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# Sexual wellness clinic collaborative initiative with a large urban emergency department: sexual health outcomes and linkage to HIV pre-exposure prophylaxis

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***Abstract***

**Introduction:** Despite escalating rates of sexually transmitted infections (STIs) in the United States (US), there has been progressive divestment of sexual health services leading to the reliance on emergency departments (EDs) for sexual healthcare, particularly among vulnerable populations. The Sexual Wellness Clinic (SWC), a novel care delivery model operating in collaboration with the ED, offers comprehensive sexual health services.

**Objectives:** This study aims to analyze the demographics, STI positivity, and HIV Pre-Exposure Prophylaxis (PrEP) uptake among patients accessing the SWC.

**Design:** This was a retrospective cohort study of patients attending the SWC between February 20, 2019, and September 30, 2022.

**Methods:** Sociodemographic characteristics, STI testing results, and PrEP initiation data were collected from the electronic health record (EHR). Two multivariable logistic regression models were employed to assess associations between patient factors and STI positivity or PrEP initiation.

**Results:** Among 651 individuals across 785 SWC visits, the majority were Black or African American (94.6%), 18–29 years of age (53.2%), and on Medicaid (65.8%). Of all visits, 27.3% resulted in a syphilis diagnosis, 16.1% tested positive for chlamydia test, and 15.0% tested positive for gonorrhea. Decreased STI positivity was associated with insertive vaginal sex (adjusted odds ratio (aOR): 0.34, $p = 0.0079$) while using condoms most of the time use was associated with increased STI positivity (aOR: 2.68, $p = 0.0038$). Eighty SWC patients started PrEP on the same day as their visit, most of which were non-Hispanic Black (96.26%), assigned female at birth (53.75%), and on Medicaid or Medicare (68.75%). Factors associated with PrEP initiation at the SWC included a previous STI (aOR: 3.78, $p < 0.001$), oral sex (aOR: 2.33, $p = 0.008$), receptive anal sex (aOR: 3.55, $p = 0.010$), having a partner with HIV (aOR: 8.95, $p = 0.019$), and participation in transactional sex (aOR: 29.46, $p = 0.029$).

**Conclusion:** Patients seen within the SWC were priority patient populations for sexual health services and PrEP linkage. The SWC was able to promote the initiation of same-day PrEP in Black cisgender women, a key population that continues to experience inequities in PrEP coverage. The SWC functions as a model for sexual healthcare delivery in populations with unmet sexual health needs.

***Keywords:*** emergency department, PrEP, sexual health, sexually transmitted infections

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## Introduction

The sexually transmitted infection (STI) epidemic in the United States (US) remains a serious public health threat. The 2022 Center for Disease Control and Prevention (CDC) Surveillance Report documented more than 2.5 million cases of gonorrhea, chlamydia, and syphilis, with sustained increases across the country.[1] Rates of STIs in the City of Chicago match this trend, with reported cases of chlamydia, gonorrhea, and primary and secondary syphilis steadily increasing over the past decade.[2] Significant inequities persist with half of reported STI cases in the US occurring in adolescents and young adults aged 15–24, a disproportionate impact on men who have sex with men (MSM), and higher rates among racial/ethnic minorities, particularly non-Hispanic African Americans, who accounted for 31.1% of reported STI cases in 2022 despite representing 12.6% of the US population.[1,2]

Despite increased STI rates, public health agencies have experienced a progressive divestment from sexual health services over the past two decades, including local health department budget cuts that reduced STI clinical services provided by these institutions.[3–5] CDC national surveillance data shows that STIs are now most commonly diagnosed and treated outside traditional sexual health clinics.[1] This reduction in STI services was exacerbated by the COVID-19 pandemic; in the early pandemic period, 83% of STI programs deferred services, 62% could not maintain their HIV and syphilis caseloads, and 60% had reduced capacity to treat STIs.[6] COVID-19 also disrupted HIV pre-exposure prophylaxis (PrEP) prescriptions in the United States, resulting in 22% fewer prescriptions and 25% fewer persons starting PrEP than projected from data before the pandemic.[7]

Due in part to this reduction of outpatient STI care options, reliance on the emergency department (ED) for sexual healthcare has been increasing, most so among vulnerable populations who are underinsured or uninsured.[8] However, the ED is not an ideal setting to provide comprehensive sexual health services given time constraints, lack of specialized staff, and increasing crowding. As the ED is the primary source of care for many individuals, connecting patients seeking STI services to a specialized sexual health clinic has the potential to reduce the high patient volume in the ED and provide access for vulnerable populations to comprehensive sexual healthcare and linkage to primary care. In recent years, pilot programs identifying those vulnerable to HIV in the ED and linking them to PrEP have proven feasible and successful.[9–12] One such program proved successful in comparison to community programs, reaching a greater proportion of young and racial/ethnic minority clients and having a higher result notification rate.[12]

The Sexual Wellness Clinic (SWC) is a novel ED-based intervention providing comprehensive sexual health care and linkage to primary care to patients presenting to the ED with sexual health needs. This collaborative clinic between the ED and Section of Infectious Diseases and Global Health aimed to offer sexual health and primary care to ED patients with STI concerns while reducing ED overcrowding by redirecting low-acuity patients. Patients in adult ED triage with STI concerns were considered for the SWC after a medical screening exam by a physician; operationalization of the SWC has been discussed previously.[13,14] We sought to better understand clinic demographics and their associations with STI positivity and PrEP uptake among our patient population.

