Utilizing Doxycycline Post-Exposure Prophylaxis (Doxy PEP) for Sexual Transmitted Infections (STIs) Prevention: Enhancing Sexual Health Counseling

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Abstract

Background: Bacterial sexually transmitted infections (STIs) continue to disproportionately affect men who have sex with men (MSM) and transgender women (TGW). In 2024, the Centers for Disease Control and Prevention (CDC) released updated guidelines recommending doxycycline post-exposure prophylaxis (Doxy PEP) for high-risk individuals. However, uptake remains low in primary care due to limited provider awareness and the absence of structured workflows.

Purpose: This quality improvement project aimed to increase provider adherence to Doxy PEP guidelines through the implementation of a standardized Doxy PEP Risk Assessment Tool.

Methods: A retrospective review of 714 high-risk patients seen in May 2024 served as the pre-intervention group. In May 2025, a four-week intervention was implemented at a primary care clinic using a structured tool to support Doxy PEP counseling and prescribing. Patient demographics, uptake, and patient-reported reasons for Doxy PEP refusal were analyzed.

Results: Doxy PEP prescribing increased from 25.6% pre-intervention to 80.1% post-intervention. Counseling was delivered to 100% of eligible patients. Most patients who accepted Doxy PEP were MSM aged 25-44 years. Common reasons for declining included low perceived risk, medication concerns, and relationship status. Provider feedback indicated improved confidence and workflow efficiency.

Conclusion: A structured risk assessment tool improved provider adherence to Doxy PEP guidelines and supported equitable STI prevention in primary care. Findings support broader adoption of decision-support tools to enhance public health efforts.

Keywords: Doxycycline, Doxy PEP, STI prevention, MSM, transgender women, primary care, quality improvement

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Clinical Issue and Significance

Sexually transmitted infections (STIs) pose a significant global public health challenge, with millions of new cases reported annually (United States Department of Health and Human Services [HHS], 2024; World Health Organization [WHO], 2024b). In 2022, the United States (US) recorded over 2.5 million cases of *Chlamydia trachomatis* (chlamydia), *Neisseria gonorrhoeae* (gonorrhea), and *Treponema pallidum* (syphilis) (Centers for Disease Control and Prevention [CDC], 2024a; HHS, 2024). The CDC (2024a) reported an upward trend of STI cases in the last ten years. Of particular concern is the high rate of syphilis during the examined ten-year period. While the syphilis epidemic is getting worse, gonorrhea cases have dropped, and chlamydia has maintained the same rate, but these rates remain alarmingly high (CDC, 2024b).

This national concern is reflected at the state level. In Florida, STI rates have increased by 42% over the past decade. The state now ranks 14th in the nation for congenital syphilis cases, reflecting critical gaps in prevention efforts (Kissel, 2024). Locally, Central Florida, particularly Orange County, has experienced a dramatic rise in bacterial STIs. In 2021, the county accounted for nearly 10% of Florida's syphilis cases, with rates increasing by 70% between 2018 and 2022 (Florida Department of Health; n.d., Pedersen, 2024). Chlamydia and gonorrhea rates in the region also exceeded state averages. In 2021, chlamydia reached 1,370.2 per 100,000 people, surpassing the state average, while gonorrhea rates rose to 346.1 per 100,000 in 2021 (Florida Department of Health, n.d.). These increasing rates demonstrate the need for strengthened prevention and treatment efforts.

Surveillance data from 2022 further illuminate disparities by sex assigned at birth. Individuals assigned male at birth (AMAB) consistently report higher STI rates than those assigned female at birth (AFAB) (CDC, 2024a). Among the 1,649,716 reported chlamydia cases, AFAB individuals saw a 1.8% increase. A similar pattern was observed with gonorrhea, which declined by 9.2% among AFAB individuals but continued rising among AMAB populations (CDC, 2024a). Syphilis cases reached their highest since 1950, with men who have sex with men accounting for 45.1%, which is a 4% increase compared to AFAB individuals (CDC, 2024a; Grey et al., 2024).

Men who have sex with men (MSM) are defined as individuals assigned male at birth (AMAB) whose gender identity aligns with their sex assigned at birth (Rietmeijer, 2019), while transgender women (TGW) are also AMAB but identify as transgender or female (Town et al., 2021). Notably, research consistently shows that these subpopulations bear a disproportionately high burden of STIs. In 2022, MSM accounted for 36.8% of all syphilis cases and 54.6% of reported gonorrhea cases among males, while TGW represented 13.2% of all reported chlamydia cases, 15.6% of gonorrhea cases, and 11.4% of syphilis cases (Brown et al., 2024; CDC, 2024a). This elevated risk is partly attributed to the biological and behavioral interplay between STIs and human immunodeficiency virus (HIV), as concurrent infections significantly increase both susceptibility and transmissibility (Brown et al., 2024; Cohen et al., 2019). As a result, MSM and TGW remain central to targeted prevention strategies aimed at reducing the dual burden of STIs and HIV in high-risk populations.

Cohen and colleagues (2019) explored this interplay, even in the context of modern antiretroviral therapies (ART). While ART effectively reduces HIV transmissibility, the presence of other STIs can increase viral shedding in genital secretions. Furthermore, MSM living with HIV experienced higher STI rates than those who are HIV-negative. However, HIV-negative

MSM are also at elevated risk, in part due to decreased condom use while on pre-exposure prophylaxis (PrEP) (Cohen et al., 2019; McManus et al., 2020). Town and colleagues (2021) found that HIV+ TGW are also disproportionately affected, with STI prevalence reaching 32% compared to 11% among HIV-negative TGW (Brown et al., 2024; Morris et al., 2024). These findings reveal important disparities even within AMAB subgroups.

The escalating rates of STIs in the US present several significant public health concerns (HHS, 2024). These infections can lead to serious long-term health complications, including infertility, pelvic inflammatory disease, and chronic pain, especially among women (CDC, 2021). Additionally, syphilis-related conditions, such as ocular syphilis and congenital syphilis, contribute to increased rates of vision loss and infant morbidity and mortality (McDonald et al., 2023). STIs also heighten susceptibility to HIV, as infections like syphilis and gonorrhea facilitate HIV transmission (Cohen et al., 2019). Compounding these issues is the growing threat of antibiotic-resistant STIs, most notably gonorrhea, which complicates treatment and threatens public health at large (WHO, 2024a). Beyond clinical implications, rising STI rates place increased strain on the healthcare system through higher demands for screening, treatment, and prevention, while social stigma continues to discourage timely diagnosis and care (CDC, 2021).

To mitigate these risks, the United States Preventive Services Task Force (USPSTF) (2021) provides evidence-based recommendations for STI screening. These include routine chlamydia and gonorrhea screening for all sexually active women under 25 and older women at increased risk, as well as syphilis screening for all pregnant individuals and those at elevated risk, such as MSM and people living with HIV (USPSTF, 2018; 2021; 2022). The USPSTF also recommends routine HIV screening for individuals aged 15 to 65 and for all pregnant people (USPSTF, 2019). These guidelines aim to promote early detection and reduce the transmission and complications of untreated STIs.

Complementing the USPSTF, the CDC offers similar screening guidance. Routine chlamydia and gonorrhea testing is recommended for sexually active women under 25 and older women at elevated risk, while MSM should undergo annual screenings (CDC, 2021). The CDC also underscores the importance of syphilis screening for pregnant individuals and MSM, especially those with HIV or multiple partners. Together, these national guidelines serve as a framework for STI prevention and early intervention (CDC, 2021).

Recognizing the need to go beyond screening and treatment alone, the CDC introduced new clinical guidelines in 2024 recommending doxycycline post-exposure prophylaxis (Doxy PEP) for bacterial STI prevention among select high-risk groups. Specifically, Doxy PEP is advised for MSM and TGW, particularly with a documented bacterial STI diagnosis in the past 12 months (Bachmann et al., 2024). A single 200 mg dose taken within 72 hours of oral, vaginal, or anal sex has been shown to significantly reduce the incidence of chlamydia and syphilis by over 70%, and gonorrhea by approximately 50%. This recommendation reflects a proactive shift in STI prevention strategy, offering a promising tool to curb rising infection rates in vulnerable populations.

The 2024 CDC Doxy PEP guidelines introduced several important public health and policy considerations. A primary concern is antimicrobial resistance (Ehsan et al., 2023; Tran et al., 2022). As Doxy PEP use expands, so too does the concern for the development of antibiotic-resistant strains of STIs, particularly gonorrhea. In response, policy efforts must prioritize antimicrobial stewardship through responsible prescribing practices, enhanced surveillance systems, and integration of resistance monitoring into routine care (Bachmann et al., 2024). Public health education also plays a critical role in reinforcing that Doxy PEP is a supplemental strategy rather than a replacement for established STI prevention methods such as condom use (Bachmann et al., 2024). To support broader implementation, health policy must also facilitate the integration of Doxy PEP into existing sexual health

infrastructures, including primary care, family planning clinics, and public health programs (Bachmann et al., 2024; Ehsan et al., 2024). Ongoing research and surveillance are critical to monitor real-world outcomes, guide updates to clinical guidelines, and ensure that Doxy PEP is used safely and effectively (Traeger et al., 2023).

Equity and access remain crucial to the successful implementation of policies. High-risk groups, such as MSM and TGW, often encounter barriers related to stigma, cost, and limited availability of services in non-specialty settings (Traeger et al., 2023; Tran et al., 2022). To address these disparities, policy initiatives must support expanded access through mechanisms such as federal STI funding, safety-net programs, and reimbursement structures that enable preventive interventions in diverse clinical settings (Barrow et al., 2020; Reitmeijer, 2019). Improving insurance coverage for post-exposure prophylaxis and forming pharmacy-based partnerships may also mitigate affordability and distribution barriers (Bachmann et al., 2024; Ogunbajo et al., 2024). Although the CDC now recommends routine Doxy PEP counseling for eligible patients, these guidelines have yet to be adopted as standard practice nationwide, highlighting a continued need for policy alignment, provider training, and resource allocation.

At Pineapple Healthcare, a federally qualified health center offering comprehensive primary care and infectious disease services, implementing these national recommendations has proven challenging. Although providers are educated on the 2024 CDC Doxy PEP guidelines, there is currently no standardized protocol in place. STI screening and treatment are largely reactive and limited to symptomatic patients or those with known exposures. Counseling still centers on traditional prevention methods such as condom use and routine testing, while discussions of Doxy PEP are inconsistent and left to provider discretion (A. Fuentes Plaza & D. Eiflander, personal communications, September 13, 2024). Notably, Doxy PEP is not introduced during patient encounter visits, further limiting its reach during routine care.

A gap analysis conducted in May 2024 highlights the consequences of this fragmented approach. Of the 810 patients seen that month, 88.1% (n=714/810) were high-risk individuals, primarily MSM and TGW. Among the high-risk identified, 95.7% (n=683/714) had at least one documented STI within the past year or required expedited partner therapy, and 91.4% (n=624/683) experienced recurrent infections or received expedited partner treatment, emphasizing the persistence of STI transmission. These findings reflect ongoing transmission and gaps in effective prevention efforts. Despite these concerning figures, only 25.6% of patients (n=183/714) received Doxy PEP counseling, a prescription, or both, leaving over 500 missed opportunities for timely intervention. (D. Eiflander, personal communication, September 13, 2024). Factors contributing to these gaps include variability in provider knowledge, inconsistent follow-up, limited resources for frequent STI testing, and barriers to patient adherence (C. Otero, personal communication, September 13, 2024).

Establishing a structured clinic-wide protocol offers a sustainable solution. Standardizing Doxy PEP risk screening, counseling, and prescribing across all providers would promote consistency, increase access, and align clinical practices with national recommendations. Integrating these measures into routine care, rather than relying on provider discretion, ensures that all eligible patients receive equitable access to this evidence-based intervention. Adopting a standardized Doxy PEP protocol at Pineapple Healthcare represents a crucial step toward improving STI outcomes in high-risk populations and addressing the broader public health crisis.

Evidence Review and Synthesis

A comprehensive literature search was conducted using six databases, including CINAHL Complete, Cochrane Library, Health Source, MEDLINE, OVID, and PubMed. The search aimed to identify causes, impact, and interventions related to the rise in sexually

transmitted infections (STIs) among high-risk populations. Keywords included terms such as "sexually transmitted infections," "STIs," sexually transmitted diseases," "STDs," "standard of care," "prevention," "counseling," "doxycycline postexposure prophylaxis," "doxy PEP," "high-risk populations," "men who have sex with men," "MSM," "bisexual," "homosexual," "transgender women," "TGW," "male-to-female," or "MTF."

The inclusion criteria focused on peer-reviewed journal articles published between 2019 and 2024 that investigated Doxycycline Post-Exposure Prophylaxis (Doxy PEP) as an STI prevention strategy for high-risk populations, particularly persons assigned male at birth (AMAB) who identify as MSM or TGW. Studies were included if they reported on implementation outcomes or explored Doxy PEP's influence on existing STI prevention practices. Preference was given to research conducted in English-speaking countries for contextual relevance. Studies unrelated to Doxy PEP or those not involving high-risk populations were excluded.

Following a detailed screening of titles and abstracts for relevance, 15 studies were selected for inclusion in the evidence review (Appendix A). These included seven systematic reviews, one randomized controlled trial (RCT), one RCT with an accompanying qualitative study, two cross-sectional studies, one qualitative study, a mixed-methods study, one retrospective cohort study, and one case-control study. Based on the Oxford Centre Levels of Evidence, the articles are of high-quality, ranging from level 1 evidence to level 4.

Recent increases in STIs, notably among MSM and TGW populations, have spurred interest in Doxy PEP as a preventive measure (Bachmann et al., 2024). This review synthesizes recent research findings on Doxy PEP's effectiveness, prescribing strategies, acceptability, and

associated risks, with a focus on its implications for STI prevention. It draws on current studies to examine both the efficacy and potential challenges of Doxy PEP use.

Several studies offer compelling evidence supporting Doxy PEP as a highly effective intervention for reducing STIs among high-risk populations, particularly MSM and TGW (Cannon & Celum, 2023; Luetkeymeyer et al., 2023; Szondy et al., 2024). A meta-analysis by Szondy and authors (2024) reported a 56% overall reduction in bacterial STI incidence associated with Doxy PEP, including an 81% reduction in chlamydia, 77% for syphilis, and 50% for gonorrhea. Similarly, Cannon and Celum (2023) demonstrated reductions in chlamydia (70%) and syphilis (73%) when Doxy PEP was administered within 72 hours after condomless sex. Luetkemeyer and team (2023) further supported these findings, noting substantial decrease in chlamydia (88%) and syphilis (87%) among individuals using both Doxy PEP and human immunodeficiency (HIV) pre-exposure prophylaxis (PrEP), compared to those receiving standard care. Collectively, these studies underscore the efficacy of Doxy PEP as a promising STI prevention strategy, especially within populations at elevated risk.

