HIV Screening Education for Healthcare Providers

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Abstract

Abstract: The CDC recommends that people from ages 13 to 64 get screened for HIV at least once in their lifetime. Despite the recommendations, some healthcare providers are not following the CDC recommendations for HIV screening. Major barriers to routine HIV screening include lack of knowledge and inadequate training among healthcare providers.

Methodology: The project consisted of providing the healthcare provider education about HIV screening and implementing CDC recommended HIV screening to the practice over one month. The healthcare provider education consisted specifically of modes of transmission, long term effects of HIV, and CDC recommendations. The project consisted of seven participants, 148 retrospective and 148 prospective chart reviews. The design of this project is a one-group pre-test and post-test design coupled with retrospective and prospective chart reviews.

Results: There was an insignificant increase in knowledge about HIV ($p = 0.11$) among healthcare providers, but a significant increase in HIV screening performed by healthcare providers ($p < .0001$). In the retrospective sample, 6 of 148 patients (4.1%) were offered the HIV test, and in the prospective sample, 132 of 148 patients (89.2%) were offered the HIV test. This indicates healthcare providers can identify people who are at risk for HIV and link to care.

Implications: HIV screening will help healthcare workers identify people living with HIV by using the CDC protocol and help improve the quality of care and safety. Early screening and linkage to care help reduce the economic burden of HIV and AIDS by decreasing incidence and mortality and reducing transmission. HIV screening leads to more people being aware of their HIV status, which supports the New Jersey Taskforce to End the HIV Epidemic, tasked with ending the HIV epidemic by 2025.

Keywords: HIV, knowledge, HIV screening, antiretroviral therapy (ART), Pre-exposure prophylaxis (or PrEP), HIV education

Introduction

Human Immunodeficiency Virus (HIV) is a retrovirus that causes HIV infection. HIV has been an epidemic since the 1980s (Avert, 2018a). It is transmitted via syringe or needle use as well as via sexual behaviors (Centers for Disease Control and Prevention [CDC], 2018a). Currently, there is no cure for HIV. However, HIV infection can be treated with antiretroviral therapy (ART), and the risk of HIV transmission can be reduced by educating people who are at risk for contracting HIV about pre-exposure prophylaxis (PrEP) (U.S. Department of Health and Human Services, 2019).

HIV is a chronic condition and it requires ART to help control its progression and symptoms. ART can only be provided if patients are informed of their HIV status and linked to care. This proposal describes a project to implement an HIV screening protocol into a primary care practice that is in accordance with the CDC's guidelines and educate providers about the importance of HIV screening and linkage to appropriate care for those who test positive for HIV or are at risk for HIV.

Background and Significance

Overall, providing HIV screening education for healthcare providers, along with adding HIV screening into the practice, are effective methods to identify a person's HIV status. Lack of knowledge, discomfort, and inadequate training among healthcare providers are major barriers to routine HIV testing (Traversy et al., 2015). Education has the potential to help eliminate those barriers (Rizza, MacGowan, Purcell, Branson, & Temesgen, 2012).

The CDC (2018d) recommends that those who are between the ages of 13 and 64 get tested at least once in their lifetime. Those who are at a higher risk for getting HIV, such as those who participate in unsafe sex or share injection needles, should get tested for HIV on an

annual basis (CDC, 2014a). Screening for HIV makes a person aware of his/her HIV status and less likely to transmit the virus (CDC, n.d.).

Statistics show that HIV continues to be a worldwide health crisis. On a global level, in 2017, about 136.9 million people were living with HIV (PLWH), and about 9.4 million people were not aware of their HIV status (UNAIDS, n.d.). As of 2015, about 1.1 million people were living with HIV infection in the United States (CDC, 2018b). Out of those 1.1 million people, approximately 162,500 people had not been diagnosed (CDC, 2018b). During the same year, there were 133,100 males and 29,400 females living with undiagnosed HIV infection (CDC, 2018c). People between the ages of 13 and 24 accounted for 22% of new HIV diagnoses (Avert, 2018b). In 2017, New Jersey ranked eighth in the United States for new HIV cases with 1,109 newly infected individuals (CDC, 2018d; Kaiser Family Foundation [KFF], 2019).

HIV Prevalence By Sexual Orientation

The prevalence of HIV varies by sexual orientation, race, age, and mode of HIV transmission. The highest prevalence of HIV is among men who have sex with men (MSM) due to unprotected receptive anal sex (Remis, Alary, Liu, Kaul, & Palmer, 2014). In 2017, 25,748 of all people diagnosed with HIV were infected through MSM sexual contact. The second highest prevalence of HIV is among heterosexuals, comprising 9,170 of those diagnosed in 2017.

HIV prevalence by sexual orientation and race. Data from 2017 show that among MSM 9,807 Black MSM were diagnosed with HIV (CDC, 2019a). This rate among Black MSM results from a lack of access to healthcare, stigma, homophobia, and poverty (Braden & Westergaard, 2015). Hispanic and Latino MSM comprised 7,436 of MSM diagnosed with HIV in 2017 (CDC, 2019a), a high rate stemming from lack of knowledge about sexually transmitted diseases (STDs) and HIV, unprotected anal intercourse (UAI), and heavy consumption of alcohol

and drug use leading to UAI (Murray, Gaul, Suttoan, & Nanin, 2018). The White MSM population had a lower prevalence rate in 2017, approximately 6,982 people (CDC, 2019a).

Black heterosexual women made up 4,008 people diagnosed with HIV; heterosexual Hispanic and Latina women made up 1,058 of those diagnosed with HIV in 2017; and, finally, heterosexual White women totaled 999 diagnosed HIV cases (CDC, 2019a). Black heterosexual men comprised 1,717 PLWH (CDC, 2019a).

HIV prevalence by race. In 2015, there were 70,700 cases of undiagnosed HIV among Blacks/African Americans, 41,700 cases among Hispanics/Latinos, 39,900 cases among Whites, and 3,100 cases of undiagnosed HIV among Asians (CDC, 2018c). According to 2017 data, minority groups in the United States have a higher prevalence of HIV than Whites (KFF, 2019a). HIV particularly impacts Blacks and Latinos compared to Whites, and Blacks have a higher rate of new HIV diagnoses than Latinos, at eight times more than Whites, and three times more than Whites, respectively. Blacks also comprise the racial group with the most PLWH, and HIV is more likely to lead to death in Blacks and Latinos than in Whites (KFF, 2019a). In 2016, HIV was one of the top five causes of death for Black women. Among women of color, in 2017, Black women made up 59% of newly diagnosed cases of HIV, and Latinas made up 16%. White women comprised 20% of newly diagnosed HIV cases (KFF, 2019a).

HIV prevalence by age. As of 2015, among 13-24-year-olds, there were 31,000 cases of undiagnosed HIV; 55,600 cases of undiagnosed HIV for ages 25-34; 33,300 cases in the 35-44 age group; 27,900 cases for ages 45-54; and 14,700 cases of undiagnosed HIV among those aged 55 and above (CDC, 2018c).

As of 2017, the highest risk for HIV was 25-34-year-olds, making up 13,433 people in 2017, followed by the 13-24 age group with 8,164 HIV diagnoses (CDC, 2019a). Those

between the ages of 35-44 consisted of 7,397 people, those between 45-54 comprised 5,735 people, and those between 55-64 totaled 3,026. The lowest prevalence of HIV by age were those 65 and above, a total of 85 people (CDC, 2019a). Among Blacks, Hispanics, and Whites younger than 65, 54% still have never been screened for HIV (KFF, 2019b).

HIV prevalence by mode of transmission. Male-to-male sexual contact is the primary mode of transmission of HIV. Injection drug users are the second-highest mode of transmission, consisting of 2,389 people in 2017 (CDC, 2019a). Drug use leads to riskier sexual behavior, such as sex without protection, and therefore increases the likelihood of transmitting HIV. The chances of contracting HIV increases when drug users share injection needles; when drug users share injection needles with another person who has HIV, they have a 1 in 160 chance of getting HIV (CDC, 2019d). Because of this risk, the CDC recommends annual screening for those who share injection needles (CDC, 2014a; KFF, 2019b). The lowest prevalence by mode of transmission occurred in men who reported engaging in both male-to-male sexual contact and injection drug use; this category consisted of 1,252 people diagnosed with HIV in 2017 (CDC, 2019b).

Pre-exposure prophylaxis

Pre-exposure prophylaxis (PrEP) is for those who are negative for HIV but at high risk for HIV. The use of PrEP in 2014 was 13,748, and in 2016 the use of PrEP increased to 78,360, which is an increase in the use of PrEP by 470% (Huang, Zhu, Smith, Harris, & Hoover, 2018). Among 78,360 PrEP users in 2016, 22,574 (68.7%) were white, 4,317 (13.1%) were Hispanic, 3,687 (11.2%) were Black, and 1,486 (4.5%) were Asians (Huang et al., 2018). Approximately 65% of the PrEP users were between the ages of 25 to 44, and 0.1% of the PrEP users were between the ages of 16-17 (Huang et al., 2018).

Benefits of HIV Screening

Opportunistic infections and co-morbidities. In addition to diagnosing those who are infected with HIV and linking them to care in a timely manner, HIV screening can reduce the risk of co-infections and opportunistic infections in PLWH. HIV contributes to co-infections such as Tuberculosis (TB), Hepatitis B, Hepatitis C, HIV-associated neurocognitive disorders (HAND), cervical cancer, and anal cancer (Avert, 2018c). Early screening and linkage to treatment prevent opportunistic infections such as pneumocystis pneumonia, esophageal candidiasis, and cryptococcal meningitis (Avert, 2018c).

Treatment. HIV screening can help identify HIV status early, and that means that a person who tests positive can be started on ART, thus increasing the chances of survival (Maricopa Integrated Health System [MIHS], n.d.). HIV screening can identify individuals at risk for HIV who can start taking PrEP, which can prevent HIV infection by more than 90% (CDC, 2019c). HIV screening also plays a role in decreasing HIV diagnoses later in life. Late diagnosis increases the risk of dual diagnosis with Acquired Immunodeficiency Syndrome (AIDS) (Mugavero, Castellano, Edelman, & Hicks, 2007). In addition, a late diagnosis delays initiation of ART and is more likely to result in opportunistic infections (Mugavero, Castellano, Edelman, & Hicks, 2007).

Cost savings. Early identification of HIV status or prevention of HIV can also result in a $229,800 cost savings per person (Schackman et al., 2015). The lifetime cost of a person infected with HIV at the age of 35 is $326,500, which includes the cost of antiretroviral medications and non-drug costs (Schackman et al., 2015). On the other hand, the lifetime cost for those who were never infected but are at risk for HIV is $96,700 (Schackman et al., 2015).

HIV Testing Process

CDC recommendations for screening for HIV consist of the initial test for HIV, antigen/antibody immunoassay, which will identify HIV-1 and HIV-2 antibodies and HIV-1 p24 antigen and establish HIV-1 or HIV-2 infection and acute HIV-1 infection (CDC, 2018f). If the test is non-reactive, no further testing is needed. If the specimen is reactive for initial antigen/antibody, the HIV-1/HIV-2 antibody differentiation immunoassay should be interpreted as positive for HIV-1 antibodies, HIV-2 antibodies, or HIV undifferentiated antibodies (CDC, 2018f). If a specimen is reactive on the primary antigen/antibody immunoassay and non-reactive on the HIV-1/HIV-2 antibody differentiation, an HIV-1 nucleic acid test (NAT) should be performed (CDC, 2018f) (Appendix A).

Needs Assessment

A (strengths, weaknesses, opportunities, and threats) analysis identified the clinic's strengths, weaknesses, opportunities, and threats that can have an impact on this project.

Strengths

Educating primary healthcare providers about screening for HIV has various strengths. First, the primary care providers (PCPs) at the outpatient clinic support this project. Second, primary care providers (PCPs) are the first point-of-care for many people (Primary Care Progress, n.d.), which means they are the first ones to identify or screen people for health problems. By educating primary healthcare providers about the importance of HIV screening, more people can be screened for HIV in a timely manner and be linked to care accordingly. Third, a rapid HIV test provides results in approximately 25 minutes, whereas blood test results may take weeks. Fourth, if a person's positive status is identified early on, treatments will cost less throughout a lifetime, compared to late identification of positive HIV status, when HIV has

progressed to a later stage.

Weaknesses

One weakness is the stigma related to HIV due to a lack of knowledge of HIV. Another weakness of educating primary care providers about HIV screening is that primary care providers may not feel comfortable discussing HIV with their patients.

Opportunities

Educating healthcare providers about HIV screening in primary care is an opportunity to provide education to healthcare providers about the use of ART for those who are positive for HIV, the use of PrEP for those who are at risk for HIV, and the CDC's screening guidelines for HIV. It is also an opportunity to target some of the challenges healthcare providers face, such as lack of knowledge, stigma related to HIV, and discomfort discussing HIV.