## Methods

We conducted a retrospective chart review of patients who attended the SWC between February 20, 2019, and September 30, 2022. Patients eligible for the SWC are identified at ED intake and undergo a Medical Screening Exam by a triage physician before being transported to the clinic.[13,14] Patients are excluded from SWC eligibility if pregnant, younger than 18 years of age, victims of sexual assault, presented when SWC was not open, or are deemed by a triage physician to require higher acuity care. Patients could also be referred to the SWC after an ED visit if they require further management of their sexual health needs. These referrals could be initiated by any ED clinical staff who cared for the patient or by SWC staff who are responsible for all STI reporting from the ED. Once at the SWC, they undergo a complete history, physical examination, and comprehensive STI testing. If indicated, empiric treatment and same-day PrEP initiation are provided. In addition, social services within the clinic assist with scheduling primary care follow-up at

the medical center or at an affiliated Federally Qualified Health Center. Given the retrospective nature of our study design, which used a convenience sample of all SWC visits, no sample size or power calculations were performed.

### Measures

*Sociodemographic characteristics.* All sociodemographic characteristics were collected through a review of electronic health record (EHR) data (including age, sex assigned at birth, gender identity, race, ethnicity, insurance status, zip code). For the initial analyses, age was categorized into six age groups (18–29, 30–39, 40–49, 50–59, 60–69, ⩾70 years). A standardized EHR note template with discrete extractable entries was used for all SWC patients. These standardized notes allowed us to uniformly collect the gender of sexual partner(s) and were used to categorize patient's sexual behaviors as MSM, men who have sex with men and women (MSMW), men who have sex with women only (MSW), women who have sex with men only (WSM), women who have sex with men and women (WSMW), and women who have sex with women only (WSW). The EHR note template allowed us to uniformly collect HIV vulnerability factors, as well as additional variables such as sexual behaviors (receptive or insertive vaginal, anal, and/or oral sex), frequency of condom use, prior history of STIs, HIV status, prior PrEP/PEP use, and whether they had a primary care provider (PCP). For time-invariant information (such as race/ethnicity, sex) that was missing at an individual SWC visit, the most recent available data was used from the demographics section of the EHR.

*STI testing.* STI test results and result dates were collected through chart review. The most recent test corresponding to either the date of the ED visit or the SWC visit was used. Chlamydia, gonorrhea, syphilis, trichomoniasis, hepatitis C (HCV), and HIV were categorized according to positive, negative, or unknown test results. Chlamydia, gonorrhea, syphilis, and trichomoniasis screening were all performed by nucleic acid amplification testing. HCV was screened by serology followed by reflex HCV RNA; a positive result was defined as reactive serology followed by detectable HCV RNA. HIV screening was performed by the established CDC algorithm.[15] Positive syphilis tests were further categorized into current and previously treated infections using a combination of serology results and clinical history, following CDC syphilis diagnosis and treatment guidelines.[15] Current syphilis infections were defined as positive Rapid Plasma Reagin (RPR) or Treponema Pallidum Particle Agglutination (TPPA) with no known history of previous treatment, fourfold or higher rise in RPR, or RPR ⩾1:8, and unable to confirm history.

*PrEP characteristics.* PrEP was discussed with all patients without HIV who were evaluated in the SWC as part of routine clinical care. PrEP eligibility was determined by CDC guidelines in practice at the time of the visit.[16] Eligible patients interested in PrEP had the option to start immediately with a protocol for same-day PrEP initiation. All PrEP prescriptions were either daily oral fixed-dose tenofovir disoproxil-fumarate/emtricitabine (F/TDF) or tenofovir alafenamide/emtricitabine (F/TAF). Eligible patients who deferred PrEP initiation were queried as to their reason for deferral during the SWC visit. Given the lack of uniform data available for follow-up after PrEP initiation, data were not analyzed on continuation, persistence, or other aspects of the PrEP cascade of care.

### Analysis

Data was analyzed using RStudio version 2022.12.0. Descriptive analyses were performed on all factors including age, ethnicity, race, sex assigned at birth, gender identity, insurance status, zip code, HIV status and HIV vulnerability factors, sexual orientation, type of sex, frequency of condom use, prior STIs, prior PrEP/PEP use, and current PCP status. Bivariable and multivariable logistic regression models were used to analyze the relationships between either positive STI tests or PrEP initiation and sociodemographic variables, insurance status, sex type, frequency of condom use, prior STIs, and for PrEP initiation, HIV vulnerability factors. Regression models were created for each outcome, one for STI positivity (anyone who tested positive for chlamydia, gonorrhea, syphilis, trichomonas, and/or HIV), and one for PrEP initiation. Two types of multivariable models were run, minimally adjusted models and fully adjusted models. Minimally adjusted models are those that examine the variable and outcome of interest while adjusting for factors likely to result in confounding due to disparities in STI incidence and prevalence reported

in the literature.[17–20] Typically, models were adjusted for race/ethnicity, age, and sex. However, we removed some covariates from minimally adjusted for certain exposures of interest due to strong correlations between covariates. Results of logistic regression models are presented as either unadjusted (OR) or adjusted odds ratios (aORs) (for both minimally and fully adjusted models) and 95% confidence intervals (95% CI).