Prescribing strategies for Doxy PEP have been designed to optimize its preventive benefits among high-risk groups while mitigating concerns related to antibiotic resistance and patient adherence (Bachmann et al., 2024; Traeger et al., 2023). The Centers for Disease Control and Prevention (CDC) recommends a targeted approach, reserving Doxy PEP for individuals with a recent history of bacterial STI, particularly within the past year (Bachmann et al., 2024). This strategy prioritizes individuals at highest risk, such as those on HIV PrEP or those with recurrent STIs (Bachmann et al., 2024). The guidelines advise a single 200 mg dose of doxycycline to be taken within 72 hours of potential STI exposure, with no more than one dose per 24-hour period (Bachmann et al., 2024). This focused approach reduces unnecessary

antibiotic use while effectively preventing new infections, as demonstrated in a study by Traeger and team (2023), which found that this strategy averted 39% of potential STI cases while minimizing the number of individuals exposed to antibiotics.

Emerging research emphasizes the importance of individualized risk assessments in guiding Doxy PEP prescribing decisions (Ogunbajo et al., 2024). The research by Ogunbajo and team (2024) highlights that evaluating recent STI history and high-risk sexual behaviors, such as frequent condomless sex, is critical to identifying appropriate candidates for prophylactic treatment. Their findings indicate that individuals with multiple sexual partners or recent STI diagnoses were significantly more likely to be prescribed Doxy PEP, reinforcing the value of a data-informed, targeted approach to maximize the intervention's impact.

Several studies recommend integrating Doxy PEP with frequent STI testing and risk-reduction counseling as part of a broader, comprehensive sexual health strategy (Cannon & Celum, 2023; Fredericksen et al., 2024; Grant et al., 2020). Fredericksen and researchers (2024) note that many participants reported a sense of "peace of mind" while using Doxy PEP, which contributed positively to adherence. However, the researchers emphasized the importance of pairing this intervention with ongoing education about antibiotic resistance to support informed and responsible use. By linking Doxy PEP with routine STI screenings and provider check-ins every 3-6 months, providers can better monitor adherence, assess effectiveness, detect side effects, and reevaluate the patient's continued need for prophylaxis (Cannon & Celum, 2023; Fredericksen et al., 2024). These targeted strategies are consistent with CDC guidelines, which recommend Doxy PEP for individuals with a recent history of bacterial STIs and highlight the importance of shared decision-making in the prescribing process. By tailoring Doxy PEP to those at highest risk, such as individuals currently using HIV PrEP or those with frequent STI

diagnoses, providers can enhance the intervention's preventive impact while minimizing the risks associated with broad antibiotic use (Grant et al., 2020).

Doxy PEP has demonstrated high acceptability among MSM and TGW, largely due to its perceived effectiveness in reducing STI risk and its psychological benefits, such as increased control over sexual health (Ehsan et al., 2024; Fredericksen et al., 2024; Park et al., 2021; Zaleski et al., 2023). Studies by Park and researchers (2021) and Fredericksen and the team (2024) found that many participants were willing to adopt Doxy PEP if recommended by providers, with 67.5% of AMAB individuals in Park's study expressing interest. Users frequently described the sense of "peace of mind" associated with Doxy PEP use, citing reduced anxiety around STI risk without significant changes in sexual behavior (Fredericksen et al., 2024; Park et al., 2021). This perceived security reinforces Doxy PEP's value as a proactive prevention strategy that supports psychological well-being while promoting sexual health among high-risk individuals (Ehsan et al., 2024; Zaleski et al., 2023).

While Doxy PEP is widely accepted and valued for its psychological and preventive benefits, its growing use has raised important concerns about antimicrobial resistance (Grant et al., 2020; Vanbaelen et al., 2024; Zaleski et al., 2023). Although current studies have not demonstrated statistically significant increase in resistance among STI pathogens, Zaleski and researchers (2023) emphasized the need for ongoing monitoring, particularly for gonorrhea and chlamydia. A systematic review by Vanbaelen and authors (2024) suggested that although tetracycline resistance may theoretically rise with prolonged doxycycline use, the effect remained minimal across most clinical trials. However, the potential for emerging resistance over time cannot be ruled out (Vanbaelen et al., 2024; Zaleski et al., 2023). Further, Grant and group members (2020) warned that extended antibiotic exposure might disrupt the microbiome or

contribute to community-level bacterial resistance. These findings underscore the importance of balancing Doxy PEP's benefits with careful surveillance and responsible prescribing to preserve its long-term efficacy (Grant et al., 2020).

In addition to clinical concerns, studies highlight significant patient apprehensions surrounding antibiotic resistance and the social stigma associated with long-term Doxy PEP use (Ehsan et al., 2024; Tran et al., 2022; Vanbaelen et al., 2024; Zaleski et al., 2023). Ehsan and authors (2024) and Tran and researchers (2022) reported that participants expressed particular concern about resistance development in gonorrhea, especially in the oropharyngeal region, where repeated antibiotic exposure could foster resistance (Ehsan et al., 2024; Tran et al., 2022; Vanbaelen et al., 2024). Vanbaelen and colleagues (2024) similarly emphasized the need for surveillance of antibiotic susceptibility in this anatomical site. To address these concerns, Zaleski and the research team (2023) called for target public health messaging and the development of structured clinical guidelines. Such efforts are essential not only to promote responsible Doxy PEP use but also to reduce stigma and build patient confidence in the safety and rationale behind this preventive strategy.

Furthermore, research emphasizes the importance of addressing behavioral factors to ensure the appropriate use of Doxy PEP (Tran et al., 2022; Zaleski et al., 2023). Zaleski and authors (2023) recommend that providers emphasize the Doxy PEP's role as a supplementary strategy rather than a replacement for established prevention methods, such as condom use. Similarly, Tran and group members (2022) raised concerns about "risk compensation," where individuals may engage in higher-risk behaviors, such as reduced condom use, under the misconception that Doxy PEP alone offers complete protection. These findings underscore the need for thorough patient education regarding Doxy PEP's benefits and limitations, reinforcing

its place within a comprehensive and multifaceted STI prevention approach (Tran et al., 2022; Zaleski et al., 2023). By integrating behavioral counseling into Doxy PEP prescribing practices, providers can help ensure its responsible use and long-term effectiveness.

This review provides a comprehensive synthesis of the emerging evidence surrounding Doxy PEP as a promising STI prevention strategy, particularly among high-risk populations such as MSM and TGW. Recent studies confirm Doxy PEP's efficacy in significantly reducing the incidence of bacterial STIs and support targeted prescribing strategies that optimize its use while minimizing the risk of antimicrobial resistance. However, the success of Doxy PEP implementation hinges on tailored patient education, ongoing monitoring, and shared decision-making to address concerns such as antibiotic resistance and behavioral risk compensation (Tran et al., 2022). As Doxy PEP adoption expands, the development of evidence-based guidelines and structured provider training will be essential to ensure its safe, equitable, and effective integration into comprehensive STI prevention efforts.

The proposed interventions for implementing Doxy PEP are closely aligned with the identified needs and population profile at Pineapple Healthcare. Evidence from similar clinical settings serving high-risk populations demonstrates that Doxy PEP is effective in reducing the recurrence of bacterial STIs. These findings support the applicability of research-based interventions, such as targeted prescribing strategies, routine risk assessments, and patient-centered education within the Pineapple Healthcare setting. By incorporating a standardized protocol that emphasizes consistent counseling, antibiotic stewardship, and regular follow-up, the clinic can address current gaps in STI prevention. Tailoring these interventions to meet the specific needs of Pineapple's high-risk population not only promotes improved health outcomes

but also supports the clinic's alignment with CDC benchmarks and national STI prevention efforts.

Purpose

The project aims to standardize and enhance prescribing practices of doxycycline post-exposure prophylaxis (Doxy PEP) as a preventive strategy for bacterial sexually transmitted infections (STIs) in a primary care setting in Orlando, Florida. The initiative seeks to strengthen clinical practices by implementing standardized protocols, delivering targeted provider education, and applying evidence-based strategies to improve outcomes among high-risk populations. The purpose of this project is to determine the impact of a multi-tiered intervention on improving Doxy PEP utilization among high-risk individuals in a primary care clinic.

PICOT Question

What is the impact of a multi-tiered intervention to improve doxycycline post-exposure prophylaxis (Doxy PEP) utilization for high-risk individuals in a primary care clinic?

Theoretical Framework

The Consolidated Framework for Implementation Research (CFIR) serves as the guiding framework for this project, which aims to address inconsistencies in doxycycline post-exposure prophylaxis (Doxy PEP) counseling and prescribing practices within a primary care setting. CFIR is widely used in healthcare research to identify barriers and facilitators that influence the adoption and sustainability of evidence-based interventions (Damschroder et al., 2022). By examining the interaction between clinical innovations and organizational, individual, and external factors, CFIR provides a systematic and adaptable structure for implementation across diverse healthcare environments (Damschroder et al., 2022).

The five key domains of CFIR, including Innovation, Outer Setting, Inner Setting, Individuals, and Implementation Process, offer a structured approach to integrating Doxy PEP into clinical workflows (Damschroder et al., 2022). The Innovation domain focuses on the introduction and implementation of a structured risk assessment tool to standardize patient identification and improve provider adherence (Fredericksen et al., 2024). The Outer Setting accounts for external influences, such as Centers for Disease Control and Prevention (CDC) guidelines, healthcare policies, and financial structures, which shape the adoption of standardized protocols (Bachmann et al., 2024). Within the Inner Setting, factors such as clinic infrastructure, leadership support, and available resources determine how effectively the intervention aligns with existing workflows (Bekemeier et al., 2021Dias et al., 2023). The Individuals Characteristics domain highlights the role of healthcare providers, ensuring that targeted education and structured documentation practices enhance adherence to best practices (Ogunbajo et al., 2024). Finally, the Implementation Process emphasizes continuous evaluation, iterative refinements, and stakeholder engagement to ensure long-term sustainability (Bachmann et al., 2024; Damschroder et al., 2022; Traeger et al., 2023).

Guided by CFIR, this project will implement a multi-tiered intervention that includes provider education, integration of a structured risk assessment tool, and standardized counseling protocols. Embedding this tool into routine care is intended to streamline provider decision-making and ensure high-risk patients are consistently identified and appropriately prescribed Doxy PEP (Fredericksen et al., 2024; Obgunbajo et al., 2024). Applying CFIR's principles will support the identification of barriers, strengthen provider engagement, and enhance adherence to systematically identify barriers, strengthen provider engagement, and enhance adherence to CDC guidelines. Ultimately, this framework will guide the development of a sustainable, standardized

STI prevention protocol that improves outcomes for high-risk populations (Bachmann et al., 2024; Traeger et al., 2023).

Setting and Population

This project was conducted at Pineapple Healthcare, a Federally Qualified Health Center (FQHC) and primary care clinic located in Orlando, Florida, a densely populated, urban area in Central Florida. The clinic is staffed by four certified family nurse practitioners (NPs) and one certified physician assistant (PA), supervised by a physician with dual expertise in family medicine and infectious diseases. Supporting the clinical team are five medical assistants, two registered nurses, two receptionists, two mental health counselors, one medical case manager, and a clinic office leader, all working collaboratively to deliver patient-centered care.

As a federally designated healthcare facility, Pineapple Healthcare offers comprehensive primary care services, including preventive care, chronic disease management, and infectious disease treatment. The clinic primarily serves medically underserved and low-income populations, with an average daily patient volume of 35 to 40 individuals. The patient population is diverse, with approximately 48% identifying as White/Caucasian, 27% as Hispanic/Latino, 19% as Black/African American, 4% as Asian/Pacific Islander, and 2% as other or mixed race. Additionally, 90% of the patient population is assigned male at birth (AMAB), while 10% is assigned female at birth (AFAB). Among these individuals, 85% identify as either men who have sex with men (MSM) or transgender women (TGW), highlighting the clinic's role in addressing the specific healthcare needs of these high-risk populations.

Pineapple Healthcare provides care to patients through various payment sources that help make preventive services, including the doxycycline post-exposure prophylaxis (Doxy PEP) intervention, more accessible. The clinic receives federal funding to ensure that individuals in underserved communities can receive care, regardless of their ability to pay. In addition to

accepting private insurance from employer-sponsored plans or marketplace enrollment, the clinic participates in the 340B Drug Pricing Program, which helps lower medication costs and expand access to preventive treatments.

For patients without insurance, a sliding fee scale is available to make care more affordable. The clinic's funding structure, which includes federal grants, 340B program savings, insurance reimbursements, and patient self-pay options, allowed for the integration of interventions like Doxy PEP into routine care. These financial resources support STI prevention efforts by funding provider education, improving clinical workflows, and expanding outreach programs that increase patient access to evidence-based care. Given this infrastructure and population profile, Pineapple Healthcare represents an ideal setting for implementing a standardized Doxy PEP protocol tailored to the unique needs of its high-risk demographic.

Sample

To align with the 2024 Centers for Disease Control and Prevention (CDC) guidelines for Doxy PEP, the sample for this project included adult MSM and TGW who are 18 years or older, are sexually active, and had a documented bacterial STI within the past 12 months. These inclusion criteria are consistent with CDC recommendations identifying MSM and TGW with a recent STI history as appropriate candidates for Doxy PEP, thereby ensuring the intervention targets individuals at the highest risk for STI infections and who may benefit most from this preventive strategy.

Exclusion criteria include individuals under 18 years of age, individuals who do not identify as MSM or TGW, and those with contraindications to doxycycline, such as allergies or medical conditions that preclude its safe use. This carefully defined sample aligns with CDC recommendations and reinforces the clinical importance of standardizing Doxy PEP counseling and prescribing for high-risk individuals receiving care at Pineapple Healthcare.

Methods

Project Identification

The problem was identified through clinical observations, patient records, and feedback from the providers. It was found that there was no standardized protocol for prescribing doxycycline post-exposure prophylaxis (Doxy PEP) at the clinic (D. Eiflander, personal communication, November 12, 2024). A review of electronic health records (EHR) and discussions with the providers revealed inconsistent Doxy PEP prescribing patterns and high rates of recurrent bacterial sexually transmitted infections (STIs) among men who have sex with men (MSM) and transgender women (TGW), indicating a gap in preventive care (D. Eiflander, personal communication, November 12, 2024).

A retrospective review of STI screening and treatment records over the past 12 months was conducted, focusing on Doxy PEP prescription rates, documented STI recurrence from three previous office visits, and whether patients received Doxy PEP counseling. Additionally, providers and clinical staff feedback highlighted barriers to Doxy PEP implementation, such as inconsistent patient counseling and workflow inefficiencies. This evidence supported the need for an intervention to standardize Doxy PEP prescribing and enhance sexual health counseling for high-risk patients.

Approval to implement the project was obtained through formal engagement with clinic leadership and key stakeholders, including the medical director, nurse practitioners, and administrative staff. Clinical site approval was secured in September 2024, ensuring institutional support for the initiative. The Clinical Site Approval Letter can be viewed in Appendix B. After the project was presented to Francis Marion University nursing faculty, it was approved on March 26, 2025 (see Appendix C).

