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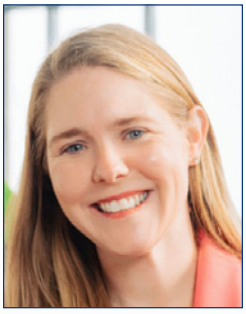

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Sexually Transmitted Infections (STIs)

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Addressing Sexually Transmitted Infections in Rhode Island

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Sexually transmitted infections (STIs) include a diverse set of bacterial, viral, protozoa and other types of infections that are primarily transmitted through sex. Rates of human immunodeficiency virus (HIV) are decreasing in the United States due to effective public health approaches such as routine testing, antiretroviral therapy, and pre-exposure prophylaxis (PrEP).[1] However, bacterial STIs such as syphilis, gonorrhea, and chlamydia have increased dramatically during the last decade. In 2022, there were over 2.5 million cases of syphilis, gonorrhea, and chlamydia reported to the Centers for Disease Control and Prevention (CDC).[2] Other STIs such as genital herpes and human papillomavirus (HPV) are not reported to the CDC given high prevalence in the general population. Importantly, cases of STIs disproportionately impact specific populations including younger individuals, cisgender women, men who have sex with men (MSM), and non-binary and gender-diverse groups, as well as African American/Black and Hispanic/Latino communities. Improved efforts are needed to address STIs across the country, including Rhode Island.

STIs can lead to significant complications and morbidity.[3] Cisgender females experience significant sequelae of STIs. Untreated gonorrhea and chlamydia can lead to pelvic inflammatory disease (PID), infertility, ectopic pregnancy, and chronic pain. Those with an STI are also at significantly increased risk of HIV, which continues to disproportionately affect MSM and transgender women (TGW).[4] Untreated or inappropriately treated syphilis can cause significant sequalae, including cardiovascular and neurological complications. Importantly, congenital syphilis is increasing in Rhode Island and across the United States, which can lead to serious fetal complication, including death. In addition to potential physical consequences of these STIs, there are also social and psychological ramifications of testing positive for an STI.

Both the CDC and United States Preventative Service Task Force (USPSTF) provide recommendations for STI screening.[5] These recommendations vary for different populations and include: 1) **Cisgender women:** Gonorrhea and chlamydia screening for all sexually active women under 25 years of age, and for women 25 years of age and older at increased risk (i.e., new partner, more than one partner, not in a monogamous relationship, history of incarceration, etc.), syphilis if at increased risk; 2) **Cisgender heterosexual men:** Although there is insufficient evidence for gonorrhea, chlamydia and syphilis screening in cisgender heterosexual men, this group should be screened in higher prevalence clinical settings (i.e., if STIs are being found in the corresponding cisgender heterosexual female population); 3) **MSM:** Chlamydia, gonorrhea, and syphilis screening at least annually and every three to six months if multiple sex partners; 4) **Transgender, gender-diverse:** STI screening in transgender and gender-diverse individuals should be adapted based on anatomy and types of sexual activity; 5) **Pregnant persons:** All pregnant persons should be screened for syphilis, HIV, and hepatitis B virus. Screening for gonorrhea and chlamydia is recommended in pregnant persons under 25 years of age or 25 years or older and at increased risk; 6) **All individuals:** Routine screening for genital herpes and trichomonas is generally not recommended. All individuals aged 13–64 years should be screened once in their lifetime for HIV, and more frequently if at risk (i.e., MSM). STIs should be treated in a timely manner according to current clinical CDC STI Treatment Guidelines.[5]

In Rhode Island, multiple options exist for specialty sexual healthcare and STI expertise. This includes infectious disease physicians at local academic centers and hospital systems, as well as community-based clinics, which commonly provide care for primary care and sexual health in general. The Miriam Hospital has a specific STI clinic dedicated to the care and management of STIs (www.lifespan.org/centers-services/infectious-diseases/sexually-transmitted-infections-clinic). Open Door Health is the state's only community-based LGBTQ+ clinic and provides timely STI testing and treatment, as well as expert consultation as needed (odhpvd.org). Planned Parenthood and Federally-Qualified Health Centers (FQHCs) such as Providence Community Health Center (PCHC) and Thundermist also provide robust and comprehensive STI services to their patients. Congenital syphilis should be managed in consultation with the Reproductive Infectious Diseases Service at Women & Infants Hospital (www.womenandinfants.org/services/infectious-disease).

In addition, the Rhode Island Department of Health (RIDOH) provides extensive resources related to STI prevention and public health, including free condoms, Testing 1-2-3 (an online program where asymptomatic individuals can be screened without visiting a clinic, www.testing123ri.

com), and the Right Time app (which provides education and resources for the community, www.righttimeapp.com). RIDOH staff routinely conduct partner-notification services with all newly diagnosed cases of HIV and cases of primary syphilis in order to ensure engagement in care and that partners are notified in a timely manner of potential exposure. RIDOH provides case management for pregnant people living with HIV or diagnosed with syphilis to ensure the health of their newborns. RIDOH has an active surveillance system to monitor trends (see the latest HIV, Sexually Transmitted Infections, Viral Hepatitis, and Tuberculosis Surveillance Report at health.ri.gov) and conduct individual and community-level interventions. With the increase in STIs both nationally and within the state, it is imperative that primary care providers and other healthcare professionals be aware and engaged in strategies for STI care and prevention.

There are multiple approaches for addressing and preventing STI transmission: 1) routine STI screening, especially given that many STIs are asymptomatic and people may not know they are infectious; 2) timely treatment; 3) notification of sex partners about exposure; 4) vaccination for STIs, if available (i.e., HPV, Hepatitis A virus, Hepatitis B virus, Mpox); 5) condoms; 6) reductions in the number of sex partners; 7) talking to partners about STIs and asking sex partners to be tested; and 8) chemoprophylaxis (i.e., HIV PrEP). Different approaches may work best for different people. STIs and sexual health can be sensitive topics, and it is important that discussions with patients are presented in a non-judgmental and respectful manner.

In addition, a new and exciting approach to STI prevention includes doxycycline as post-exposure prophylaxis (DoxyPEP). DoxyPEP is an effective method in preventing bacterial STIs in MSM and TGW,[6] and may be effective in other groups, although data is limited. DoxyPEP involves taking a single 200mg dose of doxycycline, ideally within 24 hours and up to 72 hours after condomless sex. The landmark study published in 2023 was conducted in Seattle and San Francisco and demonstrated the efficacy of this intervention in preventing syphilis, gonorrhea and chlamydia in both MSM and TGW with HIV and those taking HIV PrEP.[6] Generally, MSM and TGW who have been diagnosed with an STI in the past should consider DoxyPEP depending on current behaviors. At the very least, sexually active MSM and TGW should be made aware of DoxyPEP and the indications for use. Doxycycline is generally well tolerated.[7] Similar to HIV PrEP, DoxyPEP will likely become an important component of STI prevention.

The United States Department of Health and Human Services released their first Federal STI Implementation Plan for the country in 2023 in response to the increasing national burden.[8] The plan highlights five major goals: 1) Prevent New STIs by increasing awareness, expanding access to care, and with HPV vaccination; 2) Improve the Health of People by Reducing Adverse Outcomes of STIs by expanding affordable STI services including prevention, testing, and treatment; 3) Accelerate Progress in STI Research, Technology, and Innovation; 4) Reduce STI-Related Health Disparities and Health Inequities, including reducing stigma and addressing STI-related social determinants of health; 5) Achieve Integrated, Coordinated Efforts That Address the STI Epidemic (including the "syndemic" of STIs, HIV, viral hepatitis, substance-use disorders, and mental health disease).

In summary, STIs have been significantly increasing in Rhode Island and across the United States. Healthcare professionals should be aware of current testing and treatment guidelines, including newer prevention approaches such as DoxyPEP. Together, we can address the burden of STIs in the state and improve the overall health of people in Rhode Island.

References

1. Chan PA, Montgomery M, Marak T, Bertrand T, Flanigan TP, Fernández AJ, et al. A Nearly 50% Decrease in New HIV Diagnoses in Rhode Island from 2006-2016: Implications for Policy Development and Prevention. R I Med J (2013). 2018 Oct 1;101(8):41–5.
2. Sexually Transmitted Disease Surveillance 2021. Centers for Disease Control and Prevention.
3. Chan PA, Maher J, Poole D, Alexander-Scott N, Ducharme RB, Yates G, et al. Addressing the increasing burden of sexually transmitted infections in Rhode Island. R I Med J (2013). 2014 Jan 5;98(1):31–4.
4. Galvin SR, Cohen MS. The role of sexually transmitted diseases in HIV transmission. Nat Rev Microbiol. 2004 Jan;2(1):33–42.
5. Workowski K, Bachman L, Chan P, Johnston C, Muzny C, Park I, et al. Sexually Transmitted Infections Treatment Guidelines, 2021. MMWR. 2021;70:1–187.
6. Luetkemeyer AF, Donnell D, Dombrowski JC, Cohen S, Grabow C, Brown CE, et al. Postexposure Doxycycline to Prevent Bacterial Sexually Transmitted Infections. N Engl J Med. 2023 Apr 6;388(14):1296–306.
7. Chan PA, Le Brazidec DL, Becasen JS, Martin H, Kapadia J, Reno H, et al. Safety of Longer-Term Doxycycline Use: A Systematic Review and Meta-Analysis With Implications for Bacterial Sexually Transmitted Infection Chemoprophylaxis. Sex Transm Dis. 2023 Nov 1;50(11):701–12.
8. www.hhs.gov/programs/topic-sites/sexually-transmitted-infections/plan-overview/index.html.

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HIV and Other Sexually Transmitted Infections in Rhode Island: Trends, Disparities, and Health Equity

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ABSTRACT

Over the past 10 years, sexually transmitted infections (STIs) have seen a significant resurgence in the United States despite the availability of effective treatments and reliable prevention methods. Rhode Island has experienced a similar uptick in the incidence of syphilis, chlamydia and gonorrhea, with many cases occurring among gay, bisexual, men who have sex with men (GBMSM), which coincides with a recent concerning rise in congenital syphilis cases. We reviewed the most recent STI trends for the state of Rhode Island in 2022. During this year, 6,883 cases of STIs were reported to the Department of Health (N=5,199 chlamydia, 1,444 gonorrhea, and 240 infectious syphilis cases). Compared to 2012, this represented a 21%, 185%, and 253% increase in chlamydia, gonorrhea, and syphilis infections, respectively. Since 2020, eight cases of congenital syphilis have been reported. Prior to 2020, no cases of congenital syphilis were reported since 2009. This resurgence is mainly attributed to shifting social and behavioral trends, particularly among younger individuals and shared sexual networks across diverse groups.[1] Further efforts and resources are needed to effectively address these concerning trends in STIs.

BACKGROUND

Sexually transmitted infections (STIs) are on the rise in the United States (US), including in Rhode Island. According to preliminary data from the Centers for Disease Control and Prevention (CDC), there were more than 2.5 million new cases of syphilis, chlamydia, and gonorrhea reported in the US in 2022.[2] Syphilis infections saw a substantial 26% increase, reaching levels not observed since the 1950s. Increases among males and females, all age groups, and most racial/ethnic groups have been observed. Syphilis may be diagnosed at an infectious (primary, secondary, or early non-primary, non-secondary) stage, or at a latent/unknown stage of infection. In 2000 and 2001, total syphilis incidence (all stages) reached historic lows nationally,[2] but since then, rates have increased every year, with the greatest increases observed in the non-Hispanic American Indian or Alaska Native population.

Gay, bisexual, and other men who have sex with men (GBMSM) are disproportionately impacted by syphilis. In 2021, nearly half of all infectious male cases in the US were reported in this population. Women are generally impacted less by syphilis. However, between 2017–2021, there was a 217.4% increase in reported female cases, highlighting a growing epidemic in heterosexual populations. Congenital syphilis (CS) is a growing concern nationally. The national congenital syphilis rate of 102.5 cases per 100,000 live births in 2022 represents a 30.6% increase compared to 2021 and is the highest reported rate since 1991. In 2022, nearly all US states reported at least one case of CS.[2]

Chlamydia is the most common STI in the US. Rates of reported chlamydia continue to increase annually among both males and females, most age groups, and all racial/ethnic groups, with the highest rates occurring among adolescents and young adults aged 15–24 years. Gonorrhea is the second most common STI in the US. Similar to chlamydia, rates of gonorrhea continue to increase annually among both males and females, most age groups, and most racial and ethnic groups. In 2009, gonorrhea reached a historic low, but as of 2021, national rates have increased by 118%. Case increases among men and the higher frequency of extragenital testing in recent years likely reflect cases being identified both among GBMSM and heterosexual males.

ANALYSIS OF RHODE ISLAND SURVEILLANCE DATA ON STIS

Following national trends, syphilis increases have been observed annually in Rhode Island since 1998, with a record high occurring in 2021 with 565 total cases reported (all stages). Rates of infectious syphilis in Rhode Island have been highest in males, non-Hispanic Black/African American and Hispanic populations, and among those aged 25–34 years. Syphilis disproportionately impacts GBMSM. However, the incidence is also increasing in women of reproductive age. Untreated syphilis in pregnant individuals can lead to stillbirth and/or adverse outcomes, including death. This highlights the need to focus on timely treatment for congenital syphilis prevention. From 2020–2022, the Rhode Island Department of Health received eight reports of congenital syphilis, with most cases meeting the CDC's maternal criteria of diagnosis (i.e., inadequate treatment prior to delivery).

Before 2020, the most recent report of congenital syphilis was in 2009.

Gonorrhea is the second most common STI in Rhode Island. In 2021 a record high of 1,681 (159.4 cases per 100,000) gonococcal infections were reported, with the highest rates observed in males, those aged 20–34 years, and non-Hispanic Black/African American populations. Although a slight decrease in total incidence was observed in 2022, preliminary 2023 data suggests a continuing overall upward trend in gonorrhea infection in Rhode Island. Efforts at the RIDOH State Health Laboratory and other testing facilities have focused on the ability to detect antimicrobial resistance among cases suspected of meeting resistance criteria. Fortunately, to date, Rhode Island has not confirmed any cases of ceftriaxone-resistant gonorrhea.

Chlamydia is the most common STI in Rhode Island, with over 5,000 cases reported annually since 2017. Rates are highest among females, individuals aged 20-34 years, and in non-Hispanic Black/African American and Hispanic populations. In the last 10 years (2013–2022), rates of chlamydia have increased 68.3% in those aged 15–24 years old. Complications of both chlamydia and gonorrhea can include pelvic inflammatory disease, ectopic pregnancy, infertility, and chronic pain.