For the regression models, variables were collapsed as follows: race and ethnicity were collapsed into Hispanic, Black non-Hispanic, White non-Hispanic, other non-Hispanic, and unknown non-Hispanic; insurance status was collapsed into private, public, uninsured, or other; sex type was collapsed into receptive vaginal sex, receptive anal sex, insertive vaginal sex, insertive anal sex, oral sex, or other; frequency of condom use was collapsed into rarely (0%–25%), most of the time (26%–75%), and frequently (76%–100%), reported prior gonorrhea infection, reported prior chlamydia infection, reported prior syphilis infection and reported prior trichomonas infection were combined into prior reported STI infection. When analyzing relationships for PrEP starts, those already on PrEP were excluded.

The University of Chicago designated this study as Quality Improvement project due to its focus on understanding the population served by the SWC and improving clinical care for this population. The University of Chicago Institutional Review Board confirmed this status, ensuring compliance with institutional policies and federal regulations.

## Results

A total of 785 visits to the SWC by 651 individuals occurred during the study period. The majority (53.1%) of patients seen at the SWC were brought directly from the ED and 31.3% were referred to the SWC after a recent ED visit; the remainder were referred to SWC from acute and urgent care clinics. Table 1 shows the sociodemographic characteristics of unique patients seen at the SWC along with documented sex behaviors. The majority of patients were Black or African American (94.6%) and not Hispanic or Latino (96.0%). Around half of patients were assigned male at birth (51.2%) and about half were assigned female at birth (48.9%). Gender identity was removed from the analysis as only one

**Table 1.** Demographics of patients attending the SWC from February 20, 2019 to September 30, 2022 ($N = 651$ patients).

| Characteristic | Number (%) |
|---|---|
| Age | |
| 18–29 | 346 (53.2) |
| 30–39 | 169 (26.0) |
| 40–49 | 66 (10.1) |
| 50–59 | 43 (6.6) |
| 60–69 | 20 (3.1) |
| 70+ | 4 (0.6) |
| Ethnicity | |
| Hispanic or Latino | 14 (2.2) |
| Not Hispanic or Latino | 625 (96.0) |
| Declined | 4 (0.6) |
| Unknown/Not Reported | 7 (1.1) |
| Race | |
| American Indian/Alaska Native | 0 (0.0) |
| Asian | 4 (0.6) |
| Black or African American | 616 (94.6) |
| Native Hawaiian or Other Pacific Islander | 1 (0.2) |
| White | 11 (1.7) |
| More Than One Race | 8 (1.2) |
| Patient Declined | 3 (0.5) |
| Unknown/Not Reported | 8 (1.2) |
| Sex | |
| Male | 333 (51.2) |
| Female | 318 (48.9) |
| Insurance | |
| Private Employer | 64 (9.8) |
| Private Individual | 10 (1.5) |
| Medicare | 33 (5.1) |
| Medicaid | 428 (65.6) |
| Other | 17 (2.6) |
| Uninsured | 99 (15.2) |

*(Continued)*

**Table 1.** (Continued)

| Characteristic | Number (%) |
|---|---|
| Zip code (top five most common) | |
| 60,637 | 123 (19.4) |
| 60,619 | 101 (15.5) |
| 60,649 | 56 (8.6) |
| 60,620 | 51 (8.0) |
| 60,615 | 35 (5.4) |
| Other | 285 (43.8) |
| HIV vulnerability Factor, choose all that apply | |
| MSM or MSMW | 29 (4.5) |
| PWID or sex with PWID | 0 (0.0) |
| STI within the past 6 months | 173 (26.6) |
| HIV-positive sexual partner(s) | 8 (1.2) |
| Unknown sexual partner(s) | 36 (5.5) |
| Transactional sex/Sex work | 3 (0.5) |
| Non-monogamous relationship | 82 (12.6) |
| Inconsistent condom use | 310 (47.6) |
| Current pregnancy or pregnant in past 12 months | 9 (1.4) |
| None of the above | 95 (14.6) |
| Sexual orientation | |
| MSM | 38 (5.8) |
| MSW | 249 (38.2) |
| WSW | 11 (1.7) |
| WSM | 256 (39.3) |
| MSMW | 14 (2.2) |
| WSMW | 17 (2.6) |
| Unknown | 66 (10.1) |
| Type of sex, choose all that apply | |
| Oral | 322 (49.5) |
| Insertive vaginal | 255 (39.2) |
| Receptive vaginal | 252 (38.7) |
| Insertive anal heterosexual sex | 9 (1.4) |
| Insertive anal MSM | 21 (3.2) |
| Receptive anal heterosexual sex | 13 (2.0) |
| Receptive anal MSM | 22 (3.4) |
| None of the above | 11 (1.7) |
| Frequency of condom use | |
| All the time (100%) | 25 (3.8) |
| Most of the time (76–99%) | 35 (5.4) |
| Some of the time (51–75%) | 70 (10.8) |
| Not often (26–50%) | 76 (11.7) |
| Rarely (1–25%) | 115 (17.7) |
| Never (0%) | 232 (35.6) |
| Unknown | 98 (15.1) |
| History of STIs Reported to Provider, choose all that apply | |
| Gonorrhea | 167 (25.7) |
| Chlamydia | 234 (35.9) |
| Syphilis | 70 (10.8) |
| Trichomonas | 79 (12.1) |
| None | 165 (25.3) |
| Prior PrEP/PEP use | |
| Yes | 6 (0.9) |
| No | 645 (99.1) |
| HIV Status | |
| Positive | 19 (2.9) |
| Negative | 632 (97.1) |
| Have a PCP | |
| Yes | 193 (29.6) |
| No | 458 (70.4) |