The success of this initiative depended on collaboration among the interprofessional team members, each fulfilling a specific role in integrating the assessment tool into clinical workflows and maintaining consistent, evidence-based care practices. Primary care providers, including the NPs and PA, were central to the implementation of this intervention as they were directly responsible for Doxy PEP counseling and prescribing. They assessed patient eligibility, provided education on benefits, risks, and adherence requirements, and prescribed the medication when appropriate. Additionally, the providers ensured consistent documentation of counseling and prescribing decisions, promoting standardized and comprehensive patient care.

Medical assistants played a crucial role in supporting patient care throughout the intervention. They assisted during patient encounters, contributing to a smooth and efficient workflow. Additionally, they helped facilitate comprehensive care by supporting STI screening procedures and collecting specimens when needed, ensuring timely and accurate testing.

Registered nurses and the medical case manager were essential in patient support, education, and documentation. They provided ongoing medical assistance through daily electronic communication, including phone calls, secure emails, and patient portal messaging, ensuring continuity of care. Additionally, they helped manage patient records, track assessments, and support overall clinical operations to enhance workflow efficiency and patient engagement.

The clinical office leadership team oversaw the integration of new workflows within the healthcare team, ensured operational efficiency, and adherence to best practices. Their responsibilities included supporting staff, monitoring clinical processes, and making necessary adjustments to optimize patient care. The leadership team maintained a collaborative and effective clinical environment by aligning day-to-day operations with evidence-based standards.

The Doctor of Nursing Practice (DNP) student served as the project lead, overseeing the development, implementation, and evaluation of workflow improvements at the clinical site.

This role included assessing current practices, identifying gaps in care, and integrating evidence-based guidelines into clinical operations. The DNP student collaborated with healthcare providers, medical assistants, registered nurses, and the clinical leadership team to establish standardized processes that enhance patient care and clinical efficiency.

Additionally, the DNP student facilitated staff training to ensure all team members understood their roles in implementing workflow changes. Responsibilities also included data collection and analysis, such as monitoring provider practices, documentation trends, and patient engagement efforts**.** Working closely with clinical leadership**,** the DNP student helped refine workflow integration, address implementation barriers, and support long-term sustainability**.** Through this leadership role, the DNP student strengthened care coordination, enhanced provider adherence to best practices, and optimized patient outcomes**.**

Study Design

This was a quality improvement (QI) project that addressed the inconsistent implementation of Doxy PEP counseling and prescribing practices in a primary care setting. The intervention took place over a 4-week period and focused on standardizing Doxy PEP counseling and prescribing practices through provider education, workflow integration, and the implementation of a risk assessment tool. The study analyzed pre- and post-intervention data to evaluate the impact of a multi-tiered intervention on improving Doxy PEP utilization among high-risk individuals in a primary care clinic, with a focus on counseling and prescribing of Doxy PEP.

Materials

Materials for this project were developed based on the 2024 Centers for Disease Control and Prevention (CDC) Doxy PEP guidelines to ensure alignment with evidence-based practice. Following these guidelines, the Doxy PEP Risk Assessment Tool was created to help providers

identify eligible patients and standardize the screening process, including sexually active adults aged 18 years and older, MSM, TGW, and those who had an STI diagnosis within the past year (see Appendix D). Designed for patient use, the paper-based risk assessment tool was developed by the DNP student and was approved by the medical staff and leadership at Pineapple Healthcare and by nursing faculty at Francis Marion University (FMU).

Additional materials included a printed copy of the CDC guidelines with key selections on Doxy PEP benefits highlighted for quick reference for providers. A standardized counseling script was developed outlining key discussion points, including the purpose, eligibility criteria, proper usage, potential side effects, and adherence requirements of Doxy PEP (see Appendix E). This structured script served as a guideline for providers to deliver comprehensive, evidence-based counseling while maintaining a patient-centered approach. By using a structured script, providers ensured that all patients received clear and consistent information, reducing variability in counseling practices and improving patient understanding of Doxy PEP.

Approval for using these materials at the project site was obtained by the medical providers and administrative staff at Pineapple Healthcare. The Doxy PEP Risk Assessment Tool was reviewed for content validity by five experts in this field, including two providers at the project site and three faculty members from the nursing department at FMU.

Intervention

The project began with an initial investigation into the utilization of Doxy PEP in clinical practice, which revealed gaps in the standardization of Doxy PEP counseling and prescribing practices. Inconsistencies were identified in provider adherence to guidelines and underutilization of Doxy PEP as an STI prevention strategy. Recognizing the need for a standardized approach, discussions were held with healthcare providers and leadership team to present the proposed QI project. These discussions emphasized the importance of aligning

clinical practices with the 2024 CDC Doxy PEP guidelines, improving provider consistency in counseling, and increasing Doxy PEP utilization among high-risk populations.

The pre-implementation phase focused on staff education, workflow integration, and materials preparation to ensure a standardized approach to Doxy PEP screening, counseling, and prescribing. The DNP student developed educational materials, including the Doxy PEP Risk Assessment Tool and a standardized counseling script for providers. These materials were compiled into five training binders, one for each exam room, and utilized for training purposes to providers and support staff on screening protocols, prescriptive guidelines, and patient counseling recommendations. Additionally, the project was submitted to the FMU institutional Review Board (IRB) for ethical review and approval.

Prior to the implementation of the DNP project in May 2025, a one-time 45-minute in-service training session was conducted in late-April 2025 to educate all providers, administrative staff, and clinical leadership on the purpose, implementation, and documentation of the Doxy PEP Risk Assessment Tool. For any staff unable to attend the in-service, a follow-up session was scheduled, and educational materials were distributed electronically to ensure all team members receive the necessary training. To reinforce workflow adjustments, a 15-minute morning huddle was also held in late-April 2025 with medical assistants, registered nurses, the medical case manager, and receptionists to clarify each team member's role in the implementation process. Clinical leadership was present to provide support and address any concerns, with individual follow-ups for absent staff.

The implementation phase took place in May 2025, during which the Doxy PEP Risk Assessment Tool was integrated into routine patient encounters. Upon patient arrival, a medical assistant escorted the patient to the examination room, recorded vital signs, and retrieved the training binder from the designated drawer. They then delivered the binder and the encounter

visit worksheet to the provider, initiating the provider-led, paper-based tool as a standard component of the patient visit. No patient identifiers were placed on this tool.

During screening, the providers facilitated the questionnaire, recorded patient responses in real-time, and documented eligibility, counseling decisions, prescription status, and any refusals directly on the assessment tool. This ensured standardized data collection and consistency in clinical decision-making. Providers screened all patients during their visit in May 2025, assessing sexual history, prior STI diagnoses, and other risk factors. Only adults aged 18 and older who meet the eligibility criteria were included in the project, ensuring that minors are not assessed for Doxy PEP eligibility. The Doxy PEP Risk Assessment Tool included questions evaluating sexual preferences, sexual history, and past STI diagnoses, aligning with CDC guidelines to ensure high-risk individuals are appropriately identified. To support this process, blank assessment tools were stored in each training binder, ensuring they are readily available during patient encounters. Upon completing the assessment, the provider determined whether the patient meets eligibility criteria for Doxy PEP, made final clinical decisions, and documented all relevant information directly on the Doxy PEP Risk Assessment Tool, ensuring standardized protocol implementation.

For eligible patients, the provider initiated a standardized counseling session based on CDC recommendations. The discussion included information on the benefits, risks, adherence requirements, and potential side effects of Doxy PEP. The provider addressed any patient concerns, ensuring informed shared decision-making before prescribing the medication. For patients who agreed to Doxy PEP, the provider completed the prescription order. For uninsured patients or those who preferred an alternative option, a 50-count bottle of Doxycycline 100 mg was available from the clinic's medication stock for a cost of $20 (N. Giha, personal communication, February 14, 2025). If a patient declined the medication or was deemed

ineligible, the provider documented this information to maintain a comprehensive record of screening efforts and ensure proper follow-up.

After the visit, the provider handed the completed risk assessment tool to a medical assistant. The medical assistant team compiled and stored the forms in a designated locked overhead cabinet until the end of each day. At that time, the risk assessment tools were placed in the locked filing cabinet by a designated clinical staff member to ensure confidentiality and compliance with data security protocols. All completed risk assessment tools were kept in this locked filing cabinet for the duration of the project to ensure secure record-keeping and adherence to confidentiality standards.

The post-implementation phase involved data collection and analysis to evaluate the intervention's impact. During the four-week intervention period, the DNP student conducted structured data collection to track provider adherence, patient eligibility, and prescribing patterns. Each day, the DNP student retrieved completed Doxy PEP Risk Assessment Tools from the locked filing cabinet, where they were securely stored after patient visits. They were then manually entered into a password-protected Microsoft Excel spreadsheet on a secured clinic computer. This dataset included patient eligibility status, provider counseling completion, whether a prescription was issued or declined, and any noted refusals. To ensure accuracy, the DNP student conducted a daily review to identify any missing or incomplete data. At the end of each week, preliminary trends in provider adherence, counseling rates, and prescribing patterns were analyzed to assess implementation effectiveness.

To maintain data integrity and confidentiality, strict protocols were followed throughout the evaluation process. Completed Doxy PEP Risk Assessment Tools were securely stored in a lock filing cabinet within a restricted-access area of the clinic, accessible only to the DNP student and authorized personnel. To further protect patient privacy, all data were de-identified

before analysis, with no personal identifiers, such as name, dates of birth, or medical record numbers, included in the dataset. Instead, numerical values were recorded in an Excel-based tracking system on a password-protected laptop, with access restricted to the DNP student and authorized clinical staff. At the conclusion of the intervention, the risk assessment tools were securely disposed of in accordance with the clinic's protocols for confidential document handling. Electronic data from the assessment tools were retained only in an aggregated, de-identified format for analysis and reporting purposes, ensuring compliance with privacy regulations and preventing the storage of individual patient records beyond the project's scope.

The evaluation process assessed changes in Doxy PEP prescribing patterns, provider adherence, and patient demographics. The primary outcome evaluated the percentage of appropriate Doxy PEP prescriptions in May 2025 (post-intervention) compared to May 2024 (pre-intervention), based on the number of eligible patients counseled and prescribed Doxy PEP. Secondary outcomes analyzed demographic variables such as age, gender, and race/ethnicity to identify tendencies within the patient population. Group characteristics and tendencies helped determine whether specific demographics were more likely to be screened for Doxy PEP eligibility, counseled, or prescribed the medication.

Data Collection and Analysis

Descriptive Analysis

Pre-intervention demographics for patients seen at the clinic in May 20204 were extracted from de-identified aggregated electronic health record documentation. Variables of age, gender, and race/ethnicity were analyzed to establish baseline characteristics of the pre-intervention cohort. Additionally, data on Doxy PEP counseling and prescribing rates from May 2024 were reviewed to determine baseline adherence to CDC guidelines and measure existing Doxy PEP utilization.

Post-intervention demographics for patients seen during the month of May 2025 were collected from the Doxy PEP Risk Assessment Tool. The DNP student entered de-identified patient demographics into an Excel spreadsheet on a password-protected computer for analysis. Variables of age, gender identity, sexual preferences, and race/ethnicity were aggregated to examine group characteristics and compare changes from pre- to post-intervention.

Instrument, Survey, and Tool Data Analysis

The Doxy PEP Risk Assessment Tool was the primary instrument used to determine patient eligibility for Doxy PEP in accordance with the 2024 CDC guidelines. This tool supported clinical decision-making, ensuring that eligible patients receive standardized counseling and, when appropriate, a prescription for Doxy PEP. The DNP student, medical case manager, and registered nurses reviewed completed Doxy PEP Risk Assessment Tools daily to verify completion and ensure documentation of counseling and prescribing practices.

To establish baseline prescribing and counseling patterns, a retrospective review of patient visits from May 2024 was conducted. This data included the number of patients counseled and prescribed Doxy PEP, as appropriate, before the intervention. During the four-week intervention period in May 2025, the DNP student extracted daily data from the completed risk assessment tools and recorded findings in an Excel-based tracking system. These data points were used to calculate the percentage of appropriate prescriptions and compare Doxy PEP uptake pre- and post-intervention.

This systematic approach quantified pre-intervention adherence rates and served as a comparative reference for evaluating post-intervention outcomes. Changes in counseling rates, prescribing patterns, and provider adherence were assessed to determine the impact of the intervention. Demographic trends were also analyzed to determine potential variations in Doxy PEP screening, counseling, and prescribing patterns among different age groups, genders, and

racial/ethnic groups. By comparing pre- and post-intervention demographic distributions, the project evaluated whether the intervention reached diverse patient populations equitably.

Outcome Measures

The primary outcome of this project was the percentage of eligible patients who were either counseled, prescribed Doxy PEP, or both, in May 2025 (post-intervention) compared to May 2024 (pre-intervention). Eligibility was determined using the structured risk assessment tool. The numerator consisted of patients who received counseling and a prescription of Doxy PEP, as appropriate, while the denominator included all individuals identified as eligible. The percentage was calculated by dividing the number of patients counseled on and/or prescribed Doxy PEP (numerator) by the total number of eligible individuals (denominator) and multiplying by 100. The effectiveness of the intervention was assessed by determining whether there was a significant change in Doxy PEP counseling and prescribing rates following implementation, reflecting improved adherence to the 2024 CDC guidelines and enhanced access to STI prevention services. The secondary outcome evaluated demographic variables, including age, gender, and race/ethnicity, which were collected and analyzed to identify trends within the patient population. Descriptive statistics, such as frequencies and percentages, were used to summarize demographic patterns and assess any shifts in Doxy PEP utilization across different demographic groups following the intervention.

At the conclusion of the project, findings determined the effectiveness of a multi-tiered approach in improving Doxy PEP utilization for high-risk individuals within primary care. The results assessed whether standardizing counseling and prescribing practices, using a structured screening protocol, led to improved provider adherence, counseling rates, and prescribing patterns. These insights informed future quality improvement efforts aimed at promoting consistent, evidence-based STI prevention in vulnerable populations.

Timeline Table

The Timeline Table can be viewed in Appendix F.

Protection of Human Participants

During this project, the protection of human participants was prioritized to ensure compliance with ethical and legal regulations, including the Health Insurance Portability and Accountability Act (HIPAA) (Grace & Uveges, 2023). By adhering to ethical, legal, and security considerations, the project ensured that participant confidentiality was protected while assessing the effectiveness of the doxycycline post-exposure prophylaxis (Doxy PEP) intervention in reducing bacterial sexually transmitted sexual infection (STI) transmission among high-risk populations. The Doxy PEP Risk Assessment Tool was facilitated solely by healthcare providers as part of routine clinical care, ensuring that data collection was embedded into the standard workflow without imposing additional burdens on patients. Additional safeguards ensured the ethical treatment of participants. Patients were not required to participate in Doxy PEP counseling or prescribing if they chose not to, and their standard of care remained unaffected by their decision. Providers documented refusals, ensuring the patients' choices were respected while maintaining the integrity of the intervention.

