

VIEWPOINT

Similar, but different: drivers of the disproportionate HIV and sexually transmitted infection burden of key populations

Kenneth H Mayer^{1§}  and Lao-Tzu Allan-Blitz²

§Corresponding author: Kenneth Mayer, Beth Israel Deaconess Medical Center, Harvard Medical School, The Fenway Institute, Boston, Massachusetts 02215. Tel: +1 617 927 6087. (kmayer@fenwayhealth.org)

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Despite certain sexually transmitted infections (STI), for example, *Chlamydia trachomatis*, being sufficiently prevalent among the general population in some regions that they might be considered endemic, the contribution of “key populations” (KP) to recent increases in STI prevalence and incidence has been increasingly recognized [1]. The definition of who belongs to a KP has varied among normative bodies, but common features include engagement in specific practices that augment risk (e.g. multiple partners, anal sex and/or sharing needles) and social marginalization, which can concentrate the partner pool because of limited opportunities to meet partners outside of risk milieu, while limiting access to needed treatment and prevention. The UNAIDS programme includes men who have sex with men (MSM), transgender people, sex workers, people who inject drugs (PWID) as KP [2] and incarcerated persons [3-7]. Others have considered migrants to also be a KP [8-11], given their disproportionate HIV/STI burden and lack of social protection. Addressing HIV diagnosis, treatment and prevention for KP is important for their individual health, as well as that of the wider community with whom they interact. Understanding the relationship of HIV spread between KP and others is often hindered by insufficient data.

Although members of KP sub-groups may have different patterns of behaviour and social mixing that influence their HIV/STI risks, their vulnerabilities are augmented by common factors (Table 1). Often, KP experience structural barriers and societal discrimination that may increase their HIV/STI vulnerability by encumbering their access to healthcare [12-17]. Moreover, structural factors may not only directly affect susceptibility (e.g. lack of access to testing or treatment), but also shape behaviours and networks (e.g. being socially marginalized limiting partner choice). In settings where behaviours are criminalized [18-20], KP members may be at increased risk for HIV because of lack of access to condoms or sterile syringes, or may engage in avoidant behaviours due to the anticipation that insensitive providers might mistreat them [21],

and fear of punitive action if they disclose unapproved sexual practices. KP avoiding healthcare are less likely to benefit from routine screening for HIV/STIs, early HIV/STI therapy (delaying the benefits of treatment as prevention, aka “TasP” for their partners), and/or pre-exposure prophylaxis (PrEP). Internalized stigma and social ostracism have been linked to high rates of KP depression [22-24], anxiety and self-medication with non-prescription substances in order to alleviate distress [25-28], which may further increase risky sexual practices. Their opportunities for gainful employment may be limited because of societal stigma, leading to sex work as their sole means of livelihood [29,30]. Financial incentives to engage in condomless sex, violence and lack of negotiating power exacerbate their vulnerability to HIV/STI.

Although there are common factors affecting HIV/STI vulnerability, some unique issues enhance transmission for some KP. Anal intercourse is extremely important in facilitating HIV/STI spread in MSM and transgender women, given that anal mucosa are particularly susceptible to HIV/STI acquisition and transmission [31,32], and potentiating asymptomatic rectal STIs are common [33,34]. Although oral sex may be seen as an HIV risk reduction practice, it may potentiate the spread of other STIs, for example, *Neisseria gonorrhoeae* [35-38]. Natal males who engage in anal sex with other males have unique role versatility, since they can acquire infection through receptive intercourse, and then transmit as the insertive partner [39]. Similar to enhanced transmission of HIV by sharing unsterile syringes, the risks posed by anal intercourse are addressable through access to condoms and antiretrovirals for prevention.

Social networks play a major role in increasing the efficiency of HIV/STI spread [40,41]. Sex workers and their partners may be at increased risk for HIV/STI [29,30,42]. The presence of sexualized venues such as brothels, bathhouses and sex-seeking social media create specific environments where HIV/STI can be efficiently spread [43,44]. These physical spaces and/or online connections [45-47] may lead to rapid partner turnover,

Table 1. Multilevel drivers of enhanced susceptibility of key populations to HIV and other sexually transmitted infections^a

Biology	<ul style="list-style-type: none"> • Enhanced efficiency of anal intercourse • Direct effects of acute STI (e.g. ulceration) • Chronic mucosal inflammation due to multiple partners and sequelae of STI • Microbial dysbiosis • Role versatility (i.e. MSM and transgender women can be incentive or receptive partners)
Individual behaviour ^b	<ul style="list-style-type: none"> • Depression, and other affective disorders (often due to internalized stigma) • Substance use • Avoidance of healthcare • Condomless sex
Social networks	<ul style="list-style-type: none"> • Number of partners/time • Assortative mixing in high prevalence pools • Sexualized venues (e.g. brothels, bathhouses, sex-seeking social media)
Structural/institutional factors	<ul style="list-style-type: none"> • Societal discrimination (e.g. growing up in non-affirming environments) • Health system discrimination (e.g. providers and health care institutions) • Punitive and/or unsupportive laws (e.g. absence of anti-discrimination protection) • Criminalization • Poverty • Violence/victimization

^aMen who have sex with men (MSM), transgender people, sex workers, people who inject drugs and migrants; Many of these factors are related to, and interact with, other factors depicted here; ^bindividual behaviours are often a direct or indirect response to structural factors.

increasing the likelihood of HIV/STI transmission. In socially marginalized populations with high HIV/STI prevalence, the limited choice of new partners leads to increased risk through assortative mixing. This phenomenon has been well-characterized in Black American MSM, who have been shown to not be sexually riskier than demographically matched White MSM [48]. Yet, because they are more likely to have other Black MSM partners, due to decreased social mobility and structural racism, their likelihood of encountering HIV/STI with any new partner is greater than White MSM [49].