The number of newly diagnosed cases of HIV in Rhode Island has decreased overall in the last 10 years, from 79 cases in 2013 to 65 cases in 2022. However, this decline has not been consistent across all demographic groups, with certain populations experiencing a greater impact. When compared to non-Hispanic Whites, in 2022, the rate of HIV was four times higher among non-Hispanic Black/African Americans and Hispanic populations. Similarly, there were almost three times as many cases of HIV among GBMSM when compared to females, male heterosexuals, and people who inject drugs, combined. Rates among individuals ages 20–24 and 25–34 have remained consistently high compared to other groups. For a detailed description of trends, please see the Rhode Island 2021 HIV, STI, Viral Hepatitis, and Tuberculosis Surveillance Report.[3]

DISPARITIES IN STI OUTCOMES: A GLIMPSE INTO SPECIAL POPULATION GROUPS

Various social determinants of health impact outcomes and disparities related to STIs. These determinants encompass conditions at individual and structural levels that influence the prevention, diagnosis, and treatment of STIs. Although STI rates have increased across all populations in the US, marginalized groups – youth and young adults, women, GBMSM, and Black/African American and Hispanic/Latino people – continue to experience a disproportionate share of STI cases. Disparities in disease trends within each population group are particularly evident for some diseases (**Figures 1–3**). In addition, estimates of sexual behaviors that impact

Figure 1. Rates of Gonorrhea, by Racial and Ethnic Group, Rhode Island, 2018–2022

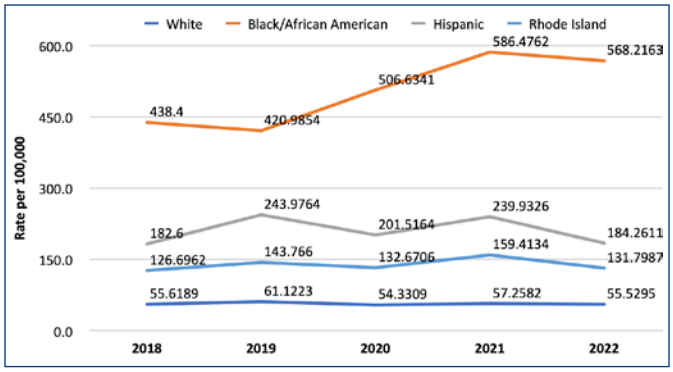


Figure 2. Number of Chlamydia Cases, by Sex, Rhode Island, 2013–2022

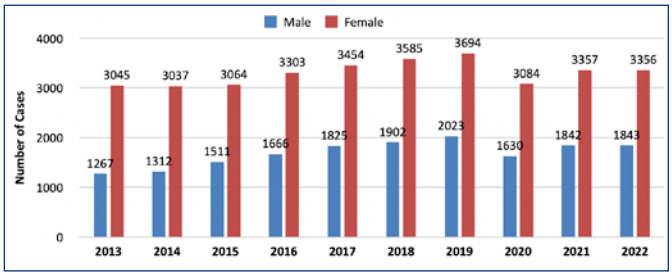
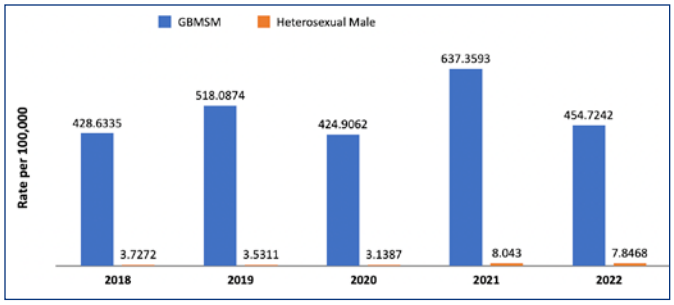


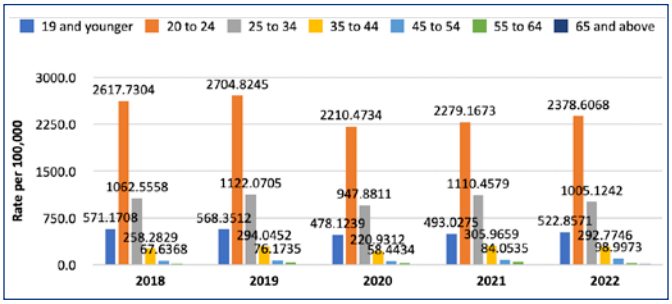
Figure 3. Rates of Infectious Syphilis in Males, by Sexual Orientation, Rhode Island, 2013–2022



STI trends are also reported as part of the Rhode Island Youth Behavioral Risk Survey (YRBS) and the Rhode Island Behavioral Risk Factor Surveillance System (BRFSS). The YRBS is an anonymous and voluntary survey of Rhode Island high school students. In 2021, 21% of students reported being currently sexually active, and among these students, 57% used a condom at their last sexual encounter. The BRFFS is a random digit telephone survey among Rhode Island adults aged 18–65. In 2022, 9% of adults reported having two or more sexual partners in the past year, and among them, 53% used a condom at their last sexual encounter.

In terms of gonorrhea, diagnoses have increased in the last 10 years and disproportionately affect minority populations (**Figure 1**). In 2022, gonorrhea rates among the Black/African American population were more than 10 times higher than

Figure 4. Rates of Chlamydia Cases, by Age, Rhode Island, 2018–2022



among the non-Hispanic White population and three times higher than among the Hispanic/Latino population. Most chlamydia cases in the last 10 years have been diagnosed in females. In 2022, nearly twice as many cases were diagnosed in females compared to males (**Figure 2**). This difference is likely due to two factors. First, women generally access routine healthcare and subsequent screening more than men. Second, men who have chlamydia often do not have symptoms and do not seek health care for screening and treatment. Between 2018–2022, the highest rates of chlamydia were observed in the 20–24-year-old age group, followed by those in the 25–34 years-old age group (**Figure 4**).

In the last five years, the rates of infectious syphilis cases among GBMSM have been substantially higher compared to heterosexual men (**Figure 3**). In the GBMSM population, the rate of infectious syphilis cases in 2022 was 58 times higher compared to the rate of infectious syphilis cases among heterosexual men. According to the CDC, transgender and gender diverse people often experience high rates of stigma and socioeconomic and structural barriers to care that negatively affect healthcare usage and increase susceptibility to HIV and STIs (**Table 1**). As defined by the CDC, persons who are transgender have a gender identity that differs from the sex that they were assigned at birth.[4]

Pregnant people who are diagnosed with HIV, syphilis, and hepatitis C can pass these infections to their newborns. While the number of babies born with these infections remains low in Rhode Island, the health consequences of these infections can be severe. HIV and syphilis screening are now incorporated into routine prenatal care. People who are diagnosed with HIV or syphilis during pregnancy receive medical case management from RIDOH nursing staff to promote healthy outcomes for their newborns. In 2022, among the 10,709 births in Rhode Island, there were five infants diagnosed with congenital syphilis and one with HIV. Before 2020 no cases of congenital syphilis or perinatal HIV were reported in more than 10 years.

Table 1. Reported Cases of Selected Diseases Among Transgender People, Rhode Island, 2021–2022

HIV	<5
Infectious Syphilis	9
Latent or Unknown Duration Syphilis	5
Gonorrhea	10
Chlamydia	19

PROGRAMS AND INITIATIVES BY THE RHODE ISLAND DEPARTMENT OF HEALTH

In recent years, the Rhode Island Department of Health (RIDOH) has implemented many innovative and evidence-based strategies to prevent and control STIs and HIV. A full description of clinical and community services offered by RIDOH can be found in the resource guide and are briefly outlined below.[5]

CASE INVESTIGATION AND CONTACT TRACING

As part of surveillance activities, all new HIV diagnoses and high-priority syphilis cases are interviewed by RIDOH staff to conduct contact tracing and ensure testing of close contacts. High-priority syphilis cases in order of workup priority include:

- Cases with signs or symptoms of syphilis as reported by patient or provider indicative of syphilis infection;
- All pregnant women and women of childbearing age (<45 years);
- Any child under 18 years of age;
- Any case with test results indicative of a new infection (four-fold increase in titer or a negative titer in the last 12 months);
- Cases with late or unknown duration infection (no symptoms and no negative titer in prior 12 months to suggest recent infection).

NEEDLE EXCHANGE AND HARM REDUCTION SERVICES

Needle exchange programs, often called "syringe services programs (SSPs)," provide a full spectrum of services to individuals who use drugs, including safe injection kits, sharps disposal containers, naloxone, fentanyl test strips, condoms, rapid HIV and hepatitis C testing, and referrals to mental health and social services as appropriate. AIDS Care Ocean State (ACOS), Project Weber/RENEW, and Parent Support Network operate SSPs throughout Rhode Island through a multi-faceted approach, including three fixed sites, mobile/street-based outreach in core cities, home-delivered services, and most recently, harm reduction vending machines which are co-located in places that serve high-risk individuals. Further, sterile syringes can be purchased without a prescription at retail pharmacies in Rhode Island.

CONDOM ACCESS

In the beginning of the COVID-19 pandemic, many individuals experienced increased barriers to accessing condoms, as many of the community distribution locations were closed or limited to the public. Starting in August 2020, individuals can request RIDOH to mail a small package with approximately 15 condoms to their home. Since program inception, RIDOH has provided condoms to over 3,200 individuals representing all 39 cities and towns. RIDOH plans to continue the Condoms by Mail program as there is a consistent demand, reaching a population with an otherwise unmet need.

RAPID HIV AND HEPATITIS C TESTING IN COMMUNITY SETTINGS

RIDOH-funded community-based organizations, including AIDS Care Ocean State (ACOS), Project Weber/RENEW, and AIDS Project Rhode Island (APRI), conduct community-based rapid HIV screening tests. APRI also offers home test kits where individuals can fill out an online form and receive a rapid HIV test kit in the mail. In 2022, there were 1,457 community-based rapid HIV tests conducted. Approximately 85% of all community-based rapid HIV tests conducted were among individuals who are at high risk of contracting HIV, demonstrating that we are reaching those most in need of testing.

TESTING 1-2-3 PROGRAM

Testing 1-2-3 is a program created by RIDOH to help asymptomatic Rhode Islanders get easily tested for HIV and other STIs. Individuals who want to be tested complete a registration form online at www.testing123ri.com, go to the lab of their choice to provide samples, and then receive their results and follow-up for positive cases. Using this service, individuals can be tested for HIV, chlamydia, gonorrhea, and syphilis. In 2022, 110 individuals received STI testing through this program.

EDUCATION AND AWARENESS FOR YOUTH AND ADOLESCENTS

RIDOH, in collaboration with Planned Parenthood of Southern New England (PPSNE), conducts sexual and reproductive health education to schools via assemblies/workshops, which are centered around STIs, contraception, gender identity and sexual orientation, etc. In the next phase of this collaboration, professional development will be offered to teachers, nurses, and other relevant school staff, which will focus on teaching teens about STIs, HIV prevention, testing and treatment, stigma, and addressing barriers to accessing care. Lastly, this partnership includes a parent-child communication program called LiFT, that increases parent-child communication and youth self-efficacy.

SEXUAL AND REPRODUCTIVE ONLINE WEBSITES AND APPS

RIDOH released the RIght Time app in 2019 to include information about sexual health and well-being in Rhode Island.[6] RIDOH is also developing the RIght to Know website and app to provide resources and information specific to adolescents. RIDOH is committed to promoting prevention, testing, and engagement in care for STIs and HIV with a focus on health equity. Fully addressing STIs and HIV in Rhode Island requires collaboration and commitment across public health, clinical, academic, and community-based organizations and institutions.

References

1. Schmidt R, Carson PJ, Jansen RJ. Resurgence of Syphilis in the United States: An Assessment of Contributing Factors. Infect Dis (Auckl). 2019 Oct 16;12:1178633719883282. doi: 10.1177/1178633719883282. PMID: 31666795; PMCID: PMC 6798162.
2. Division of STD Prevention, National Center for HIV, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance, 2022 (cdc.gov)
3. Rhode Island Department of Health, Center for HIV, Hepatitis, STD and TB Epidemiology. https://health.ri.gov/publications/surveillance/2021/HIVSTI.pdf
4. Division of STD Prevention, National Center for HIV, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention. https://www.cdc.gov/std/treatment-guidelines/trans.htm
5. Rhode Island Department of Health, Center for HIV, Hepatitis, STD and TB Epidemiology. https://health.ri.gov/publications/resourceguides/HIVSTDViralHepatitisProgramClinicalResources.pdf. https://www.righttimeapp.com/

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Disclosures

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Considerations for Sexual History-Taking and Screening for Sexually Transmitted Infections Among Persons Identifying as Part of the LGBTQIA+ Community

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In the United States, rates of sexually transmitted infections (STIs) are increasing. In 2022, there were over 2.5 million cases of syphilis, gonorrhea and chlamydia reported to the Centers for Disease Control and Prevention (CDC).[1] STIs are often asymptomatic and when untreated, may lead to significant morbidity and associated healthcare costs. Lesbian, gay, bisexual, transgender, queer/questioning, intersex, and asexual/agender/aromantic (LGBTQIA+) individuals experience significant disparities related to healthcare access and outcomes, including sexual health and STIs. Gay, bisexual, and other men who have sex with men (MSM) are disproportionately at risk for HIV infection. They also have higher rates of STIs, including gonorrhea, and syphilis when compared with the general population.[2] In addition, transfeminine persons have a 49-times greater odds of HIV infection when compared to all adults.[3] Queer individuals may be at increased risk for developing gynecologic cancers and are less likely to undergo cervical cancer screening compared to their heterosexual counterparts.[4] CDCs recent annual report underscores that the prevention and treatment of STIs must be a public health priority. Enhanced STI screening and improved access to safe and affirming sexual health care is needed, especially among the LGBTQIA+ community.

LGBTQIA+ individuals face multiple challenges to obtaining sexual health care and STI services. Health disparities can be attributed to discrimination, stigma, lack of knowledge among providers and financial and insurance barriers.[5] LGBTQIA+ persons have endorsed avoiding or delaying care because of negative experiences with healthcare providers or within the healthcare setting.[6] Trans-identifying individuals are at higher risk for physical and sexual violence, highlighting the need for a gender-inclusive and trauma informed approach.[7] It is important for all providers to make LGBTQIA+ persons feel comfortable and respected in the clinical space to achieve optimal health outcomes.

One important step in addressing sexual health care for LGBTQIA+ persons involves taking a comprehensive sexual health history that is inclusive for all people. The five "Ps," a framework created by CDC, can guide the dialogue with patients and highlights the major aspects of a sexual health history (**Table 1**).[2] Providers should inform patients that these questions are asked of everyone, and the responses are an important part of their care plan. Providers should ask questions in a manner that does assume monogamy, gender, or anatomy of partners. One consideration is to tailor questions by asking about preferred language regarding body parts, internal organs, or genitals. The gender identity of patients can exist independently of sexual orientation, and both may exist across a spectrum. Gender identity refers to a person's current gender which may be the same (cisgender) or different (transgender) from the sex assigned at birth. Sexual orientation refers to attraction including to the opposite gender (i.e., heterosexual) or same gender. It is important to understand the anatomy a person has and to base sexual health discussions and STI screening on sexual behaviors. Providers should also be informed about the types of tissue used to construct a neovagina or neopenis, as this may also impact STI screening recommendations.[2] Patients are not

Table 1. Suggested Dialogue for Taking a Comprehensive Sexual Health History

Aspect of Sexual Health History	Suggested Dialogue
Partners	• Are you currently having sex of any kind? • When was the last time you were sexually active? • Do your partners tend to be people with penises, vaginas, or both?
Practices	• To take the best care of you, I need to ask some specific questions about the types of sex that you have. There are different types of tests that we use for screening, depending on the type of sex you have, or the body parts you use to have sex. • In relation to oral/anal/vaginal sex, do you give, receive, or both?
Protection from STIs	• Do you use any sexual prevention tools? • How do you decide when to use condoms?
Past history of STIs	• Have you ever been diagnosed with an STI in the past?
Pregnancy Intention	• Are you interested in being a parent in the future? • Do you have any intentions of becoming pregnant in the future?
Sexual function and satisfaction	• Are you engaging in consensual sex? • Are you comfortable with who you are having sex with and how often? • Do you have pain with sex?