To uphold patient confidentiality, all collected data were fully de-identified, ensuring that personal identifiers, such as names, dates of birth, and medical record numbers, were excluded from reports and analyses. Instead, aggregate numerical data were used to assess provider adherence to Doxy PEP counseling and prescribing rates without linking individual patient information to specific outcomes. Numerical values were recorded in the dataset to evaluate the impact of the intervention objectively without compromising patient privacy. Since the Doxy PEP Risk Assessment Tool was paper-based, completed forms were securely stored in a locked file cabinet within a restricted-access area of the clinic to maintain confidentiality and data

security throughout the evaluation process. Only the Doctor of Nursing Practice (DNP) student and authorized personnel had access to these forms. To reinforce data protection, de-identified data were entered into an Excel-based data tracking system on a password-protected laptop, with access restricted to the DNP student and authorized clinical staff.

At the conclusion of the intervention, the risk assessment tool was shredded following the clinic's protocols for securely disposing of confidential documents. Electronic data were retained only as de-identified, aggregated information for analysis and reporting purposes, ensuring that no individual patient data were stored beyond the scope of the project. Additionally, patients had the right to opt out of participation in the risk assessment at any point during their visit. While all adult patients were screened using the tool, participation in Doxy PEP counseling or prescribing remains voluntary, and refusals were documented to maintain ethical transparency.

This project was submitted to the Francis Marion University (FMU) Institutional Review Board (IRB) for ethical review and approval prior to implementation. Oversight by the IRB ensured that all ethical considerations, participant protections, and data security measures aligned with regulatory standards for quality improvement initiatives in clinical practice. Since the risk assessment tool was administered as part of routine clinical care, no additional surveys were required, and formal informed consent was not necessary (Hunt et al., 2021). This aligned with research policies that allow quality improvement initiatives in clinical settings without requiring individual patient consent, provided there are no deviations from standard care (Goldstein, 2021; Hunt et al., 2021).

All clinical staff involved in the intervention, including providers, nurses, and medical assistants, completed HIPAA compliance and patient confidentiality training within the last year (A. Fuentes Plaza, personal communication, February 14, 2025). Certification records for each employee were reviewed to verify compliance and ensure that all staff members adhere to data

security and ethical responsibility protocols throughout the implementation of the intervention. By ensuring robust confidentiality protections, participant autonomy, and IRB oversight, this project upheld high ethical standards in clinical research and quality improvement initiatives, providing both patient safety and data integrity in evaluating the effectiveness of Doxy PEP implementation in a primary care setting.

Cost-Benefit Analysis

A structured cost-benefit analysis was conducted to evaluate the financial feasibility and resource impact of implementing the doxycycline post-exposure prophylaxis (Doxy PEP) Risk Assessment Tool and associated provider training. The total estimated implementation cost is $839, which covered the development of the risk assessment tool, provider and staff training, and necessary clinical supplies. A contingency fund of $100 was allocated for unforeseen expenses, ensuring financial flexibility. Despite these initial costs, the intervention is expected to yield significant financial benefits. Research indicates that Doxy PEP can prevent up to 70% of bacterial sexually transmitted infections (STIs) occurrences among high-risk individuals (Bachmann et al., 2024). Applying this prevention to an anticipated 800 patients, projected financial savings from reduced STI treatment costs and increased insurance reimbursements amount to $95,998. After deducting implementation costs ($839), the net financial benefit is $95,159, resulting in a return on investment of $114.34 saved for every dollar spent. A detailed breakdown of the cost-benefit analysis can be found in Appendix G.

In addition to financial savings, Doxy PEP implementation is expected to enhance provider efficiency and improve patient outcomes. Standardized protocols help reduce decision-fatigue, improve workflow consistency, and expand access to timely preventive care (Fredericksen et al., 2024). Patients will benefit from improved sexual health outcomes, greater access to preventive services, and reduced stigma, while community STI transmission rates are

expected to decline, lessening the broader public health burden (Ehsan et al., 2024). The long-term sustainability is reinforced by its alignment with Centers for Disease Control and Prevention (CDC) guidelines, institutional credibility, and comprehensive patient care initiatives (Jung et al., 2023). Given the significant financial savings, increased provider engagement, improved patient screening, and expansion of STI prevention services, Doxy PEP integration into primary care settings represents a cost-effective, evidence-based strategy (Pearson et al., 2021). This initiative also reinforces Pineapple Healthcare's leadership in advancing sexual health and aligning with national prevention goals (United States Department of Health and Human Services [HHS], 2024).

Results

Demographics

A retrospective chart review conducted in May 2024 identified patients at high risk for bacterial sexually transmitted infections (STIs) who were eligible for doxycycline post-exposure prophylaxis (Doxy PEP) counseling and potential prescription. During this period, 810 patients were seen. Of these, 714 (88.1%) met criteria for eligibility based on documented gender identity and sexual behavior, including men who have sex with men (MSM) and transgender women (TGW). Among the high-risk cohort, 96.6% (n=690/714) identified as MSM, 3.1% (n=22/714) as TGW, and 0.3% (n=2/714) as nonbinary or third gender, whose sexual behaviors aligned with MSM and TGW risk profiles. In terms of age, the most common groups were 25-34 years (n=299 or 41.9%) and 35-44 years (n=234 or 32.8%), followed by 45-54 (n=85 or 11.9%), 18-24 (n=53 or 7.4%), 55-64 (n=42 or 5.9%), and 65 years or older (n=1 or 0.1%)**.** Regarding race and ethnicity, 44.5% (n=320/714) identified as White/Caucasian, 44.3% (n=316/714) as Latino/Hispanic, 7.0% (n=50/714) as Black/African American, 3.8% (n=27/714) as

Asian/Pacific Islander, and 0.1% (n=1/714) as Middle Eastern. A full summary of pre-intervention demographics is provided in Appendix H, Table 1.

During the May 2025 implementation period, 656 patients were assessed using the standardized Doxy PEP Risk Assessment Tool. Of these, 592 (90.2%) were identified as high risk for bacterial STIs based on gender identity and sexual behavior. Most high-risk patients identified as MSM (98.0% or n=580/592), with smaller proportions identifying as TGW (1.9% or n=11/592) or nonbinary/third gender (0.2% or n=1/592). Classifications were not mutually exclusive; eligibility was based on a combination of sexual behavior and gender identity, which meant some individuals could be counted in more than one high-risk group. Among this group, the most common age categories were 35-44 years (37.5% or n=222/592) and 25-34 years (36.0% or n=213/592), followed by 45-54 years (15.5% or n=92/592), 55-64 years (6.1% or n=36/592), 18-24 years (4.2% or n=25/592), and 65+ years (0.7% or n=4/592). Racial and ethnic data showed that 56.8% (n=336/592) were White, 33.4% (n=198/592) Latino/Hispanic, 5.2% (n=31/592) Black/African American, 3.4% (n=20/592) Asian/Pacific Islander, 1.0% (n=6/592) Middle Eastern, and 0.2% (n=1/592) Native American/Alaska Native. Most had active health insurance (97.3% or n=576/592), and 83.1% (492/592) preferred English, followed by Spanish (15.7% or n=93/592), Portuguese (0.7% or n=4/592), and Haitian Creole (0.5% or n=3/592). Comprehensive demographic details are presented in Appendix I, Table 2

Doxy PEP Counseling and Prescribing Percentages

The primary outcome compared the proportion of eligible patients who either received counseling, a prescription, or both in May 2025 (post-intervention) versus May 2024 (pre-intervention). In May 2024, 25.6% (n=183/714) of high-risk patients received both counseling and a prescription. By May 2025, this increased significantly to 80.1% (n=474/592), reflecting a

substantial improvement in provider adherence to structured screening protocols. Counseling was provided to 100% (n=592/592) of eligible patients, and 80.1% (n=474/592) received a prescription. These results demonstrate that the initiative achieved full adherence to counseling protocols and significantly improved prescribing practices. A visual comparison of these rates is available in Appendix J.

Characteristics of Patients (Post-Intervention)

Accepted and Received Doxy PEP

Among those counseled in May 2025, 474 (80.1%) accepted and received a Doxy PEP prescription. Most were aged 35-44 years (38.6% or n=183/474) and 25-34 years (34.4% or n=164/474), followed by 45-54 years (15.6% or n=74/474), 55-64 years (5.5% or n=26/474), 18-24 years (4.9% or n=23/474), and 65+ years (0.8% or n=4/474). The majority identified as MSM (97.9% or n=464/474), while 1.9% (n=9/474) identified as TGW, and 0.2% (1/474) as nonbinary/third gender. As with the broader post-intervention sample, some patients may have been counted in more than one category due to overlapping sexual behavior and gender identity. In terms of race and ethnicity, 57.6% (n=273/474) were White, 33.5% (n=159/474) Latino/Hispanic, 4.6% (n=22/474) Black/African American, 3.0% (14/474) Asian/Pacific Islander, and 1.3% (n=6/474) Middle Eastern. These findings suggested strong uptake among younger, insured, English-speaking MSM, though prescribing reached diverse age, gender, and racial groups. A detailed summary is included in Appendix K.

Declined Doxy PEP

Conversely, 118 high-risk individuals (19.9%) declined Doxy PEP following counseling. Refusal patterns varied across age and demographic profiles. The majority were aged 25-34 years (41.5% or n=49/118) and 35-44 years (33.1% or n=39/118), followed by 45–54 years

(15.3% or n=18/118), 55-64 years (8.5% or n=10/118), 18–24 years (1.7% or n=2/118), and 65+ (0.8% or n=1/118). Most who declined were MSM (98.3% or n=116/118), while 1.7% (n=2/118) were TGW. Racial and ethnic demographics included 53.4% (n=63/118) White, 33.1% (n=39/118) Latino/Hispanic, 7.6% (n=9/118) Black/African American, 5.1% (n=6/118) Asian/Pacific Islander, and 0.8% (n=1/118) Native American.

Open-Ended Responses and Additional Notes

Among the open-ended responses documented by providers, several patients were categorized under "Other" for both race/ethnicity and preferred language. Specifically, one patient self-identified as Middle Eastern, while others reported Portuguese or Haitian Creole as their preferred language. In cases where patients were eligible for Doxy PEP but did not receive a Doxy PEP prescription, providers documented reasons under open-text fields. The most commonly documented reasons for declining Doxy PEP included a reported allergy to doxycycline (2.5% or n=3/118), low perceived risk due to monogamous relationship partnership (75.4% or n=89/118), identifying as asexual (5.1% or n=6/118), concerns about antibiotic resistance or side effects (12.7% or n=15/118), and engaging primarily in non-penetrative sexual activity (4.2% or n=5/118). Some patients in the latter group described themselves as "side," a term used within certain sexual health and LGBTQ+ communities to refer to individuals who do not engage in anal or vaginal intercourse but instead prefer other forms of sexual intimacy (Bollas, 2023). Appendix L provides a full breakdown of patient-reported reasons for declining Doxy PEP. These findings emphasized the role of patient-centered decision-making in shaping Doxy PEP uptake.

Discussion

The implementation of a standardized Doxy PEP screening form within primary care setting resulted in a marked improvement in both the identification of high-risk individuals and the delivery of appropriate sexually transmitted infection (STI) prevention efforts. Counseling and prescribing rates rose significantly from 25.6% (n=183/714) in May 2024 (pre-intervention) to 80.1% (n=474/592) in May 2025 (post-intervention), demonstrating that the tool effectively addressed a previously identified practice gap at Pineapple Healthcare. These findings suggested that integrating a standardized clinical tool into routine workflows enhanced provider adherence to national guidelines and supported public health efforts to reduce bacterial STI reinfections in high-risk populations, particularly among priority populations such as men who have sex with men (MSM) and transgender women (TGW).

This outcome was both expected and encouraging. The retrospective review of May 2024 revealed a substantial gap in the delivery of preventive services, particularly in the areas of Doxy PEP counseling and prescribing practices. The project was designed to address this gap by streamlining clinical decision-making, standardizing eligibility assessment, and reinforcing Centers for Disease Control and Prevention (CDC) recommendations. The post-intervention results supported the claim that a targeted, evidence-based approach can enhance STI prevention outcomes and promote consistency among providers in clinical practice.

The project's implications were multifaceted. For patients, the availability of Doxy PEP counseling and prescriptions had the potential to lower the incidence of recurrent bacterial STIs that could have led to long-term reproductive and systemic health issues. The project also promoted engagement with sexual health services, especially among those facing care barriers related to stigma or gender identity. For providers, the structured risk assessment tool simplified eligibility screening and documentation, reducing cognitive burden and improving clinical

efficiency. At a systems level, the success of this initiative underscored the feasibility of adopting CDC-aligned protocols into everyday workflows without compromising care delivery. Informal feedback from providers post-intervention indicated increased confidence and comfort in initiating conversations about Doxy PEP, reflected improved provider perceptions and demonstrated willingness to engage in preventive sexual health discussions. Patients expressed appreciation for the proactive and affirming approach to care.

These findings aligned with the 2024 CDC Doxy PEP Clinical Practice Guidelines, which recommended offering Doxy PEP to high-risk individuals, especially with a recent history of bacterial STIs, to reduce the risk of reinfection (Bachmann et al., 2024). This intervention also reinforced existing literature, which showed that Doxy PEP was a safe, effective, and acceptable STI prevention strategy when applied to appropriately screened, high-risk individuals (Cannon & Celum, 2023; Luetkemeyer et al., 2023). Cannon and Celum (2023) emphasized that successful Doxy PEP adoption relies on more than just patient education. Systematic clinical workflows, such as structured risk assessment forms and integration with electronic health record (EHR) systems, were also essential. These tools helped identify high-risk individuals and supported consistent provider adherence to established guidelines. The structured assessment tool used in this project reflected this approach and likely contributed to improved provider uptake and standardization of care.

Furthermore, qualitative and applied science research further highlighted the importance of culturally affirming care, strong provider-patient relationships, and streamlined clinical workflows in the success of preventive health strategies (Ehsan et al., 2024; Fredericksen et al., 2024). These factors were shown to influence patient engagement and satisfaction with services like Doxy PEP. These elements were reflected in this project’s outcomes, including increased

provider confidence, workflow efficiency, and improved patient engagement. Collectively, these outcomes supported the adoption of decision-support tools into clinical workflows as a mechanism to advance equitable and evidence-based STI prevention.

Barriers and Facilitators

One notable challenge involved inconsistent documentation practices prior to implementation, which hindered the ability to conduct comprehensive pre- and post-intervention comparisons. Consequently, the analysis was limited to patients who were both counseled and prescribed Doxy PEP in May 2024 and May 2025. This restricted the evaluation of additional factors, such as standalone counseling documentation, documented reasons for patient refusal, and partial adherence among providers in the pre-intervention group. Some providers also required clarification on the CDC eligibility criteria for Doxy PEP, leading to minor delays in consistent use of the tool. Despite initial inconsistencies, collaboration with site champions Dr. Christian Otero, DMSc, PA-C, and Derek Eiflander, APRN, FNP-C, was instrumental in reinforcing tool use and building provider engagement. These champions actively reinforced use of the clinical decision-support tool, modeled adherence to the new workflow, and provided peer-level support to fellow clinicians, fostering a culture of shared purpose and collective accountability.