Threats

The staff at the clinic may be resistant to policy and protocol changes. The current protocol at the clinic is to test only those patients who have signs and symptoms of HIV or who may have come in contact with HIV. Resistance to a change in this policy can interfere with the implementation of rapid HIV screening as part of the primary care visit. The primary care providers may also lack motivation or coordination for carrying out policy changes (Health Policy Project, 2014). Another major challenge is patients' unwillingness to take a rapid HIV test, as it is a sensitive topic, and the result of the test can be distressing.

Problem Statement

The outpatient clinic in Plainfield, N.J., does not offer HIV screening as part of primary care screenings, but only when the clinician believes HIV screening is necessary because the patient presents with signs and symptoms of HIV, reports a suspected exposure, or when a

patient requests it. If the result of the HIV antibody/antigen test is positive, the patient is notified of his or her positive HIV status and referred to an infectious disease specialist, without confirmation of an HIV diagnosis with the test. The clinic protocol also does not require identifying if a patient is at risk for contracting HIV and then linking the patient to care for PrEP and to education about how to lower the risk of transmitting HIV. In short, the clinic does not follow the CDC's recommended guidelines. The CDC recommends rapid testing that does not require a confirmatory test and requires linking PLWH to care.

Clinical Question

Among healthcare providers, how effective is providing an HIV screening education program and incorporating the CDC-recommended HIV screening protocol to the practice, compared to the present complaint or symptom based HIV screening protocol, in increasing the rate of HIV screening and linkage to care for ART or PrEP?

P – healthcare providers

I – education about HIV screening and implementing the CDC-recommended HIV screening recommendations to the practice

C – compared to no HIV screening education and symptom or complaint-based HIV screening protocol at the practice

O – increase the rate of HIV screening and linkage to care for ART or PrEP

Aims and Objectives

This study aims to increase HIV screening and increase linkage to care for ART for those who are HIV positive or linkage to care for PrEP at this primary care setting by implementing the CDC-recommended HIV screening protocol. This study also aims to increase knowledge about the CDC's recommendations for HIV screening among healthcare providers.

Implementation of the following objectives achieve the aim:

- Conduct an educational intervention that reviews the CDC's standards for HIV screening for low- and high-risk individuals.
- Measure providers' rate of HIV screening with retrospective and prospective patient chart review pre- and post-intervention.
- Measure the numbers of referrals for linkage to care for ART for those diagnosed with HIV and PrEP for those at risk for HIV using a random patient chart review pre-and-post-intervention.
- Measure the change in knowledge about HIV using a pre- and post-test HIV questionnaire.

Review of Literature

A search of the literature was conducted using Ovid (Medline), Cumulative Index of Nursing and Allied Health Literature (CINAHL), Joanna Briggs Institute (JBI), and Web of Science. Additional articles were found using Google Scholar and the Centers for Disease Control and Prevention database. The search strategy used the Preferred Reporting Items for Systemic Reviews and Meta-Analyses (PRISMA), found in Appendix B. Search terms used were: "HIV screening," "rapid HIV testing," "emergency room," "emergency department," "primary care," "HIV infections," "clinic," "out-patient clinic," "mass screening," "primary health care," "outpatient," "link to care," "lack of awareness," "lack of knowledge," and "lack of time," "lack of time," "time constraints," "PrEP," and "barriers." Inclusion criteria were articles published between 2014 and 2019, with samples of adult participants between ages 18 to 64, and written in the English language only. Exclusion criteria were studies before 2014.

A full search strategy returned 860 articles; 59 were excluded because they were duplicates, leaving 801 articles to be screened. Out of the 801 articles, 755 records were

excluded because they lacked full texts. The remaining 46 articles were assessed for eligibility, and 29 articles were excluded because the articles did not relate to the topic of HIV or because HIV testing was performed in settings other than outpatient clinics. The final literature review consisted of 16 articles (Appendix C).

Lack of Knowledge

Healthcare providers need to be educated about HIV screening to accurately diagnose HIV in patients and help link patients to care. Lack of knowledge is a major barrier to offering HIV screening in primary care (Bares et al., 2017; Elgalib, Fidler, & Sabapathy, 2018; Marcelin et al., 2016; Tan & Black, 2018). Specifically, providers' lack of knowledge about cost, reimbursement rates, and lack of HIV-specific training prevented providers from offering HIV screening (Elgalib et al., 2017; Tan & Black, 2018). For example, rather than following evidence based CDC guidelines to screen all patients between the ages of 13 and 64, 25% of a sample of Internal Medicine providers (n=68) indicated that they did not screen those patients whom they assumed to be at low risk for HIV (Marcelin et al., 2016). This assumption is contrary to evidence that indicates a recommendation for HIV screening by a provider can convince patients to get tested for HIV (Baumann et al., 2018). In a survey, out of 281 participants, 116 participants indicated they would get tested if a physician recommends it (Baumann et al., 2018).

A survey conducted among internal medicine, obstetrics and gynecology, emergency medicine, and pediatric residents indicated a lack of knowledge about screening guidelines, HIV epidemiology, and HIV testing behaviors (Bares et al., 2014). Out of the 205 residents who responded, only 25.4% ($P = 0.005$) knew the most common mode of HIV transmission in the United States and only 25% ($P < 0.00001$) knew the institutional protocol for follow-up for

individuals who are positive for HIV (Bares et al., 2017). About 77.6% ($P = 0.06$) of the residents were able to correctly identify the frequency and which HIV screening to be performed for those who are at high risk (Bares et al., 2017). The results of the survey indicate that a lack of knowledge prevents HIV screening.

A lack of awareness of the updated CDC guidelines or insufficient understanding of the CDC's recommendations for HIV screening among healthcare providers is a barrier to offering HIV screening (Arya et al., 2014; Tan & Black, 2018; Wise et al., 2019; Zheng, Suneja, Chou, & Arya, 2014). For the U.S. Preventive Service Task Force (USPSTF), the recommendation for HIV screening for ages 15 to 65 is considered grade A (Moyer, 2013). In a systematic review, two of the twelve studies indicated providers were unaware or confused about the federal guidelines and laws pertaining to HIV screening (Tan & Black, 2018). In 2010, approximately 40% of providers at a Veterans Affairs primary care were unaware of the updated 2006 CDC recommendations (Zheng et al., 2014). Out of 312 primary care physicians who participated in a web-based survey about HIV-testing knowledge, approximately one-third to one-half were unaware that anyone between the ages of 13 to 64 should be routinely tested for HIV (Arya et al., 2014). Moreover, about one-fourth to one-half of the participating physicians were unaware of the updated HIV testing recommendations specific to primary care (Arya et al., 2014).

Lack of PrEP awareness. Screening for HIV also identifies those who are at risk for HIV and need PrEP. Lack of awareness, familiarity, and experience with PrEP are barriers to identifying those who are at risk for HIV (Gunn et al., 2019; Petroll et al., 2017). A sample of nurse practitioners, physician assistants, and physicians (n=280) was asked about their comfort level discussing patients' sexual activities, prescribing PrEP, awareness of PrEP, and discussion with patients about PrEP (Petroll et al., 2017). Only 75% were comfortable discussing patients'

sexual activities, only 28% were somewhat or very familiar with prescribing PrEP; 76% had an awareness of PrEP, and only 33.3% had ever had discussions with patients about PrEP (Gunn et al., 2019; Petroll et al., 2017). However, with appropriate skills and knowledge, 89% indicated that they would be able to initiate PrEP conversations with patients, 76% specified they would be able to prescribe PrEP, and 96% would link those who are at high risk for HIV to care to other providers (Petroll et al., 2017).

Another survey assessed knowledge about PrEP among 12 various health care providers, including five primary care providers. The survey indicated only eight providers (66.7%) were aware of PrEP as preventative medicine for those who are HIV negative but at risk for HIV (Gunn et al., 2019). The survey also indicated that one-quarter of the providers did not discuss PrEP with patients who were at high risk for HIV. Out of the 12 healthcare providers, only two always discussed PrEP with those who are at risk for HIV, four very often discussed PrEP with those who are at risk for HIV, two rarely discussed PrEP, and four never discussed PrEP with those who are at risk for HIV (Gunn et al., 2019).

Time Constraints

Time constraints are a major barrier to screening for HIV in a primary care setting (Traversy, Austin, Ha, Timmerman, & Gale-Rowe, 2015; White et al., 2015). Time constraints stem from a lack of familiarity with consent procedures among health care providers and the time required for the pre- and post-test counseling process (Traversy et al., 2015; Zheng et al., 2014). In a study of internal medicine resident physicians, 19.1% of the residents indicated difficulties finding the written HIV consent forms and 26.8% of the residents indicated that the consent process is tedious and time-consuming (Zheng et al., 2014). Further compounding time constraints is an increase in the time it takes for physicians to interpret HIV tests during office

hours while also focusing on clinical priorities (White et al., 2015).

Even with time constraints, it is still feasible to perform HIV screening using the fourth generation (Ag/Ab) HIV testing as the rapid test can provide results in about 28 minutes (Avert, 2018d). Because the results are available immediately, patients do not need to make another appointment to get test results or a confirmatory test for HIV (Galbraith et al., 2016; Tan & Black, 2017). In addition, delegating HIV screenings to other members of the office staff, such as nurses or medical assistants, can help diminish the barrier related to time constraints (White et al., 2015).

Cost of HIV Screening

The cost of HIV treatment escalates as the HIV disease progresses, specifically, as the CD4 count decreases and the viral load increases. There is a statistically significant inverse relationship between CD4 count and the increased cost of treating HIV ($p=0.01$) at late stages (Halperin et al., 2017). Comparing the cost for 19 outpatient visits over two years, the cost for patients with a CD4 count less than 200cells/mm^3 would be $18,419; the cost of the same number of visits for patients with a CD4 count ≥500 cells/mm^3 would be $12,850 (Halperil et al., 2017). The cost of HIV care for those with a CD4 less than 350 cells/mm^3 doubles the cost for HIV care in the first year after the diagnosis (O'Connell et al., 2016).

For the median number of inpatient days of two days, the cost for patients with a CD4 count less than 200cells/mm^3 is $21,878 over two years; on the other hand, the cost for patients with a CD4 count ≥500 cells/mm^3 is $6,607 over two years (Halperil et al., 2017). The cost of inpatient days when the viral load is <100,000 copies/mL is $6,607, while the cost of the same stay when the viral load is ≥100,000 is $13,872.

Knowledge of HIV screening factors and implementation of the protocols can lead to effective HIV screening in primary care. Educating PCPs about CDC-recommended guidelines for HIV screening can remove the barriers to HIV screening. Education can emphasize the importance of prescribing PrEP for those at risk for HIV. Early HIV screening is related to cost savings. Educating other members of the healthcare team enables the delegation of HIV screening to free PCPs to focus on treatment and the counseling process.

Theoretical Framework

The Plan-Do-Study-Act (PDSA) model (Appendix D) presents an ongoing cycle of change. The PDSA model is also known as the Deming Cycle, which was first introduced by Walter A. Shewhart as the Plan-Do-Check-Act (PDCA) model in 1939 (Weinstein & Vasovski, 2004). Edward W. Deming later modified the PDCA model to PDSA (Weinstein & Vasovski, 2004). The purpose of this model is to evaluate changes on a small scale before expanding the intervention, which provides an opportunity to make improvements based upon the initial feedback (ACT Academy, n.d; AHRQ, n.d.). The PDSA model is an effective and systematic method of improvement and intervention through ongoing adjustments.

The four components of this cycle are Plan, Do, Study, and Act. The first component, Plan, focuses on what exactly is going to be done (CMS, n.d.). In this component, the co-investigator identified staff involved in the process, and the project is developed (Hall, 2016). In this proposed project, the plan is to educate healthcare providers at the outpatient clinic about HIV, HIV screening, and linkage to care for those who are positive for HIV or at risk for HIV.

The second component, Do, is the act of performing the actual pilot study (AHRQ, n.d.). In this component of the cycle, it is important to document any unexpected findings or problems that are observed (CMS, n.d.). In this phase of the PDSA cycle for this project, the investigator

administered a pre-test, the education session, and then a post-test based on the HIV screening education provided to the healthcare providers. Then, healthcare providers implemented the CDC-recommended HIV screening recommendations over a month.

In the third component of the cycle, Study, the results were compared to the predicted results. This phase of the PDSA cycle provided an opportunity to reflect on the impact of the healthcare provider education intervention (NHS, n.d.). The investigator described what happened and provides a summary of successes, failures, and factors that may have contributed to the actual results (CMS, n.d.; Hall, 2016). This project measured provider comfort level of discussing sexual level and HIV with patients using a Likert scale. Chart reviews determined if HIV screening and linkage to care occurred in accordance with the CDC guidelines.

The fourth step of the PDSA model, Act, focused on identifying needed modifications for the next cycle based on the results of the project (CMS, n.d.). The action can fall into one of the following three categories depending on results found in the third step of the PDSA cycle:

- Adapt: modify the changes based on observations and repeat the PDSA cycle.
- Abandon: change the intervention and repeat the PDSA cycle.
- Adopt: determine if the intervention can be expanded to other parts of the organization (CMS, n.d.).

In this phase of the proposed project, the project is re-evaluated and modified based on the outcomes. A major challenge would be the patients' willingness to take a rapid HIV test, as it is a sensitive topic, and the result of the test can be distressing.