*Adapted from the Centers for Disease Control and Prevention (CDC)

Table 2. Screening Recommendations and Considerations Based on Population

Population	Screening Recommendation by Infection
Women	**Chlamydia/Gonorrhea:** Sexually active <25 years old; sexually active women ≥25 years old at increased risk **Syphilis:** Screen asymptomatic adults at increased risk for syphilis infection **HIV:** All women age 13–64 years (opt out); all women who seek evaluation and treatment for STIs **Trichomonas:** Consider screening in high-prevalence settings and for asymptomatic women at increased risk for infection
Men who have sex with women	**Chlamydia/Gonorrhea:** Consider screening in high prevalence settings **Syphilis:** Screen asymptomatic adults at increased risk for syphilis infection **HIV:** All men aged 13–64 years (opt out); all men who seek evaluation and treatment for STIs
Men who have sex with men	**Chlamydia:** At least annually for sexually active MSM at sites of contact (urethra, rectum); every 3–6 months if at increased risk (multiple partners, on HIV PrEP) **Gonorrhea:** At least annually for sexually active MSM at sites of contact (urethra, rectum, pharynx); every 3–6 months if at increased risk (multiple partners, on HIV PrEP) **Syphilis:** At least annual for sexually active MSM; every 3-6 months if at increased risk **HIV:** At least annually for sexually active MSM; consider more frequent screening (every 3–6 months) for MSM at increased risk of acquiring HIV infection
Transgender and gender-diverse persons	**Chlamydia:** Screening recommendations should be adapted based on anatomy; consider screening at the rectal site based on reported sexual behaviors and exposure **Gonorrhea:** Screening recommendations should be adapted based on anatomy; consider screening at the pharyngeal and rectal sites based on reported sexual behaviors and exposure **Syphilis:** Consider screening at least annually based on reported sexual behaviors and exposure **HIV:** HIV screening should be discussed and offered; frequency of repeat screening should be based on risk level

*Adapted from the Centers for Disease Control and Prevention (CDC)

always forthcoming or honest about their sexual risk. This should be taken into consideration when screening for HIV and other STIs. One approach is to offer the different types of screening available and the indication for each type of screening, allowing patients to opt in or out of the testing and make decisions without disclosing sexual activity.

Given that many LGBTQIA+ persons may be at risk for STIs, the CDC has developed specific screening recommendations and considerations for this group (**Table 2**).[2] Engaging patients in routine STI screening is not complex and does not require elaborate resources. Routine screening for STIs is imperative to diagnosis and treatment and reducing morbidity and associated health costs. It is important to highlight the need for extragenital screening for chlamydia and gonorrhea for patients at risk. Data reviewed from the STD Surveillance Network demonstrates that extragenital chlamydia and gonorrhea are common among MSM. Offering only urogenital screening to MSM patients may result in a missed opportunity to diagnosis and treat over 70% of extragenital chlamydia and gonorrhea infections.[8] Extragenital screening is straightforward and acceptable to patients and can be performed via the use of self-collected swabs.

In addition to screening, healthcare providers should be aware of other prevention tools. Pre-exposure prophylaxis (PrEP) for HIV is a safe and effective tool to reduce HIV acquisition. PrEP is available in both an oral and injectable formulation and is approved for persons who are at risk of acquiring HIV via sexual activity or injection drug use. Importantly, emtricitabine tenofovir disoproxil fumarate (FTC-TDF) is the only oral formulation approved in vagina-owning persons. Gender affirming hormones have not been shown to impact daily PrEP efficacy, and thus are safe to use among transfeminine or transmasculine patients taking gender affirming therapy. Oral medications can be used daily or on-demand dosing. FTC-TDF is the only oral medication studied for on-demand dosing and is currently recommended only for MSM at risk for sexual acquisition of HIV. On-demand dosing has not been studied in transfeminine patients and there are potential concerns about decreased efficacy in patients on gender affirming therapy with estrogen.[9] It also is important to be aware and educate patients that the use of testosterone can lead to vaginal atrophy, which may lead to vaginal discomfort or bleeding and potentially an increased risk for STIs including HIV.[2] PrEP can easily be prescribed in primary care settings and generally can be available with limited or no out-of-pocket expenses. Injectable cabotegravir is a newer formulation of PrEP that is available and an option for those who may struggle with adherence or taking pills.

Another approach to addressing the STI epidemic is the use of antimicrobials after an STI exposure or potential STI exposure. DoxyPEP is the use of a single dose of doxycycline (200mg) taken orally within 24–72 hours after condomless sex. Studies demonstrated that DoxyPEP prevented syphilis, gonorrhea, and chlamydia among MSM and transgender women with HIV and those taking HIV PrEP.[10] Research of DoxyPEP in other populations is ongoing. This medication is safe and commonly used for other indications in the primary care setting. Healthcare professional should be aware of DoxyPEP and offer to appropriate patients which had the potential of improving rates of STIs in the United States.

There are several other methods of STI prevention. Condoms should be encouraged and provided if possible.

Disclosure and communication (i.e., asking partners about recent screening) are examples of behaviors that can help mitigate STIs. Vaccines are also readily available for many infections that can be sexually transmitted including human papilloma virus (HPV), hepatitis A and B virus, meningococcal disease, and monkeypox virus (Mpox). Optimizing sexual health in LGBTQIA+ persons involves taking a comprehensive sexual health history and providing options and shared decision making to determine optimal health approaches.

In conclusion, STI rates are rising steadily, resulting in a substantial financial and social burden for all, but especially among the LGBTQIA+ community. There are significant and inherent barriers for LGTBQIA+ persons to receiving adequate healthcare including sexual health. Providers should be aware of approaches and current clinical recommendations on STI screening, care, and prevention. Making simple clinical changes such as taking a comprehensive sexual health history, utilizing gender inclusive dialogue, offering routine STI screening and promoting the use of HIV PrEP and DoxyPEP, has the potential to improve STI care and overall health.

References

1. The Centers for Disease Control and Prevention (CDC). *Sexually Transmitted Infections Surveillance,* 2022. https://www.cdc.gov/std/statistics/2022/default.htm
2. Workowski KA, Bachmann LH, Chan PA, et al. Sexually Transmitted Infections Treatment Guidelines, 2021. *MMWR Recomm Rep*. 2021;70(4):1-187.
3. Baral SD, Poteat T, Strömdahl S, Wirtz AL, Guadamuz TE, Beyrer C. Worldwide burden of HIV in transgender women: a systematic review and meta-analysis. Lancet Infect Dis. 2013 Mar;13(3):214-22. PMID: 23260128
4. Stenzel AE, Bustamante G, Sarkin CA, Harripersaud K, Jewett P, Teoh D, Vogel RI. The intersection of sexual orientation with race and ethnicity in cervical cancer screening. Cancer. 2022 Jul 15;128(14):2753-2759.
5. Zeeman L, Sherriff N, Browne K, et al. A review of lesbian, gay, bisexual, trans and intersex (LGBTI) health and healthcare inequalities. *Eur J Public Health*. 2019;29(5):974-980.
6. Kcomt L, Gorey KM, Barrett BJ, McCabe SE. Healthcare avoidance due to anticipated discrimination among transgender people: A call to create trans-affirmative environments. *SSM Popul Health*. 2020;11:100608.
7. Grant, Jaime M., Lisa A. Mottet, Justin Tanis, Jack Harrison, Jody L. Herman, and Mara Keisling. Injustice at Every Turn: A Report of the National Transgender Discrimination Survey. Washington: National Center for Transgender Equality and National Gay and Lesbian Task Force, 2011.
8. Patton ME, Kidd S, Llata E, et al. Extragenital gonorrhea and chlamydia testing and infection among men who have sex with men--STD Surveillance Network, United States, 2010-2012. *Clin Infect Dis*. 2014;58(11):1564-1570.
9. Shieh E, Marzinke MA, Fuchs EJ, et al. Transgender women on oral HIV pre-exposure prophylaxis have significantly lower tenofovir and emtricitabine concentrations when also taking oestrogen when compared to cisgender men. *J Int AIDS Soc*. 2019;22(11):e25405.
10. Luetkemeyer AF, Donnell D, Dombrowski JC, et al. Postexposure Doxycycline to Prevent Bacterial Sexually Transmitted Infections. N Engl J Med. 2023;388(14):1296-1306.

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Syphilis in Pregnancy and Congenital Syphilis

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ABSTRACT

Syphilis, once in decline, is seeing a rapid re-emergence throughout the United States. A sexually transmitted infection caused by the spirochete *Treponema pallidum*, syphilis infection in pregnancy can result in serious complications and have a profound impact on maternal and neonatal health. As rates of syphilis have increased among people of reproductive age, so too have cases of congenital syphilis. In 2021, congenital syphilis rates in the United States reached a 30-year high.[1] This article provides a review of syphilis in pregnancy and congenital syphilis to help clinicians respond to this emerging public health concern.

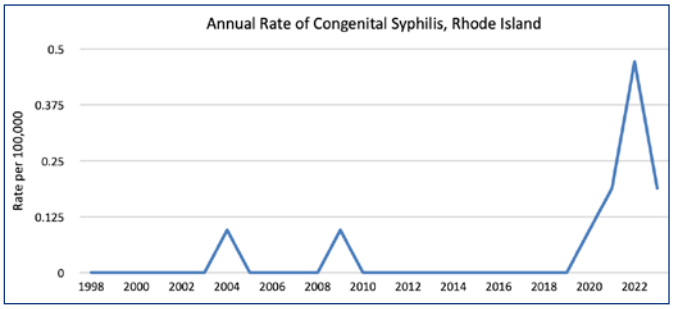
KEYWORDS: Syphilis, congenital syphilis, sexually transmitted infections

EPIDEMIOLOGY

The incidence of syphilis infections in the United States (US) has increased among men and women of all age groups. In 2022, the national rate of primary and secondary syphilis infections was 17.7 per 100,000, a 9.3% increase from 2021.[2] Rhode Island currently ranks 31st in the nation with 133 cases reported in 2022 (12.2 per 100,000 population).[2] The incidence among women is surging, with dramatic increases among women of reproductive age. Between 2012 and 2021, there was a 676% increase in primary and secondary syphilis in women aged 15–44 years.[3] In Rhode Island in 2022, there were 93 cases of syphilis reported in women of this age group, resulting in a rate of 43.1 per 100,000 population.[3]

The increase in syphilis in women has been mirrored by a spike in congenital syphilis cases. Between 2012 and 2021, there was a 755% increase in congenital syphilis cases reported in the US and the numbers continue to climb.[3] Between 2021 and 2022 alone, there was a 30.6% increase in reported cases resulting in a national congenital syphilis rate of 102.5 per 100,000 live births.[3] Rhode Island ranked 27th amongst US states in 2022 with five cases reported during this time period, resulting in a rate of 47.8 per 100,000 live births (**Figure 1**).[3] This was after a decade of zero congenital syphilis cases in Rhode Island. Given these significant increases, healthcare professionals should be aware of screening recommendations and clinical presentations of syphilis including congenital syphilis.

Figure 1. Congenital Syphilis Rates, Rhode Island, 1998–2023



Data Sources: RI-NEDSS Base System (NBS); 2000 US Census Population Estimate; 2010 US Census Population Estimate; 2016 US Census Population Estimate; 2021 5-Year ACS

NOTE: All rates are expressed per 100,000 population.

Source: RI Department of Health, Division of Emergency Preparedness and Infectious Disease

MATERNAL FACTORS ASSOCIATED WITH CONGENITAL SYPHILIS

While vertical transmission (transmission from a pregnant person to fetus during pregnancy) can occur at any gestational age or stage of syphilis, the highest risk of transmission is for infants born to pregnant persons with primary or secondary stages of infection, when spirochetemia is highest.[1,4,5] The risk of vertical transmission also increases when maternal acquisition of infection occurs at later gestational ages.[1,4,5] The rate of transmission ranges from 60 to 100% in pregnancies affected by primary or secondary infection. Those rates drop to approximately 40% in early latent infection and to <8% with late latent infection.[6]

Sociodemographic factors associated with adverse syphilis-related pregnancy outcomes include concurrent infection with another sexually transmitted infection (STI), low educational attainment, Medicaid insurance, non-Hispanic Black race/ethnicity, and delayed or inadequate prenatal care.[5,7] These factors reflect socioeconomic inequities which limit access to appropriate prenatal care, rather than biological predisposition to infection or transmission.

SCREENING IN PREGNANCY

Current Centers for Diseases Control and Prevention (CDC) guidelines recommend that serologic screening for syphilis

be performed at the initial prenatal visit.[8] Repeat screening is recommended at 28 weeks gestation for women categorized as being at high risk for syphilis acquisition during pregnancy.[8] Pregnant people are categorized as high risk if they live in an area of high prevalence, and/or have the following risk factors: sex with multiple partners, sex in conjunction with drug use or transactional sex, late entry to prenatal care or no prenatal care, methamphetamine or heroin use, incarceration of the woman or her partner, and unstable housing or homelessness.[8] Most states (including Rhode Island) mandate syphilis screening at least in the first trimester of pregnancy, and some states mandate screening later in pregnancy and at delivery.[9] Due to the increasing rates of syphilis and congenital syphilis nationally and in Rhode Island, Rhode Island recently outlined new testing guidance.[10] All pregnant people should continue to be tested for syphilis at the first prenatal encounter. Pregnant people at high risk of infection should have repeat testing at 28–32 weeks and at delivery.[10] This includes pregnant people with individual risks of infection outlined above, as well as those individuals living in Providence, Kent or Newport counties, which have exceeded the rate of primary and secondary syphilis of 4.6 per 100,000, which is considered a threshold for consideration as a high prevalence community.[10] If the partner tests positive for syphilis at any time, the pregnant person should be tested again as soon as possible.[10] Pregnant people who have not been tested in pregnancy or who experience a stillbirth after 20 weeks of gestation should be tested at delivery. Fetal and placental tissue should be tested as well.[10] Cases of syphilis in pregnancy should be reported to Rhode Island Department of Health (RIDOH) and care coordination can be initiated by calling 401-222-2577.[10]

Pregnant persons may continue to have exposures that place them at risk for syphilis acquisition throughout pregnancy. Negative first trimester screening does not, therefore, eliminate the possibility of congenital infection and clinicians should remain vigilant. Furthermore, data suggest that a substantial proportion of women with pregnancies affected by congenital syphilis do not report any high-risk behaviors.[1,5,11,12] The approach of selectively screening based on presumed risk factors in the third trimester may therefore result in missed infections.

