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Expanding the evidence-base for improving sexual health among transgender communities: the importance of rigorous epidemiologic studies

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Though approximately 1.3 million adults identify as transgender in United States (US) [1], transgender populations remain marginalized and understudied in public health. Epidemiological studies of health outcomes of transgender populations are infrequent, but available data show alarming disparities with respect to sexual health between transgender and cisgender populations [2–4]. Additionally, the few studies examining health, and specifically sexual health, of transgender populations are often published in specialty journals. This highlights the important work published by Brown et al. about sexual health of transgender women in this issue of *The Journal of Infectious Diseases*.

Brown et al. greatly advance the field of transgender sexual health research by presenting baseline findings for a multisite prospective cohort study called The Leading Innovation for Transgender Women's Health and Empowerment (LITE). Specifically, Brown et al. investigate the prevalence and factors associated with bacterial sexually transmitted infections (STIs) among a community-based sample of adult transgender women, stratified by HIV status, in six cities across the eastern and southern US. The study highlights the high prevalence of bacterial STIs among transgender women (16%) and differences in STI prevalence by HIV status (32% among transgender with HIV versus 11% without HIV). These findings suggest unique considerations are needed for transgender women with and without HIV and may help inform tailored interventions to curtail sexual health inequities. Given the sparsity of robust epidemiologic data to inform best practices for improving the sexual and reproductive health of transgender persons, Brown et al.'s paper is impactful.

Brown et al.'s work is one of the first to report population-level estimates in six cities of STIs derived from a cohort of transgender women. While the Centers for Disease Control and Prevention report annual STI case rates for men and women, national STI case rates among transgender persons are particularly challenging to estimate. Some states are unable to send data on gender identity, limiting the report to a subset of states. Furthermore, case data that are reported to CDC via the National Notifiable Diseases Surveillance System

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(NNDSS) are sometimes suppressed due to small cell counts or missing data, and a lack of population denominators preclude rates from being estimated. In other large-scale studies of sexual health, small sample sizes and analytic requirements often lead to transgender persons being grouped with MSM into an overarching category for sexual and gender minorities, despite the different experiences and challenges each of these populations face [5]. When transgender persons are included in sub-analyses with MSM, little actionable information is produced to tailor prevention interventions to this underserved community. These data limitations pose challenges for understanding unique sexual health risks that may impact transgender persons.

Additionally, among sexual health studies of the transgender community, most research centers around human immunodeficiency virus (HIV) in transgender women [3, 6]. Rates of HIV are disproportionately high among adult transgender women compared to the general population of adults [4, 7]. Several factors may contribute to elevated HIV rates among transgender women, including: unprotected anal sex, multiple sex partners, dense sexual networks, commercial sex work, needle sharing for injection hormone therapy, and/or compounding stigma and structural factors that negatively impact access to HIV testing and care [3, 6, 8]. These factors may also translate into disproportionately high rates of STIs among transgender women; however, very few estimates of the prevalence of bacterial STIs among transgender women in the US exist, particularly among transgender women who do not engage in sex work [3].

Brown et al. help address the gaps in understanding STI morbidity among transgender women by designing and conducting a study that has several notable strengths with respect to validity. First, many previous studies rely on self-report of STIs, which may be subject to recall bias and lack rigor of standardized diagnostic testing. Second, given logistical challenges of recruiting people from marginalized communities for health studies [9, 10], small sample sizes often make it difficult to sufficiently power sexual health studies in the transgender women community and to generalize results. The transgender community is heterogenous and the only way to appreciate that diversity is to sufficiently power a study to explore differences within transgender populations. We applaud the LITE study's ability to collect laboratory-confirmed sexual health data from a sample of 1,018 transgender women using a standardized protocol for recruitment, sample collection, and diagnostic testing across all six study sites (Atlanta, Baltimore, Boston, Miami, New York City, and Washington D.C.).

An important finding of Brown et al.'s study is the difference in STI prevalence by HIV status. At baseline, 27% of the LITE cohort tested positive for HIV. Bacterial STI prevalence was three times higher among transgender women living with HIV, and these women were also more likely than transgender women without HIV to report many situated vulnerabilities, such as homelessness, incarceration, or sex work. Among transgender women without HIV, Black participants were over six times more likely to have a bacterial STI compared to White participants. These findings indicate that transgender women who experience intersectional stigma, such as being transgender in addition to being a woman of color and/or living with HIV, are vulnerable to heightened risk of STI infection and might

benefit from culturally tailored interventions to increase access to STI testing and treatment services.

Brown et al.'s work also emphasizes that individual-level factors, such as number of sexual partners or number of sexual encounters, only tell part of the story about STI risk among transgender women, while more structural and macro-level factors, such as geography and network connectivity, contribute as well. In the LITE study, 16% of transgender women had at least one bacterial STI, with even higher prevalence among those living with HIV. This is concerning given that geography affects economic opportunities and their downstream effects [11, 12]; these opportunities – or lack thereof – may have cascading effects on the likelihood of acquiring an STI, especially for marginalized populations that face a varying degree of stigma across the US. For example, living in a geographic area that stigmatizes the transgender community could negatively impact a transgender woman's ability to acquire and maintain employment. Without income, her housing situation may become unstable, which could make her more likely to engage in sex work, experience intimate partner violence, or become incarcerated – all factors that have been linked to increased risk of STIs [13, 14]. Additionally, being diagnosed with an STI is predicated upon one's ability to access STI testing. Stigma and transphobia may hinder STI detection in some settings, whereas settings with multiple trans-friendly options for STI testing may empower transgender women to seek care. Regional-level population estimates suggest that relatively stable percentages of adults identify as transgender across four regions of the US (West, 0.54%; South, 0.54%; Northeast, 0.57%; Midwest, 0.44%) [1]; however, the lived experiences of transgender persons across these regions are likely to vary considerably. Research that explores how geographic context affects STI risk among transgender persons can inform more effective, location-specific STI interventions.

In addition to geography, sexual networks undoubtedly influence STI risk, as one's STI risk is conditional on the STI prevalence in one's sexual network [15]. Sexual network data provide crucial insights into risk factors and transmission dynamics for HIV/STIs among cisgender persons, however, there is a paucity of such network data for transgender persons. Compared to cisgender persons, transgender women may have dense social and sexual networks if they seek support within a smaller community that feels safe from stigma. Conversely, transgender women who engage in commercial sex work may have little ability to negotiate safe sex in transactional relationships [16]; these women may be likely to have multiple sex partners and may have high betweenness centrality, connecting disparate parts of their sexual networks. Furthermore, it is unknown how tertiary connections may affect STI risk in the transgender community. For example, it is possible that transgender women who do not engage in commercial sex work are linked to the sex trade through their sexual networks. Network data are notoriously difficult to collect for any population [17, 18], and the challenges of accurately capturing network data are amplified for marginalized populations, such as transgender women. Yet, even when a portion of nodes and connections are unknown, methods for imputing missing network data can aid in network visualization and analyses [19]. Insights gained from transgender womens' sexual networks could help inform risk and patterns of transmission for HIV and STIs.

Brown et al.'s work and the LITE study serve as an excellent foundation for future rigorous, robust epidemiologic studies of sexual health research within the transgender community. We are eager to see forthcoming research from this prospective, longitudinal cohort, and we look forward to additional actionable findings that can inform sexual health interventions for transgender women. More studies like the one presented in this month's issue of *Journal of Infectious Diseases* are critical to understanding the unique experiences and barriers to sexual health. Without more data to support evidence-based prevention programs, vibrant and resilient transgender communities will continue to be underserved.

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