*Based on most recent encounter.
MSM, men who have sex with men; MSMW, men who have sex with men and women; MSW, men who have sex with women only; PCP, primary care provider; PEP, post-exposure prophylaxis; PrEP, pre-exposure prophylaxis; STI, sexually transmitted infection; SWC, Sexual Wellness Clinic; WSM, women who have sex with men only; WSMW, women who have sex with men and women; WSW, women who have sex with women only.

**Table 2.** Visits with STI positive testing results ($N = 785$ visits).

| Positive STI tests | Number percentage (%) |
|---|---|
| Chlamydia | 127 (16.2) |
| Gonorrhea | 118 (15.0) |
| Syphilis | |
| All syphilis infections | 214 (27.3) |
| Current infections | 184 (23.4)[a] |
| Past infections | 30 (3.8)[b] |
| Trichomonas | 62 (7.9) |
| HIV | |
| Existing | 19 (0.02) |
| New | 0 (0.0) |

[a]86.0% of all positive syphilis results.
[b]14.0% of all positive syphilis results.
STI, sexually transmitted infection.

individual did not identify with the sex given at birth. Most patients were young, either 18–29 years of age (53.2%) or 30–39 years of age (26.0%). Nearly two-thirds of patients (65.8%) had Medicaid insurance. We found that the majority of patients reported exclusive heterosexual contact (MSW 38.2%, WSM 39.3%), while small percentages of participants reported same-sex sexual experiences (MSM 5.8%, WSW 1.7%, MSWM 2.2%, and WSWM 2.6%). Inconsistent condom use (47.6%), a history of an STI within the past 6 months (26.6%), and having a non-monogamous relationship (12.6%) were the three most reported vulnerability factors for HIV. The most common types of sex reported were oral (49.5%), insertive vaginal (39.2%), and receptive vaginal sex (38.7%). Over a third of the patient population (35.6%) reported never using condoms. The most commonly self-reported prior STIs were chlamydia (35.9%) and gonorrhea (25.7%) while nearly another quarter of the population reported never having previously had an STI. Six individuals had already used PrEP or PEP prior to their visit (0.9%) and 19 were living with HIV (2.9%).

The frequency of STI positivity at each visit is shown in Table 2. Out of all SWC visits, 27.3% included a syphilis diagnosis, 16.12% included a positive chlamydia test, and 15.0% included a positive gonorrhea test. The majority (86.0%) of syphilis tests that were positive were considered current syphilis infections, while the minority (14.0%) were previously treated infections. Only 7.9% of visits had a positive test for trichomonas, although not all visits included trichomonas testing. Of note, 0.02% of visits had a positive HIV test, all of whom were eventually determined to be in persons previously known to be living with HIV.

Modeling of associations between patient factors and any positive STI test (including testing positive for chlamydia, gonorrhea, syphilis, trichomonas, and/or HIV) can be seen in Table 3. Decreased risk was seen for participating in insertive vaginal sex for unadjusted, minimally adjusted, and fully adjusted models (fully adjusted model results: aOR: 0.34 (95% CI: 0.15–0.74), $p = 0.0079$). Using condoms most of the time (26%–75% of the time) was associated with increased risks of receiving a positive test for any STI for unadjusted, minimally adjusted and fully adjusted results (aOR: 2.68 (95% CI: 1.38–5.28), $p = 0.0038$).

In total, 80 people initiated PrEP at the SWC, 78 on the same day as their first SWC visit, and two on subsequent visits to the SWC. Demographics of the patients who started PrEP can be seen in Table 4, most were Black non-Hispanic (96.3%) with public insurance (68.8%). The median age of those who initiated PrEP was 27, with most being between 23 and 33 years of age. The majority of people who started PrEP were assigned female at birth (53.8%). Most people identified the sex of their partners as male (61.3%) and most (63.8%) had a positive STI test on the visit that they started PrEP.

Results from multivariable analysis of same-day PrEP initiation are seen in Table 5. Age was consistently in unadjusted, minimally, and fully adjusted results associated with a reduced likelihood of beginning PrEP (per year increase (fully adjusted model results: aOR: 0.97 (95% CI: 0.94–0.99), $p = 0.048$)). Reporting a previous STI was associated with a greater likelihood of beginning PrEP regardless of which variables were adjusted for (fully adjusted model results: aOR: 3.78 (95% CI: 1.88–8.42), $p < 0.001$).