Methodology

The design of this pilot study was one group pre-test and post-test design coupled with retrospective and prospective chart reviews. Before the intervention, a retrospective chart

review determined the number of HIV screenings, referrals to an HIV specialist for patients with a positive HIV test, and referrals for PrEP. The next step was to present the provider education (Appendix E). Before the healthcare provider education session, the healthcare providers completed a pre-test (Appendix F); after the presentation, the healthcare providers completed a post-test related to the healthcare provider education (Appendix G). The change in knowledge about HIV screening was evaluated via the use of pre- and post-test among healthcare providers. After the completion of healthcare provider education, the CDC recommended HIV screening recommendations were implemented to the practice over one month.

One month after the healthcare provider education, a prospective chart review was conducted. The prospective chart review evaluated the number of rapid-HIV-screening tests performed and the number of referrals made to HIV specialists for linkage to care for those individuals who are (1) positive for HIV or (2) at risk for HIV. After the completion of prospective chart reviews, the results of the retrospective and prospective chart reviews were compared to measure the effectiveness of implementing the CDC-recommended HIV screening protocol to clinical practice (Appendix H).

Setting

This project was conducted at an outpatient clinic located in Plainfield in Union County, N.J., that serves various towns with high rates of HIV throughout Essex, Middlesex, and Union counties. These towns include Edison that has 361 cases of HIV, Elizabeth with 2,428 cases, Newark with 15,462 cases, Plainfield with 1,253 cases, and Rahway with 486 cases (NJDOH, 2018b). This practice sees approximately 3,500 patients a year.

According to the most recent census data, the total population of Plainfield is 49,808

(U.S. Census Bureau [USCB], n.d.). Approximately 43.6% of the population is Hispanic or Latino (USCB, n.d.), 40.8% is of Black or African American descent, and 22% of the population is White (USCB, n.d.). The poverty rate in Plainfield is 23% compared to 10.9% in Union County and 10.8% in New Jersey in general (New Jersey Health Initiatives [NJHI], 2017). The median household income for Plainfield in 2017 was $56,425 (USCB, n.d.) compared to the median household income for New Jersey, which was $80,088 (Department of Numbers, n.d.).

This practice provides various services, including routine checkups, pulmonary function tests, Sudomotor testing, family planning, weight-loss program, suture removal, osteopathic manipulative techniques, complete balance testing, and diabetes management.

Project Population

This project included a total of seven participants: a physician, a nurse practitioner, a physician's assistant, and four medical assistants.

Project Recruitment

Information about HIV screening education for healthcare providers at the selected primary care setting was shared via recruitment flyers (see Appendix I) displayed in the office. The co-investigator was responsible for posting the recruitment flyers.

Prospective participants were approached and informed that participation in the research study is voluntary, and they were not penalized for their decision not to participate. The participants were given the contact information, including e-mail address and telephone number, of the co-investigator for any concerns and questions.

Consent Procedure

Informed consent (see Appendix J) were obtained as part of the Rutgers University IRB

requirements for performing a study. The co-investigator was responsible for conducting the consent procedure with participants. The co-investigator informed potential participants that completing the project takes 30 minutes and allowed them to read the consent form and to ask questions before signing the consent. Participants can withdraw from the project at any time without being penalized. The co-investigator explained the purpose of the project to the participants. Participants were also assured that all the information gained through the study would be anonymous and confidential.

Risks, Harms, and Benefits

Participants were informed about the risks, harms, and benefits of this project. There are no significant risks from this project; however, during the healthcare provider HIV screening education session, healthcare providers may have felt uncomfortable or embarrassed about discussing HIV.

The benefits of participating in this project included the knowledge about HIV screening and the CDC's recommendations for HIV screening. However, participants may not receive any direct benefit from taking part in this project.

Subject Costs and Compensations

There was no cost to participate in this project. Participants were provided lunch to thank them for their time and their contribution towards the project.

Project Intervention

This project educated healthcare providers about CDC-recommended HIV screening protocol using PowerPoint and lecture. Topics included in the educational intervention were:

- HIV and AIDS,
- opportunistic infections,

- modes of transmission,
- stages of HIV,
- long term effects of HIV,
- HIV prevention and treatment
- local infection statistics,
- continuum of care,
- CDC recommendations,
- barriers to HIV screening,
- and the role of primary healthcare providers in HIV screening and linkage to care.

The presentation took 30 minutes and included an opportunity for questions and answers. Before the education, healthcare providers completed a pre-test that took 10 minutes and a post-test after the presentation that took 10 minutes. The total time for participation was 50 minutes.

Upon completion of the healthcare provider education, the CDC-recommended HIV testing protocol was implemented for one month. The effectiveness of adding the CDC-recommended HIV testing protocol was evaluated by comparing the results of the retrospective and prospective chart reviews.

Project Protocol

The project was implemented in the following order:

1. The co-investigator performed retrospective chart reviews to obtain a baseline evaluation of the number of HIV screenings conducted and the number of referrals made to an HIV specialist for HIV positive patients and PrEP for those at risk.
2. The co-investigator hung recruitment flyers in the back of the office.

3. The co-investigator conducted recruitment during office hours, Monday through Saturday.
4. Interested potential participants reached out to the co-investigator using the contact information mentioned in the flyers.
5. The co-investigator discussed the project with the interested participants, including potential harms and risks.
6. Once the co-investigator confirmed that the participants are interested in being part of the project, they signed a consent form to participate in the project.
7. The participants were given a pre-test questionnaire (Appendix F).
8. The co-investigator delivered the educational intervention (Appendix E).
9. After the completion of the educational intervention, participants completed a post-test related to the educational intervention (Appendix G).
10. Over one month, the primary care clinic implemented the CDC-recommended HIV screening protocol and offered HIV screening to anyone between the ages of 18 and 65.
11. After one month, the co-investigator performed prospective chart reviews (Appendix H).
12. After the completion of prospective chart reviews, the results of the retrospective and prospective chart reviews were compared to measure a change in HIV screening and linkage to care for ART for HIV positive patients and PrEP for patients at risk for HIV post healthcare provider educational intervention (Appendix H).

Outcomes to be Measured

Independent and dependent variables. The independent variable was the educational

program about HIV screening in primary care and implementation of the CDC- recommended HIV screening guidelines. The first dependent variable or outcome measure was the change in knowledge after the HIV screening educational intervention. The second dependent variable was the rate of HIV screening for patients at this clinic between the ages of 18 and 64 over a month. The third dependent variable was the change in referrals made to an HIV specialist (a) for linkage to care for ART for those who are positive for HIV and (b) for linkage to care for PrEP for those who are at risk for HIV.

Data collection tools. The data collection tools included the pre-test and the post-test (Appendix F and G) and chart audit tool (Appendix I).

Pre-test and post-test. The pre-test and post-test were used to measure any changes in knowledge among healthcare providers (Appendices F and G). The pre-test and the post-test consisted of 19 multiple-choice, true or false, and Likert style questions. Nineteen questions reflected the content of the educational program, such as modes of transmission, opportunistic infections, HIV prevention and treatment, long term effects of HIV, symptoms of HIV, and local infection rates. Two Likert questions measured healthcare providers' level of comfort discussing HIV and sexual health with patients.

Chart audit tool. Retrospective chart reviews were performed before the intervention and prospective chart reviews were conducted two months after the healthcare provider educational program and implementation of CDC-recommended HIV screening protocol. The chart audit tool consisted of 148 charts (Appendix I). The sample size was determined using the Raosoft sample size calculator based on a 5% margin of error and a 95% confidence level. Chart reviews evaluated (1) the number of rapid HIV screenings performed, and (2) the number of referrals made to an HIV specialist (a) for linkage to care for ART for those who are positive

for HIV and (b) for linkage to care for PrEP.

The audit tool consists of the following parameters (Appendix K):

1. Charts of patients between the ages of 18 to 64.
2. Documentation of HIV testing and the result.
3. Documentation of the linkage of care:
    1. HIV care and ART for patients who are positive for HIV.
    2. Linkage to PrEP care for patients who are at risk for HIV.

Results of the chart review determined if the educational intervention, along with the implementation of the CDC-recommended HIV screening recommendations at the practice, resulted in an increase in referrals to HIV care by the primary care providers.

Project Timeline

The project timeframe for the DNP project was 15 months. Proposal development was started on January 21, 2019, and the date for the proposal presentation is April 29, 2019. The date the proposal was completed was November 2019, and IRB submission was completed in December 2020. The amount of time for IRB approval was one month. Project implementation, which was healthcare provider education, was done on February 13, 2020. Project implementation began on February 20, 2020, and took place over a month until March 20, 2020. Data collection and data analysis were completed by March 27, 2020. Final writing started on March 30, 2020, and finished by April 1, 2020. The presentation of the project and dissemination happened on April 20, 2020. A copy of the anticipated timeline is in Appendix L.

Resources Needed and Economic Considerations

The costs associated with this project were the sole responsibility of the co-investigator.

Costs include recruitment materials, information sheets related to PrEP, and HIV information handouts. The cost of this project to the co-investigator was $363.25 (see Appendix M).

Evaluation Plan

The co-investigator, chair, and a team member were involved in the evaluation plan. The goals were evaluated using the PDSA model. A comparison of the results of retrospective and prospective chart reviews evaluated if HIV screening and linkage to care for ART increased for those who were positive for HIV and for PrEP for those at risk for HIV (Appendix H).

Data Analysis

Statistical package for social sciences (SPSS) software was used for statistical data analysis. Descriptive statistics compared retrospective and prospective chart reviews for the number of rapid-HIV screening tests performed and the number of referrals made to an HIV specialist for linkage to care for those who are positive for HIV and linkage to care for PrEP. One sample T-test identified any change between the data in the pre-tests and post-tests related to healthcare provider education.

Data Maintenance and Security

The data was stored on a password-protected laptop, and paper records, including consent forms and data files, was kept in a locked file cabinet at the chair's office. Participants got a copy of the signed consent form for their records. After the completion of the study, the data was destroyed in compliance with Rutgers IRB requirements.

Findings

The recruitment process started on February 5th and ended on February 12th. Over the week, seven participants were recruited. On February 13th, the participants completed a pre-test, healthcare provider education, and a post-test. The primary care clinic implemented the

CDC-recommended HIV screening protocol and offered HIV screening for a month from February 20th to March 20th. A retrospective chart review provided a baseline measure of HIV screening and referrals. Upon the completion of the HIV screening implementation period, a prospective chart review measured the effectiveness of adding the CDC- recommended HIV screening protocol to clinical practice. After the completion of prospective chart reviews, the results of the retrospective and prospective chart reviews were compared to measure a change in HIV screening and linkage to care for ART for HIV positive patients and PrEP for patients at risk for HIV.

Pre-test & post-test results

For the analysis of the pre-test and post-test comparisons for knowledge and comfort ratings, both paired *t*-tests (Table 1) and Wilcoxon matched pairs test (Appendix Q) was used due to the small sample size ($N = 7$). The knowledge test was based on a maximum score of 17 points. The change from pre-test ($M = 11.47$) to post-test ($M = 14.04$) was an increase of 2.57 points or 22.4% increase. The change from pre-test to post-test was not significant for either the paired *t*-test ($t[6] = 1.91$, $p = .11$) or the Wilcoxon matched-pairs test ($z[6] = 1.47$, $p = .14$). When compared the results of pre-test and post-test of HIV screening educational intervention, there was an insignificant increase in knowledge (Figure 2). The insignificant increase can be due to the healthcare providers had some knowledge ($M = 11.47$) related to HIV screening before receiving education intervention. The HIV education intervention further enhanced knowledge-based questions of healthcare providers, as indicated by the post-test result ($M = 14.04$).

The comfort with discussing sexual health rating was based on five-point scale: 1 = *Not at all comfortable* to 5 = *Very* comfortable. The change from pre-test ($M = 3.43$) to post-test (M

= 4.00) was not significant for either the paired *t* test (*t*[6] = 1.33, *p* = .23) or the Wilcoxon matched pairs test (z[6] = 1.30, *p* = .19). When compared the results of pre-test and post-test of healthcare providers' comfort with discussing sexual health with patients, there was an insignificant increase in comfort level by 16.61% (*p* =.23) (Figure 3). The insignificant increase can be due to the healthcare providers felt somewhat comfortable discussing sexual health (*M* = 3.43) before receiving education intervention. The HIV education intervention increased healthcare providers' comfort with discussing sexual health as indicated by the post-test result (*M* = 4.00).

The comfort with discussing HIV rating was based on five-point scale: 1 = Not at all comfortable to 5 = Very comfortable. The change from pre-test (*M* = 3.86) to post-test (*M* = 3.71) was not significant for either the paired t test (t[6] = 0.35, p = .74) or the Wilcoxon matched pairs test (z[6] = 0.38, p = .71) (Table 1). When compared the results of pre-test and post-test of healthcare providers' comfort with discussing HIV with patients, there was an insignificant decrease in comfort level by 3.88 % (*p* =.74) (Figure 3). The insignificant decrease can be due to the healthcare providers felt more comfortable discussing HIV (*M* = 3.86) before receiving education intervention. The HIV education intervention decreased healthcare providers' comfort level with discussing HIV as indicated by the post-test result (M = 3.71).