SYPHILIS DISEASE PRESENTATION IN PREGNANCY

During pregnancy, the clinical presentation of syphilis does not differ from the presentation outside of pregnancy. Syphilis is classified into stages, and management is based on the stage of disease at presentation.[8] Primary syphilis is characterized by one or more painless chancres (i.e., similar to an ulcer) at the site of inoculation. These typically appear within three weeks of exposure and will resolve even without treatment. Subsequently, the secondary stage manifests as a systemic illness with clinical findings that may include fever, fatigue, generalized lymphadenopathy, pharyngitis, rash, mucocutaneous lesions, condyloma lata, or alopecia. Symptoms typically present one to two months following the primary chancre.[8] Many may not notice a painless chancre. A common presentation of secondary syphilis is a rash, and syphilis should be on the differential diagnosis of any patient with a compatible rash in pregnancy, and testing for syphilis should be performed. The rash can have a varied appearance, it can be maculopapular, and can involve the palms of the hands and soles of the feet but may not involve those areas. A low threshold for syphilis testing in any pregnant patient with a rash is a reasonable approach. Without treatment, secondary syphilis symptoms will also resolve, which may decrease the chance that a patient will seek care for the symptoms, or further evaluation by a provider. The next stage of syphilis is the latent stage (where the patient is asymptomatic but serologic testing will remain positive). Latent infection of less than a year is considered early latent disease. Beyond one year, asymptomatic infection is described as late latent. Patients may have recurrent secondary syphilis if untreated and 30% of untreated patients go on to develop tertiary disease, and often decades after initial infection. Clinical findings may include gumma formation (granulomatous growths which destroy tissue in skin, bones, other organs) and cardiovascular manifestations (most commonly aortitis). Neurosyphilis, caused by the invasion of T. pallidum into the central nervous system (CNS), can occur at any stage of the disease. Clinical findings of neurosyphilis are varied and may include ocular and otic anomalies and should be screened for in all patients diagnosed with syphilis since the treatment may be different.[8] According to the CDC STI guidelines, manifestations of neurologic involvement include cognitive dysfunction, motor or sensory deficits, cranial nerve palsies, or symptoms or signs of meningitis or stroke.[8]

DIAGNOSIS AND TREATMENT IN PREGNANCY

The approach to testing in pregnancy is the same as for non-pregnant patients. Testing modalities are categorized as treponemal tests (i.e., treponemal antibodies, FTA-ABS, TPPA, EIA, CIA) and non-treponemal tests (i.e., RPR, VDRL). The traditional testing algorithm starts with a non-treponemal test followed by a treponemal test if positive. The reverse testing algorithm starts with a treponemal test and reflexes to a non-treponemal test, with an additional treponemal test for discordant results between the initial treponemal and non-treponemal tests. Treponemal tests are qualitative and often remain reactive regardless of treatment. For anyone, including pregnant persons, with a known history of syphilis, testing should be conducted with a non-treponemal test (such as RPR) which is quantitative and correlates with disease activity.[8] When following disease activity, it is

important to always use the same test (RPR or VDRL) and ideally within the same laboratory.

Treatment in pregnancy is exclusively with penicillin G, given its established efficacy and safety.[8] Early infection (primary, secondary, or early latent disease) typically requires a single dose of benzathine penicillin G, while three weekly doses are recommended for patients with late latent infection or infection of unknown duration.[8] One nuance in syphilis treatment in pregnancy is that the optimal duration between doses of penicillin G when treating late latent syphilis in pregnant patients is seven days. If more than nine days elapse between doses in a pregnant patient, the whole course should be repeated. In a non-pregnant patient, up to 14 days between doses is acceptable (although not optimal).[8] Patients with a history of penicillin allergy should undergo skin testing or oral challenge and, if appropriate, desensitization as there are no treatment alternatives. Infectious disease specialist consultation is recommended in the setting of a penicillin allergy in pregnancy.[8] In non-pregnant patients, doxycycline can be used but should not be used to treat syphilis in pregnancy since penicillin G is the only known antimicrobial to be effective in treating fetal infection and preventing congenital syphilis.[8]

Adequate response to treatment can be evaluated with repeat RPR testing with an adequate treatment response being a four-fold (2 dilution, such as 1:32 to 1:8) decrease in titer 12 months after treatment (though this does not exclude neonatal infection).[8] For people diagnosed before 24 weeks gestation, titers should be repeated after at least eight weeks and again at delivery.[8] For those diagnosed after 24 weeks gestation, titers should be repeated at delivery.[8] Those diagnosed later in pregnancy will likely not achieve a four-fold decrease before the end of pregnancy; however, a sustained four-fold increase in titer could be concerning for reinfection or treatment failure and warrants evaluation.[5,8]

POTENTIAL OBSTETRIC COMPLICATIONS AND MANAGEMENT

Vertical transmission of syphilis can result in varied and severe pregnancy complications. These include spontaneous abortion, pre-term labor, intrauterine growth restriction, placentomegaly, polyhydramnios, fetal anemia, fetal hepatomegaly, nonimmune hydrops, and ascites.[1,4] Fetal abnormalities typically present after 18 to 20 weeks gestational age when the fetus can mount an immunologic response which can lead to the characteristic abnormalities.[1,13] All pregnancies affected by maternal syphilis infection require a detailed fetal anatomy ultrasound (i.e., level II ultrasound) to evaluate sequelae of intrauterine infection. A normal ultrasound, however, does not exclude congenital infection.[13,14] Infants with abnormal ultrasound results should be closely followed. Anemia and hydrops fetalis typically resolve within 30 days of maternal treatment. Resolution of placentomegaly and hepatomegaly may take up to 90 to 120 days.[13] Early screening, diagnosis, and treatment are essential to mitigate fetal morbidity and mortality.

NEONATAL EVALUATION AND MANAGEMENT

Diagnosis of congenital syphilis is challenging as maternal treponemal and non-treponemal antibodies may be passively transferred to the fetus and are not necessarily indicative of fetal infection. Diagnostic and treatment decisions are made after assessing adequacy and timing of maternal treatment, comparison of maternal and neonatal RPR, clinical features, and if indicated laboratory and radiographic results.[6] A blood sample for RPR testing should be taken directly from the baby after delivery. Cord blood samples should not be used due to maternal blood contamination at delivery, and because false negative results can occur from Wharton's jelly contamination.

Diagnosis is further complicated because infants with congenital syphilis are often asymptomatic. Symptomatic newborns may have varied symptoms including syphilitic rhinitis, rash, anemia, thrombocytopenia, hepatobiliary dysfunction, osteochondritis, periostitis, neurologic deficits, and pneumonia, that may be complicated by pulmonary hypertension.[4] Infants meeting criteria for congenital syphilis or with presumed infection should be evaluated for neurosyphilis and receive treatment with aqueous crystalline penicillin G. A pediatric infectious disease consultation is recommended to help interpret test results and determine appropriate treatment. All infants with a reactive RPR at birth should have repeat testing every two to three months until non-reactive.[1,4] For children not identified in infancy, late manifestations include ocular abnormalities, sensorineural hearing loss, Hutchinson's teeth, and bony abnormalities in the midline face or lower extremities.[1,4]

MISSED OPPORTUNITIES FOR INTERVENTION

In conclusion, syphilis has re-emerged as a significant public health concern over the last couple of decades. Children born to pregnant people with undiagnosed and untreated syphilis may experience disease progression, resulting in potentially severe and irreversible complications. Lack of prenatal care is the primary missed opportunity identified in infants with congenital syphilis, followed by inadequate treatment despite diagnosis.[15] Prevention of congenital syphilis is dependent on appropriate and timely screening and treatment of pregnant people. Accessible, timely and comprehensive prenatal care is essential to prevent congenital syphilis. Interventions to address these missed opportunities are necessary to reverse the rising incidence of congenital syphilis.

References

1. Stafford IA, Workowski KA, Bachmann LH. Syphilis Complicating Pregnancy and Congenital Syphilis. N Engl J Med. 2024;390(3):242-253. doi:10.1056/NEJMra2202762
2. Centers For Disease Control and Prevention. Sexually Transmitted Infectious Surveillance 2022. Atlanta: US Department of Health and Human Services; 2024. Table 21: Primary and Secondary Syphilis — Reported Cases and Rates of Reported Cases by State, Ranked by Rates, United States, 2022.
3. Centers For Disease Control and Prevention. Sexually Transmitted Infectious Surveillance 2022. Atlanta: US Department of Health and Human Services; 2024. Table 34. Syphilis — Reported Cases and Rates of Syphilis (All Stages) Among Women Aged 15-44 Years and Reported Cases and Rates of Congenital Syphilis by State/Territory and Region in Alphabetical Order, United States, 2022.
4. Cooper JM, Sánchez PJ. Congenital syphilis. Semin Perinatol. 2018;42(3):176-184. doi:10.1053/j.semperi.2018.02.005
5. Eppes CS, Stafford I, Rac M. Syphilis in pregnancy: an ongoing public health threat. Am J Obstet Gynecol. 2022;227(6):822-838. doi:10.1016/j.ajog.2022.07.041
6. Zheng T. Comprehensive Handbook Obstetrics & Gynecology 3rd Ed. BookBaby; 2021.
7. Gulersen M, Lenchner E, Eliner Y, et al. Risk factors and adverse outcomes associated with syphilis infection during pregnancy. Am J Obstet Gynecol MFM. 2023;5(6):100957. doi:10.1016/j.ajogmf.2023.100957
8. Workowski KA, Bachmann LH, Chan PA, et al. Sexually Transmitted Infections Treatment Guidelines, 2021. MMWR Recomm Rep 2021;70(No. RR-4):1–187.
9. Centers For Disease Control and Prevention. Division of STD Prevention (DSTDP). Atlanta: US Department of Health and Human Services; 2024. State Statutory and Regulatory Language Regarding Prenatal Syphilis Screenings in the United States, 2024.
10. RIDOH. RIDOH Healthcare Professional Advisory. Cases of Congenital Syphilis Increasing in Rhode Island, Universal Prenatal Testing Recommended; 2023.
11. Trivedi S, Williams C, Torrone E, Kidd S. National Trends and Reported Risk Factors Among Pregnant Women With Syphilis in the United States, 2012-2016. Obstet Gynecol. 2019;133(1):27-32. doi:10.1097/AOG.0000000000003000
12. Matthias JM, Rahman MM, Newman DR, Peterman TA. Effectiveness of Prenatal Screening and Treatment to Prevent Congenital Syphilis, Louisiana and Florida, 2013-2014. Sex Transm Dis. 2017;44(8):498-502. doi:10.1097/OLQ.0000000000000638
13. Rac MWF, Bryant SN, McIntire DD, et al. Progression of ultrasound findings of fetal syphilis after maternal treatment. Am J Obstet Gynecol. 2014;211(4):426.e1-6. doi:10.1016/j.ajog.2014.05.049
14. David M, Hcini N, Mandelbrot L, Sibiude J, Picone O. Fetal and neonatal abnormalities due to congenital syphilis: A literature review. Prenat Diagn. 2022;42(5):643-655. doi:10.1002/pd.6135
15. McDonald R, O'Callaghan K, Torrone E, et al. Vital Signs: Missed Opportunities for Preventing Congenital Syphilis — United States, 2022. MMWR Morb Mortal Wkly Rep. 2023;72(46):1269-1274. doi:10.15585/mmwr.mm7246e1

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Demographics and Clinical Characteristics of Patients with Neurosyphilis in Rhode Island

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ABSTRACT

The incidence of syphilis has been steadily rising throughout the United States over the past decade, including Rhode Island. Neurosyphilis is a manifestation of syphilis involving the central nervous system and can present with a multitude of symptoms. We evaluated all cases of syphilis at a single healthcare system in Rhode Island over a 10.5-year period and identified 33 cases of neurosyphilis (24 confirmed and 9 diagnosed clinically). Neurosyphilis was more common in females, older patients, White/Caucasian patients, and non-Latino patients. Patients with neurosyphilis confirmed by cerebral spinal fluid analysis were more likely to have a higher RPR than patients who did not have neurosyphilis. Six patients with HIV were diagnosed with neurosyphilis and were similar to those with HIV and syphilis except for lower rates of drug use. Given increasing trends, clinicians should be familiar with the diagnosis and management of neurosyphilis.

KEYWORDS: Neurosyphilis, Otosyphilis, Ocular Syphilis, HIV, Rhode Island

BACKGROUND

Syphilis is caused by the bacterial spirochete *Treponema pallidum* and is transmitted both sexually and vertically. Since 2000, there has been an increase in the incidence of primary and secondary syphilis within the United States, in addition to rising rates of congenital syphilis.[1,2] In Rhode Island (RI), there was a 382% increase in the number of infectious syphilis cases from 2012 to 2021.[3] Syphilis has a variable clinical course that is often defined by multiple stages, including primary, secondary, latent, and tertiary. Complications of syphilis include neurosyphilis, syphilis aortitis, hepatic syphilis and other atypical presentations.[4,5,6,7] Neurosyphilis is a manifestation of spirochetal invasion of the central nervous system. This can occur at any stage of infection, but often occurs within days of the initial primary infection. Approximately 1.8% of cases with early syphilis in the United States have neurosyphilis.[8] Early neurosyphilis may be asymptomatic or present with a broad range of symptoms including headache, meningismus, cranial-nerve palsies, and changes in vision or hearing. Late neurosyphilis typically presents decades after primary infection with general paresis, dementia paralytica, and tabes dorsalis; these cases may also present with neuroimaging abnormalities including cerebral gummas and medial temporal lobe enhancements.[1,8,9]

Lack of sensitivity and specificity of both serologic and cerebral spinal fluid (CSF) testing contribute to the difficulty of diagnosing syphilis and neurosyphilis, which necessitates high clinical suspicion for the disease. Sampling of the CSF via a lumbar puncture (LP) is recommended to confirm neurosyphilis.[10] Neurosyphilis is associated with elevated CSF protein (>50mg/dL2) or leukocyte count (>5 white blood cells/mm3).[11] However, neurosyphilis may be diagnosed empirically in clinical practice in some situations where a lumbar puncture may carry excessive risks.

Although late complications of untreated neurosyphilis are likely irreversible, penicillin can help to prevent further progression of neurological complications.[8,12] The treatment for latent syphilis is typically benzathine penicillin G as this has an adequate half-life required to achieve appropriate treponemocidal concentrations over the spirochete's slow dividing cycle. However, benzathine penicillin G does not sufficiently achieve treponemocidal concentrations in the CSF.[13] To treat early and late neurosyphilis, the CDC recommends aqueous crystalline penicillin G 3-4 million units IV every four hours or 18–24 million units every 24 hours as a continuous infusion for 10–14 days.[8] However, there is limited data on neurosyphilis outcomes in the United States.