**Table 3.** Logistic regression analysis of STI positivity and subject characteristics ($N = 639$).

| Characteristic | OR (95% CI) Unadjusted | aOR (95% CI) Minimally adjusted | aOR (95% CI) Fully adjusted | *p* Value for adjusted |
|---|---|---|---|---|
| Age (per year increase) | 1.02 (1.00–1.03) | 1.01 (1.00–1.03)[a] | 1.01 (1.00–1.03) | 0.09 |
| Sex | | | | |
| Male | Reference | Reference | Reference | |
| Female | 1.23 (0.90–1.68) | 1.24 (0.90–1.70)[b] | 1.27 (0.68–2.40) | 0.46 |
| Race/Ethnicity | | | | |
| Black, non-Hispanic | Reference | Reference | Reference | |
| Hispanic | 1.86 (0.88–12.74) | 2.74 (0.84–12.26)[c] | 2.74 (0.79–12.86) | 0.14 |
| White, non-Hispanic | 0.58 (0.11–2.67) | 0.57 (0.11–2.63)[c] | 0.53 (0.10–2.59) | 0.43 |
| Other, non-Hispanic | 0.31 (0.04–1.46) | 0.32 (0.04–1.50)[c] | 0.37 (0.05–1.91) | 0.26 |
| Unknown | 0.35 (0.09–1.08) | 0.38 (0.10–1.19)[c] | 0.43 (0.11–1.42) | 0.18 |
| Insurance | | | | |
| Private | Reference | Reference | Reference | |
| Public | 1.63 (0.99–2.68) | 1.63 (0.98–2.70)[c] | 1.55 (0.91–2.67) | 0.11 |
| Uninsured | 1.06 (0.58–1.94) | 1.12 (0.61–2.07)[c] | 1.22 (0.64–2.33) | 0.54 |
| Other | 2.06 (0.65–7.28) | 1.63 (0.98–2.70)[c] | 1.85 (0.52–7.12) | 0.35 |
| Partner gender | | | | |
| Male | Reference | Reference | Reference | |
| Female | 0.86 (0.62–1.19) | 0.98 (0.60–1.61)[d] | 1.57 (0.83–3.06) | 0.17 |
| Unknown | 1.42 (0.79–2.60) | 1.44 (0.78–2.75) [d] | 1.52 (0.61–3.82) | 0.37 |
| Oral sex | | | | |
| No | Reference | Reference | Reference | |
| Yes | 0.70 (0.51–0.95) | 0.74 (0.54–1.02)[d] | 0.71 (0.49–1.03) | 0.07 |
| Insertive vaginal sex | | | | |
| No | Reference | Reference | Reference | |
| Yes | 0.68 (0.50–0.94) | 0.59 (0.37–0.95)[d] | 0.34 (0.15–0.74) | 0.0079** |
| Receptive vaginal sex | | | | |
| No | Reference | Reference | Reference | |
| Yes | 1.05 (0.76–1.44) | 0.85 (0.51–1.41)[d] | 0.53 (0.23–1.18) | 0.13 |
| Insertive anal sex | | | | |
| No | Reference | Reference | Reference | |

*(Continued)*

**Table 3.** (Continued)

| Characteristic | OR (95% CI) Unadjusted | aOR (95% CI) Minimally adjusted | aOR (95% CI) Fully adjusted | *p* Value for adjusted |
|---|---|---|---|---|
| Yes | 1.11 (0.60–2.11) | 1.23 (0.64–2.43)[d] | 1.07 (0.48–2.40) | 0.87 |
| Receptive anal sex | | | | |
| No | Reference | Reference | Reference | |
| Yes | 1.18 (0.63–2.27) | 1.36 (0.71–2.67)[d] | 1.15 (0.52–2.62) | 0.73 |
| Condom use | | | | |
| Frequently | Reference | Reference | Reference | |
| Most of the time | 2.35 (1.27–4.42) | 2.38 (1.26–4.57)[d] | 2.68 (1.38–5.28) | 0.0038** |
| Rarely | 1.85 (1.05–3.29) | 1.74 (0.98–3.15) [d] | 1.78 (0.97–3.31) | 0.07 |
| Unknown | 2.41 (1.24–4.76) | 2.21 (1.12–4.44)[d] | 0.79 (0.27–2.24) | 0.66 |
| Reported Prior STI positivity | | | | |
| No | Reference | Reference | Reference | |
| Yes | 0.84 (0.61–1.15) | 0.89 (0.64–1.23)[d] | 0.95 (0.65–1.38) | 0.78 |

*Significant at the $p = 0.001$ level.
**Significant at the $p = 0.01$ level.
***Significant at the $p = 0.05$ level.
[a]Adjusted for race/ethnicity and sex.
[b]Adjusted for age and race/ethnicity.
[c]Adjusted for age and sex.
[d]Adjusted for age, sex, and race/ethnicity.
95% CI, 95% confidence interval; OR, odds ratio; STI, sexually transmitted infection.