Retrospective & prospective chart review results

For HIV testing in the retrospective sample, 6 of 148 patients (4.1%) were offered the HIV test. In the prospective sample, 132 of 148 patients (89.2%) were offered the HIV test. The chi-square test was significant, $\chi 2$ (1 *N* = 296) = 212.12, *p* < .0001, Cramer's *V* = 0.85 (Figure 4). For the prospective chart review, the frequency counts further analyzed analysis of

HIV test offered for selected variables: race, sex, ethnicity, and age group (Table 2). The most common racial group was Black or African American (48%), followed by Asian (10.1%), White (2.7), and other (2%). In terms of ethnicity, nine out of 148 respondents (6.1%) were identified as Hispanic or Latino. However, in the sample, 37.2% of charts were missing the racial or ethnic information.

There were more women in the sample (55.4%) compared to men (44.6%). Ages ranged from 20 years old to 89 years old (M =55.55, SD = 16.05). Eighty-nine percent of the sample were offered an HIV test. Fifty-nine percent were offered the test but declined, and another 26.4% tested negative and were not at high risk for HIV (Table 2). For the linkage to care data, one was HIV positive based on history, and four additional patients out of 148 charts (2.7%) tested negative but at high risk for HIV were linked to care for PrEP (Table 2).

Chi-square tests were performed for four demographic variables with whether the patient was offered an HIV test (Table 3). As stated previously, overall, 89.2% of the sample had been offered the test. There were no significant differences in whether the test was offered based on the respondent's race ($p = .61$), sex ($p = .94$), ethnicity ($p = .49$), or age group ($p = .28$) (Table 3).

Discussion

The primary aim of the pilot study is to increase HIV screening and increase linkage to care for ART for those who are HIV positive or linkage to care for PrEP at this primary care setting by implementing the CDC-recommended HIV screening protocol. This pilot study also aims to increase knowledge about the CDC's recommendations for HIV screening among healthcare providers. The results of the pilot study indicated that a lack of knowledge was a significant barrier to HIV screening in primary care (Bares et al., 2017; Elgalib, Fidler, &

Sabapathy, 2018; Marcelin et al., 2016; Tan & Black, 2018). Upon the completion of HIV education for healthcare providers, the rate of HIV screening increased from 4.1% to 89.2%. Healthcare providers needed knowledge about HIV to offer and recommend HIV screening to their patients (Baumann et al., 2018; Elgalib et al., 2017; Tan & Black, 2018).

This pilot study indicated an increase of 2.57 points or a 22.4% in knowledge from the pre-test (M = 11.47) to post-test (M = 14.04). There was an increase of 16.6% in comfort discussing sexual health from the pre-test (M = 3.43) to post-test (M = 4.00). There was a slight insignificant decrease, a reduction of 4%, in comfort discussing HIV from the pre-test (M = 3.86) to post-test (M = 3.71. As a result of the education, four patients were linked to care for PrEP; before the education and change in protocol, patients at risk for HIV would not be identified or referred to care.

Implications

Economic Implication

Point of care HIV testing in primary care using rapid-HIV is cost-effective. It does not require the direct costs for machines, staffing, and chemical reagents associated with laboratory analysis (Schilling, 2015). There are also indirect costs involved with laboratory analysis, such as delay in the result, which can contribute to delay in diagnosis and treatment (Schilling, 2015). For example, in Uganda, a primary care facility screened for HIV and syphilis using POC testing and saw a 76.5% cost reduction in screening (Schilling, 2015). Early diagnosis decreases the costs related to HIV. Decreases the incremental cost-effectiveness ratio (ICER), the cost per death is averted, the cost per secondary HIV infection also decreases, and early diagnosis shows gains in quality-adjusted-life-year (QALY) (Baggaley et al., 2017). For early diagnosis of HIV, over a 30-year timeframe, ICERs are £34,425 [$46,100.9] (95% CrI) per

QALY gained, £429,083 [$574,615] per death averted, and £721,693 [$966,470] per HIV transmission averted; in 40 years, ICERs are £22,202 [$29,732.3] (95%CrI) per QALY gained, £372,207 [$498,448] per death averted, and £628,874 [$842,169] per HIV transmission averted (Bert et al., 2018). By increasing screening and linking patients to care early, 90% of those who tested positive can have a decreased burden of mortality rate and HIV incidence rate by 20% - 25% (Shah, Risher, Berry, & Dowdy, 2016).

Implications for Healthcare Quality and Safety

At the federal level, the National HIV/AIDS Strategy emphasizes quality of care and safety, such as making sure that PLWH are diagnosed and ensuring access to and prompt follow up care (HIV.gov, n.d.). HIV screening at the primary care clinic ensures that PLWH are diagnosed and addresses linkage to care when necessary. Rapid HIV tests have a sensitivity of ≥99% and specificity of ≥98% and are accurate when used properly (Johnson, Dalal, Baggaley, & Taegtmeyer, 2018). For this reason, rapid HIV tests can be used by the primary care clinic to identify HIV early and obtain definite test results. HIV screening in primary care can lead to more people tested and the identification of more people with HIV who may have been previously undiagnosed. HIV screening is also a way of addressing safety by decreasing HIV transmission because those with knowledge of their HIV status are less likely to transmit HIV than those without knowledge (Maricopa Integrated Health System [MIHS], n.d.).

Policy Implications

Offering HIV screening to those between the ages of 18 and 64 will make the practice compliant with CDC guidelines and help bring the healthcare providers up to date with current guidelines. HIV screening will also support state and national efforts to end HIV and AIDS, such as the New Jersey Taskforce to End the HIV Epidemic, begun by Governor Murphy in

2018 and tasked with ending the HIV epidemic by 2025. HIV screening will aid the taskforce in achieving three main goals: reducing HIV and AIDS by 75%, ensuring that all people know their HIV/AIDS status, and ensuring that those with HIV/AIDS receive treatment (NJDOH, 2019). HIV screening will also aid in international efforts, such as the United Nations Population Fund (UNFPA) and the Joint United Nations Programme on HIV/AIDS (UNAIDS) five pillars initiative to end the HIV epidemic. This initiative combines prevention programs for key populations, increasing national condom distribution and associated behavior change programs, voluntary medical male circumcision, and offering PrEP (UNFPA & UNAIDS, 2017).

Sustainability

Sustainability will be maintained through the change to the clinic's policy and protocol related to HIV screening by adding HIV screening as part of the annual wellness visit order sets at the primary care clinic. Sustainability will be maintained by offering HIV screening on a case by case basis such as patients presenting with flu-like symptoms. The office staff, including the healthcare providers and medical assistants, received training in performing rapid-HIV testing. Medical assistants (MA) were trained to ask patients whether they are interested in getting tested for HIV when they take vitals and prepare the patient for the clinic visit. Before offering an HIV test, the MAs will check the medical record to confirm that each patient has not already been tested.

Dissemination and Professional Reporting

Findings will be disseminated through a poster presentation on poster day at Rutgers University and a presentation to stakeholders at the primary care clinic. Results will also be disseminated via presentations at professional conferences such as the Association of Nurses in

AIDS Care, the National Conference of the American Association of Nurse Practitioners, and the International Council of Nurses NP/APN network conference. It will also be disseminated by in a peer-reviewed journal.

Scholarship

Plans consist of publishing the findings in the peer review article and nursing journals, which will contribute significantly to strengthening patient outcomes. The next step will be to recreate the project with a larger sample size with multiple outpatient clinics and implement it for over a month to understand facilitators and barriers to HIV screening further. Also, consider providing HIV screening education for healthcare providers at the local hospital. Plans consist of publishing the findings in the peer review article and nursing journals, which will contribute significantly to strengthening patient outcomes.

Summary

HIV is a chronic condition; it requires linkage to HIV care along with ART to control the progression and symptoms of HIV. Linkage to care and ART can only be initiated if patients are HIV status is identified through HIV screening. People who are at risk for HIV can be identified through HIV screening.

Some of the benefits of HIV screening include helping physicians detect HIV and initiating an HIV treatment regimen early, reducing the risk of co-infections and opportunistic infections in PLWH, and realizing cost savings. Early HIV screening can be achieved by implementing CDC-recommended HIV screening guidelines and delegation of HIV screening and counseling to other healthcare staff.

This DNP project instituted a healthcare provider education about the CDC-recommended HIV screening protocol using PowerPoint and lecture. The DNP project also

established the HIV screening protocol at the clinical practice over a month. Additionally, the co-investigator performed retrospective and prospective chart reviews for comparison to measure the effectiveness of implementing the CDC-recommended HIV screening protocol in the clinical practice. This pilot study was conducted to increase knowledge about HIV among healthcare providers and to increase the rate of HIV screening and link to care for ART or PrEP. The findings of the study indicated there was an increase in knowledge about HIV, an increase in HIV screening, and linkage to care.

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Appendix A

Recommended Lab HIV testing

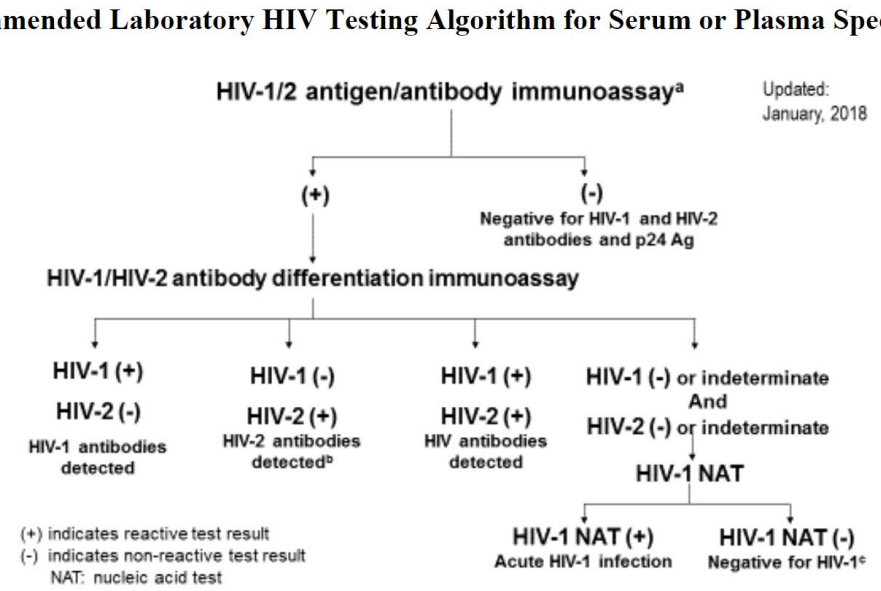
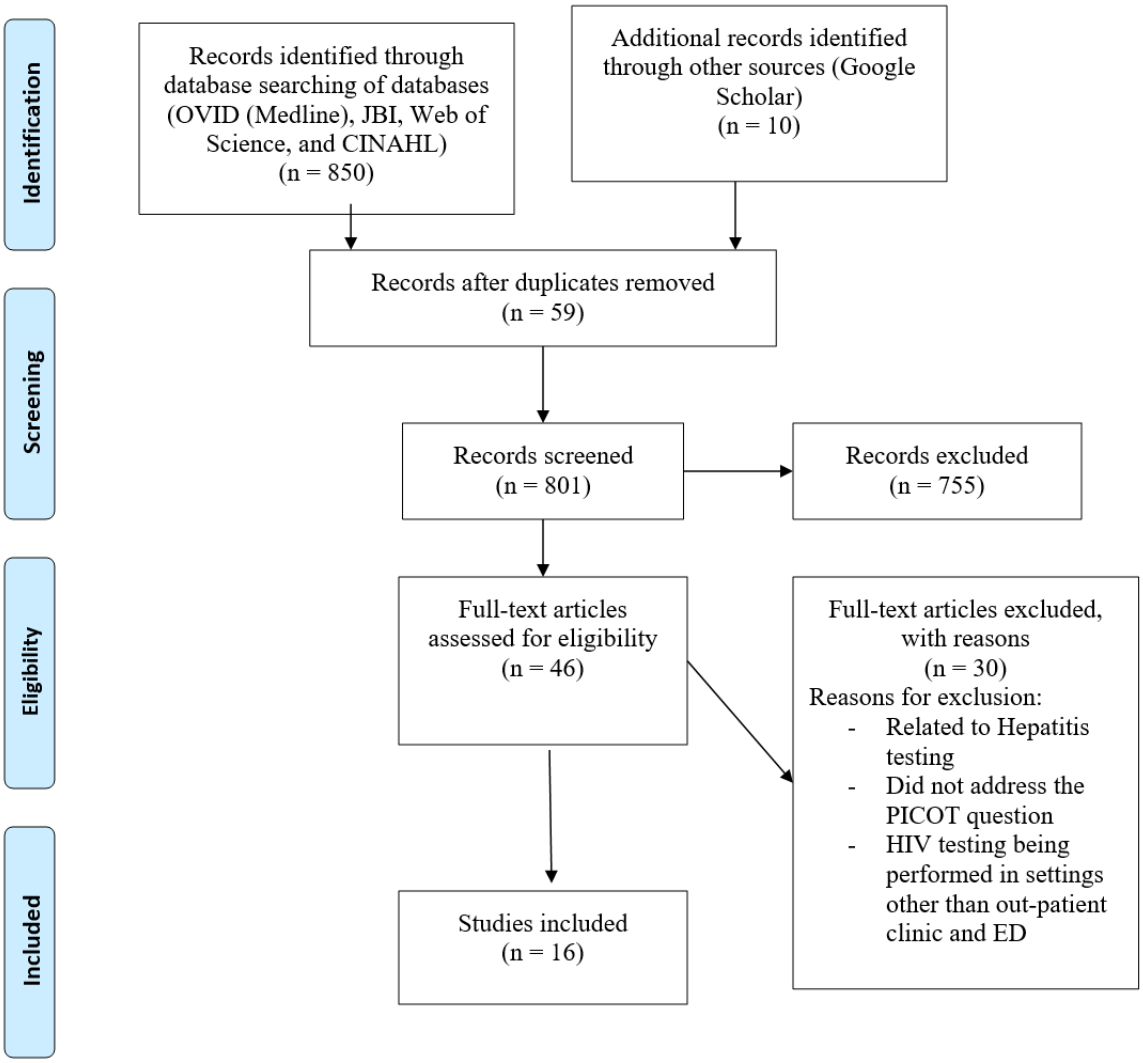


Figure 1: CDC HIV Algorithm. Adapted from Centers for Disease Control and Prevention (2018).