Revisions to Risk Assessment Tool

In response to early feedback, the structured screening form was revised at the outset of the intervention to enhance clarity, usability, and alignment with CDC recommendations (see Appendix M). The original tool listed multiple risk factors without distinguishing between core eligibility criteria from supplementary indicators. After several completed forms and provider consultations, it became evident that greater delineation was necessary to support consistent

decision-making. The revised tool introduced two clearly defined sections: “Required Criteria”, based on CDC guidance identifying MSM and TGW as primary high-risk populations, and “Additional Risk Factors”, including recent STI diagnosis or treatment, which reflect heightened susceptibility to reinfection. This structural adjustment clarified the eligibility pathway and strengthened clinical judgment during patient encounters.

The tool’s language was also refined to include the phrase “or previously” in critical prompts, such as “Was patient counseled on Doxy PEP (or previously)?” and “Was Doxy PEP prescribed (or previously)?” This change allowed providers to account for counseling or prescriptions documented in prior visits, reducing redundancy and ensuring accurate capture of preventive care activities. By acknowledging prior efforts, the tool reinforced continuity of care and encouraged providers to consistently offer counseling once a patient was identified as high-risk.

A revised workflow diagram was created and introduced alongside the updated screening tool (see Appendix N). This visual resource illustrated the standardized process of administering the tool, evaluating eligibility, and proceeding with structured Doxy PEP counseling. By integrating a stepwise workflow, the project reinforced continuity of care and encouraged providers to consistently assess and address patient risk in alignment with CDC guidelines.

Strengths and Limitations

A key strength of this project was the high level of engagement and commitment from site leadership and clinical staff, which facilitated successful uptake and provider buy-in. The strategy was cost-effective, required few additional resources, and was intentionally designed to fit seamlessly into existing clinic workflows, enhancing its feasibility and adaptability in routine primary care. Additionally, the structured Doxy PEP Risk Assessment Tool offered a reliable

and standardized mechanism for identifying eligible patients and guiding provider decision-making. Informal observations during the implementation period revealed strong provider participation, growing confidence in delivering guideline-based care, and increasing comfort with using the tool. However, the project also had notable limitations. It was conducted at a single primary care site, which may not be fully generalizable to other clinical settings or populations. The four-week timeline limited the ability to assess long-term changes in provider behavior and patient outcomes. Moreover, although the paper-based tool was practical and effective, future iterations could benefit from embedding within the EHR to streamline documentation and enhance workflow efficiency.

Future Implications

The results of this project highlighted several important directions for future quality improvement initiatives and translation research. To enhance generalizability, future projects should consider replicating the approach across multiple clinical sites, including those that serve more diverse patient populations and geographic regions. Such expansion would help evaluate whether the standardized Doxy PEP Risk Assessment Tool remains effective in varied healthcare settings. Additionally, extending the project timeline beyond four weeks would provide a more comprehensive understanding of sustained provider adherence, long-term prescribing patterns, and patient outcomes over time. Another important opportunity for refinement lies in embedding the risk assessment tool into the EHR. Incorporating the tool within standard documentation workflows could improve efficiency, reduce redundancy, and promote consistent application across providers. EHR integration also enables real-time clinical decision support and facilitates robust data collection for ongoing monitoring and evaluation. Lastly, a preliminary pilot-testing phase prior to full-scale rollout may be beneficial. Pilot testing can help identify and address

issues related to tool design, language clarity, and ease of use, thereby increasing provider confidence and compliance. Moreover, engaging a broader range of clinic staff, such as medical assistants, nurses, and patient navigators, as project champions can strengthen interdisciplinary collaboration, improve workflow consistency, and enhance patient education.

Cost is often cited as a barrier to STI prevention; however, Pineapple Healthcare's policy of directly supplying doxycycline to uninsured patients at low cost likely minimized financial barriers during the intervention (Sunagawa et al., 2025). The high uptake of Doxy PEP among both insured and uninsured individuals suggests that access-supportive workflows, such as in-clinic medication procurement, may enhance intervention equity. While no direct correlation was observed between insurance status and Doxy PEP acceptance, future projects may benefit from exploring how structural supports impact uptake across diverse clinical settings.

These recommendations supported the scalability of the initiative and emphasized the value of incorporating structured, evidence-based tools into routine clinical practice. By continuing to refine and expand these efforts, future projects may achieve an even greater impact on reducing STI incidence and advancing equitable access to sexual health services for high-risk populations. Ongoing feedback from both patients and providers will be essential to ensure sustained success, adaptability, and relevance in diverse clinical environments. One key lesson learned from this project is that successful implementation depends not only on tool design but also on early provider buy-in, workflow clarity, and sustained engagement from clinical champions; elements that future implementers should prioritize from the outset.

Conclusion

This quality improvement project demonstrated that implementing a standardized Doxycycline Post-Exposure Prophylaxis (Doxy PEP) screening tool within a primary care setting

significantly enhanced provider adherence to national guidelines and increased patient engagement in preventing sexually transmitted infections (STIs). The increase in Doxy PEP counseling and prescribing, from 25.6% pre-intervention to 80.1% post-intervention, illustrates the intervention's effectiveness in improving clinical workflows and delivering evidence-based care. These findings suggest that structured, low-cost decision-support tools can help close critical gaps in STI prevention, particularly among high-risk groups such as men who have sex with men (MSM) and transgender women (TGW). In addition to improving clinical outcomes, the project promoted a more proactive, affirming approach to sexual health counseling among providers. The success highlighted the project's scalability potential and reinforced the importance of integrating guideline-aligned tools into routine care to advance equitable, preventive healthcare delivery. As STI rates continue to rise nationally, the adoption of structured clinical tools like the Doxy PEP Risk Assessment Tool contributes to broader public health goals by reducing preventable infections and addressing persistent disparities among high-risk and marginalized populations.

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Appendix A

Focused Evidence Table

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
CDC Clinical Guidelines on the Use of Doxycycline Postexposure prophylaxis for Bacterial Sexually Transmitted Infection Prevention, United States, 2024, Bachmann et al., 2024, United States Department of Health and Human Services, Centers for Disease Control and Prevention, Level 1.	The objective is to provide clinical guidelines on the use of Doxy PEP for preventing bacterial STIs like syphilis, gonorrhea, and chlamydia in high-risk populations, such as MSM and TGW.	Systematic literature review and meta-analysis were conducted by the multidisciplinary CDC workgroup. Also, two virtual consultations were reviewed by the Doxy PEP Guidelines Development workgroup.	67 reviewed literatures published during 1987-2022. Meta-analysis of 18 studies, including randomized controlled trials (RCTs), clinical trials, and cohort studies.	Authors screened the search results for literature reviews. MEDLINE/PubMed and Embase were searched. Additionally, virtual consultations involving experts and community stakeholders. were reviewed.	Collected data informs the following questions: 1. Does doxycycline taken after vaginal, anal, or oral sex decrease bacterial STIs (i.e., syphilis, chlamydia, and gonorrhea) compared with not taking doxycycline? 2. Does long-term doxycycline use cause substantial harms such as the development of antimicrobial resistant pathogens, and dermatologic, gastrointestinal, neuropsychiatric, and metabolic side effects?	Conducted meta-analysis by pooling data. GRADE system used to evaluate quality of evidence. Peer and public reviews were also conducted to ensure the recommendations reflect diverse expert opinions and public health needs.	Taking 200 mg of doxycycline taken within 72 hours after sex has been shown to reduce syphilis and chlamydia infections by >70% and gonococcal infections by approximately 50%.	Emphasizes the importance of a tailored, individualized patient care plan. Doxy PEP should be offered and implemented to improve a comprehensive sexual health approach, including risk reduction counseling, STI screening, and treatment, recommended vaccination, linkage to HIV pre-exposure prophylaxis (PrEP), HIV care, or other services as appropriate.

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
Doxycycline postexposure prophylaxis for prevention of sexually transmitted infections, Cannon & Celum, 2023, *Topics in Antiviral Medicine,* Level 1a	The objective of this study is to evaluate the current evidence surrounding Doxy PEP for STI prevention, weighing its benefits and risks, and to offer guidance for clinical practice and future research in this evolving area of public health.	Systematic Review	Reviewed literature, including observational studies, cohort studies, and RCTs.	Authors screened the search results for literature reviews. PubMed, Crossref, and Google Scholar databases were searched. Additionally, consultations involving experts and community stakeholders. were reviewed.	Themes include incidence of bacterial STIs, safety and adverse effects, antibiotic resistance, adherence to PEP regimen, acceptability and behavioral outcomes, HIV status, and viral load (if applicable).	Conducted meta-analysis by pooling data. GRADE system used to evaluate quality of evidence.	**Primary Outcome:** There has been a significant reduction in STI incidence on Doxy PEP. **Secondary Outcomes:** Doxycycline is generally well-tolerated with mild side effects. There are no significant long-term safety concerns No major resistance in syphilis or chlamydia, suggesting that doxycycline remains effective for these infections	Doxy PEP should be considered for use alongside other prevention strategies like condom use, HIV pre-exposure prophylaxis (PrEP), and regular STI screening.

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
							when used as PEP. High adherence rates.	
Doxycycline as Postsexual Exposure Prophylaxsis: Use, Acceptability, and Associated Sexual health Behaviors Among Multi-Site Sample of Clinical Trial Participants, Fredericksen et al., 2024, *AIDS Patient Care and STDs,* Level 1	The study aims to explore the behavioral and sexual health impacts of Doxy PEP, including how it affects participants' sexual practices, adherence to the medication, and any shifts in sexual risk behaviors.	Open-label RCTs, and Qualitative Substudy.	Multisite cohort study from four public sexual health clinics or HIV clinics in San Francisco and Seattle representing 44 MSM and TGW individuals.	**Variables:** Doxy PEP use, acceptability, sexual health behaviors (after starting Doxy PEP), and STI incidence. **Interventions:** Participants were given doxycycline (200 mg) to take as PEP after condomless sex, with the instruction to take it within 24-72 hours of sexual exposure. The intervention assessed the	Combination of interviews, surveys, and clinical data were collected over the duration of the study.	The study used multi-step coding and thematic grouping to identify overarching themes related to doxycycline PEP use, acceptability, and its impact on sexual behavior and mental health. The researchers developed a codebook that was applied consistently across transcripts, with adjustments made as new	Many reported adherence to the regimen and satisfaction with its protective effects against bacterial STIs. Participants felt more in control of their sexual health reducing their anxiety of contracting or transmitting STIs.	Findings suggest that Doxy PEP is an effective and acceptable intervention for preventing STIs in men who have sex with men (MSM) and transgender women (TGW), with the added benefit of improving mental health and well-being by reducing STI-related anxiety.

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
				impact of this regimen on STI prevention, participants' sexual behaviors, and overall acceptability.		themes emerged. Transcripts were coded using both deductive codes (based on the interview guide) and inductive codes (emerging from the data).		
Postexposure Doxycycline to Prevent Bacterial Sexually Transmitted Infections, Luetkemeyer et al., 2023, *New England Journal of Medicine,* Level 1	The objective is to evaluate the effectiveness, safety, and potential impact on antimicrobial resistance of Doxy PEP to prevent bacterial STIs among MSM and TGW.	Open-label RCT	Multisite cohort study from two settings including HIV clinics and sexual health clinics, in San Francisco and Seattle representing 501 participants who identify as MSM and TGW, with 174 participants living with HIV and 327 participants on HIV PrEP,	**Dependent variables:** incidence of bacterial STIs, occurrence of antimicrobial resistance, safety, adverse event profiles, and acceptability of Doxy PEP. **Interventions/ Independent Variables:** Patients were randomly	STI testing was performed every three months and collected data of at least one bacterial STI during each follow-up quarter. Data were also gathered on sexual activity, adherence to doxycycline, and potential resistance to antimicrobial treatments. The study compared outcomes in participants using	The relative risk (RR) of STIs in participants using Doxy PEP compared to those receiving standard care were calculated. Consistent use of Doxy PEP was reported by 86% of participants after condomless sex, with a	The study showed that Doxy PEP significantly reduced the incidence of bacterial STIs in MSM and TGW, particularly a 66% decrease of STIs in participants taking PrEP and a 50% decrease in those living with HIV.	This study supports the use of Doxy PEP as a preventative measure for individuals at high risk for STIs, offering an effective intervention that could potentially reduce STI transmission rates and improve sexual health outcomes.

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
				assigned in a 2:1 ratio to take 200mg of doxycycline within 72 hours after condomless sex or receive standard of care.	Doxy PEP against a standard care group with quarterly STI testing.	median of four doses per month. Incident STIs were analyzed as binary outcomes using modified Poisson regression models to account for repeated measurements. Safety, adverse events, and antimicrobial resistance were also assessed with statistical tests for significance.		
Doxycycline Prophylaxis for the Prevention of Sexually Transmitted Infections: A Systematic Review and Meta-Analysis	The aim is to investigate the effects of doxycycline pre- and post-exposure proph ylaxis (Doxy-	A systematic review and meta-analysis of randomized controlled trials.	Literature review including six eligible studies containing data from seven articles and four conference abstracts.	**Intervention:** PubMed, Embase, and CENTRAL were searched for randomized controlled trials (RCTs),	This study measured the incidence of bacterial STIs measured as the number of visits with an STI per total number of visits.	Random-effects model was used to estimate pooled effect sizes. The risk ratio (RR) with a 95% confidence	The pooled analysis demonstrated a 56% decrease in overall STI incidence with doxy-PrEP/PEP use, along with	Based on the findings, Doxy PEP has the potential to be integrated into clinical guidelines for STI prevention, particularly among high-risk populations like MSM and TGW. This

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
of Randomized Controlled Trials, Szondy et al., 2024, *International Journal of Infectious Diseases,* Level 1	PrEP/PEP) on bacterial STIs.			including ongoing studies published until November 7, 2023.		interval (CI) was the primary effect size measure. Heterogeneity was assessed using Higgins and Thompson's I^2 statistics, and a leave-one-out analysis was conducted to ensure robustness by excluding unpublished studies.	significant reductions in specific infections: 81% for chlamydia, 77% for syphilis, and a potential reduction of 45% in gonorrhea, although local resistance patterns influenced this effect	literature review supports and recommends Doxy PEP as part of shared decision-making for individuals with a history of bacterial STIs.
45 Years of Tetracycline Post Exposure Prophylaxis for STIs and the Risk of Tetracycline Resistance: A Systematic Review and Meta-Analysis, Vanbaelan et al., 2024, *BMC*	The objective is to evaluate the effects of tetracycline post-exposure prophylaxis (PEP), specifically doxycycline and minocycline, on antimicrobial	Systematic Review and Meta-analysis	The study combined data from three randomized controlled trials (RCTs) that fulfilled the inclusion criteria to evaluate the effects of tetracycline post-exposure	**Interventions:** PubMed and Google Scholar were searched for articles and conference abstracts published between 1 March 1948 (and 30 April 2023.	This study measured the percentage of bacterial isolates resistant to tetracycline was measured, with a focus on *Neisseria gonorrhoeae*, commensal *Neisseria* species, and *Staphylococcus aureus*.	The odds ratios (ORs) with 95% confidence intervals (CI) were computed to compare the prevalence of tetracycline resistance between the tetracycline PEP and control	The overall findings suggest that tetracycline PEP could select for resistance in both *Neisseria gonorrhoeae* and commensal *Neisseria* species, with	The study acknowledges Doxy PEP's short-term efficacy in preventing STIs and highlights the long-term risks of AMR, suggesting a need for caution in its widespread use.