Similarly, participating in oral sex (fully adjusted model results: aOR: 2.33 (95% CI: 1.26–4.47), $p = 0.008$), receptive anal sex (fully adjusted model results: aOR: 3.55 (95% CI: 1.33–9.29), $p = 0.010$), having a partner with HIV (fully adjusted model results: aOR: 8.95 (95% CI: 1.44–62.58), $p = 0.019$), and participation in transactional sex/sex work (fully adjusted model results: aOR: 29.46 (95% CI: 1.40–875.98), $p = 0.029$) were all associated with a greater likelihood of PrEP initiation in the SWC regardless if unadjusted, minimally adjusted, or fully adjusted results were examined. Documented reasons for deferring PrEP can be seen in Table 6. The most common reasons for deciding not to initiate PrEP at this visit were low self-perceived risk (55.74%), being in a monogamous relationship (14.75%), and no longer reporting sexual activity with a partner of concern (8.20%).

## Discussion

This paper describes demographics and sexual behaviors in addition to examining the characteristics associated with STI positivity and PrEP uptake among people presenting to the ED with STI concerns and linked to a comprehensive sexual health clinic. Using condoms most of the time was associated with an increased risk of current STI while a history of insertive vaginal sex was associated with decreased risk of current STI. We also found patients diagnosed with a previous STI as well as those with a partner with HIV were more likely to start PrEP during their SWC visit. By affording the opportunity to educate and engage all patients about HIV prevention, the SWC was able to successfully promote same-day PrEP initiation, particularly in Black cisgender women. This differs significantly from existing same-day PrEP models in STI clinics which have

**Table 4.** Demographics of patients with PrEP start from February 20, 2019 to September 30, 2022 (*N* = 80 patients).

| Characteristic | Number (%) or median (IQR) |
|---|---|
| Age (per year increase) | 27 (10) |
| Sex | |
| Male | 37 (46.3) |
| Female | 43 (53.8) |
| Race/Ethnicity | |
| Black, non-Hispanic | 77 (96.3) |
| Hispanic | 1 (1.3) |
| White, non-Hispanic | 1 (1.3) |
| Other, non-Hispanic | 1 (1.3) |
| Unknown | 0 (0.0) |
| Insurance | |
| Private | 12 (15.0) |
| Public | 55 (68.8) |
| Uninsured | 13 (16.3) |
| Other | 0 (0.0) |
| Partner gender | |
| Male | 49 (61.3) |
| Female | 30 (37.5) |
| Unknown | 1 (1.3) |
| Oral sex | |
| No | 18 (22.5) |
| Yes | 62 (77.5) |
| Insertive vaginal sex | |
| No | 53 (66.3) |
| Yes | 27 (33.8) |
| Receptive vaginal sex | |
| No | 42 (52.5) |
| Yes | 38 (47.5) |
| Insertive anal sex | |
| No | 65 (81.3) |
| Yes | 15 (18.8) |
| Receptive anal sex | |
| No | 62 (77.5) |
| Yes | 18 (22.5) |
| Condom use | |
| Frequently | 9 (11.3) |
| Most of the time | 23 (28.8) |
| Rarely | 47 (58.8) |
| Unknown | 1 (1.3) |
| Reported Prior Gonorrhea infection | |
| No | 40 (50.0) |
| Yes | 40 (50.0) |
| Reported Prior Chlamydia infection | |
| No | 41 (51.3) |
| Yes | 39 (48.8) |
| Reported Prior Syphilis infection | |
| No | 67 (83.8) |
| Yes | 13 (16.3) |
| Reported Prior Trichomonas infection | |
| No | 57 (71.3) |
| Yes | 23 (28.8) |
| MSM or MSMW | |
| No | 71 (88.8) |
| Yes | 9 (11.3) |
| HIV-positive sexual partner (s) | |
| No | 76 (95.0) |
| Yes | 4 (5.0) |

**Table 4.** (Continued)

| Characteristic | Number (%) or median (IQR) |
|---|---|
| Unknown sexual partner(s) | |
| No | 71 (88.8) |
| Yes | 9 (11.3) |
| Transactional sex/Sex work | |
| No | 78 (97.5) |
| Yes | 2 (2.5) |
| Non-monogamous relationship | |
| No | 70.0 (87.5) |
| Yes | 10.0 (12.5) |
| Current pregnancy or pregnant in past 12 months | |
| No | 78 (97.5) |
| Yes | 2 (2.5) |
| Lab confirmed Positive STI test | |
| No | 29 (36.3) |
| Yes | 51 (63.8) |

IQR, interquartile range; MSM, men who have sex with men; MSMW, men who have sex with men and women; PrEP, Pre-Exposure Prophylaxis; STI, sexually transmitted infection.

largely reached only MSM.[21,22] Establishing linkage to PrEP directly to patients presenting from the ED may offer a more successful means to reach Black cisgender women vulnerable to HIV and other STIs.