This study evaluates patients diagnosed with neurosyphilis over a 10.5-year period within our health system to identify characteristics that may be associated with neurosyphilis. We compare cases of neurosyphilis diagnosed empirically or confirmed by CSF analysis and compare patients with confirmed neurosyphilis with those who were found to not have neurosyphilis upon evaluation of CSF studies.

METHODS

This is a retrospective, cross-sectional, observational study of patients who were diagnosed with syphilis with or without neurosyphilis and being managed within the Lifespan Healthcare system. Study participants were identified as patients who tested positive for syphilis (RPR, *Treponema*

antibody, and/or *Treponema pallidium* particle agglutination (TPPA)) between 1/1/2010 and 6/30/2021, were 18 years or older at the time of laboratory tests, and were receiving care in any of the Lifespan facilities in Providence, Rhode Island. Using this criteria, 692 patients were identified with a positive syphilis test during the study period.

All 692 patients were classified into five groups as: Group 1 (all patients diagnosed with syphilis in study timeframe but not neurosyphilis); Group 2 (all patients with neurosyphilis with lumbar puncture (LP) confirmation); Group 3 (all patients who were clinically diagnosed with neurosyphilis based on history alone without confirmatory CSF analysis); Group 4 (all patients with syphilis but required neurosyphilis to be ruled out via CSF analysis), and Group 0 (all patients excluded from the study). Study exclusion criteria included syphilis infection occurring outside of the study time frame (RPR reflecting treated rather than active infection), age of less than 18 at time of syphilis diagnosis, or no available information in the chart to identify if the RPR reflected an active or prior infection.

The EMR search function was used for all 692 patients for the following phrases: "syphilis", "neurosyphilis", "otosyphilis", and "ocular syphilis." Patients who had no record of these in the chart were excluded. The charts of patients with "neurosyphilis", "otosyphilis", and "ocular syphilis" were reviewed in detail for manual data collection. Detailed chart review (beyond demographic information) of the rest of the patients (those who were diagnosed with syphilis in the study timeframe but not diagnosed with neurosyphilis) was not performed.

Patients' age was calculated as of the first positive syphilis lab result date. Demographic variables including gender, race, and ethnicity were collected from the EMR. Some data items related to HIV diseases were taken from The Miriam Hospital Immunology Center Database (ICDB). Manual data collection included binary information (Yes/No) on: prior history of positive RPR, substance use, diagnoses of HIV, pre-exposure prophylaxis for HIV (PrEP) at time of diagnosis, and current or prior history of STIs (gonorrhea, chlamydia, and HCV). "Current" diagnosis of another STI was defined as a positive diagnosis within a 30-day window from the time of syphilis diagnosis. A comprehensive list of neurosyphilis-related symptoms was also collected manually. This included: fever, headache, nausea/vomiting, weight loss, fatigue, arthralgias, vision change, seizures, strokes/TIA, gait abnormalities, dementia, hearing changes, cranial nerve palsy, rash, myalgias, tremors, hair loss, and altered mental status. Laboratory results were also evaluated at the time of diagnosis to assess if hepatic transaminitis was also present (ALT >3 times the upper limit of normal). Treatment administered, and treatment outcomes were also manually collected.

Primary outcomes included incidence and prevalence of neurosyphilis, but the study also evaluated any trends amongst predisposing factors that could be associated with the development of neurosyphilis. For sub-analyses, these groups were further classified as: Group A (all patients who were diagnosed with syphilis but not neurosyphilis) and Group B (all patient diagnosed with neurosyphilis with or without LP confirmation). For second sub-analyses, all patients with neurosyphilis with LP confirmation were compared with patients diagnosed clinically with neurosyphilis without LP confirmation (Group 2 compared with Group 3). Another sub-analysis compared the patients who had neurosyphilis confirmed with an LP with those who required an LP to rule out neurosyphilis (Group 2 compared with Group 4). An additional sub-analysis compared all cases of persons with HIV (PWH) diagnosed with neurosyphilis and PWH diagnosed with other forms of syphilis.

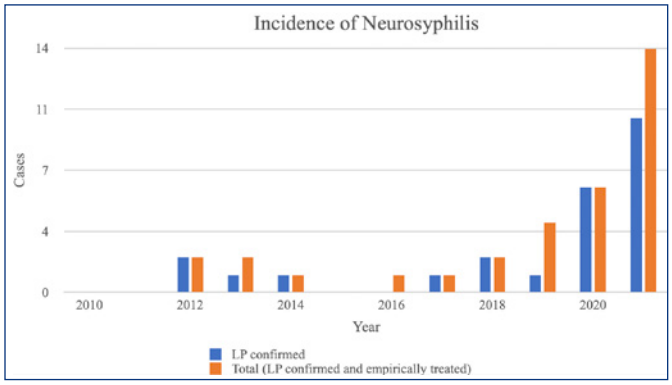
STUDY ANALYSIS

All data was summarized by using descriptive statistics. Bivariate analyses including chi-square, Fisher exact tests, or t-tests were used to assess the marginal effect of demographic and clinical variables on different outcome variables**.** Statistical analyses were performed using SAS 9.4 (SAS Institute Inc., Cary, NC, USA). Software for chart reviews and manual data entry was created using MS-Access, and all graphs were created using MS Excel software. For all analyses, a P value <.05 was considered significant. The Institutional Review Board of The Miriam Hospital approved the study.

RESULTS

Out of the 692 patients with positive syphilis testing, 94 were excluded either due to lack of information in the chart, no clear diagnosis of syphilis during the study timeframe, or there was a confirmed old/treated syphilis infection as the etiology for the positive RPR. Three patients were excluded as they were younger than 18 at the time of their diagnosis. Of the remaining 598 patients with a diagnosis of syphilis during the study time frame, 8.7% (52) had

Figure 1. Incidence of neurosyphilis throughout the study time frame.



LP: lumbar puncture

symptoms concerning for neurosyphilis. Of these 52, nine patients were treated empirically for neurosyphilis without CSF analysis for confirmation (either the risks of a lumbar puncture to rule out neurosyphilis were felt to be too high or the clinical suspicion for neurosyphilis was high enough that the patient was empirically treated). Of the 43 patients who underwent a lumbar puncture, neurosyphilis was diagnosed/confirmed in 24 patients and ruled out in 19 patients. In total, 33 patients were treated for neurosyphilis and 568 were treated for non-neurosyphilis syphilis. The incidence of neurosyphilis was low until 2019, with a precipitous rise after that (**Figure 1**). The majority of these neurosyphilis cases (42.42%) occurred during the last six months of the study in early 2021.

The characteristics of patients diagnosed with either syphilis or neurosyphilis are detailed in **Table 1**. The average age of patients with syphilis was 38 years (median 33 years, range 18-100 years) compared to 53 years (median 47 years, range 18-89 years) for patients with neurosyphilis (p=0.0118). Women were more commonly diagnosed with neurosyphilis than men (OR 2.84, 95% CI 1.27–6.36), although syphilis was much more common in men overall (87.46%). Those with neurosyphilis were more likely to be White/Caucasian and less likely to be Black/African American compared to the syphilis group (p=0.0101). Neurosyphilis was more common in Non-Hispanic/Latino patients in comparison to the syphilis group (p=0.0166).

A total of 43 patients underwent a lumbar puncture to diagnose neurosyphilis (**Table 2a**, **2b**). Neurosyphilis was confirmed in 24 patients and ruled out in 19 patients. The majority of these lumbar punctures occurred during or after 2019 (31/43 (72.09%); 14/19 cases in which neurosyphilis was ruled out and 17/24 cases in which neurosyphilis was confirmed). There were no significant differences between these two groups in regard to age, gender, race, ethnicity, recent/remote STI diagnosis, HIV status, use of PrEP, drug use, or MSM status. A prior history of syphilis was more common among patients in which neurosyphilis was ruled out by CSF analysis than those for whom it was confirmed (63.16% compared to 29.17%, p=0.0258). RPR values for those with neurosyphilis were higher. Those diagnosed with neurosyphilis were more likely to have a positive CSF FTA (p=<0.0001) and VDRL (p=0.0023). CSF protein was higher in patients diagnosed with neurosyphilis (62.00 compared to 39.42, p=0.0089), but CSF glucose and WBC were not significantly different. The spectrum of presenting symptoms for the two groups are outlined in **Table 2b**. The most common symptom in Group 4 was headaches (47.36%). The most common symptoms for Group 2 were headaches and vision changes (seen in 37.50% of patients). Symptoms were more likely to fully resolve for the syphilis group compared to neurosyphilis (p=0.0045).

Among the patients diagnosed with neurosyphilis (33), nine (27.27%) were diagnosed clinically without CSF analysis (**Table 3a, 3b**). There were no significant differences between these groups except that symptom resolution after treatment was less common in the confirmed neurosyphilis group (p=0.0088). Most (29/33, 87.88%) of the patients with neurosyphilis were treated with a continuous infusion of penicillin G; the duration was usually 14 days (27/29, 93.10%) with only two patients receiving 10 days of IV penicillin G. One of the patients treated empirically received doxycycline 100mg twice daily for 30 days. One of the patients with confirmed neurosyphilis was treated with ceftriaxone 1g IV daily for 14 days; another was treated with doxycycline 200mg twice daily for 28 days; another was treated with intramuscular penicillin G weekly for three weeks followed by a 60-day course of doxycycline 100mg twice daily. The most common symptoms for those with confirmed neurosyphilis were headaches and vision changes, while the most common symptom for those treated empirically was vision changes followed by altered mental status.

A total of 177 persons with HIV (PWH) were found to be diagnosed with syphilis during the study time frame. Six

Table 1. Characteristics of patients with syphilis compared to those with neurosyphilis

Characteristics	Total	Syphilis (Group A)	Neurosyphilis (Group B)	P-Values
Total Patients	598 (100.00)	565 (94.48)	33 (5.52)	
Age (in years) at Syphilis Diagnoses				0.0118**
Mean Age [Min, Max, STD]	39 [18–100, 15]	38 [18–100, 14]	53 [18–89, 19]	
Median Age [IQR]	34 [20]	33 [19]	47 [29]	
Gender				0.0086
Male	523 (87.46)	499 (95.41)	24 (4.59)	
Female	75 (12.54)	66 (88.00)	9 (12.00)	
Race				0.0101*
Black or African American	113 (18.90)	110 (97.35)	3 (2.65)	
White or Caucasian	326 (54.52)	305 (93.56)	21 (6.44)	
All Others	159 (26.59)	150 (94.34)	9 (5.66)	
Ethnicity				0.0166*
Hispanics or Latino	157 (26.25)	151 (96.18)	6 (3.82)	
Not Hispanic or Latino	414 (69.23)	387 (93.48)	27 (6.52)	
Unknown-Others	27 (4.52)	27 (100.00)	0 (0.00)	

Race: All Others include, American Indian or Alaska (5), Asian (10), Native Hawaiian or Other (1), Other (123), Patient Refused (7), Unknown (13)
Ethnicity: Unknown-Others include, Patient Refused (11), Unknown (16)

Table 2a. Characteristics of patients who required lumbar punctures for further assessment to diagnose or rule out neurosyphilis

Characteristics	Total	Non-Neurosyphilis (Group 4)	Neurosyphilis (Group 2)	P-Values
Total Patients	43 (100.00)	19 (44.19)	24 (55.81)	
Age at Syphilis Diagnosis				0.7117
Mean [Min, Max, STD]	52 [18–89, 20]	52 [24–85, 21]	52 [18–89, 19]	
Median [IQR]	47 [34)	54 [40]	47 [25]	
Gender				0.2721*
Male	32 (74.42)	14 (43.75)	18 (56.25)	
Female	11 (25.58)	5 (45.45)	6 (54.55)	
Race				0.0882*
Black or African American	6 (13.95)	3 (50.00)	3 (50.00)	
White or Caucasian	25 (58.14)	11 (44.00)	14 (56.00)	
All Others	12 (27.91)	5 (41.67)	7 (58.33)	
Ethnicity				0.0878*
Hispanics or Latino	13 (30.23)	8 (61.54)	5 (38.46)	
Not Hispanic or Latino	30 (69.77)	11 (36.67)	19 (63.33)	
Prior Syphilis				0.0258
Yes	19 (44.19)	12 (63.16)	7 (36.84)	
No	24 (55.81)	7 (29.17)	17 (70.83)	
STI Any History				0.3195*
Yes	7 (16.28)	3 (42.86)	4 (57.14)	
No	36 (83.72)	16 (44.44)	20 (55.56)	
Any Drug Use History (Drug use + IVDU)				0.2840*
Yes	8 (18.60)	4 (50.00)	4 (50.00)	
No	35 (81.40)	15 (42.86)	20 (57.14)	
HIV				0.2578
Yes	10 (23.26)	5 (50.00)	5 (50.00)	
No	33 (76.74)	14 (42.42)	19 (57.58)	
Use of PrEP if HIV Negative				0.5581*
Yes	1 (2.33)	0 (0.00)	1 (100.00)	
No	42 (97.67)	19 (51.35)	18 (48.65)	
MSM				0.2240
Yes	17 (53.13)	6 (35.29)	11 (64.71)	
No	15 (46.88)	8 (53.33)	7 (46.67)	
Serum RPR (Median, 25th Percentile-75th Percentile)	1:16 (1:2–1:256)	1:4 (1:2–1:16)	1:128 (1:8–1:512)	<.0.0017

*Fisher's Exact Test

Table 2b. Symptoms of patients who required lumbar punctures for further assessment to diagnose or rule out neurosyphilis

	Total	Non-Neurosyphilis (Group 4)	Neurosyphilis (Group 2)	P-Values
Symptom				
Fever	3 (6.98)	1 (33.33)	2 (66.67)	
Headache	18 (41.86)	9 (50.00)	9 (50.00)	
Nausea/ Vomiting	4 (9.30)	2 (50.00)	2 (50.00)	
Weight Loss	1 (2.33)	0 (0.00)	1 (100.00)	
Fatigue	4 (9.30)	3 (75.00)	1 (25.00)	
Arthralgia	4 (9.30)	2 (50.00)	2 (50.00)	
Vision Changes	11 (25.58)	2 (18.18)	9 (81.81)	
Seizure	3 (6.98)	2 (66.67)	1 (33.33)	
Strokes/TIA	4 (9.30)	2 (50.00)	2 (50.00)	
Gait Abnormalities	8 (18.60)	3 (37.50)	5 (62.50)	
Dementia	11 (25.58)	4 (36.36)	7 (63.63)	
Hearing Changes	4 (9.30)	1 (25.00)	3 (75.00)	
Facial Nerve Palsy	1 (2.33)	0 (0.00)	1 (100.00)	
Rash	8 (18.60)	1 (12.50)	7 (87.50)	
Transaminitis	10 (23.26)	1 (10.00)	9 (90.00)	
Myalgias	5 (11.63)	3 (60.00)	2 (40.00)	
Tremors	2 (4.65)	0 (0.00)	2 (100.00)	
Hair Loss	2 (4.65)	0 (0.00)	2 (100.00)	
Altered Mental Status	9 (20.93)	4 (44.44)	5 (55.56)	
Symptom resolution after treatment				0.0045*
Resolved	15 (34.88)	8 (53.33)	7 (46.67)	
Partially Resolved	5 (11.63)	0 (0.00)	5 (100.00)	
Unresolved	20 (46.51)	10 (50.00)	10 (50.00)	
Unknown	3 (6.98)	1 (33.33)	2 (66.67)	

*Fisher's Exact Test

were diagnosed with neurosyphilis (five confirmed with CSF analysis and one diagnosed clinically). PWH were not more likely to be diagnosed with neurosyphilis compared to syphilis (OR 0.5035 (95% CI: 0.2042–1.2416); p-value 0.1294). There were no significant differences between the groups except for drug use history, with PWH with neurosyphilis being less likely to have any substance use history.