Appendix B

Preferred Reporting Items for Systemic Reviews and Meta-Analyses (PRISMA) flow diagram



Appendix C

Table of Evidence

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Study findings that help answer the EBP Question	Limitations	Evidence Level & Quality
1	O'Connell et al., 2016	Cross-sectional study	N= 10,000 n= 8,839 Emergency department in Dublin, Ireland	Out of n= 8,839 tested for HIV, Hep B, and Hep C, 97 were positive for HIV. A few of the HIV positive subjects presented with low CD4 counts which varied from <200 cells/mm3 to <300 cells/mm3 Out of the seven newly diagnosed patients, four patient did not have any clinical indicator of HIV	Limitations with the electronic medical record system, unable to be sure the refusal rate (opt-out) of HIV tests offered Risk demography of patients was not routinely collected at the time of the test	Level III B
2	Baumann et al., 2018	Convenience sample	N= 285 n = 281	Out of 116 participants, 57.8% indicated they would get tested for HIV if their doctor recommends they get tested	The results may not be representative of patient attitudes in other health-care settings as the survey was conducted at a single site in a	Level II B

					publically funded health care system. Those who completed the survey in English their attitudes may differ in their attitudes towards HIV testing compared to those who completed their survey in another language	
3	Halperin et al., 2017	Retrospective cohort study	N= 56 Two viral load categories: <100,000 copies/mL n=35 >/= 100,000 copies/mL	Difference between total costs across each category (inpatient days, outpatient visits and emergency department) was statistically significant (P value <.01) Difference between the highest CD4 count (>/= 500 cells/mm3) and lowest CD4 (<200 cells/mm3) inpatient cost is also statistically significant (P = .01) CD4 <200 cells/mm3 cost of inpatient stay $21,878; CD4 >/= 500 cells/mm3 costs $6,607	Cost of medication and Antiretroviral (ARV), outpatient pharmacy utilization, and home-based services were not included Cost of ART (outpatient medication)	Level III, B

				The difference between the total median costs for viral load <100,000 HIV-RNA copies/mL and >100,000 HIV-RNA copies/mL was also statistically significant with P value of .03 Viral load <100,000 copies/mL inpatient stay $6,607 and viral load >/= copies/mL $13,872		
4	Moyer, 2013	Clinical Guidelines		U.S. Preventive Service Task Force (USPSTF) recommends adolescents and adults ages 15 to 65 years should be screened, and it is considered Grade A. USPSTF also recommends screening all pregnant women for HIV including those who do not know their HIV status Use of ART is related to a decrease in the risk of HIV transmission		Level IV A

				Patients can request HIV testing in the absence of reported risk factors The sensitivity and specificity of the rapid test are greater than 99.5% According to USPSTF the most effective method of reducing HIV-related mortality and morbidity is the avoidance of exposure to HIV infection or primary prevention The patient should have an option of opt-out screening Early initiation of ART can reduce the risk for HIV transmission to uninfected sexual partners Early diagnosis of HIV allows for behavior change, counseling, and decrease transmission of HIV Initially, if a result is positive		

				for HIV, confirmatory testing should be performed before starting on ART		
5	Marcelin el al., 2016	Survey	N = 148 n = 68 Hospital	63% of the Internal Medicine residents stated they did not universally screen all eligible patients for HIV 33% were not familiar with current screening guidelines 25% of the residents did not believe in screening those who are considered "low risk" 4% of the providers indicated there are uncomfortable discussing HIV with their patients	HIV screening prompt is only available only electronically to the providers as an alert through the EMR rather than on the patient printout	Level III, B
6	Wise et al., 2019	Concurrent triangulation design	Phase I, quantitative data N= 250 Primary healthcare office, Federally Qualified	Phase I A survey was used to collect data about attitudes and behaviors for being at risk for HIV infection Cost and not knowing where	Limited sample size and geographic The setting is just limited to Federally Qualified Health Centers	Level III, B

			Health Centers Phase II, Semi-focused interviews used to collect qualitative information N = 10 Primary health care office, Federally Qualified Health Centers	to receive specialty care were major barriers to HIV testing Phase II, Semi-focused interviews used to collect qualitative information on attitudes implementation of HIV testing guidelines Cultural resistance, lack of knowledge, insurance concerns were some of the barriers to offering HIV testing identified by care providers		
7	Tan & Black, 2017	Systemic review		Lack of awareness of the updated CDC guidelines among healthcare providers Lack of time and prevention and testing Attitudes such as concerns for confidentiality, concern for stigma and fear of positive results		Level III, B

				are barriers to HIV testing		
8	Arya et al., 2014	Web-based survey	N= 312 physicians n =137 physicians	41% or 45 physicians were not aware of CDC updated guidelines 114 physicians aware of the updated guideline, they were not aware of for whom or in what setting the test needs to be done	Those physicians who responded to the survey may differ significantly from those who filled out the survey This sample may not represent a different population of physicians	Level III, B
9	Zheng, Suneja, Chou, & Arya, 2014	Grey Literature		Barriers to HIV testing: Knowledge, attitudes, and behavioral skills Lack of awareness of clinical recommendations among physicians Internal medical residents in New York City identified barriers to HIV testing are lack of time (40.6%), language barrier (20.2%) and time-consuming process (26.8%)	Only focused on physician-level barriers not clinical- or setting-related barrier	Level V, C
10	Galbraith et al. (2016)	Primary research study	N= 128,748 n = 46,385	Throughout 21 months, out of 46,385 subjects, there were 252	HIV screening eligibility was self-reported HIV status, which can be affected by	Level III, A

				confirmed cases of HIV infection Out of 252 confirmed individuals, 76% of the individuals were linked to care (including first provider visit) Fourth generation testing is has a short wait time of 28 minutes to find out the result. Fourth-generation has decreased the workload for MLTs and better-quality control The opt-out rate was low, 11.6%. It can be due to the triage process is being performed by nursing staff members rather than registration staff members	recall bias, health literacy, privacy concerns, or denial. Encounter level data did not differentiate between newly diagnosed and rediagnosed HIV infection Filters applied to time-trend analysis may not have detected small fluctuations in the number of patients screened per week causing underrepresentation of number of patients screened	
11	Bares et al., 2016	Paper survey	N = 307 n =205 Hospitals	52% of the residents properly identified the most common	HIV screening behaviors were self-reported, it is possible it may not	Level III, B

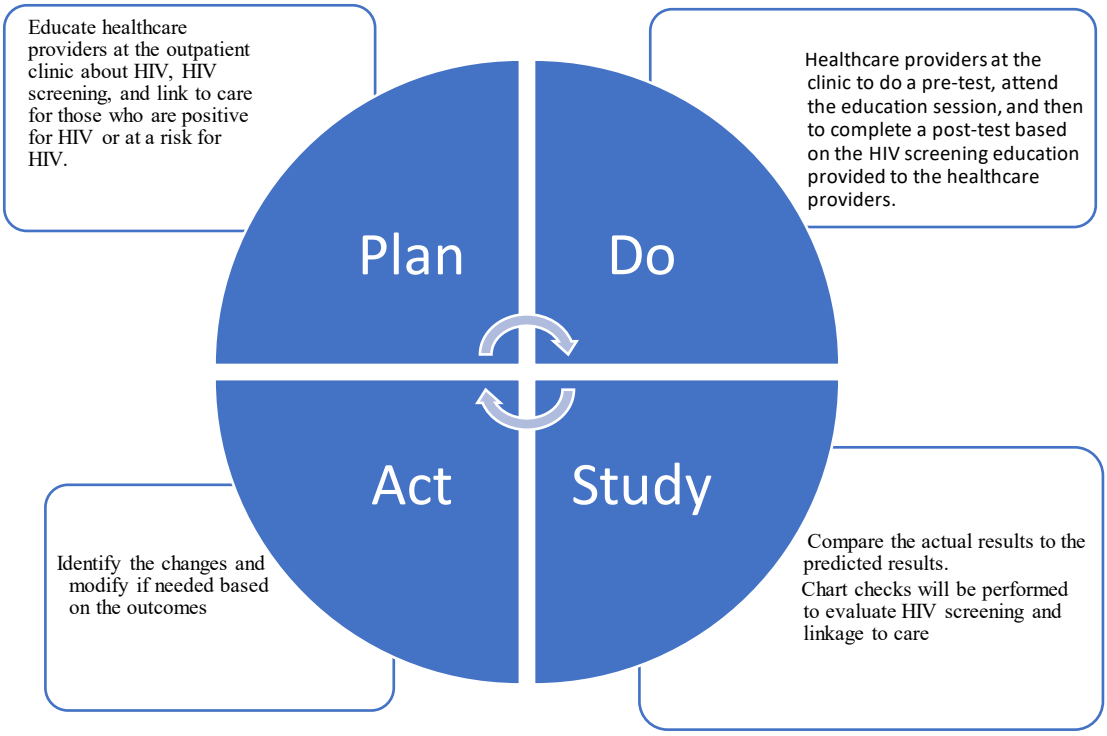
				mode of HIV transmission in the U.S. 51% of the residents were familiar with institutional protocol for follow-up for positive HIV results 29% of the residents were to correctly identified age limit for routine HIV testing	represent actual screening practice This facility serves primarily underserved population therefore the results may not be generalizable to areas with low rates of HIV	
12	Gunn et al., 2019	Survey	N = 62 n= 12 Outpatient clinic	66.7% were aware of PrEP as preventative medicine for those who are HIV negative but at a risk for HIV Two out of the 12 providers always discussed PrEP with those who are at a high risk for HIV Four out of the 12 providers very often discussed PrEP with those	Fairly low response rate of 19.35% Non-responders may differ from providers who participated about their perception, knowledge and prescribing practices	Level III, B

				who are at a high risk for HIV		
13	Petroll et al., 2017	Cross-sectional, online survey	N = 627 n = 527 Outpatient	75% of the healthcare providers are comfortable discussing patients' sexual activities 28% of the healthcare providers are somewhat or very familiar with prescribing PrEP 33.3% have ever had discussions with patients about PrEP	Response rate was approximately 30% Single-item measures were to assess familiarity with prescribing PrEP	Level III, B
14	Traversy, Austin, Timmerman, & Gale-Rowe, (2015)	Review of Literature	n = 34	Barriers to HIV testing are lack of perceived risk of HIV infection, time constraints for health care provider, discrimination, fear and stigma Facilitators to HIV testing are increasing knowledge, awareness, and normalizing HIV testing		Level IV, B

15	Elgalib, Fidler, & Sabapathy (2018)	Systematic literature review	n= 14	Barrier to HIV testing: privacy concerns, stigma, confidentiality concerns, staff fear of offering HIV testing due to lack of knowledge about HIV, and lack of time Facilitators to HIV testing: motivation and high-level commitment of medical staff to offer HIV tests and patient specific factors	Lack of data on outcomes such as coverage and uptake of HIV testing Different settings may have a impact on the validity of the thematic analysis Mixture of proof of concept studies and effective sustainable implementation initiatives	Level I, A
16	White et al., 2015	Interviews & surveys	N = 124 n = 31	Barriers to HIV testing: social stigma, lack of time, discomfort communicating about HIV testing, and stigma about HIV Facilitators: Decrease stigma, require physicians to routinely test, and screen for HIV during initial or wellness visit	Study was small and mostly non-random Sample was compromised of a highly diverse group of primary care physicians with gender, practice geography, and race	Level III, B