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
Infectious Diseases, Level 1	resistance (AMR) in bacterial species, with a focus on *Neisseria gonorrhoeae* and other commensal bacteria.		prophylaxis (PEP) on antimicrobial resistance, with a specific emphasis on *Neisseria gonorrhoeae* and other bacterial species.		Additionally, Minimum Inhibitory Concentration (MIC) Distribution data were synthesized. The MIC values for tetracycline were recorded for bacterial isolates, assessing the efficacy of prophylaxis at varying MIC levels.	groups for each bacterial species. A meta-analysis was conducted using a fixed-effects model to pool the results from the included studies. Heterogeneity was assessed through I^2 statistics, and the chi-square test was used to evaluate statistical significance. Lastly, The Cochrane risk-of-bias tool for randomized controlled trials (RoB 2) was used to assess bias across several domains,	implications for the broader spread of antimicrobial resistance.	

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
						including randomization, blinding, and outcome reporting.		
Doxycycline Prophylaxis for Bacterial Sexually Transmitted Infections, Grant et al., 2020, *Infectious Diseases Society of America,* Level 1	The objective is to examine existing research, identify knowledge gaps, and discuss challenges associated with using Doxy PEP for preventing bacterial STIs.	Systematic review, meta-analysis	Reviewed literature, including small RCTs and observational, modeling studies	**Interventions:** Authors screened the search results for literature reviews. Participation in expert panel with international experts from academia, government, and community-based organizations.	Reduction in STI incidence rates as a primary measure of Doxy PEP effectiveness Clinical testing for antibiotic resistance. Surveys and observational data were used to measure changes in sexual behavior, patient and provider perceptions of Doxy PEP, and evaluate adherence rates, side effects, and resistance patterns.	The study used descriptive and comparative statistics from several studies and trials evaluating the effectiveness, acceptability and associated risks of Doxy PEP for STI prevention.	The study found significant relative risk reductions with Doxy PEP, showing approximately 70-73% lower incidence rates of bacterial STIs. The review noted high acceptability of Doxy PEP among high-risk populations. However, it also highlighted concerns about behavioral risk compensation,	Doxy PEP shows strong potential to reduce bacterial STIs, serving as an additional prevention tool, complementing current standard of care. Authors support a tailored approach to STI prevention. Education about Doxy PEP's benefits and limitations can optimize its preventive effects. Authors support the importance of monitoring antibiotic resistance.

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
							where individuals might reduce condom use or engage in riskier sexual practices.	
Doxycycline in STI Prophylaxis- A Literature Review, Zaleski et al., 2023, *Venerology,* Level 1	The objective is to summarize evidence on doxycycline's effectiveness and safety as prophylaxis for bacterial STIs, while highlighting concerns about antibiotic resistance and adverse effects.	Systematic review.	Reviewed literature including clinical trials and observational studies.	**Independent Variables:** Participant demographics, including gender, HIV status, and PrEP use. **Dependent Variables:** Efficacy of doxycycline for STI prevention, incidence of bacterial STIs, and adverse effects associated with doxycycline use. **Interventions:**	The study measured the efficacy of doxycycline for preventing bacterial STIs, along with evaluating the rates of antibiotic resistance associated with doxycycline prophylaxis. The review also assessed side effects and safety profiles of doxycycline use for STI prevention across different studies	Odds ratios (ORs) with 95% confidence intervals were calculated to compare the rates of tetracycline-resistant isolates between the intervention and control groups. Heterogeneity was assessed using I^2 statistics and the p-value from the chi-square test, with a fixed-effects model	One trial showed a 73% STI reduction in MSM with prior syphilis, and another found a 47% risk drop among MSM and TGW. Gonorrhea resistance was observed in 38% of doxycycline users. Mild side effects like nausea and abdominal pain led some to discontinue, though no severe adverse	Doxy PEP could significantly reduce STI rates in high-risk populations, such as MSM and TGW. Regular monitoring and guidelines are vital to manage resistance and maintain doxycycline's efficacy. Clinicians should advise on managing common side effects, such as GI discomfort, to improve adherence.

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
				The primary intervention examined was the administration of Doxy PEP and PrEP regimens, compared to standard STI prevention methods without doxycycline use.		used to pool data across studies. Analyses were performed in Review Manager (RevMan) and STATA software, and findings were deemed statistically significant if p-values were less than 0.05.	events were linked to doxycycline.	
Non-Conventional Interventions to Prevent Gonorrhea or Syphilis Among Men Who Have Sex with Men: A Scoping Review, Tran et al., 2022, *Frontiers in Medicine,* Level 1	The objective is to evaluate non-conventional interventions to prevent gonorrhea and syphilis in MSM, specifically focusing on strategies that do not rely on increasing	Systematic review, meta-analysis	Meta-analysis of 13 studies including RCTs, pre- and post-intervention studies, and single-arm trials.	**Independent Variables:** Types of non-conventional interventions, such as biomedical approaches, self-managed interventions, and technology-based interventions.	The primary measurements involved assessing the reduction in STI incidence across different intervention groups. Additional outcome measurements included adherence rates and behavioral adjustments	Data were analyzed by comparing relative risk reductions and incidence rates between groups that received doxycycline PrEP/PEP and control groups, evaluating the preventive	The literature review found that Doxy PEP significantly reduced the incidence of syphilis among MSM by approximately 73% in some studies, whereas its impact on preventing	The study suggests that Doxy PEP may offer substantial benefits when implemented with careful monitoring of resistance trends and tailored public health messaging.

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
	condom use or testing			**Dependent Variables:** The effectiveness of these interventions STI prevention. **Interventions:** Authors screened the search results for literature reviews. Ovid Medline, Ovid Global Health, Embase, Scopus, and Web of Science Core Collection were searched.	associated with the interventions.	impact of each intervention.	gonorrhea was less conclusive.	
Potential Impact of Doxycycline Post-Exposure Prophylaxis Prescribing Strategies on Incidence of Bacterial Sexually Transmitted Infections, Traeger	The study aimed to identify prescribing strategies that minimize antibiotic use while maximizing STI prevention	Retrospective Cohort Study	The sample included gay and bisexual men, transgender women, and nonbinary people assigned male sex at birth, all of whom had at least	**Independent Variables:** Participant demographics, HIV status, PrEP use, and STI frequency/type.	Electronic health records provided demographic data, STI test results, HIV/PrEP status, and encounter dates. Ten hypothetical Doxy PEP prescribing strategies were	Counterfactual scenarios were created to estimate the number of STI diagnoses averted under each Doxy PEP strategy, assuming STI	The findings revealed that implementing Doxy PEP among high-risk individuals, particularly those with recent or concurrent	Tailoring Doxy PEP prescriptions to individuals with recent or concurrent STIs maximizes preventive impact. Targeted prescribing minimizes antibiotic

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
et al., 2024, *Clinical Infectious Diseases,* Level 2	effectiveness, especially among people with HIV or those using PrEP.		two STI tests from 2015–2020.	**Dependent Variables:** Rate of STI diagnoses averted and Number needed to treat (NNT) to prevent one STI. **Interventions:** Data were extracted from Fenway Health evaluating hypothetical Doxy PEP strategies for high-risk subgroups.	analyzed based on criteria such as PrEP use, HIV status, and STI history.	rates would decrease according to clinical trial efficacy estimates. The efficiency of each strategy was evaluated by calculating the number needed to treat (NNT) to avert one STI diagnosis.	STIs, significantly reduced STI rates. Prescribing Doxy PEP to all PrEP users or individuals with HIV averted 60% of STI cases, while targeting those with recent STIs for 12 months averted 39%, demonstrating greater efficiency.	exposure, addressing resistance concerns. Emphasizes need for continued STI testing and monitoring of antimicrobial resistance to support sustainable use.
Predictors of Receiving a Doxycycline Prophylaxis (doxy-PEP) Prescription for the Prevention of Bacterial Sexually Transmitted Infections (STIs) in	The objective of this study is to investigate the factors associated with receiving a Doxy PEP prescription among a sample of racial and	Case–control study	The study involved 100 clients who received healthcare services at a community-based clinic in Washington, DC, between May and	**Independent Variables:** sociodemographic characteristics, sexual risk behaviors, recent STI diagnoses, and (PrEP) use that	The study measured sociodemographic characteristics, sexual behaviors (e.g., condom use, number of sexual encounters), STI test results, and current PrEP use among participants.	The study used descriptive statistics to compare sociodemographic characteristics and sexual behaviors between	The study found that individuals prescribed Doxy PEP were more likely to report engaging in anal sex with cisgender males, a higher	The findings emphasize the need to increase awareness and access to Doxy PEP, particularly among high-risk groups, as part of a comprehensive sexual health approach in addition to regular STI screenings and risk-

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
a Community-Based Clinic: A Case-Control Study, Ogunbago et al., 2024, *Sexually Transmitted Infections, Level* 3	sexual minority individuals.		November 2023. The population consisted of racial and sexual minority individuals.	influence whether individuals are prescribed Doxy PEP for STI prevention. **Interventions:** Participants were prescribed 200 mg doxycycline to be taken after condomless sexual encounters.	These variables were compared between those who were prescribed Doxy PEP and those who were not, with statistical analyses performed to identify significant associations.	participants. Bivariate analyses, including chi-square tests, examined the relationship between variables. Unadjusted and adjusted conditional matched pair logistic regression models were applied, controlling for visit date, age, and HIV status, with SPSS 29, a statistics software program, used for data analysis.	number of receptive anal sex acts, and a history of condomless sex. Significant associations were identified with recent reactive gonorrhea test results and current PrEP use. However, in the adjusted analysis, only current daily PrEP use remained marginally associated with being prescribed Doxy PEP, with an odds ratio (OR) of 0.80 (95% CI 0.67 to 1.02).	reduction counseling, enhancing STI prevention efforts.

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
Interests, Concerns, and Attitudes Among Men Who Have Sex With Men and Healthcare Providers Toward Prophylactic Use of Doxycycline Against Chlamydia Trachomatis Infections and Syphilis, Parker et al., 2021, *Sexually Transmitted Diseases,* Level 4	The study aimed to evaluate the acceptability of doxycycline as a preventive intervention (either as pre-exposure or post-exposure prophylaxis) and to identify potential areas of concern, such as antibiotic resistance, which may impact the broader adoption and clinical use of doxycycline prophylaxis in these populations.	Cross-sectional study	Two groups in Southern California were studied: 212 community members who identify as MSM; Eligible participants for the MSM group were 18 years or older, residing in Southern California. 76 HCPs, including physicians, nurse practitioners, and physician assistants with prescribing authority in the same region.	**Independent variables:** demographics, previous STI history and current use of PrEP, and level of concern regarding STI acquisition and antibiotic resistance. **Dependent variables:** Acceptability of Doxy PEP and willingness of HCPs to prescribe DoxyPEP for STI prevention. **Interventions:** 2 standardized online surveys were administered, one tailored to MSM	The primary measurement was the level of acceptability or willingness among MSM to use doxycycline for STI prevention, and willingness to be prescribed by HCPs. Secondary measurements captured specific concerns regarding doxycycline prophylaxis, including worries about potential drug resistance and side effects. The study measured demographic and health characteristics to determine associations with acceptability of	Descriptive statistics and binary logistic regression were applied to analyze survey responses. For acceptability, Likert scales were converted to binary variables to simplify statistical comparisons across different participant characteristics. Pearson's chi-square tests were used to assess associations, and significant results were followed by logistic regression.	High Acceptability: 67.5% of MSM expressed a willingness to use doxycycline PrEP/PEP if recommended by their HCP. A slight majority (52.4%) of community participants favored doxycycline PEP over PrEP. Acceptability among HCPs increased significantly if backed by CDC guidelines, rising to 89.5%. Both MSM and HCPs expressed	The high acceptability of Doxy PEP/PrEP among MSM and HCPs indicates a viable addition to current STI prevention strategies. Integrating education on potential resistance and appropriate prophylactic use into patient care can support adherence and mitigate resistance risks. Recognizing psychological benefits, providers may improve patient satisfaction and adherence by acknowledging and addressing these factors

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
				participants and the other to HCPs.	doxycycline PEP/PrEP.		concerns about antibiotic resistance.	
Perceptions About Doxycycline Post-Exposure Prophylaxis (Doxy-PEP) as an STI-Prevention Strategy Among Gay and Bisexual Men (GBM) in the United States: Results from a Qualitative Study, Ehsan et al., 2024, *Preventive Medicine*, Level 4	The objective is to explore and understand the attitudes, perceptions, and potential barriers or facilitators regarding the use of DoxyPEP as a strategy to prevent STIs.	Qualitative Study	24 GBM from across the U.S.	**Independent Variables:** Awareness of Doxy PEP, previous experience with STI prevention strategies, perceived benefits of Doxy PEP, concerns about Doxy PEP, socio-demographic factors, and sexual practices and risk behaviors. **Dependent Variables:** Acceptance of Doxy PEP, barriers to adoption, facilitators.	Interviews or focus group discussions exploring how participants view (perceptions, attitudes, and potential adoption) the use of doxycycline (200 mg) taken after sexual exposure to prevent bacterial STIs.	Developed codebook for analyzing interview transcripts using thematic analysis.	Participants expressed interest in using Doxy PEP but had concerns about antibiotic resistance, side effects, medication interactions, and potential stigma. They were motivated by its simplicity and its ability to reduce STI-related anxiety. However, they emphasized the need for more information to address their concerns.	This study highlights Doxy PEP's potential as a valuable tool in reducing STIs among high-risk populations. This study helps HCPs and policymakers to develop a broader STI prevention plan, aside from the current standard of care condom use and behavioral counseling, to optimize patient outcomes.

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
Prevalence of Sexually Transmitted Infections Among Transgender Women With and Without HIV in the Eastern and Southern United States, Brown et al., 2024, *The Journal of Infectious Diseases,* Level 4	Aimed to characterize the prevalence and correlates bacterial STIs among TGW and identifies differences based on HIV status.	Cross-sectional study.	Multisite prospective cohort study in six eastern and southern United States cities representing 1, 018 TGW participants that met inclusion criteria between March 2018 and August 2020.	**Independent Variables:** HIV status, demographic factors (age, race/ethnicity), and behavioral factors (sexual practices, drug use). **Dependent Variables:** Prevalence of bacterial STIs. There are no experimental interventions in this observational study, as it focuses on assessing the prevalence and correlates of STIs in the sample population.	All participants completed a facility-based study visit, which included a socio-behavioral survey (self-administered or interviewed), laboratory-confirmed HIV and bacterial STI testing, and specimen collection (serum, plasma, and urine).	Baseline survey via self-report, Alcohol Use Disorder Identification Test-Consumption (AUDIT-C) score of ≥4 was used to classify high-risk alcohol use; adjusted prevalence ratio with confidence interval (CI) were used.	High prevalence of bacterial STIs among TGW, with notable differences between those with and without HIV. TGW living with HIV had a significantly higher prevalence of STIs compared to those without HIV.	This study identifies TGW as a high-risk subpopulation group for recurrent STIs. Additionally, the authors emphasize the importance of tailored interventions for TGW, particularly those living with HIV, who are at higher risk, such as improving STI screening, prevention, and treatment efforts.