Table 3a. Characteristics of patients treated empirically for neurosyphilis compared to those with confirmed neurosyphilis

Characteristics	Total	Suspected Neurosyphilis Group 3	Confirmed Neurosyphilis Group 2	P-Values
Total Patients	33 (100.00)	9 (27.27)	24 (72.73)	
Age (in years) at Syphilis Diagnoses				0.6334*
Mean Age [Min, Max, STD]	53 [18,89,19]	55 [32,84,21]	52 [18,89,19]	
Median Age [IQR]	47 [29]	59 [33]	47 [25]	
Gender				0.2932*
Male	24 (72.73)	6 (25.00)	18 (75.00)	
Female	9 (27.27)	3 (33.33)	6 (66.67)	
Race				0.1085*
Black or African American	3 (9.09)	0 (0.00)	3 (100.00)	
White or Caucasian	21 (63.64)	7 (33.33)	14 (66.67)	
All Others	9 (27.27)	2 (22.22)	7 (77.78)	
Ethnicity				0.3454*
Hispanics or Latino	6 (18.18)	1 (16.67)	5 (83.33)	
Not Hispanic or Latino	27 (81.82)	8 (29.63)	19 (70.37)	
Prior Syphilis				0.3141*
Yes	10 (30.30)	3 (30.00)	7 (70.00)	
No	23 (69.70)	6 (26.09)	17 (73.91)	
STI Any History				0.4029*
Yes	5 (15.15)	1 (20.00)	4 (80.00)	
No	28 (84.85)	8 (28.57)	20 (71.43)	
Any Drug Use History (Drug use + IVDU)				0.3454*
Yes	6 (18.18)	2 (33.33)	4 (66.67)	
No	27 (81.82)	7 (25.93)	20 (74.07)	
HIV				0.3454*
Yes	6 (18.18)	1 (16.67)	5 (83.33)	
No	27 (81.82)	8 (29.63)	19 (70.37)	
Use of PrEP if HIV Negative				0.4091*
Yes	2 (6.06)	1 (50.00)	1 (50.00)	
No	31 (93.94)	8 (25.81)	23 (74.19)	
MSM				0.3651*
Yes	15 (62.50)	4 (26.67)	11 (73.33)	
No	9 (37.50)	2 (22.22)	7 (77.78)	
Serum RPR (Median, 25th Percentile-75th Percentile)	1:64 (1:8–1:512)	1:64 (1:16–1:512)	1:128 (1:8–1:512)	0.7544

*Fisher's Exact Test

Table 3b. Symptoms of patients treated empirically for neurosyphilis compared to those with lumbar puncture confirmed neurosyphilis

	Total	Suspected Neurosyphilis Group 3	Confirmed Neurosyphilis Group 2	P-Values
Symptom				
Fever	3 (9.09)	1 (33.33)	2 (66.67)	
Headache	11 (33.33)	2 (18.18)	9 (81.81)	
Nausea/ Vomiting	2 (6.06)	0 (0.00)	2 (100.00)	
Weight Loss	1 (3.03)	0 (0.00)	1 (100.00)	
Fatigue	2 (6.06)	1 (50.00)	1 (50.00)	
Arthralgia	3 (9.09)	1 (33.33)	2 (66.67)	
Vision Changes	15 (45.45)	6 (40.00)	9 (60.00)	
Seizure	1 (3.03)	0 (0.00)	1 (100.00)	
Strokes/TIA	2 (6.06)	0 (0.00)	2 (100.00)	
Gait Abnormalities	5 (15.15)	0 (0.00)	5 (100.00)	
Dementia	8 (24.24)	1 (12.50)	7 (87.50)	
Hearing Changes	4 (12.12)	1 (25.00)	3 (75.00)	
Facial Nerve Palsy	1 (3.03)	0 (0.00)	1 (100.00)	
Rash	9 (27.27)	2 (22.22)	7 (77.78)	
Transaminitis	10 (30.30)	1 (10.00)	9 (90.00)	
Myalgias	3 (9.09)	1 (33.33)	2 (66.67)	
Tremors	2 (6.06)	0 (0.00)	2 (100.00)	
Hair Loss	2 (6.06)	0 (0.00)	2 (100.00)	
Altered Mental Status	8 (24.24)	3 (27.50)	5 (62.50)	
Symptom resolution after treatment				0.0088*
Resolved	13 (39.39)	6 (46.15)	7 (53.85)	
Partially Resolved	6 (18.18)	1 (16.67)	5 (83.33)	
Unresolved	11 (33.33)	1 (9.09)	10 (90.90)	
Unknown	3 (9.09)	1 (33.33)	2 (66.67)	

*Fisher's Exact Test

DISCUSSION

This is among the most comprehensive studies of neurosyphilis in the state of Rhode Island. Our retrospective chart review study over a 10.5-year period identified 598 patients with a diagnosis of syphilis and 5.5% (33) with a diagnosis of neurosyphilis. The majority of these neurosyphilis cases (42.42%) occurred at the very end of the observation period, between 1/1/2021 and 6/30/2021. This is consistent with data from the RI Department of Health (RIDOH) reporting a 382% increase in the diagnosis of syphilis since 2012 to

2021, with a particularly sharp increase in 2021 with 328 cases.[3] RIDOH had noted a decrease in syphilis diagnoses in 2020 (186), although this was presumably due to less testing in the setting of the COVID-19 pandemic.

We found that most patients diagnosed with any type of syphilis were predominantly male (87.46%). This is consistent with other studies and data reported by the state health department, with almost 90% of cases of syphilis in 2017 occurring in men, especially MSM.[3,14] However, our study notably found that neurosyphilis was more common among female patients compared to men (OR 2.835). The reason for this is not clear but highlights the need for higher clinical suspicion for neurosyphilis in female patients if they are positive for syphilis. HIV is a known risk factor for development of neurosyphilis, especially in those with low CD4 counts and not on antiretroviral therapy.[15] Our study interestingly found that patients with HIV were not more likely to be diagnosed with neurosyphilis. However, we had a rather low sample size of six patients (18.12% of 33 patients with neurosyphilis). HIV viral loads and CD4 counts were not recorded, but it is possible that the cohort of PWH diagnosed with syphilis were mostly well controlled on antiretroviral therapy, reducing the risk of progression to neurosyphilis. Further analysis of this data should be pursued.

Neurosyphilis can present with a variety of symptoms and can be misdiagnosed as a different neurologic disorder in the absence of high clinical suspicion.[16] In the setting of marked increases in the incidence of syphilis and neurosyphilis over the past few years, further attention is required to identify which patients may be at an increased risk for progression of syphilis to neurosyphilis especially as it can even in the early phases. Otosyphilis was rare with hearing changes only noted in two patients (one treated empirically and another diagnosed by lumbar puncture). Ocular syphilis was more frequent with vision changes reported in 45.45% (15/33), with much higher frequency among the group treated empirically for neurosyphilis (6/9). It should be noted though that CSF examination to diagnose neurosyphilis is not typically recommended if the presenting symptoms are ocular or otic in nature, as approximately 30% of persons with ocular syphilis and at least 30% of persons with otic syphilis will have normal CSF findings.[17,18]

The goal of treatment is to prevent progression of neurologic damage and hopefully reverse symptoms. However, some symptoms of neurosyphilis may remain permanently, especially dementia, tabes dorsalis, and ocular and otic symptoms.[12,19,20] We noted that 39.39% of patients diagnosed with neurosyphilis had full resolution of symptoms, but that 18.18% had only partial improvements and 33.33% had no improvements. Notably, patients who had neurosyphilis confirmed by CSF studies seemed to have poorer outcomes than those diagnosed empirically. This difference could be due to possible overdiagnoses of neurosyphilis among the group diagnosed empirically. Roughly 44% of patients who underwent lumbar puncture to evaluate neurosyphilis were ultimately found to not have neurosyphilis and treated instead for latent syphilis.

After treatment, it is recommended to monitor serum RPR titer to ensure that it decreases four-fold or becomes nonreactive within 12 months as adequate treatment.[8,13] Of note, the response to treatment by serial RPR of syphilis without presumed neurosyphilis can sometimes lead to more diagnostics and diagnosis of neurosyphilis (if RPR does not adequately decrease). This was the case for the PWH who was treated empirically for neurosyphilis in our study; their RPR did not adequately improve after treatment for latent syphilis so they were treated empirically for neurosyphilis after declining a lumbar puncture due to anxiety. This study did not evaluate whether serial RPR titers improved after treatment for neurosyphilis, so it is not possible to assess whether a persistence of symptoms had any association with persistently elevated RPR values. However, none of the patients treated for neurosyphilis were later diagnosed with treatment failure.

Our study has several limitations. We did not perform detailed chart reviews of all patients with syphilis as this was outside the scope of our study. We subsequently were not able to compare certain characteristics of these patients (like drug use, sexual partners, use of PrEP) to those with more detailed chart review. While we were able to identify that the patients were diagnosed with syphilis during the study time frame, we relied on the first date of the syphilis serologic testing to determine the age of diagnosis and were unable to identify cases of re-infection. This likely underestimates the incidence of syphilis in Group 1. Notably though, there were no cases of neurosyphilis re-infections in Groups 2 or 3. Despite these limitations, this remains one of the most comprehensive reviews of neurosyphilis in Rhode Island to date.

In summary, cases of syphilis and neurosyphilis are increasing across the United States, including in Rhode Island. The etiology for this is still unclear. While the most significant increases were seen over the most recent years during the COVID-19 pandemic, data from RIDOH indicates that the rise appeared to begin before the onset of the pandemic. It is possible that there has been increased vigilance for neurosyphilis (as demonstrated by the overall increase in lumbar punctures performed to investigate neurosyphilis from 2019 onward) and that perhaps cases of neurosyphilis were previously being underdiagnosed. Further evaluation is also needed to determine if perhaps there may be a more neurotrophic strain of syphilis circulating within Rhode Island. This study highlights the importance for an ongoing need to maintain high clinical suspicion for neurosyphilis in patients who present with neurologic symptoms with a new diagnosis of syphilis.

References

1. Marra CM. Neurosyphilis. Continuum (Minneap Minn). 2015 Dec;21(6 Neuroinfectious Disease):1714-28.
2. Thean L, Moore A, Nourse C. New trends in congenital syphilis: epidemiology, testing in pregnancy, and management. Curr Opin Infect Dis. 2022 Oct 1;35(5):452-460
3. RHODE ISLAND HIV, Sexually Transmitted Diseases, Viral Hepatitis, and Tuberculosis Surveillance Report: https://health.ri.gov/publications/surveillance/2021/HIVSTD.pdf
4. Garg D, Vibha D, Pandit AK, Srivastava AK. Neurosyphilis presenting as pure cerebellar ataxia: an atypical manifestation. BMJ Case Rep. 2019 Aug 31;12(8):e231058.
5. Son C, Samples D, Brenner A, Floyd J. Osteolytic calvarial lesions as initial presentation of latent neurosyphilis. J Clin Neurosci. 2015 May;22(5):909-10.
6. Skalnaya A, Fominykh V, Ivashchenko R, Averchenkov D, Grazhdantseva L, Frigo N, Negasheva E, Dolya O, Brylev L, Guekht A. Neurosyphilis in the modern era: Literature review and case series. J Clin Neurosci. 2019 Nov;69:67-73.
7. Mejdoubi A, Khoulali M, Raouzi N, Nasri S, Mebrouk Y, Oulali N, Moufid F. Neurosyphilis revealed by compressive cervical spine syphilitic gumma: a case report. Spinal Cord Ser Cases. 2020 Jun 30;6(1):56.
8. Ropper AH. Neurosyphilis. N Engl J Med. 2019 Oct 3;381(14):1358-1363.
9. Gonzalez H, Koralnik IJ, Marra CM. Neurosyphilis. Semin Neurol. 2019 Aug;39(4):448-455.
10. Papp JR, Park IU, Fakile Y, Pereira L, Pillay A, Bolan GA. CDC Laboratory Recommendations for Syphilis Testing, United States, 2024. MMWR Recomm Rep 2024;73(No, RR-1):1-32.
11. Brown DL, Frank JE. Diagnosis and management of syphilis. *Am Fam Physician*. 2003;68(2):283-290.
12. Lasagabaster AM, Guerra OL. Syphilis. Enferm Infecc Microbiol Clin (Engl Ed). 2019 Jun-Jul;37(6):398-404.
13. Clement ME, Okeke NL, Hicks CB. Treatment of syphilis: a systematic review. JAMA. 2014 Nov 12;312(18):1905-17.
14. Junco-Fernández A, Montgomery MC, Crowley C, Bertrand T, Marak TP, Maynard MA, Gummo C, Flanigan TP, Chan PA. Increasing Syphilis in Rhode Island: Return of an Old Foe. R I Med J (2013). 2019 Feb 1;102(1):50-54.
15. Ghanem KG, Moore RD, Rompalo AM, Erbelding EJ, Zenilman JM, Gebo KA. Neurosyphilis in a clinical cohort of HIV-1-infected patients. *AIDS*. 2008;22(10):1145-1151.
16. Du FZ, Zhang HN, Li JJ, Zheng ZJ, Zhang X, Zhang RL, Wang QQ. Neurosyphilis in China: A Systematic Review of Cases From 2009-2021. Front Med (Lausanne). 2022 May 13;9:894841.
17. Vadboncoeur J, Labbé AC, Fortin C, et al. Ocular syphilis: case series (2000-2015) from 2 tertiary care centres in Montreal, Canada. *Can J Ophthalmol*. 2020;55(1):30-37.
18. Theeuwen H, Whipple M, Litvack JR. Otosyphilis: Resurgence of an Old Disease. *Laryngoscope*. 2019;129(7):1680-1684.
19. Gu X, Gao Y, Yan Y, et al. The importance of proper and prompt treatment of ocular syphilis: a lesson from permanent vision loss in 52 eyes. *J Eur Acad Dermatol Venereol*. 2020;34(7):1569-1578.
20. Gleich LL, Linstrom CJ, Kimmelman CP. Otosyphilis: a diagnostic and therapeutic dilemma. *Laryngoscope*. 1992;102(11):1255-1259.