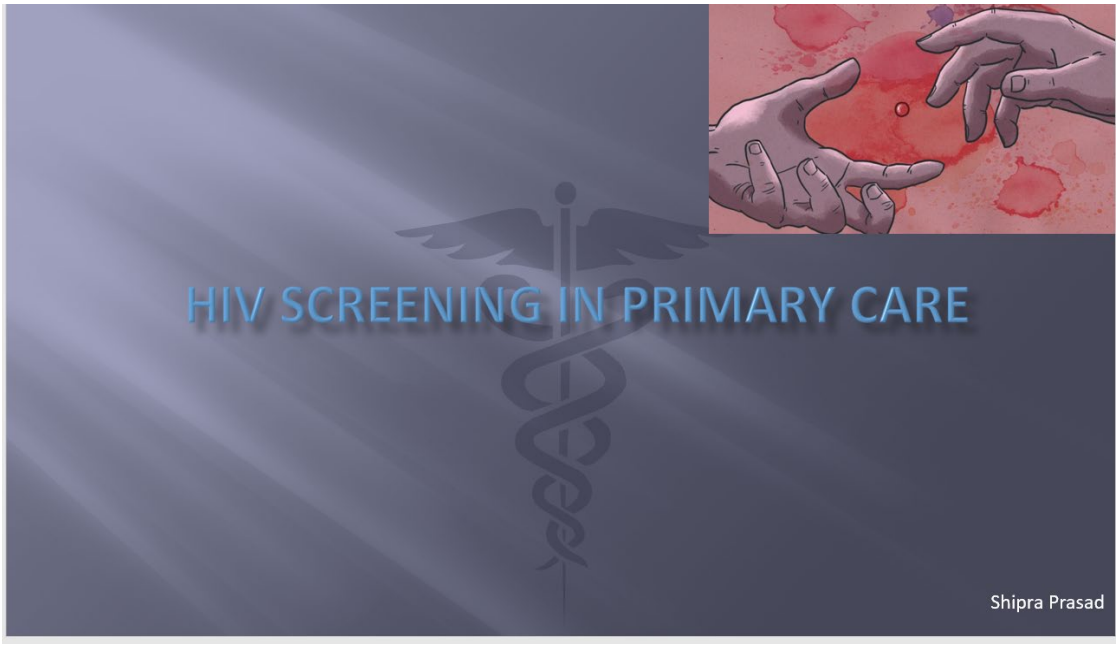
Appendix D

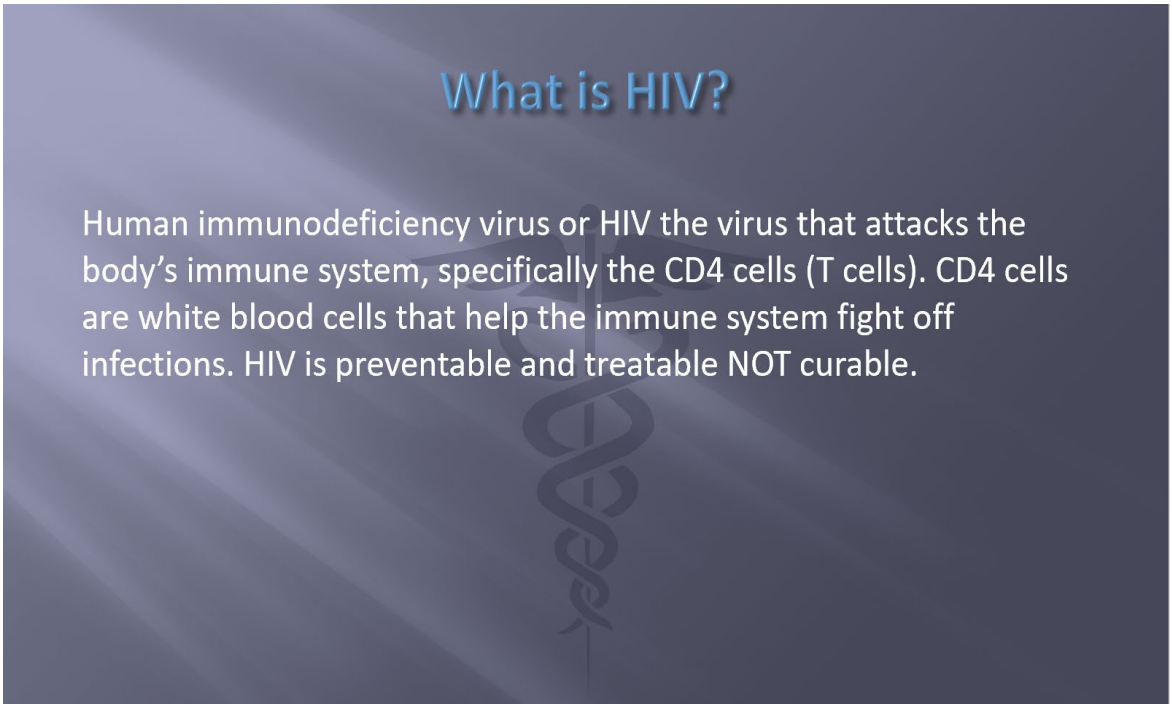
PDSA Model



Appendix E

Provider Education





What is AIDS?

Acquired immunodeficiency syndrome or AIDS is the last stage of HIV. If HIV left untreated can lead to AIDS. At this stage, people are very infectious due to high viral load

CDC's AIDS diagnosis criteria

When CD4 cell count drops below 200 cells/mm or if they develop certain opportunistic illnesses

Due to weakened immune system, people are at a high risk for opportunistic infections

Modes of Transmission

Sexual contact
- Vaginal or anal sex

Sharing needles (drug use)
Blood (blood transfusion)
Breast milk

Rare modes of transmission:
Oral sex
Bitten by a HIV positive person
Eating pre-chewed food of a HIV infected person

HIV is NOT transmitted via:
- Sharing toilets
- Kissing
- Hugging
- Sharing needles
- Sharing food
- Saliva

Impact of HIV on other health conditions

HIV can increase the risk for cardiovascular disease along with many other co-morbidities:

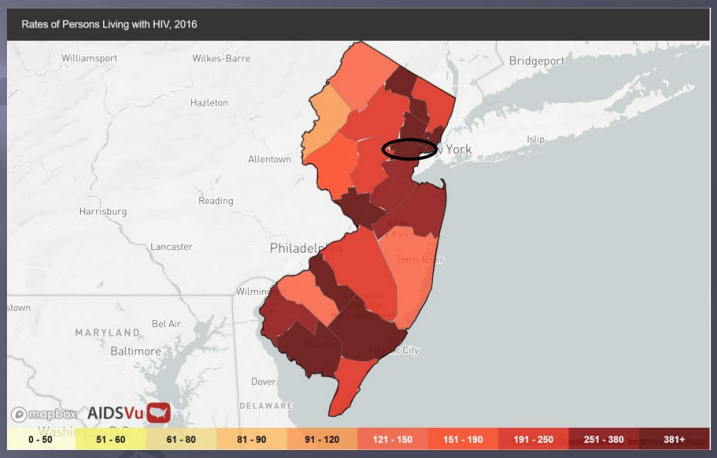
- Coronary artery disease
- Heart attack
- Heart failure
- Hypertension
- Diabetes
- Chronic kidney disease
- Hyperlipidemia

HIV Statistics

- In 2017, on a global level there were 136.9 million people living with HIV (PLWH)
- 9.4 million people were not aware of their HIV status
- In 2015, in U.S. there were 1.1 million people were living with HIV infection
- Out of 1.1 million, approximately 162,500 people had not been diagnosed
- During the same year, people between the ages of 13 and 24 accounted for 22% of new HIV diagnoses

HIV Statistics in NJ

- In 2017, New Jersey ranked eighth in the U.S. for new HIV cases with 1,109 newly infected individuals
- As of 2017, Edison has 361 cases of HIV, Elizabeth with 2,428 cases, Newark with 15,462 cases, Plainfield with 1,253 cases, and Rahway with 486 cases .



What is ART?

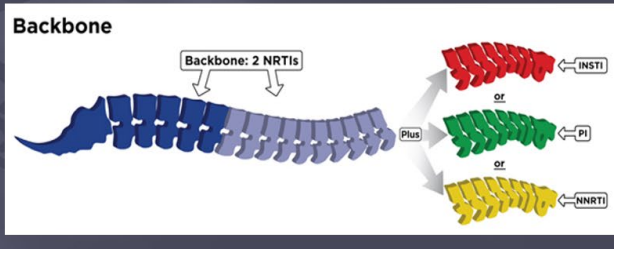
- Antiretroviral therapy or ART is HIV medicine, which reduces the viral load in the body to a very low level
- Decreases the viral load so low that it becomes undetectable in the blood

1. Less likely to transmit HIV to others
2. Stay healthier longer

Three classes of ART

1. Nucleoside reverse transcriptase inhibitors (NRTIs or “nukes”)
2. Non-nucleoside reverse transcriptase inhibitors (NNRTIs or non-nukes)
3. Protease inhibitors (PIs)
4. HIV integrase inhibitors

Combination therapy:
Two NRTIs with INSTI, NNRTIs, or PIs



What is PrEP?

Pre-exposure prophylaxis is an HIV medicine for those who are negative for HIV but at a high risk for HIV infection

- Gay/bisexual or heterosexual and have an HIV-positive partner
- Serodiscordant couples who want to conceive
- Multiple partners or a partner with unknown HIV status
- Share needles
- IV drug users

Truvada is a combination two drugs: Tenofovir and Emtricitabine. It is the only drug that is approved to be used as PrEP.

HIV Continuum of Care

HIV treatment cascade, steps from initial diagnosis to viral suppression

CDC Recommendation

- CDC recommends that anyone between the ages of 13 and 64 get tested at least once in his or her lifetime as part of routine care
- HIV testing should be offered at least once a year to those who are at a high risk for HIV infections:

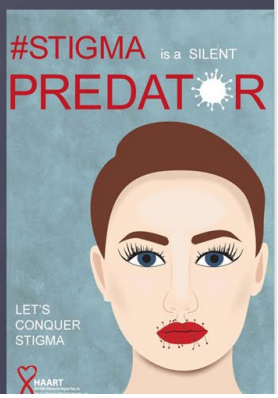
1. Men who have sex with men (MSM)
2. Injection-drug users
3. Person who has had more than one sexual partner
4. Person who have sex in exchange for money

U=U

- Undetectable = Untransmittable, or U=U: slogan launched in 2016
- Three large studies between 2007 and 2016 among serodiscordant couples indicated not a single case of HIV transmission from HIV virally suppressed to HIV negative.
- People living with HIV who have undetectable viral load cannot transmit HIV to their partners.

Barriers to HIV Screening

Stigma
Fear or misconception about HIV
Lack of knowledge
1. Among healthcare providers
2. Consumers
Lack of emotional and physical support



Role of Primary Healthcare Providers

Be non-judgmental
- Decrease HIV stigma among healthcare providers
- Decrease stigma among people

Follow CDC guidelines
- Increase knowledge about HIV
- Educate patients about HIV and importance of testing
- Offer HIV screening
- Link to care

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Appendix F

HIV Pre- Test Questions

1. What is the difference between HIV and AIDS?

A. HIV is a virus and AIDS is a bacterial disease

B. HIV is the virus that causes AIDS

C. HIV is curable but AIDS is not curable

2. What is Human Immunodeficiency Virus (HIV)?

A. Bacteria that attacks your cells in the immune system

B. Virus that attacks your red blood cells and immune system

C. Virus that attacks body's immune system specifically CD4 cells

3. Which of these are NOT a mode of transmission of HIV? (Select all that apply)

A. Vaginal fluid

B. Kissing

C. Used condoms

D. Breast milk

E. Blood

F. Water

G. Sharing needles

H. Split/ saliva

I. Anal mucous

J. Vaginal delivery

4. An infected mother can pass HIV to her unborn child?

A. True

B. False

5. There is a vaccine that prevents HIV?

A. True

B. False

6. Antiretroviral Therapy (ART) can cure HIV?

A. True

B. False

7. Hispanic men having sex with men (MSM) account for new and existing HIV infections?

A. True

B. False

8. Pre-exposure prophylasix (PrEP) can be used to prevent

A. Sexually transmitted infections (STIs) other than HIV

B. Pregnancy

C. HIV

9. Who should use PrEP?

A. People who do not have HIV and are at a high risk for getting HIV

B. People who are positive for HIV

C. People who want to use it as birth control

10. U = U stands for undetectable = untransmittable? People living with HIV who have undetectable viral load cannot transmit HIV to their partners

A. True

B. False

11. CDC recommends anyone between the ages of 18 -65 should get HIV tested annually?

A. True

B. False

12. Once identified someone is positive for HIV, what should be done next?

A. Follow up in 3 months

B. Prescribe PrEP

C. Link to a care to a HIV specialist

13. The HIV care continuum or the HIV treatment cascade outlines stages of HIV medical care that people living with HIV go through from initial diagnosis to the goal of viral suppression?