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
Comparison of Trends in rates of Sexually Transmitted Infections Before vs After Initiation of HIV Preexposure Prophylaxis Among Men Who Have Sex with Men, McManus et al., 2020, *JAWA Network Open*, Level 4	To determine trends in STI test positivity among high-risk MSM before and after the start of HIV PrEP.	Quantitative and Qualitative	Multisite cohort study in 54 sexual health clinics and 6 primary health care clinics across Australia representing 9,709 MSM between 2015 and 2018. linked for analysis, which was conducted from June to December 2019.	**Independent Variables:** use of Doxy PEP, acceptability, and sexual health behaviors. **Dependent Variables:** STI incidence, adherence to Doxy PEP, and reported side effects.	**Quantitative:** STI testing rates. **Qualitative:** participant interviews and surveys.	Poisson regression model was used quarterly to assess trends in STI positivity rates. Binary time-updated indicator of enrollment status was also used to test for potential change in positivity attributable to immediate change in sexual practices after adjusting for marginal change in time trend following PrEP, a pattern unable to be detected by a time trend alone.	STI positivity was very high during scale-up of PrEP in a high-risk population of HIV-negative MSM. Prior to PrEP, 50% of participants had a positive STI result, with an 8% quarterly increase in STI positivity. After starting PrEP, STI rates remained high, with no significant change in positivity trends, maintaining an 8% increase in STI sensitivity. This study observed an increase in STI testing during	Encouraged a thorough sexual health assessment to determine risks, such as increased unprotected sexual encounters while on PrEP to determine necessity of routine STI screenings, especially in high-risk populations., improving early diagnosis timely treatment of STIs and treatment of STIs. The study raises the concern of antibioitic-resistent strains due to overuse of antibiotics, calling for an improved strategy plan.

Article Title, Author, Year, Journal and Level of Evidence	Purpose	Design, methodology	Sample, setting	Major variables, interventions	Measurement	Data analysis	Findings	Significance for practice and patient care outcomes
						EHR system was used to screen and determine whether access to PrEP is associated with changes in the trajectory of the preexisting trend in STIs.	PrEP use which may have led to a higher case detection.	

Appendix B

Clinical Site Approval

1724 33rd St Suite 100 Orlando, FL 32839
Phone: 407-553.6336
Fax: 321-445.9733

September 27, 2024

Dr. Deborah Hopla
Francis Marion University
Department of Nursing
4822 E. Palmetto St.
Florence, SC 29506

Dear Dr. Hopla:

I have discussed **Emma Victoria Ayson**'s proposal for an evidence-based quality improvement project to be carried out at **Pineapple Healthcare-Orlando.** I understand that this student is conducting this project as part of their scholarly requirements for the Doctor of Nursing Practice (DNP) degree at Francis Marion University, with a plan to publish and present their results upon successful completion.

I also understand that the Institutional Review Board (IRB) at FMU will be consulted regarding protection of confidentiality, privacy, and the well-being of project participants. Further, it is my understanding that the student will be advised in this project by a faculty member who will have regular contact with this student, and that the student will make a formal presentation for approval to a committee of faculty prior to implementation.

I want to express my strong support for this project entitled **"Utilizing Post-Exposure Prophylaxis for STI Prevention: Enhancing Sexual Health Evaluation and Counseling."** This project is one that is needed to promote quality care. I have no concerns about the proposed project based on conversations with the student and am committed to allowing them to complete the project at our organization/agency. I also understand that during project implementation and evaluation the student will be in regular contact with faculty advisors.

Should you have additional questions or concerns, you may contact me at **407-553-6336** or email me at **Ethan@pineapplehealthcare.com**.

Sincerely,

Ethan Suarez
Chief Executive Officer
Pineapple Healthcare, Inc.

Appendix C

Defense of DNP Project Proposal

Francis Marion University
Defense of DNP Project Proposal

Name of Student: Emma Ayson

Title of Project:__ Utilizing Doxycycline Post-Exposure Prophylaxis (Doxy PEP) for Sexual Transmitted Infections (STI) Prevention: Enhancing Sexual Health Counseling

Date of DNP Project Proposal Presentation: 3/26/25

Option 1:

__x____ This student has received approval to move forward with FMU IRB submission with no recommended changes. Once the project is approved by the FMU IRB, the student may proceed with project implementation.

DNP 805 Faculty Signature __Tracy George Date ___3/26/25_____

DNP Advisor Signature

Sarah Kershner Date

March 28, 2025

Appendix D

Doxy PEP Risk Assessment Tool

Doxy PEP Risk Assessment Tool

For provider to record the below information about patient:

Age:	**Gender:**	**Race/Ethnicity:**
☐ Under 18 years	☐ Male	☐ African American/Black
☐ 18 – 24 years	☐ Female	☐ Asian/Pacific Islander
☐ 25 – 34 years	☐ Transgender Male	☐ Caucasian/White
☐ 35 – 44 years	☐ Transgender Female	☐ Hispanic/Latino
☐ 45 – 54 years	☐ Non-binary/Third Gender	☐ Native American/Alaska Native
☐ 55 – 64 years	☐ Other: _____	☐ Other: _____
☐ 65 years and older	☐ Prefer not to say	☐ Prefer not to say

Insurance Status:	**Preferred Language:**
☐ Insured	☐ English
☐ Uninsured	☐ Spanish
☐ Prefer not to say	☐ Other: _____

Risk Assessment

Definition of Sexual Behavior: For the purpose of this assessment, sexual behavior is defined as any behavior/activity involving genital, oral, or anal contact with another person that may lead to the transmission of infections. This includes vaginal, anal, and oral sex, as well as other forms of intimate contact where bodily fluids may be exchanged.

Please place a check by each true statement:

☐ The patient is 18 years old or older.

☐ The patient engages in non-heterosexual activity (refers to sexual interactions outside the traditional heterosexual framework, including same-sex and multi-gender sexual activity among gay, lesbian, bisexual, pansexual, queer, transgender, and non-binary individuals).

☐ The patient engages in unprotected sexual activity (sex without a condom or another barrier method) in the past 12 months.

☐ The patient has been diagnosed and treated with a sexually transmitted infection in the past 12 months

If 4 criteria are met on the risk assessment tool, the patient is considered at **high-risk** for STI recurrence. Please provide Doxy PEP counseling to the patient.

Care Plan

Is this patient eligible for Doxy PEP?	☐ Yes	☐ No
Was patient counseled on Doxy PEP?	☐ Yes	☐ No
Was Doxy PEP prescribed?	☐ Yes	☐ No
Did the patient refuse Doxy PEP?	☐ Yes	☐ No

Appendix E

Standardized Doxy PEP Counseling Script

Doxy PEP Counseling Guide	
Purpose of Doxy PEP:	● Doxycycline post-exposure prophylaxis (Doxy PEP) is an evidence-based strategy aimed at reducing the risk of acquiring bacterial sexually transmitted infections (STIs), specifically syphilis, gonorrhea, and chlamydia. ● Studies have shown that taking a 200 mg dose of doxycycline within 72 hours after condomless sex can reduce the risk of: o Syphilis and chlamydia by over 70% o Gonorrhea by approximately 50% ● The goal of Doxy PEP is to provide an additional layer of protection for individuals at high risk of STIs, complementing existing preventive measures such as: o Condom use o Regular STI screenings
Eligibility Criteria:	● Doxy PEP is recommended for men who have sex with men (MSM) and transgender women (TGW) who have had a bacterial STI (syphilis, gonorrhea, or chlamydia) in the past 12 months. ● It may also be considered for individuals with multiple sexual partners or those engaging in condomless sex who are not at increased risk for STIs. o Provider should assess patient history, exposure risks, and shared decision-making preferences when determining eligibility.
Proper Usage:	● **Dosage**: Take one 200 mg dose of doxycycline as soon as possible after sex, ideally within 24 hours but no later than 72 hours. ● **Frequency**: Do not exceed 200 mg in a 24-hour period. Doxy PEP is designed for event-driven use and should not be taken as a daily preventive measure. ● **Administration**: Take the medication with a full glass of water and avoid lying down for at least 30 minutes after ingestion to reduce the risk of esophageal irritation. ● **Adherence**: Doxy PEP should be taken only as prescribed by a healthcare provider. Patients should maintain regular follow-ups to assess continued need for Doxy PEP and monitor any potential side effects.
Potential Side Effects:	Most side effects are mild and resolve with continued use or discontinuation. Common side effects include: ● **Gastrointestinal issues** (nausea, vomiting, diarrhea) ● **Photosensitivity** (increased risk of sunburn; patients should use sunscreen and protective clothing) ● **Esophageal irritation** (can be minimized by taking the medication with water and remaining upright for at least 30 minutes) ● **Possible microbiome alterations** (ongoing studies are evaluating long-term effects on gut and skin bacteria)
Adherence Requirements:	● **Routine STI Testing**: Patients prescribed Doxy PEP should undergo STI screening at baseline and every 3–6 months to monitor for infections and assess the continued need for prophylaxis. ● **HIV Testing**: HIV-negative patients should be screened per CDC guidelines to ensure appropriate linkage to HIV prevention services, such as PrEP. ● **Behavioral Counseling**: Doxy PEP should be part of a comprehensive sexual health strategy, including condom use, partner communication, and STI risk-reduction counseling.
Reference/ Works Cited	Bachmann, L. H., Barbee, L. A., Chan, P., Reno, H., Workowski, K. A., Hoover, K., Mermin, J., & Mena, L. (2024). CDC clinical guidelines on the use of doxycycline postexposure prophylaxis for bacterial sexually transmitted infection prevention, United States, 2024. *MMWR. Recommendations and Reports, 73*(2), 1-8. http://dx.doi.org/10.15585/mmwr.rr7302a1

Appendix F

Timeline Table

Month	Aug 2024	Sep 2024	Oct 2024	Nov 2024	Feb 2025	Mar 2025	Apr 2025	May 2025	Jun 2025	Jul 2025
Project Topic Selected	X									
Executive Director Approval of Project		X								
Obtain Pre-intervention Data			X	X						
Development/ Approval of Educational Materials					X					
Project Proposal Presentation to Faculty						X				
Project Proposal Sent to IRB Committee						X				
Project Proposal Approved by IRB per Expedited Review							X			
Final Project Proposal Paper							X			
Staff In-service Prior to Beginning Project							X			
Implementation of Project/Practice Changes								X		
Bi-weekly Progress Meetings								X		
Completion of Project									X	
Anonymous Survey of Clinical Team									X	
Data Analysis									X	
Completion of Project Proposal Paper and Meet with Project Mentor										X
Final DNP Project Paper and Presentation										X

Appendix G

Cost-Benefit Analysis

Cost-Benefit Analysis: Doxycycline PEP for STI Prevention

Itemized Costs and Totals			
Expenses Category	**Cost per Unit**	**Quantity**	**Total Cost (USD)**
Providers Training (wage/hour) – Pro-rated to a 1-hour training session (Approved by leadership)			
Nurse Practitioner (NP)	$70	4	$350.00
Physician Assistant (PA)	$68	1	$68.00
Registered Nurses (RN)	$48	2	$96.00
Medical Assistants (MA)	$25	5	$125.00
Administrative Staff Training (wage/hour) – Pro-rated to a 30-minute training session (Approved by leadership)			
Clinic Office Lead	$13	1	$13.00
Medical Case Manager	$12	1	$12.00
Front Receptionist	$10	2	$20.00
Education Material for Providers & Implementation			
2024 CDC Doxy PEP Guidelines	$0	5	$0.00
Counseling Guide	$0	5	$0.00
Printed Materials (Doxy PEP Risk Assessment Tools & Factsheets)	$0.2	1,000	$20.00
Binders (1” 3-ring)/ each	$7	5	$35.00
Data Management & Security – Provided by Pineapple Healthcare			
Secure Laptop for Data Entry	$0	1	$0.00
Locked Filing Cabinet	$0	1	$0.00
Pre-existing Office Space	$0	1	$0.00
Printer Ink	$0	1	$0.00
Misc. Supplies (pens, clipboards, storage folders)	N/a	N/a	N/a
Budget Contingency			
Contingency Fund Allocation	$100	1	$100.00
			Total Estimated Cost: $839.00

Tangible Benefits (Projected Post-Intervention May 2025)	
Benefit Category	**Projected Savings (USD)**
• Projected 800 Patients: Reduction in STI Treatment Costs (70% Prevention)	($20 per gonorrhea treatment + $20 per chlamydia treatment + $60 per syphilis treatment) x 560 cases = **$56,000**
• Projected 800 Patients: Lower Medication Costs (Reduced Antibiotic Use)	(Ceftriaxone 500mg vial is $2.50 ea; total cost of 30 vials per 3 months) + (Azithromycin 500mg 30ct bottle is $70 ea; total cost of 3 bottles per 3 months) + (Bicillin 2.4 million Units/4ml syringes is $0; supplied by the FDOH) = (Annual cost) x (70% projected savings) = **$798**
• Increased Patient Savings for Office Visits (~60% Insured, ~25% Uninsured, ~15% Subsidized)	($40 per insured patient x 480 patients) +($100 per uninsured patient x 200 patients) + ($0 per subsidized patient x 120 patients) = **$39,200**
	Total Tangible Benefits: $95,998

Intangible Benefits (Projected Post-Intervention May 2025)	
Benefit Category	**Projected Savings (USD)**
• Improved Patient Outcomes:	Reduced STI recurrences improve sexual health and quality of life.
• Enhanced Provider Efficiency:	Standardized workflow reduces decision fatigue and streamlines prescriptions.
• Public Health Impact:	Reducing the spread of bacterial STIs in high-risk populations contribute to lower community transmission rates.
• Reduced Stigma & Increased Prevention Awareness:	Patients feel more empowered to take preventive measures against STIs.
• Compliance with CDC Guidelines:	Aligning with national guidelines boosts credibility and compliance.

Total Tangible Benefits ($95,998) - Total Costs ($839) = $95,159 Net Positive Benefit

Appendix H

Pre-Intervention Demographics Profile

Table 1. Demographic Characteristics of Patients – May 2024 (Pre-Intervention)

Variable	Total Patients Encounters n= 810, n (%)	High-Risk Individuals n= 714, n (%)
Age:		
Under 18	4 (0.5%)	*Excluded*
18 – 24	65 (8.0%)	53 (7.4%)
25 – 34	328 (40.5%)	299 (41.9%)
35 – 44	258 (31.9%)	234 (32.8%)
45 – 54	100 (12.3%)	85 (14.7%)
55 – 64	51 (6.3%)	42 (5.9%)
65 years and older	4 (0.5%)	1 (0.1%)
Gender:		
Male	721 (89%)	---
MSM	---	690 (96.6%)
Female	60 (7.4%)	---
Transgender Male	5 (0.6%)	---
Transgender Female/ TGW	22 (2.7%)	22 (3.1%)
Non-binary/Third Gender	2 (0.2%)	2 (0.3%)
Race/Ethnicity:		
Asian/Pacific Islander	28 (3.5%)	27 (3.8%)
Black/African American	76 (9.4%)	50 (7.0%)
Latino/Hispanic	359 (44.3%)	316 (44.3%)
White/Caucasian	346 (42.7%)	320 (44.8%)
Native American/ Alaska Native	0 (0.0%)	0 (0.0%)
Other: *Middle Eastern*	1 (0.1%)	1 (0.1%)
Insurance Status:		
Insured	745 (92%)	661 (92.6%)
Uninsured	64 (7.9%)	53 (7.4%)
Prefer Not to Say	1 (0.1%)	0 (0.0%)
Preferred Language:		
English	614 (75.8%)	549 (76.9%)
Spanish	188 (23.2%)	160 (22.4%)
Other: *Portuguese*	5 (0.6%)	5 (0.7%)
Other: *Haitian Creole*	3 (0.4%)	0 (0.0%)

Note: MSM and TGW were reported as separate high-risk groups. Individuals may belong to more than one category based on sexual behavior and gender identity.