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Achieving Top National Mpox Vaccination Coverage for Gay, Bisexual, and Other Men Who Have Sex with Men in Rhode Island: The Critical Role of Community Engagement, Public Health Collaboration, and Health Equity

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ABSTRACT

Since 2022, mpox (formerly known as monkeypox) has emerged as a sexually-associated infection that disproportionately impacts gay, bisexual, and other men who have sex with men (GBMSM). Fortunately, the JYNNEOS vaccine, which was initially developed for smallpox, has demonstrated significant efficacy against mpox and was distributed across the United States. In January 2024, the Centers for Disease Control and Prevention (CDC) reported that Rhode Island ranked first among the 50 states for rates of full vaccination coverage (two doses) against mpox among people at increased risk including GBMSM, and second among the 50 states for rates of partial vaccination (single dose).[1] The Rhode Island Department of Health (RIDOH), in partnership with other state agencies, clinicians, and community-based organizations, succeeded in rapid outbreak response focusing on community engagement and health equity to address the mpox epidemic.

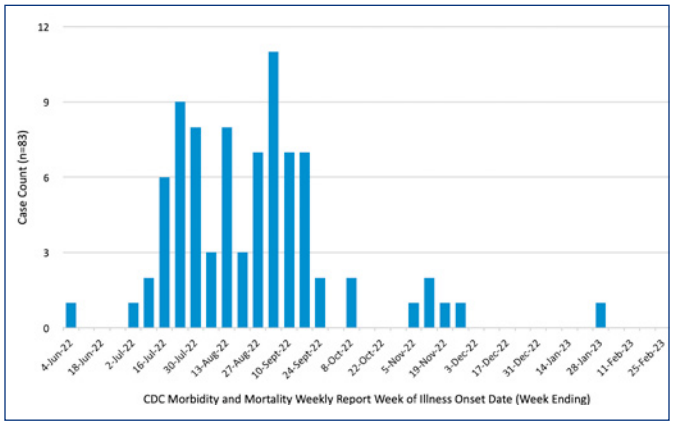
KEYWORDS: Mpox, Health Equity, Vaccination, Community Engagement, Gay, Bisexual, and other Men Who Have Sex with Men

BACKGROUND

In May 2022, a worldwide outbreak of mpox began in Europe, spreading to 113 countries and affecting more than 93,000 people.[2] Mpox is characterized by the emergence of pox lesions. Fever and systemic symptoms may follow with severe cases involving the oropharynx and the central nervous system. Mild cases resolve with supportive care, while more severe cases can be treated with tecovirimat (TPOXX). During this outbreak, mpox was found to be spread largely through sexual/intimate contact, with most cases occurring among gay, bisexual, and other men who have sex with men (GBMSM).

The first mpox cases in Rhode Island were identified in June 2022, peaking July–September 2022 (**Figure 1**). The total number of cases reported to the Rhode Island Department of Health as of February 1, 2024 was 90.[3] Vaccination as post-exposure prophylaxis and for individuals at high risk of exposure has been recommended, utilizing an existing

Figure 1. Epidemic curve of mpox cases by week of illness onset, Rhode Island, June 2022–February 2023



smallpox vaccine, JYNNEOS, administered in a two-dose series over 28 days. The effectiveness of the JYNNEOS vaccine in preventing mpox disease has been demonstrated to be 35% to 75% after one dose and 66% to 85% after two doses.[4,5] Initial efforts to vaccinate individuals at high risk of mpox exposure were hampered by significantly limited supplies and high demand. Once a limited supply of vaccine was announced for those at highest risk, RIDOH started planning for and established a system of public vaccination clinics using existing collaborations with hospitals, health centers, and contracted vendors.

RIDOH's Center for Emergency Preparedness and Response and Center for Preventive Services have significant experience planning, staffing, supplying, and executing public vaccination clinics with little lead time. This infrastructure and support from key healthcare partners quickly launched a successful vaccination campaign. Using technology developed during Rhode Island's COVID-19 response, RIDOH created an mpox Vaccine Interest Notification List, prompting interested individuals to receive text message or email notifications when the vaccine was available. An online clinic and appointment management software (also acquired during the COVID-19 response) was used to coordinate clinics. Vaccination administration data were transmitted to the Rhode Island Child and Adult Immunization Registry and these data informed vaccine distribution decisions.

Figure 2. Example of RIDOH advertisement on GBMSM dating sites.

RIDOH adopted a health equity framework for the mpox campaign development to identify groups for targeted outreach and vaccination access, including GBMSM and gender-diverse individuals, individuals living with HIV, people facing housing instability, people who use drugs, communities of color, and individuals who exchange sex for money. Reaching these groups and the broader vaccine-eligible populations was achieved through partnerships with community organizations, including AIDS Care Ocean State (ACOS), AIDS Project Rhode Island (APRI), and Project Weber/RENEW.

An important early step was to raise targeted awareness of mpox risk and the need for vaccination among GBMSM, given that this group has historically experienced societal stigma and discrimination.[6] A comprehensive community engagement and communications plan was created with guidance from an mpox community advisory group formed by APRI. Special efforts were needed to avoid stigmatizing language and images in campaign materials (see **Figure 2**), encourage low-risk sexual behaviors without appearing "preachy," identify trusted spokespeople, and address privacy and confidentiality concerns.

The Miriam Hospital Infectious Diseases and Immunology Center was the first Rhode Island location to treat mpox cases with TPOXX and offer post-exposure vaccination and routine vaccination protocols for its at-risk patients. Post-exposure prophylaxis (PEP) for mpox can be given with the mpox vaccine, JYNNEOS, to people with known or presumed exposure to the mpox virus. Ideally, when used as mpox PEP, one dose of the mpox vaccine should be given as soon as possible, with protection possible from days 4 through 14 after exposure. The standard regimen for routine vaccination with JYNNEOS for pre-exposure prophylaxis is a two-dose series administered 28 days apart.

Open Door Health (an LGBTQ+ health center), Thundermist Health Center, and Tri-County Community Health Center soon established clinics. RIDOH's contracted vaccination and emergency response force multipliers, including the Rhode Island Medical Reserve Corps and The Wellness Company, conducted 44 public clinics.

RIDOH created a webpage about GBMSM sexual health, highlighting mpox information. During the initial campaign period, this webpage received 35,000 page views. Advertising on GBMSM dating apps was the primary strategy for raising mpox awareness. The most popular advertisement resulted in a 42% click-through rate, compared to an average 1.2% click-through rate for public health campaigns.

Other innovative communications methods included a text-messaging system encouraging people who received one dose of vaccine to complete their series as well as displaying video advertisements in cinemas during the run of *Bros* and *Wakanda Forever*, among other PG-13 and R-rated films. Advertisements encouraged moviegoers to scan a QR code to learn about mpox and schedule a vaccination appointment. Advertising materials were prepared in English and Spanish featuring images of people representing diverse backgrounds.

A key response feature was conducting large- and small-scale mpox public vaccination clinics in various community settings. Locations were selected to reduce stigma, maximize access, and respond to diverse preferences among GBMSM and other eligible individuals. Locations included Rhode Island College, AAA of Southern New England, Beneficent Church, Providence Gay Flag Football League games, Drag Bingo, and high-risk venues. A total of 6,220 doses of JYNNEOS vaccine were administered in Rhode Island as part of the campaign (**Table 1**). As of January 2024, the CDC reports that 62% of Rhode Island's target population received one dose, and 46% received two doses (fully vaccinated) of JYNNEOS.[1]

Table 1. Doses of Mpox Vaccine Administered by Clinic Setting, Rhode Island, June 10, 2022–January 31, 2024

Setting	Mpox Vaccine Doses Total = 6,970	Percent
Community-based	3,420	50%
Open Door Health	1,142	16%
The Miriam Hospital Immunology Center/Rhode Island Hospital ED	1,006	14%
Tri-County Community Health Center	386	5%
Thundermist Health Center	204	4%
Other	62	1%
Out of State	750	10%

In conclusion, many aspects of Rhode Island's nation-leading mpox outbreak response can inform future infectious disease outbreaks: (1) a non-stigmatizing education campaign informed by community engagement; (2) a nimble infrastructure for rapid establishment of public vaccination clinics; (3) existing collaboration with community and advocacy groups, and (4) strong support from local healthcare professionals. With this experience, RIDOH will remain a national leader in responding to emerging public health threats.

References

1. JYNNEOS Vaccine Coverage by Jurisdiction. cdc.gov. Updated January 9, 2024. Accessed February 14, 2024. https://www.cdc.gov/poxvirus/mpox/cases-data/mpx-jynneos-vaccine-coverage.html.
2. 2022-2023 Mpox Outbreak Global Map. cdc.gov. Updated February 7, 2024. Accessed February 19, 2024. https://www.cdc.gov/poxvirus/mpox/response/2022/world-map.html.
3. Mpox (Monkeypox) Case Data. health.ri.gov. Accessed February 29, 2024. https://health.ri.gov/data/monkeypox/
4. Dalton AF, Dialo AO, Chard AN, et al. Estimated effectiveness of JYNNEOS vaccine in preventing mpox. MMWR Morb Mortal Wkly Rep. 2023;72(20):553-558. doi:10.15585/mmwr.mm7220a3
5. Deputy NP, Deckert J, Chard AN, et al. Vaccine effectiveness of JYNNEOS against mpox disease in the United States. N Engl J Med. 2023;388:2434-2443. Published online May 18, 2023. doi:10.1056/NEJMoa2215201
6. Casey LS, Reisner SL, Findling MG, et al. Discrimination in the United States: Experiences of lesbian, gay, bisexual, transgender, and queer Americans. Health Serv Res. 2019;54(Suppl 2):1454-1466. doi:10.1111/1475-6773.13229

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Implementing a Community-Based LGBTQ+ and Sexual Health Program in Providence, Rhode Island

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ABSTRACT

BACKGROUND: Lesbian, gay, bisexual, transgender, and queer (LGBTQ+) communities experience significant health disparities related to sexual health, including sexually transmitted infections (STIs). Improved access to culturally congruent primary care and sexual health services, including HIV/STI prevention and care, are needed. We describe how we developed a new community-based LGBTQ+ primary care clinic and implemented safety-net sexual health and STI screening and care services in Providence, Rhode Island.

METHODS: Open Door Health in Providence, Rhode Island, was started in 2020 to improve access to HIV/STI care and prevention services, primary care, and gender-affirming care for the LGBTQ+ community. We reviewed demographics and behaviors of patients presenting for STI screening services from February 2021 to October 2023 at the clinic. Bivariate and multivariate analyses were used to evaluate demographics and behaviors among patients testing positive for HIV and other STIs.

RESULTS: A total of N=1,633 people presented for STI screening. Of these, 56% were 30 years or younger, 65% identified as male, 24% as female, and 9% as non-binary or gender diverse. Forty-three percent were MSM, 19% were Black/African American (B/AA), and 22% were Hispanic/Latino (H/L). Seventy-one percent reported two or more partners in the last three months. The prevalence of STIs was 22.3% (4.4% syphilis, 7.5% gonorrhea, and 9.7% chlamydia). Those who tested positive for an STI were more likely to be B/AA (23.3% of B/AA individuals versus 15.9% of White, $p<0.05$), H/L (23.1% versus 17.4%, $p<0.05$), and MSM (25% versus 16.9%, $p<0.05$).

CONCLUSION: Open Door Health provides important safety-net STI services for the LGBTQ+ community. Individuals presenting for services had a high prevalence of HIV/STIs. Improved approaches are needed for HIV/STI care and prevention in this group, including among B/AA and H/L communities.

INTRODUCTION

Lesbian, gay, bisexual, transgender, and queer (LGBTQ+) communities experience significant health disparities in the United States.[1] Among these, gay, bisexual, and other men who have sex with men (MSM) and transgender women (TGW) are disproportionately impacted by HIV and other sexually transmitted infections (STIs). Bacterial STIs such as syphilis, gonorrhea, and chlamydia have significantly increased across the United States. In 2022, there were approximately 2.5 million cases reported to the Centers for Disease Control and Prevention (CDC).[2] STIs also disproportionately impact people of color, including African American/Black (AA/B) and Hispanic/Latino (H/L) populations.[2] Novel approaches are required to enhance healthcare access and combat the rising burden of STIs within the LGBTQ+ community in the United States.

The LGBTQ+ community encounters numerous barriers to accessing healthcare services, including lack of healthcare access, stigma, discrimination, homophobia, and a shortage of culturally tailored services.[3] Stigma and discrimination is even more pronounced among AA/B and H/L MSM.[4] This results in suboptimal HIV/STI care and prevention outcomes, including less HIV/STI testing, limited awareness and education about HIV/STIs, and suboptimal access to biomedical prevention interventions such as HIV pre-exposure prophylaxis (PrEP). Improved access to culturally competent primary care and sexual health services, including HIV/STI care and prevention, are needed.

With support from the Executive Office of Health and Human Services (EOHHS) and the Rhode Island Department of Health (RIDOH), and with a groundswell of community support, Open Door Health was opened in March 2020. Open Door Health began offering primary care, gender-affirming care, sexual health services, including walk-in appointments. Despite the initial challenges of the COVID-19 pandemic, the clinic became an immediate success in providing primary and gender-affirming care, as well as HIV/STI care and prevention services to the entire state. The clinic is supported by diverse funding streams, including clinical billing, 340B revenue, grants, and private philanthropy. This ensures that care is provided to every person who walks through the door regardless of one's ability to pay. Staff and medical providers prioritize creating a welcoming and affirming environment for all patients. To date, Open Door Health has

provided care to over 8,000 unique patients. Although many identify as part of the LGBTQ+ community, the clinic provides care to all regardless of background.

We review demographics and behaviors of individuals presenting to Open Door Health for STI screening services.

METHODS

Open Door Health is the only community-based LGBTQ+ clinic in the state of Rhode Island. All individuals presenting for HIV/STI testing complete a clinical intake form which includes demographics, behavioral risk factors, and other conventional HIV/STI surveillance information. We reviewed de-identified patient data for all individuals presenting for HIV/STI testing from February 2021 to October 2023. We assessed the following data: age, sex at birth, gender, race, ethnicity, risk behaviors, state of residence, insurance status, prior HIV and STI testing, injection drug use, and number of sex partners in the last 12 months (oral, vaginal, and/or anal). Other behavioral data included sex with anonymous partner(s), alcohol or drug use during sex, sex with someone of unknown HIV status, sex with someone who exchanges sex for drugs or money, history of exchanging drugs or money for sex, having ever been forced to have sex, and prior history of incarceration. Laboratory testing reviewed included HIV (antibody/antigen testing), syphilis (treponemal and non-treponemal), gonorrhea (nucleic acid amplification testing, NAAT), and chlamydia (NAAT) results. Review of de-identified data was approved by the Brown University Institutional Review Board.

Bivariate analyses including the chi-square test were used to compare demographics and behaviors between groups. Significance was defined as alpha less than 0.05, and all reported p-values are two-sided.