By expanding PrEP eligibility to all sexually active adults and adolescents, the updated CDC guidelines aim to engage diverse populations who may benefit from PrEP.[16,23] However, inequities in PrEP knowledge, access, and uptake persist in key populations, specifically, cisgender women.[24] It may be that "perceived risk" is central to the continuing PrEP gap, as evidenced in our population as the major reason for PrEP deferrals.[25,26] In addition, the outdated and stigmatizing framework regarding the concept of risk disproportionally impacts PrEP uptake by marginalized populations, including Black cisgender women. Black women face significant barriers to accessing PrEP due to limited visibility in public education campaigns, healthcare provider biases, and unique cultural and social dynamics. Addressing these inequities requires targeted patient and provider educational initiatives, policy interventions, community engagement, and increased representation in research to ensure Black women can effectively utilize PrEP for HIV prevention.[27] Efforts to destigmatize PrEP must start with the elimination of risk-based language and movement toward a comprehensive sexual health care model like the SWC.[28] Notably, while men made up the majority of SWC encounters, women were more likely to initiate PrEP than men through this clinical setting. This observation supports the idea that initiatives to promote PrEP among women can effectively lead to increased uptake. Equally important is to integrate PrEP services in settings where priority populations already seek care and identify eligible patients through routine STI screening. The STI and HIV epidemics amplify each other, leading to an excess disease burden and perpetuating health disparities.[29,30] Appropriate STI control and HIV elimination will require a syndemic approach to be effective. Expanding and co-locating HIV prevention efforts alongside sexual health services through models of care like the SWC will work toward crosscutting effects across the syndemic.[6]

Our study results should be interpreted in the presence of its limitations. As a retrospective chart review, any relationships we identify within the study sample may not be reflective within the wider population. In addition, this study design may not account for unmeasured confounders or other factors that could influence the outcomes of interest. Notably, as we used all available historical visits to the SWC, we did not conduct power and sample size calculations prior to our analysis of the data. It is possible that we were underpowered to detect some differences or associations in this study. Our patient population was composed of people accessing the ED for their sexual health; this may not represent the greater population receiving care in other settings, including those not seeking care at all. Patients who seek care at the SWC may differ systematically from those who do not, potentially influencing the representativeness of the study sample and limiting the generalizability of our findings. While our staff worked to contact patients presenting to the ED during SWC off-hours, particularly nights and

**Table 5.** Multivariable logistic regression analysis of same-day PrEP starts and associations with subject characteristics (*N* = 639).

| Characteristic | OR (95% CI) Unadjusted | aOR (95% CI) Minimally adjusted | aOR (95% CI) Fully adjusted | *p* Value |
|---|---|---|---|---|
| Age (per year increase) | 0.97 (0.95–1.00) | 0.97 (0.95–1.00)[a] | 0.97 (0.94–0.99) | 0.048*** |
| Sex | | | | |
| Male | Reference | Reference | Reference | |
| Female | 1.32 (0.82–2.13) | 1.32 (0.82–2.14)[b] | 3.13 (0.88–10.78) | 0.07 |
| Race/Ethnicity | | | | |
| Black, non-Hispanic | Reference | Reference | Reference | |
| Hispanic | 0.53 (0.03–2.71) | 0.64 (0.03–3.35)[c] | 0.39 (0.01–3.65) | 0.49 |
| White, non-Hispanic | 1.14 (0.06–6.83) | 1.39 (0.82–2.14)[c] | 1.16 (0.05–10.61) | 0.91 |
| Other, non-Hispanic | NA | NA | NA | 0.99 |
| Unknown | NA | NA | NA | 0.99 |
| Insurance | | | | |
| Private | Reference | Reference | Reference | |
| Public | 0.68 (0.35–1.39) | 0.61 (0.31–1.27)[c] | 0.50 (0.23–1.17) | 0.10 |
| Uninsured | 0.76 (0.32–1.80) | 0.68 (0.29–1.62)[c] | 0.47 (0.18–1.26) | 0.13 |
| Other | NA | NA | NA | 0.99 |
| Partner gender | | | | |
| Male | Reference | Reference | Reference | |
| Female | 0.57 (0.34–0.93) | 0.41 (0.19–0.87)[d] | 0.67 (0.22–1.86) | 0.46 |
| Unknown | 0.09 (0.01–0.43) | 0.08 (0.00–0.38)[d] | NA | 0.99 |
| Oral sex | | | | |
| No | Reference | Reference | Reference | |
| Yes | 3.67 (2.16–6.54) | 3.71 (2.16–6.67)[d] | 2.33 (1.26–4.47) | 0.008** |
| Insertive vaginal sex | | | | |
| No | Reference | Reference | Reference | |
| Yes | 0.75 (0.45–1.23) | 0.79 (0.39–1.63)[d] | 1.69 (0.47–7.06) | 0.45 |
| Receptive vaginal sex | | | | |
| No | Reference | Reference | Reference | |
| Yes | 0.56 (0.97–2.52) | 1.64 (0.76–3.82)[d] | 0.67 (0.18–3.05) | 0.58 |
| Insertive anal sex | | | | |
| No | Reference | Reference | Reference | |
| Yes | 4.01 (1.97–7.87) | 6.91 (3.08–15.37)[d] | 2.53 (0.86–7.09) | 0.08 |