Appendix I

Post-Intervention Demographics Profile

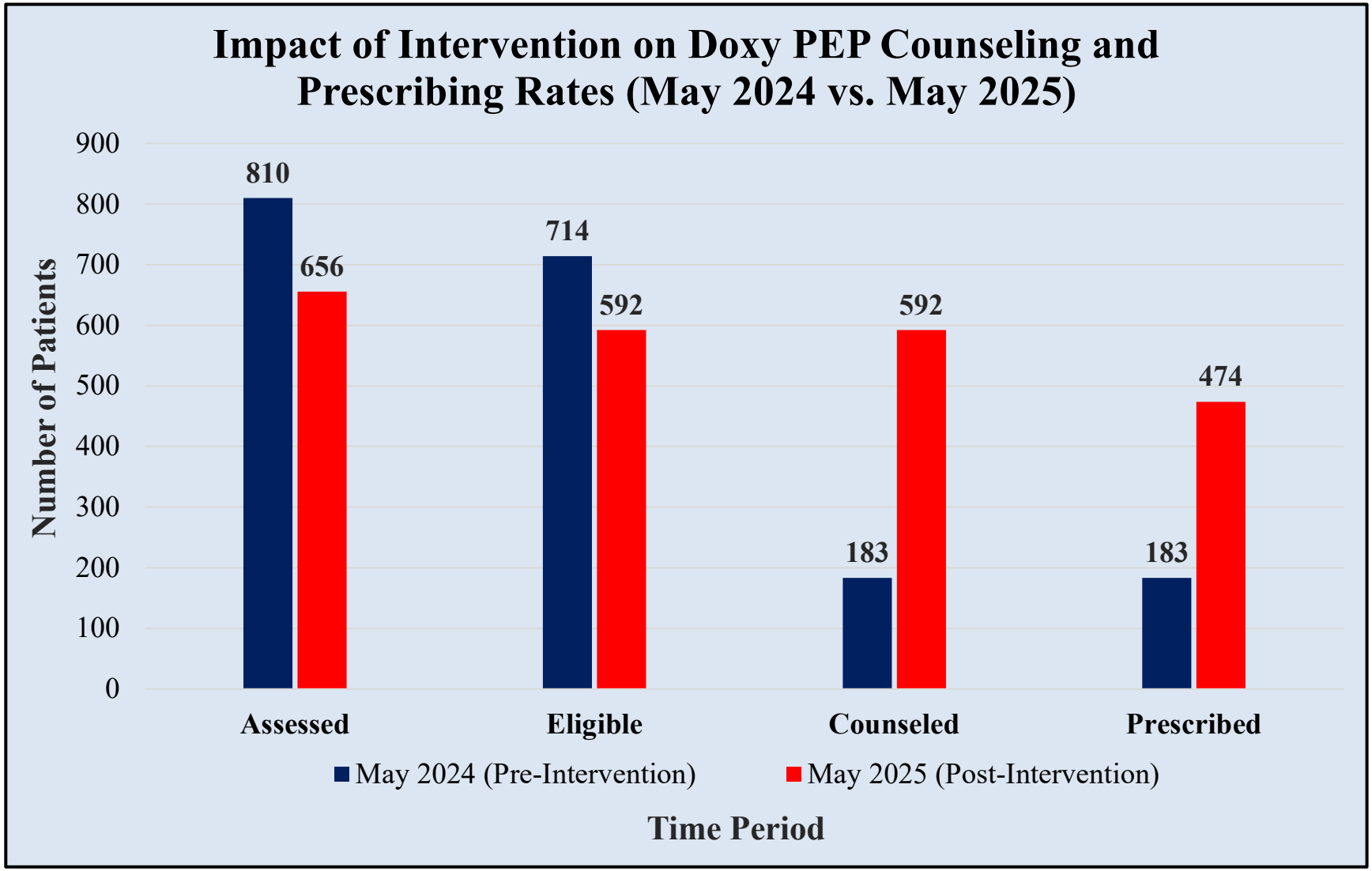
Table 2. Demographic Characteristics of Patients – May 2025 (Post-Intervention)

Variable	Total Patient Encounters n= 656, n (%)	High-Risk Individuals n= 592, n (%)
Age:		
Under 18	2 (0.3%)	*Excluded*
18 – 24	34 (5.2%)	25 (4.2%)
25 – 34	235 (35.8%)	213 (36.0%)
35 – 44	237 (36.1%)	222 (37.5%)
45 – 54	102 (15.5%)	92 (15.5%)
55 – 64	41 (6.2%)	36 (6.1%)
65 years and older	5 (0.8%)	4 (0.7%)
Gender/Sexual Preferences:		
Male	602 (96.6%)	---
MSM	---	580 (97.9%)
Female	38 (5.8%)	---
Transgender Male	4 (0.6%)	---
Transgender Female/ TGW	11 (1.7%)	11 (1.9%)
Non-binary/Third Gender	1 (0.2%)	1 (0.2%)
Race/Ethnicity:		
Asian/Pacific Islander	23 (3.5%)	20 (3.4%)
Black/African American	51 (7.8%)	31 (5.2%)
Latino/Hispanic	220 (33.5%)	198 (33.4%)
White/Caucasian	355 (54.1%)	336 (56.8%)
Native American/ Alaska Native	1 (0.2%)	1 (0.2%)
Other: *Middle Eastern*	6 (0.9%)	6 (1.0%)
Insurance Status:		
Insured	637 (97.1%)	576 (97.3%)
Uninsured	19 (2.9%)	16 (2.7%)
Prefer Not to Say	0 (0.0%)	0 (0.0%)
Preferred Language:		
English	549 (83.7%)	492 (83.1%)
Spanish	100 (15.2%)	93 (15.7%)
Other: *Portuguese*	4 (0.6%)	4 (0.7%)
Other: *Haitian Creole*	3 (0.5%)	3 (0.5%)

Note: MSM and TGW were reported as separate high-risk groups. Individuals may belong to more than one category based on sexual behavior and gender identity.

Appendix J

Doxy PEP Counseling and Prescribing Rates



Appendix K

Doxy PEP Decision Outcomes

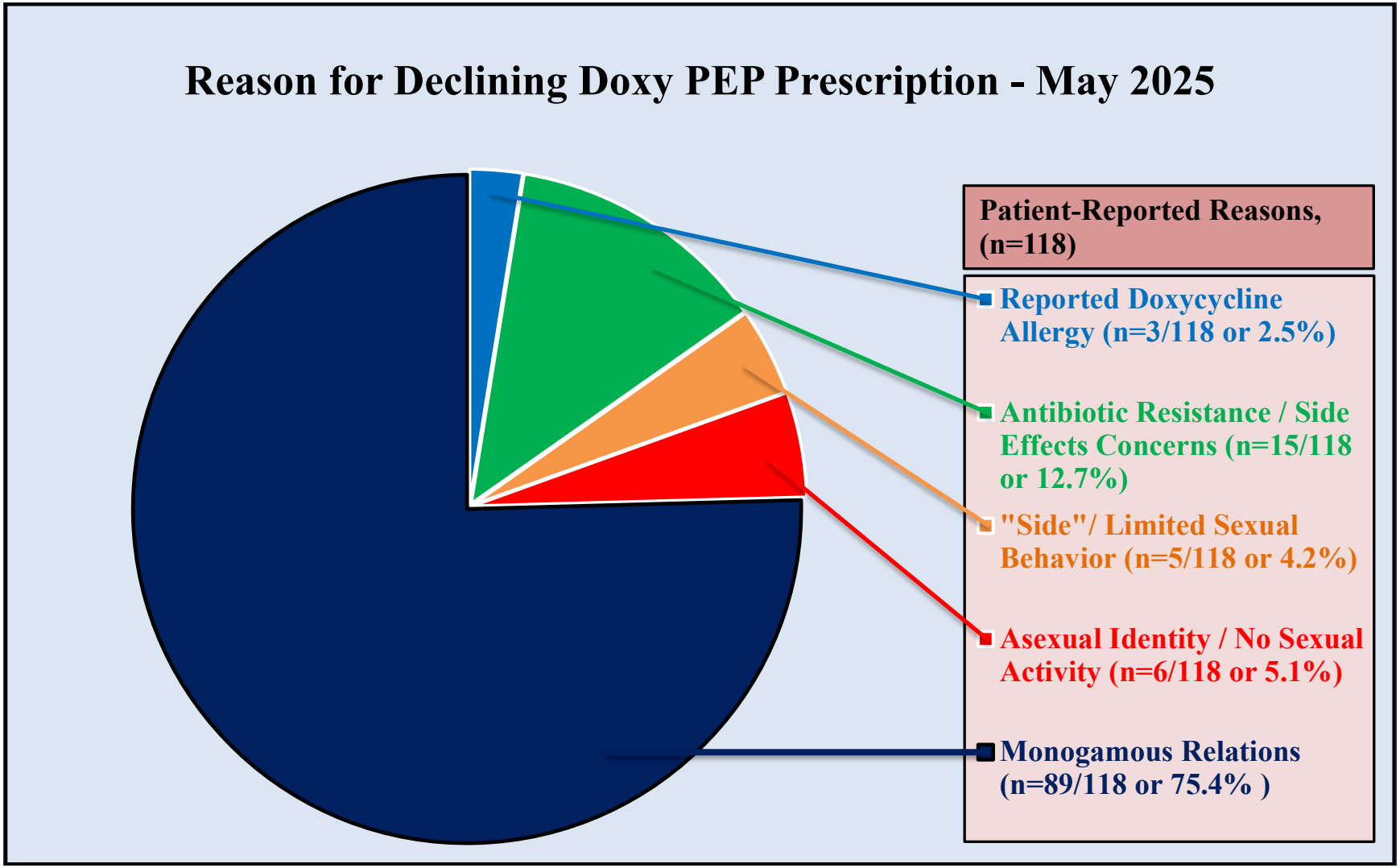
Table 3. Accepted and Received vs. Declined Doxy PEP: Demographic Overview

Variable	Accepted/Received n= 474, n (%)	Declined n= 118, n (%)
Age:		
Under 18	*Excluded*	*Excluded*
18 – 24	23 (4.9%)	2 (1.7%)
25 – 34	164 (34.6%)	49 (41.5%)
35 – 44	183 (38.6%)	39 (33%)
45 – 54	74 (15.6%)	18 (15.3%)
55 – 64	26 (5.5%)	10 (8.5%)
65 years and older	4 (0.8%)	1 (0.8%)
Gender/Sexual Preferences:		
Male	---	---
MSM	464 (97.9%)	116 (98.3%)
Female	---	---
Transgender Male	---	---
Transgender Female/ TGW	9 (1.9%)	2 (1.7%)
Non-binary/Third Gender	1 (0.2%)	0 (0.0%)
Race/Ethnicity:		
Asian/Pacific Islander	14 (2.9%)	6 (5.1%)
Black/African American	22 (4.6%)	9 7.6%)
Latino/Hispanic	159 (33.5%)	39 (33%)
White/Caucasian	273 (57.6%)	63 (53.4%)
Native American/ Alaska Native	---	1 (0.8%
Other: *Middle Eastern*	6 (1.3%)	0 (0.0%)
Insurance Status:		
Insured	468 (98.7%)	108 (87.3%)
Uninsured	6 (1.3%)	10 (12.7%)
Prefer Not to Say	0 (0.0%)	0 (0.0%)
Preferred Language:		
English	392 (82.7%)	95 (80.5%)
Spanish	77 (16.2%)	21 (17.8%)
Other: *Portuguese*	3 (0.6%)	1 (0.8%)
Other: *Haitian Creole*	2 (0.4%)	1 (0.8%)

Note: MSM and TGW were reported as separate high-risk groups. Individuals may belong to more than one category based on sexual behavior and gender identity.

Appendix L

Reasons for Doxy PEP Declination



Appendix M

Revised Doxy PEP Risk Assessment Tool

Doxy PEP Risk Assessment Tool

For provider to record the below information about patient:

Age:	**Gender:**	**Race/Ethnicity:**
☐ Under 18 years	☐ Male	☐ African American/Black
☐ 18 – 24 years	☐ Female	☐ Asian/Pacific Islander
☐ 25 – 34 years	☐ Transgender Male	☐ Caucasian/White
☐ 35 – 44 years	☐ Transgender Female	☐ Hispanic/Latino
☐ 45 – 54 years	☐ Non-binary/Third Gender	☐ Native American/Alaska Native
☐ 55 – 64 years	☐ Other: _____	☐ Other: _____
☐ 65 years and older	☐ Prefer not to say	☐ Prefer not to say

Insurance Status:	**Preferred Language:**
☐ Insured	☐ English
☐ Uninsured	☐ Spanish
☐ Prefer not to say	☐ Other: _____

Risk Assessment

Definition of Sexual Behavior: For the purpose of this assessment, sexual behavior is defined as any behavior/activity involving genital, oral, or anal contact with another person that may lead to the transmission of infections. This includes vaginal, anal, and oral sex, as well as other forms of intimate contact where bodily fluids may be exchanged.

Please place a check by each true statement

Required Criteria (*must meet both):*

☐ The patient is 18 years old or older.

☐ The patient identifies as a man who has sex with men (MSM) or as a transgender woman (TGW).

Additional Risk Factors (*Select all that apply*):

☐ The patient engages in unprotected sexual activity (sex without a condom or other barrier method) in the past 12 months.

☐ The patient has been diagnosed and treated with a sexually transmitted infection in the past 12 months.

Clinical Guidance: According to the 2024 Centers for Disease Control and Prevention guidelines, MSM and TGW who have had a bacterial STI in the past year are the priority group for Doxy PEP. However, prescribing may be appropriate for those meeting **the required criteria** with additional risk factors.

Care Plan:

Is this patient eligible for Doxy PEP?	☐ Yes	☐ No
Was patient counseled on Doxy PEP (*or previously)*?	☐ Yes	☐ No
Was Doxy PEP prescribed (*or previously)*?	☐ Yes	☐ No
If not prescribed, reason:	☐ Patient Declined	☐ Not Advised, per CDC

Appendix N

Revised Doxy PEP Workflow Integration