A. True

B. False

14. People living with HIV (PLWH) are more likely to get heart disease compared to those without HIV?

A. True

B. False

15. How comfortable are you discussing sexual health with patients?

1. Not at all comfortable
2. Not much comfortable
3. Neutral
4. Somewhat comfortable
5. Ver comfortable

16. How comfortable are you discussing HIV with patients?

1. Not at all comfortable
2. Not much comfortable
3. Neutral
4. Somewhat comfortable
5. Ver comfortable

17. Which is **not** an early symptom(s) of HIV?

A. Flu- like symptoms (fever, body ache and sore throat)
B. Nausea and vomiting
C. Dry mouth
D. Diarrhea
E. Headache
F. Blurred vision
G. Yeast infection
H. Memory loss

18. Primary care plays a major in identifying and preventing HIV by offering HIV testing?

A. True
B. False

19. As of 2017, Plainfield is one of the top cities in New Jersey with highest number of HIV/AIDS cases?

A. True
B. False

Appendix G

HIV Post- Test Questions

1. What is the difference between HIV and AIDS?

A. HIV is a virus and AIDS is a bacterial diseas

B. HIV is the virus that causes AIDS

C. HIV is curable but AIDS is not curable

2. What is Human Immunodeficiency Virus (HIV)?

A. Bacteria that attacks your cells in the immune system

B. Virus that attacks your red blood cells and immune system

C. Virus that attacks body's immune system specifically CD4 cells

3. Which of these are NOT a mode of transmission of HIV? (Select all that apply)

A. Vaginal fluid

B. Kissing

C. Used condoms

D. Breast milk

E. Blood

F. Water

G. Sharing needles

H. Split/ saliva

I. Anal mucous

J. Vaginal delivery

4. An infected mother can pass HIV to her unborn child?

A. True

B. False

5. There is a vaccine that prevents HIV?

A. True

B. False

6. Antiretroviral Therapy (ART) can cure HIV?

A. True

B. False

7. Hispanic men having sex with men (MSM) account for new and existing HIV infections?

A. True

B. False

8. Pre-exposure prophylasix (PrEP) can be used to prevent

A. Sexually transmitted infections (STIs) other than HIV

B. Pregnancy

C. HIV

9. Who should use PrEP?

A. People who do not have HIV and are at a very high risk for getting HIV

B. People who are positive for HIV

C. People who want to use it as birth control

10. U = U stands for undetectable = untransmittable. People living with HIV who have undetectable viral load cannot transmit HIV to their partners.

A. True

B. False

11. CDC recommends anyone between the ages of 18 -65 should get HIV tested annually?

A. True

B. False

12. Once identified someone is positive for HIV, what should be done next?

A. Follow up in 3 months

B. Prescribe PrEP

C. Link to a care to a HIV specialist

13. The HIV care continuum or the HIV treatment cascade outlines stages of HIV medical care that people living with HIV go through from initial diagnosis to the goal of viral suppression?

A. True

B. False

14. People living with HIV (PLWH) are more likely to get heart disease compared to those without HIV?

A. True

B. False

15. How comfortable are you discussing sexual health with patients?

A. Not at all comfortable

B. Not much comfortable

C. Neutral

D. Somewhat comfortable

E. Very comfortable

16. How comfortable are you discussing HIV with patients?

1. Not at all comfortable

2. Not much comfortable

3. Neutral

4. Somewhat comfortable

5. Very comfortable

17. Which is **not** an early symptom(s) of HIV?

A. Flu- like symptoms (fever, body ache and sore throat)

B. Nausea and vomiting

C. Dry mouth

D. Diarrhea

E. Headache

F. Blurred vision

G. Yeast infection

H. Memory loss

18. Primary care plays a major in identifying and preventing HIV by offering HIV testing?

A. True

B. False

19. As of 2017, Plainfield is one of the top cities in New Jersey with highest number of HIV/AIDS cases?

A. True

B. False

Appendix H

Comparison of Retrospective and Prospective Chart Reviews

	Pre-intervention Chart reviews	Intervention	Post-intervention Chart reviews	Increase/ decrease
HIV screening performed those between 18-64				
HIV positive				
Link to care for ART				
HIV negative, high risk for HIV				
Link to care for PrEP				

Appendix I

Recruitment Flyer

Lunch & Learn HIV Screening in Primary Care Presentation

Title: HIV screening in Primary Care

Purpose: Increase routine HIV screening in primary care

Location: Outpatient clinic

Eligibility criteria: Health care provider in primary care

Description:

Healthcare providers working at a primary care are invited to lunch and learn importance of HIV screening in primary care presentation. Participants will be asked to for a pre- and post- test related to the presentation. The study will take 50 minutes.

Co-investigator: Shipra Prasad

If interested, please call: [redacted] or E-mail: [redacted]

This document was approved by the Rutgers University Institutional Review Board for the Protection of Human Subjects on (_____); approval of this form expires on (_____).

Appendix J

Informed Consent

CONSENT TO TAKE PART IN A RESEARCH STUDY

TITLE OF STUDY: HIV Screening Provider Education in Primary Care

Principal Investigator: Shipra Prasad, BSN, RN

STUDY SUMMARY: This consent form is part of an informed consent process for a research study and it will provide information that will help you decide whether you want to take part in this study. It is your choice to take part or not. The purpose of the research is to increase the rate of HIV screening in Primary care. If you take part in the research, you will be asked to fill out a pre-and post-test questionnaire to evaluate provider's understanding for the presentation. Your time in the study will take approximately 50 minutes. Possible harms or burdens of taking part in the study is healthcare providers may feel uncomfortable or embarrassed when discussing HIV. The benefits of taking part in this project is healthcare providers will gain knowledge about the importance of HIV screening and be brought up to date with CDC's recommendations for HIV screening.

The information in this consent form will provide more details about the research study and what will be asked of you if you choose to take part in it. If you have any questions now or during the study, if you choose to take part, you should feel free to ask them and should expect to be given answers you completely understand. After all of your questions have been answered and you wish to take part in the research study, you will be asked to sign this consent form. You are not giving up any of your legal rights by agreeing to take part in this research or by signing this consent form.

Who is conducting this research study?

Shipra Prasad is co-investigator of this research study. A co-investigator has the overall responsibility for the conduct of the research. However, there are often other individuals who are part of the research team.

Shipra Prasad may be reached at [redacted] and [redacted]

The co-investigator or another member of the study team will also be asked to sign this informed consent. You will be given a copy of the signed consent form to keep.

Why is this study being done?
The purpose of the research is to increase the rate of HIV screening in Primary care by providing HIV screening education to healthcare providers in primary care.

Who may take part in this study and who may not?
People who can participate are health care providers who work in a primary care setting.

Why have I been asked to take part in this study?
Centers for Disease Control and Prevention recommends that everyone between the ages of 13 and 64 gets tested for HIV at least once as part of routine health care.

How long will the study take and how many subjects will take part?
The study will take place at the clinic, and the number of participants will be part of this study are seven participants. The duration of the individual's participation in the study will be seven minutes. The study will last until February 29, 2020.

What will I be asked to do if I take part in this study?
The steps involved in this study are filling out the pre and post-test questionnaires along with taking part in lunch and learn HIV screening education.

What are the risks and/or discomforts I might experience if I take part in this study?
Possible harms or burdens of taking part in the study, you may feel mild uncomfortable or embarrassed when discussing HIV.

Are there any benefits to me if I choose to take part in this study?
The benefits of taking part in this study is they will gain knowledge about the important of HIV screening and be brought up to date with CDC's recommendations for HIV screening.

What are my alternatives if I do not want to take part in this study?
Not participating in this study.

How will I know if new information is learned that may affect whether I am willing to stay in the study?
During the study, you may feel mild uncomfortable or embarrassed when discussing HIV and HIV screening during the present. If you choose to continue to be part of the study, you can do so.

Will I receive the results of the research?
Yes, you will be given the results of pre- and post-test upon completion of lunch & learn presentation.

Will there be any cost to me to take part in this study?
There will be no cost to take part in this study.

Will I be paid to take part in this study?

You will not be paid to take part in this study. However, you will be provided lunch to compensate for your time.

How will information about me be kept private or confidential?
All efforts will be made to keep your information in your research record confidential, but total confidentiality cannot be guaranteed. The data will be stored on a password-protected laptop, and paper records including consent forms and data files will be kept in a locked file cabinet at the chair's office. Participants will get a copy of the signed consent to keep for their records.

What will happen to my information or biospecimens collected for this research after the study is over?
The information collected about you for this research will not be used by or distributed to investigators for other research. After the completion of the study, the data will be destroyed to ensure compliance with IRB requirements.

What will happen if I do not wish to take part in the study or if I later decide not to stay in the study?
It is your choice whether to take part in the research. You may choose to take part, not to take part or you may change your mind and withdraw from the study at any time. If you do not want to enter the study or decide to stop taking part, you may do so without penalty.

Who can I call if I have questions?
If you have questions about taking part in this study or if you feel you may have suffered a research related injury, you can call the study doctor: Shipra Prasad, School of Nursing, 65 Bergen Street. Newark, NJ 07107. [redacted].

If you have questions about your rights as a research subject, you can call the IRB Director at: *Newark Health Science (973)-972-3608* or the Rutgers Human Subjects Protection Program at (973) 972-1149.

PERMISSION (Authorization) TO USE OR SHARE HEALTH INFORMATION THAT IDENTIFIES YOU FOR A RESEARCH STUDY

The next few paragraphs tell you about how investigators want to use and share identifiable health information from your medical record in this research. Your information will only be used as described here or as allowed or required by law. If you sign this consent form, you agree to let the investigators use your identifiable health information in the research and share it with others as described below. Ask questions if there is something you do not understand.

What is the purpose of the research and how will my information be used?
You are being invited to take part in this research study which is described at the beginning of this form. The purpose of collecting and using your health information for this study is to help investigators answer the questions that are being asked in the research.

What information about me will be used?

Healthcare provider position (D.O., M.D., Medical assistants)

Who may use, share or receive my information?
The research team may use or share your information collected or created for this study with the following people and institutions:

- Rutgers University investigators involved in the study;
- University Hospital or Robert Wood University Hospital personnel to communicate information necessary for health care operations;
- The Rutgers University Institutional Review Board and Compliance Boards
- The Office for Human Research Protections in the U.S. Dept. of Health and Human Services

Those persons or organizations that receive your information may not be required by Federal privacy laws to protect it and may share your information with others without your permission, if permitted by the laws governing them.

Will I be able to review my research record while the research is ongoing?
No. We are not able to share information in the research records with you until the study is over. To ask for this information, please contact the Principal Investigator, the person in charge of this research study.

Do I have to give my permission?
No. You do not have to permit use of your information. But, if you do not give permission, you cannot take part in this study. (Saying no does not stop you from getting medical care or other benefits you are eligible for outside of this study.)

If I say yes now, can I change my mind and take away my permission later?
Yes. You may change your mind and not allow the continued use of your information (and to stop taking part in the study) at any time. If you take away permission, your information will no longer be used or shared in the study, but we will not be able to take back information that has already been used or shared with others. If you say yes now but change your mind later for use of your information in the research, you must write to the researcher and tell him or her of your decision: Shipra Prasad. [redacted]

How long will my permission last?
Your permission for the use and sharing of your health information will last until the end of the research study.

AGREEMENT TO PARTICIPATE

1. Subject consent:

I have read this entire consent form, or it has been read to me, and I believe that I understand what has been discussed. All of my questions about this form and this study have been answered. I agree to take part in this study.

Subject Name:_____

Subject Signature:_____ Date:_____

2. Signature of Investigator/Individual Obtaining Consent:

To the best of my ability, I have explained and discussed all the important details about the study including all of the information contained in this consent form.

Investigator/Person Obtaining Consent (printed name):_____

Signature:_____ Date: _____

Appendix K

Chart Audit Tool

HIV Testing Chart Review

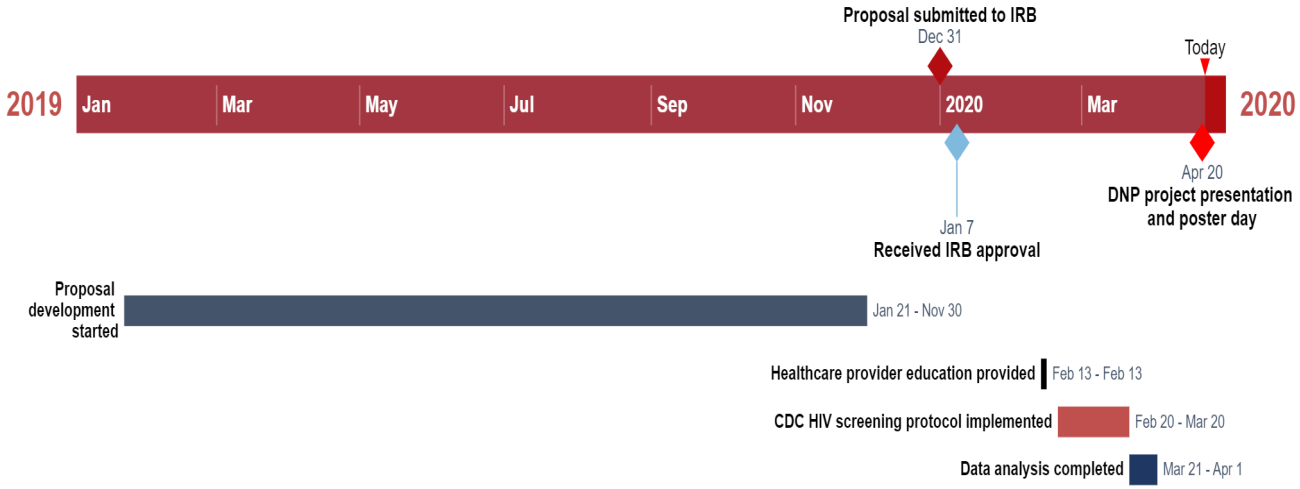
Reviewer: _____

Date: _____

Race										
Sex										
Ethnicity										
Age										
HIV testing performed										
Link to care for ART										
Link to care for PrEP										

Appendix L

Projected Timeline



Appendix M

Projected Budget

Expense	Cost	Total Cost
Recruitment Flyers	$ 0.50 x 5 flyers	$ 2.50
Educational Materials (brochures)	$ 1.35 x 25 brochures	$ 33.75
Lunch	$20 x 7 people	$140
Statistician Consultant	$ 60/hr x 2 hours	$ 120
Dissemination Posters	$ 87 x 1 poster	$ 87
Total Budget		$363.25

Appendix O

Site Letter of Support

[redacted]

Date: 11/14/2019

Re: Letter of Cooperation For [redacted]

Dear Shipra Prasad,

This letter confirms that I, as an authorized representative of [redacted], allow the co-investigator, Shipra Prasad, access to conduct study-related activities at the listed site(s), as discussed with the co-investigator and briefly outlined below, and which may commence when the co-investigator provides evidence of IRB approval for the proposed project.