RESULTS

A total of N=1,633 people presented for sexual health care during the time period (**Table 1**). Of these, 56% were 30 years or younger, 65% identified as male, 24% as female, and 9% as non-binary or gender diverse. Forty-three percent were MSM, 19% were Black/African American (B/AA), and 22% were Hispanic/Latino (H/L). Twenty-six percent reported earning $25,000 or less. Seventy-one percent reported 2+ partners in the last three months. Other behaviors associated with STI risk included condomless anal sex (11.2%), sex with an HIV-positive partner (3.3%), exchanging sex for money, drugs or other goods (5.1%), sex with someone who exchanges money, drugs or other goods (6.6%), sex while intoxicated (39.9%), sex with an anonymous partner (33.3%), history of incarceration (5.2%), methamphetamine use (1.8%) and ever injecting drugs (2.2%) (**Table 2**).

The prevalence of STIs was 22.3% (4.4% syphilis, 7.5% gonorrhea, and 9.7% chlamydia). Those who tested positive for an STI were more likely to be B/AA (23.3% of B/AA individuals versus 15.9% of White individuals were STI positive, $p<0.05$), H/L (23.1% H/L versus 17.4% non-H/L, $p<0.05$), and MSM (25% MSM versus 16.9% non-MSM, $p<0.05$).

DISCUSSION

Since opening in 2020, Open Door Health has provided important safety-net services for LGBTQ+ individuals, including sexual health and STI care and prevention. Open Door Health is the first and only clinic dedicated to providing LGBTQ+ services as the core function of its clinical mission. In addition, Open Door Health also focuses on research, education/training, and public health, which distinguishes it from other organizations in the state and region. Open Door Health provides primary care, gender-affirming care, HIV care and prevention including PrEP, Hepatitis C Virus (HCV) management, and STI care and prevention. The clinic also includes an anal health program and offers high-resolution anoscopies. In this analysis, individuals presenting to the clinic for HIV/STI testing had high positivity rates, particularly among MSM and B/AA and H/L communities. These findings highlight the significant disparities that exist among the LGBTQ+ community and communities of color. Improving and ensuring access to primary care, gender-affirming care, and HIV/STI care and prevention is critical for the LGBTQ+ community in Rhode Island and elsewhere.

LGBTQ+ individuals may experience significant challenges successfully engaging with the healthcare system, including stigma, lack of culturally tailored services, and limited access to health care services. LGBTQ+ individuals have highlighted that a lack of culturally competent knowledge and affirming care among providers contributes to perceived stigma within the healthcare landscape.[5] As a result, patients may question whether to disclose their sexual identity to a healthcare provider.[6] A unique challenge for LGBTQ+ patients is accessing comprehensive care for basic health needs. Often, patients must visit multiple providers to fulfill these needs, highlighting the importance of establishing comprehensive, integrated healthcare settings tailored to the needs of LGBTQ+ individuals. Creating a "one-stop-shop" setting for LGBTQ+ health services is ideal to address this challenge.[7] Inconsistent insurance coverage exacerbates these challenges, particularly for sexual and gender minorities.[8] Open Door Health works to achieve cultural competency by providing training and education to providers and staff with the goal of increasing cultural awareness, knowledge and skills; hiring staff who reflect the community the clinic serves; providing interpreter services; patient navigators to help facilitate care; and promoting culture-specific attitudes and values at the organization.

In addition, our results highlight STI disparities across race and ethnic groups. B/AA and H/L communities are more likely to experience social and structural barriers that

Table 1. Demographics of Individuals Presenting for Sexually Transmitted Infection (STI) Testing

			ANY STI					
	Total (All)		Positive[1]		Negative		Missing	P-Value
	%	N	%	N	%	N	N	
Total	100	1,633	22.3%	297	77.7%	1,033	303	
Age								0.161
<25	24.2%	395	27.6%	82	22.0%	227	86	
25–30	31.6%	516	31.7%	94	32.2%	333	89	
31–40	29.2%	477	28.3%	84	31.2%	322	71	
41–50	8.7%	142	8.8%	26	8.3%	86	30	
>50	6.3%	103	3.7%	11	6.3%	65	27	
Sex at Birth								0.000
Male	68.5%	1,118	83.1%	246	66.8%	679	193	
Female	29.3%	478	15.9%	47	32.4%	329	102	
Other or Unknown	0.8%	13	1.0%	3	0.9%	9	1	
Missing	1.5%	24		1		16	7	
Gender								0.000
Man	64.8%	1,058	81.9%	240	63.0%	635	183	
Woman	24.3%	397	15.0%	44	26.1%	263	90	
Non-binary or gender diverse	8.6%	141	3.1%	9	10.9%	110	22	
Other or Unknown	2.3%	37		4		25	8	
Race								0.008
Black/African American	19.4%	317	29.3%	74	22.6%	193	50	
White	51.6%	842	53.0%	134	63.7%	545	163	
Other	12.1%	198	17.8%	45	13.7%	117	36	
Missing	16.9%	276		44		178	54	
Ethnicity								0.023
Non-Hispanic/Latino	69.4%	1,133	70.4%	197	77.0%	723	213	
Hispanic/Latino	22.0%	359	29.6%	83	23.0%	216	60	
Missing	8.6%	141		17		94	30	
Sexual Orientation								0.000
Same-sex	35.3%	577	29.3%	87	36.5%	377	113	
Straight	39.1%	475	42.1%	125	26.3%	272	78	
Other	35.6%	581	28.6%	85	37.2%	384	112	
MSM								0.002
Yes	43.1%	703	71.5%	176	60.4%	410	117	
No	25.4%	415	28.5%	70	39.6%	269	76	
Missing and assigned female at birth	31.5%	515		51		354	110	
Household Income								0.110
More than $100,000	10.3%	168	12.3%	27	14.1%	111	30	
$50,001–$100,000	20.5%	335	25.9%	57	27.9%	219	59	
$25,001–$50,000	19.2%	313	22.3%	49	27.0%	212	52	
$25,000 or less	25.7%	419	39.6%	87	31.0%	243	89	
Missing	24.4%	398		77		248	73	

MSM=Men who have sex with men (Defined as born male sex, sex with at least one reported male sex partner)
[1]Some ppl tested positive for more than one type of STI

Table 2. Behaviors of Individuals Presenting for Sexually Transmitted Infection (STI) Testing

			Any Sti					
	Total (All)		Positive		Negative		Missing	P-Value
	%	N	%	N	%	N	N	
Total	100	1,633	22.3%	297	77.7%	1,033	303	
Total Sex Partners (Last Three Months)								0.000
0	3.3%	53	2.0%	6	3.0%	31	16	
1	25.7%	420	17.9%	53	26.5%	274	93	
2-4	46.4%	758	41.1%	122	48.5%	501	135	
5+	24.6%	402	39.1%	116	22.0%	227	59	
Condomless Anal Sex								0.306
No	55.2%	901	85.2%	201	82.3%	547	153	
Yes	11.2%	183	14.8%	35	17.7%	118	30	
Missing	33.6%	549		61		368	120	
Sex with an HIV+ Partner								0.000
No	87.6%	1,430	92.6%	250	97.6%	918	262	
Yes	3.3%	54	7.4%	20	2.4%	23	11	
Missing	9.1%	149		27		92	30	
Exchanged sex for money/drugs/goods								0.133
No	90.5%	1,477	93.0%	265	95.2%	940	272	
Yes	5.1%	83	7.0%	20	4.8%	47	16	
Missing	4.5%	73		12		46	15	
Sex with someone who exchanges money/drugs/goods								0.179
No	89.0%	1,454	90.9%	259	93.2%	922	273	
Yes	6.6%	108	9.1%	26	6.8%	67	15	
Missing	4.4%	71		12		44	15	
Sex while intoxicated (yes/no)								0.231
No	55.9%	912	60.4%	172	56.4%	558	182	
Yes	39.9%	651	39.7%	113	43.6%	432	106	
Missing	4.3%	70		12		43	15	
Sex with an anonymous partner (yes/no)								0.011
No	62.2%	1,016	58.1%	165	66.3%	656	195	
Yes	33.3%	544	41.9%	119	33.7%	333	92	
Missing	4.5%	73		13		44	16	
History of incarceration (yes/no)								0.057
No	90.5%	1,477	92.2%	261	95.2%	942	274	
Yes	5.2%	85	7.8%	22	4.9%	48	15	
Missing	4.4%	71		14		43	14	
Injected drugs (ever)								0.072
No	93.5%	1,526	96.1%	272	98.0%	971	283	
Yes	2.2%	36	3.9%	11	2.0%	20	5	
Missing	4.4%	71		14		42	15	
Crystal Meth Use (Last 12 months)								0.000
No	98.2%	1,603	94.3%	280	99.3%	1,026	297	
Yes	1.8%	30	5.7%	17	0.7%	7	6	

contribute to higher rates of STIs.[9,10] These disparities persist in B/AA and H/L communities across the spectrum of sexual orientation and gender identity,[11] underscoring the critical need for culturally competent care across all populations. Addressing the disproportionate impact of STIs on these communities will require a multilevel approach that addresses both social and individual determinants of health.

Importantly, Open Door Health provides care to all individuals regardless of ability to pay. Out-of-pocket costs have been shown to be significant barriers to STI care and prevention. In our prior work, we demonstrated that 40% of people presenting for HIV/STI services in Rhode Island may be uninsured.[12] Those patients also reported that out-of-pocket costs were a significant concern.[12] To sustain its operation, Open Door Health leverages multiple revenue sources, including clinical billing of insurance, grant support, philanthropy, and safety-net funding sources such as 340B.[12-14] These diverse revenue sources allow the organization to provide care regardless of any individual's ability to pay. These safety net services have had high uptake among sexual and gender minorities as well as people of color.

Open Door Health's STI service structures have also been leveraged to implement new STI prevention programs. Open Door Health recently began offering STI post-exposure prophylaxis (PEP), which involves taking an antimicrobial after an STI exposure or a potential exposure. PEP can be distinguished from PrEP, which involves taking a medication before exposure. Doxycycline has been evaluated as PEP for STI prevention and is taken as a single 200mg dose ideally within 24 hours and up to 72 hours after condomless sex. In 2022, the DoxyPEP study conducted in Seattle and San Francisco demonstrated that doxycycline as PEP prevented syphilis, gonorrhea, and chlamydia in both MSM and TGW with HIV and those taking HIV PrEP.[15] Other recent studies have confirmed that doxycycline is effective as PEP in preventing bacterial STIs in MSM and TGW.[16] Studies of other populations which also include doxycycline as PrEP for STI prevention are ongoing and holds promise for expanding the toolkit for STI prevention interventions.

In conclusion, improved efforts are needed to address sexual health and the burden of STIs among the LGBTQ+ community, as well as communities of color. Open Door Health provides critical safety-net health care services for LGBTQ+ individuals in Rhode Island, including sexual health and STI care and prevention. Resources and investments in infrastructure including mechanisms to ensure sustainability of STI services for these groups are essential.

References

1. Daniel H, Butkus R, Health and Public Policy Committee of American College of Physicians. Lesbian, Gay, Bisexual, and Transgender Health Disparities: Executive Summary of a Policy Position Paper From the American College of Physicians. *Ann Intern Med*. 2015;163(2):135-137. doi:10.7326/M14-2482
2. STI Surveillance Report. Published online 2022.
3. Zeeman L, Sherriff N, Browne K, et al. A review of lesbian, gay, bisexual, trans and intersex (LGBTI) health and healthcare inequalities. *Eur J Public Health*. 2019;29(5):974-980. doi:10.1093/eurpub/cky226
4. Babel RA, Wang P, Alessi EJ, Raymond HF, Wei C. Stigma, HIV Risk, and Access to HIV Prevention and Treatment Services Among Men Who have Sex with Men (MSM) in the United States: A Scoping Review. *AIDS Behav*. 2021;25(11):3574-3604. doi:10.1007/s10461-021-03262-4
5. Matsuzaka S, Romanelli M, Hudson KD. "Render a service worthy of me": A qualitative study of factors influencing access to LGBTQ-specific health services. *SSM - Qualitative Research in Health*. 2021;1:100019. doi:10.1016/j.ssmqr.2021.100019
6. Rossman K, Salamanca P, Macapagal K. A Qualitative Study Examining Young Adults' Experiences of Disclosure and Nondisclosure of LGBTQ Identity to Health Care Providers. *Journal of Homosexuality*. 2017;64(10):1390-1410. doi:10.1080/00918369.2017.1321379
7. Kenner C, Cherry J, Mizock L, DiStefano A, Tosh J, Gurse C. Reimagining sexual and reproductive healthcare for LGBTQ communities. *Culture, Health & Sexuality*. 2023;25(11):1419-1432. doi:10.1080/13691058.2022.2159066
8. Ramsey ZS, Davidov DM, Levy CB, Abildso CG. An etic view of LGBTQ healthcare: Barriers to access according to healthcare providers and researchers. *Journal of Gay & Lesbian Social Services*. 2022;34(4):502-520. doi:10.1080/10538720.2022.2042452
9. Ramos SR, Nelson LE, Jones SG, Ni Z, Turpin RE, Portillo CJ. A State of the Science on HIV Prevention Over 40 Years Among Black and Hispanic/Latinx Communities. *J Assoc Nurses AIDS Care*. 2021;32(3):253-263. doi:10.1097/JNC.0000000000000266
10. Agénor M, Geller AB, Crowley JS, Boyer CB. The Importance of Structural Interventions for Advancing Sexual Health and Health Equity in the United States: A Review of the Evidence and Recommendations for Action on Sexually Transmitted Infections. *Sexual Trans Dis*. 2023;50(1):1-4. doi:10.1097/OLQ.0000000000001695
11. Pérez AE, Gamarel KE, Van Den Berg JJ, Operario D. Sexual and behavioral health disparities among African American sexual minority men and women. *Ethnicity & Health*. 2020;25(5):653-664. doi:10.1080/13557858.2018.1444149
12. Lee AJ, Montgomery MC, Patel RR, Raifman J, Dean LT, Chan PA. Improving Insurance and Health Care Systems to Ensure Better Access to Sexually Transmitted Disease Testing and Prevention. *Sex Transm Dis*. 2018;45(4):283-286. doi:10.1097/OLQ.0000000000000727
13. Dean LT, Montgomery MC, Raifman J, et al. The Affordability of Providing Sexually Transmitted Disease Services at a Safety-net Clinic. *Am J Prev Med*. 2018;54(4):552-558. doi:10.1016/j.amepre.2017.12.016
14. Montgomery MC, Raifman J, Nunn AS, et al. Insurance Coverage and Utilization at a Sexually Transmitted Disease Clinic in a Medicaid Expansion State. *Sex Transm Dis*. 2017;44(5):313-317. doi:10.1097/OLQ.0000000000000585
15. Luetkemeyer AF, Donnell D, Dombrowski JC, et al. Postexposure Doxycycline to Prevent Bacterial Sexually Transmitted Infections. *N Engl J Med*. 2023;388(14):1296-1306. doi:10.1056/NEJMoa2211934
16. Molina JM, Bercot B, Assoumou L, et al. ANRS 174 DOXYVAC: An Open-Label Randomized Trial to Prevent STIs in MSM on PrEP. *CROI*. 2023;Seattle, Washington. https://www.croiconference.org/abstract/anrs-174-doxyvac-an-open-label-randomized-trial-to-prevent-stis-in-msm-on-prep/

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