*(Continued)*

**Table 5.** (Continued)

| Characteristic | OR (95% CI) Unadjusted | aOR (95% CI) Minimally adjusted | aOR (95% CI) Fully adjusted | *p* Value |
|---|---|---|---|---|
| Receptive anal sex | | | | |
| No | Reference | Reference | Reference | |
| Yes | 5.98 (3.02–11.63) | 7.65 (3.72–15.68)[d] | 3.55 (1.33–9.29) | 0.010** |
| Condom use | | | | |
| Frequently | Reference | Reference | Reference | |
| Most of the time | 0.92 (0.40–2.25) | 0.76 (0.33–1.88)[d] | 0.56 (0.21–1.56) | 0.25 |
| Rarely | 0.86 (0.41–1.98) | 0.71 (0.33–1.65)[d] | 0.81 (0.34–2.11) | 0.65 |
| Unknown | 0.06 (0.003–0.33) | 0.05 (0.00–0.29)[d] | NA | 0.99 |
| Reported Prior STI positivity | | | | |
| No | Reference | Reference | Reference | |
| Yes | 4.85 (2.66–9.62) | 4.57 (2.49–9.10)[d] | 3.78 (1.88–8.42) | <0.001* |
| HIV-positive sexual partner(s) | | | | |
| No | Reference | Reference | Reference | |
| Yes | 7.53 (1.75–32.45) | 10.26 (2.26–48.17)[d] | 8.95 (1.44–62.58) | 0.019*** |
| Transactional sex/Sex work | | | | |
| No | Reference | Reference | Reference | |
| Yes | 14.74 (1.40–319.35) | 15.49 (1.37–355.16)[d] | 29.46 (1.40–875.98) | 0.029*** |
| Lab confirmed positive STI test | | | | |
| No | Reference | Reference | Reference | |
| Yes | 1.40 (0.86–2.30) | 1.41 (0.86–2.33)[d] | 1.50 (0.87–2.63) | 0.15 |

*Significant at the $p = 0.001$ level.
**Significant at the $p = 0.01$ level.
***Significant at the $p = 0.05$ level.
[a]Adjusted for race/ethnicity and sex.
[b]Adjusted for age and race/ethnicity.
[c]Adjusted for age and sex.
[d]Adjusted for age, sex, and race/ethnicity.
95% CI, 95 confidence interval; OR, odds ratio; PrEP, Pre-Exposure Prophylaxis.

weekends, these individuals are likely also underrepresented in our sample. In addition, the reliance on self-reported data for certain variables, such as sexual behaviors and STI history, introduces the possibility of recall bias and social desirability bias. Of note, our institution performs universal syphilis screening for all patients presenting to the ED.[31] All patients requiring treatment for active or presumed active syphilis were referred to the SWC; our significantly elevated syphilis positivity rate is likely due to this program. Additionally, by solely attributing HCV and HIV infections to sexual transmission, other important prevention strategies and public health

**Table 6.** Reasons indicated for deferring PrEP start among those who provided a reason ($N = 61$ patients).

| Reason for PrEP deferral | Number (%) |
|---|---|
| Low self-perceived risk | 34 (55.7) |
| In monogamous relationship | 9 (14.8) |
| No longer with partner putting them at risk | 5 (8.2) |
| Wants more time to consider | 4 (6.6) |
| Does not want more pills | 2 (3.3) |
| On PEP | 1 (1.6) |
| Not sexually active | 1 (1.6) |
| Already on PrEP | 1 (1.6) |
| Not interested/declined | 4 (6.6) |

PrEP, Pre-Exposure Prophylaxis.

interventions targeting nonsexual transmission routes may be overlooked during SWC visits; however of note, of the 651 patients seen in the clinic, none identified as persons who inject drugs. Lastly, due to limited resources, we were unable to collect comprehensive data pertaining to PrEP persistence and reasons for PrEP discontinuation. We aim to focus our future efforts on PrEP retention among those who initiate PrEP at the SWC and how to support patient challenges along the PrEP continuum. Additional future directions for the SWC include the integration of long-acting PrEP agents and trials of the use of STI chemoprophylaxis within the SWC to better serve our patient population.

## Conclusion

We present information on the demographics and STI associations among our patient population that originally presented to the ED and were transferred to a specialized sexual health clinic. Through operating in a nontraditional setting, the SWC was able to promote PrEP initiation in young adults and Black cisgender women. However, further work is needed to support the ongoing PrEP cascade of care following initiation. Creation and expansion of novel sexual health delivery locations, such as the SWC represent a unique approach to addressing broader healthcare disparities and barriers faced by underserved populations.

## Declarations

### *Ethics approval and consent to participate*

The Institutional Review Board of the University of Chicago waived the need for ethics approval and the need to obtain consent for the collection, analysis, and publication of the retrospectively obtained and anonymized data for this non-interventional study.

### *Consent for publication*

Not applicable.

### *Author contributions*

**Ruby Massey:** Conceptualization; Data curation; Formal analysis; Investigation; Writing – original draft; Writing – review & editing.

**Joesph A. Mason:** Data curation; Formal analysis; Methodology; Software; Validation; Writing – review & editing.

**Eleanor E. Friedman:** Data curation; Formal analysis; Methodology; Software; Supervision; Validation; Writing – review & editing.

**Kimberly A. Stanford:** Conceptualization; Methodology; Supervision; Writing – review & editing.

**Damaris Garcia:** Data curation; Project administration; Writing – review & editing.

**Jackson Montgomery:** Data curation; Project administration; Writing – review & editing.

**Jessica Schmitt:** Conceptualization; Data curation; Investigation; Methodology; Project administration; Supervision; Writing – review & editing.

**Aniruddha Hazra:** Conceptualization; Data curation; Investigation; Methodology; Project administration; Supervision; Validation; Visualization; Writing – original draft; Writing – review & editing.

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The corresponding author can make data available upon reasonable request.

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