- **Research Site(s):** [redacted]
- **Study Purpose:** To educate healthcare providers about HIV screening in primary care, and the importance of linkage to care.
- **Study Activities**: The Centers for Disease Control and Prevention (CDC) recommendations for HIV testing will be explained to healthcare providers. Healthcare providers will fill out questionnaires about their personal perspectives about routine HIV testing in the primary care setting. Prior to the HIV screening education, healthcare providers will fill out a pre-test related to HIV screening. After the HIV education, healthcare providers will fill out a post-test.

Co-investigator (Shipra Prasad) will have access to [redacted] to perform chart reviews to evaluate the intervention (education for healthcare providers about HIV screening in primary care).

- **Subject Enrollment**: Healthcare providers, which include; one physician, one nurse practitioner, one physician's assistant, and four medical assistants.
- **The site (s) Support**: The study site has agreed to provide space to conduct the study and distribute questionnaires as part of the eligibility criteria. The clinicians and the office staff will be educated about the CDC guidelines for HIV testing as well as about PrEP.
- **Data Management:** Data will be collected by the co-investigator, and the data will be stored on a password-protected laptop, and paper records will be kept in the chair's office.
- **Other:** [redacted] is funding the cost of the CLIA waiver application and the cost of Alere Abbott 4th generation Antibody/Antigen rapid HIV testing kits.
- **Anticipated End Date:** February 29, 2020

[redacted] [redacted] [redacted]

Letter of Cooperation for Study: Education for Healthcare Providers about HIV Screening

[redacted]

We understand that this site's participation will only take place during the study's active IRB approval period. All study-related activities must cease if IRB approval expires or is suspended. I understand that any activities involving Personal Private Information or Protected Health Information may require compliance with HIPAA Laws and Rutgers Policy.

Our organization agrees to the terms and conditions stated above. If we have any concerns related to this project, we will contact the Principal Investigator. For concerns regarding IRB policy or human subject welfare, we may also contact the Rutgers IRB (see orra.rutgers.edu/hspp).

Regards,

[Please ask the representative authorized to grant permission to use the site for research to provide the following]:

[redacted]

[redacted]

[redacted]

[redacted]

Letter of Cooperation for Study: Education for Healthcare Providers about HIV Screening

Appendix P

Wilcoxon Signed Ranks Test

	postknow - preknow	post15 - pre15	post16 - pre16
Z	-1.472[b]	-1.300[b]	-.378[c]
Asymp. Sig. (2-tailed)	.141	.194	.705

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

c. Based on positive ranks.

Table 1

Pretest and Posttest Comparisons for Knowledge and Comfort Ratings

Variable	Time	*M*	*SD*	Paired *t* Test *t*	Paired *t* Test *p*	Wilcoxon *z*	Wilcoxon *p*
Knowledge [a]				1.91	.11	1.47	.14
	Pretest	11.47	2.50				
	Posttest	14.04	1.59				
15. Comfort discussing sexual health [b]				1.33	.23	1.30	.19
	Pretest	3.43	0.79				
	Posttest	4.00	1.00				
16. Comfort discussing HIV [b]				0.35	.74	0.38	.71
	Pretest	3.86	0.69				
	Posttest	3.71	0.95				

[a] Knowledge based on the number of correct answers (maximum 17 points).

[b] Comfort ratings based on five-point scale: 1 = *Not at all comfortable* to 5 = *Very comfortable.*

Note. $N = 7$.

Table 2

Frequency Counts for Selected Variables

Variable	Category	*n*	%
Race			
	Asian	15	10.1
	Black or African American	71	48.0
	White	4	2.7
	Other	3	2.0
	Missing	55	37.2
Sex			
	Female	82	55.4
	Male	66	44.6
Ethnicity			
	Hispanic or Latino	9	6.1
	Not Hispanic or Latino	125	84.5
	Missing	14	9.5
Age Category [a]			
	20-29 years	10	6.8
	30-39 years	14	9.5
	40-49 years	28	18.9
	50-59 years	37	25.0
	60-69 years	24	16.2
	70-89 years	35	23.6
Test Offered			
	No	16	10.8
	Yes	132	89.2
Results			
	Not offered the test	16	10.8
	Declined but HIV positive	1	0.7
	Patient offered but declined	87	58.8
	Negative but not high risk	39	26.4
	Negative but high risk	4	2.7
	Tested but invalid test	1	0.7

[a] Age: $M = 55.55$, $SD = 16.05$.

Note. $N = 148$.

Table 3

Chi-Square Tests for Demographic Variable with HIV Test Being Offered

Variable	Category	Sample *n*	Percent Offered Test	$\chi 2$	*p*	Cramer's *V*
Race				2.75	.61	.14
	Asian	15	93.3			
	Black or African American	71	90.1			
	White	4	75.0			
	Other	3	66.7			
	Missing	55	89.1			
Sex				0.01	.94	.01
	Female	82	89.0			
	Male	66	89.4			
Ethnicity				1.43	.49	.10
	Hispanic or Latino	9	77.8			
	Missing	14	92.9			
	Not Hispanic or Latino	125	89.6			
Age Group				6.39	.28	.21
	20-29 years	10	100.0			
	30-39 years	14	92.7			
	40-49 years	28	78.6			
	50-59 years	37	94.6			
	60-69 years	24	91.7			
	70-89 years	35	85.7			

Note. $N = 148$.

Figure 2

Knowledge Scores Based on Time Period

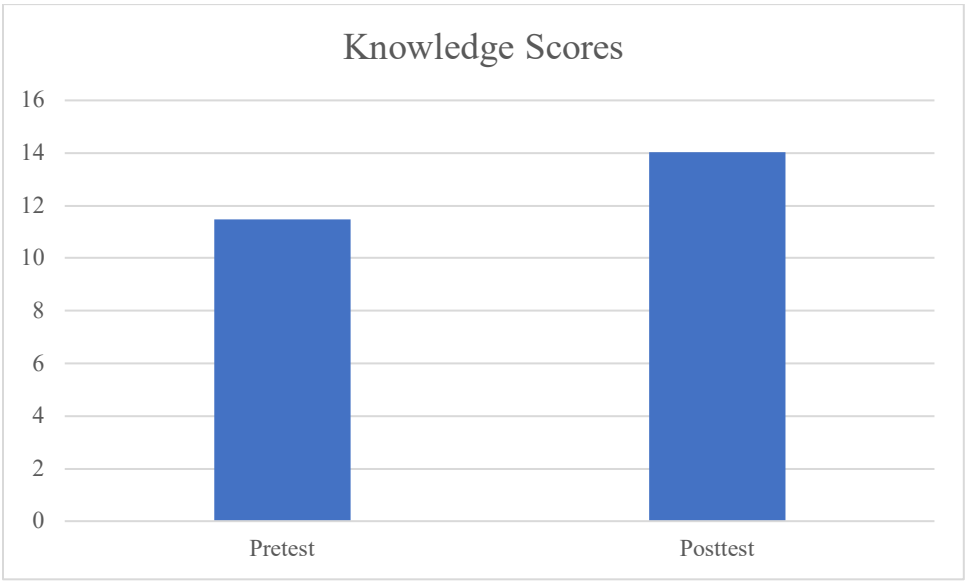
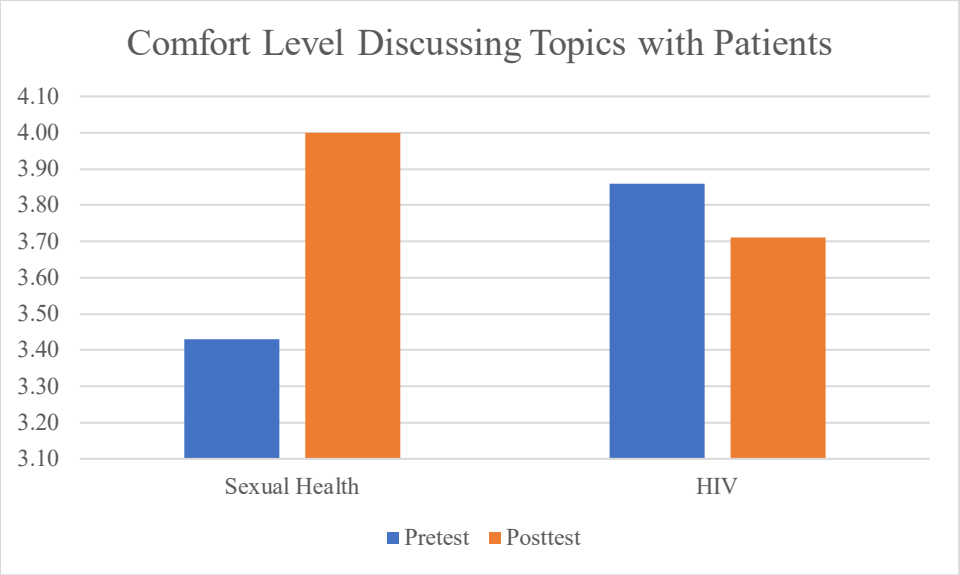


Figure 2. These knowledge scores were based on a maximum of 17 correct points. At pretest, the mean knowledge score was $M = 11.47$ while at posttest, the mean score was $M = 14.04$.

Figure 3

Ratings of Comfort Level Discussing Selected Topics with Patients Based on Time Period



Note. Comfort ratings based on five-point scale: 1 = *Not at all comfortable* to 5 = *Very comfortable.*

Figure 3. These comfort ratings based on five-point scale: 1 = *Not at all comfortable* to 5 = *Very comfortable.* For sexual health, the comfort ratings increased from $M = 3.43$ to $M = 4.00$. For discussing HIV, the comfort ratings declined from $M = 3.86$ to $M = 3.71$.

Figure 4

HIV Testing Based on Time Period

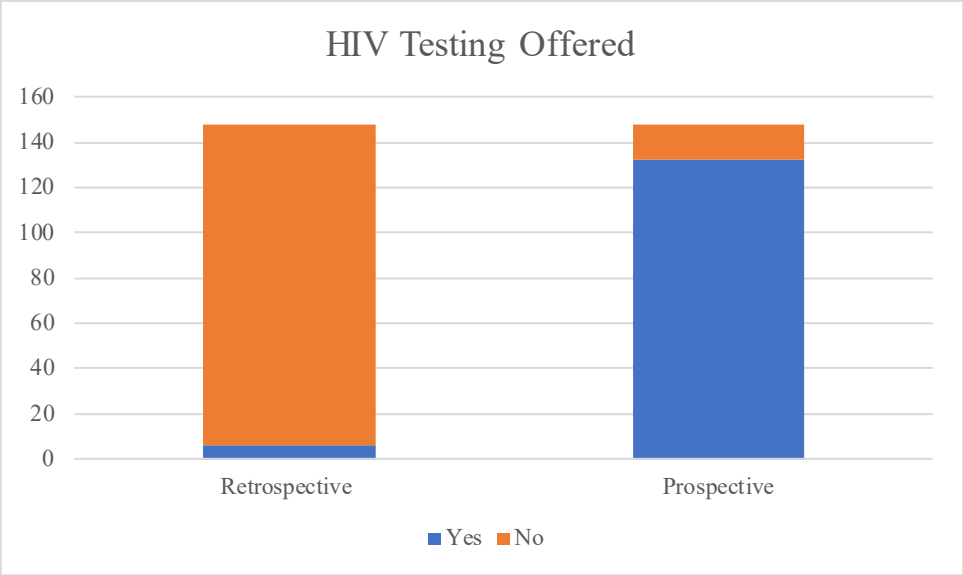


Figure 4. displays the stacked column chart showing HIV testing at two points in time. Retrospectively, six patients (4.1%) were tested. Prospectively, 129 patients (87.2%) were tested.