Comparing and contrasting the dynamics of HIV/STI spread in different KP sub-groups can help to inform policy, providing insights about general and specific needs. Attention to human rights should be integrated into any intervention focusing on KP, including the promotion of the rights of all individuals to be entitled to access life-saving care, without fear of stigma, criminalization, or punitive practices by authorities, peers or others [50-52]. KP members need to believe that their local healthcare systems are beneficent, and that access to, and affordability of, services are optimized, if they are to be effectively engaged and adherent to key medications. Providers need to be educated to provide culturally competent care [53,54]. An increasing array of

resources is available to facilitate this, for example, www.lgbthealtheducation.org. Punitive laws that criminalize specific sexual practices, sex work, injection drug use and other socially marginalized behaviours, need to be removed so that individuals do not avoid seeking healthcare services that may improve their health, and that of their partners and the general community [55]. To effectively address the increasing rise of STIs in the era of TasP and PrEP, sexual health education needs to discuss anal and oral sex among KP in nonstigmatizing ways.

Each KP group has specific issues that should be addressed in order to optimize their sexual health. Community empowerment interventions among sex workers have been associated with increased condom use and a reduction in HIV risk [56-58], while legislation to facilitate gender affirmation may be more beneficial in reducing risk among TP [59,60]. Other interventions may be appropriate for multiple groups. For example, MSM, TP, sex workers and PWID may all benefit from education about the risk of HIV and STI transmission from anal intercourse, contemporary options for safer sex, the benefits of early initiation of antiretroviral therapy for HIV-infected individuals, and PrEP for those at risk. Early initiation of antiretroviral therapy for HIV-infected individuals, and PrEP for those at risk, can decrease HIV spread, but will not mitigate the risk for STIs. Thus, education about the role of condoms in reducing STI transmission remains important, and if condoms are not accepted, then routine STI screening should be promoted. Harm reduction remains a cornerstone of any initiative to decrease HIV/STIs among PWID.

In summary, no single factor is driving increasing STI and HIV rates among KP. Multiple biological, behavioural and structural factors compound one another to potentiate individual and group risk. Most of these factors are socially and legally embedded (e.g. homophobia and transphobia), which may be expressed differently in diverse societies; but the lack of acceptance impeding individual development may lead to reactive depression and/or substance abuse, increasing sexual risk. For such individuals, a multi-pronged approach is necessary if HIV/STI control is to be achieved: first of all: the removal of punitive laws that drive KP away from seeking needed services [62], then complemented by the education of providers and policymakers to develop culturally competent programmes to address clinical issues specific to KP, in addition to individual level interventions. One size will not fit all KP groups or individuals, yet commonalities exist. Understanding the similarities and differences driving risk is needed to effectively address the disproportionate burden of HIV and STI among KP.

AUTHORS' AFFILIATIONS

¹Beth Israel Deaconess Medical Center, Harvard Medical School, The Fenway Institute, Boston, MA; ²Brigham and Women's Hospital, Harvard Medical School, Boston, MA

COMPETING INTERESTS

KHM and LA-B have no competing interests to declare.

AUTHORS' CONTRIBUTIONS

KHM conceptualized the paper and wrote the first draft. LA-B provided editorial support, reviewed and revised the manuscript.

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REFERENCES

1. World Health Organization [Internet]. c2016[cited 2019 Jan 3]. Available from: [https://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-\(stis\)](https://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-(stis))
2. The Joint United Nations Programme on HIV/AIDS (UNAIDS) [Internet]. [cited 2019 Jan 3]. Available from: <http://www.unaids.org/en/topic/key-populations>
3. Stoltey JE, Li Y, Bernstein KT, Philip SS. Ecological analysis examining the association between census tract-level incarceration and reported chlamydia incidence among female adolescents and young adults in San Francisco. *Sex Transm Infect.* **2015**;91(5):370–4.
4. Javanbakht M, Boudov M, Anderson LJ, Malek M, Smith LV, Chien M, et al. Sexually transmitted infections among incarcerated women: findings from a decade of screening in a Los Angeles County Jail, 2002–2012. *Am J Public Health.* **2014**;104(11):e103–9.
5. Adams JW, Lurie MN, King MRF, Brady KA, Galea S, Friedman SR, et al. Potential drivers of HIV acquisition in African-American women related to mass incarceration: an agent-based modelling study. *BMC Public Health.* **2018**;18(1):1387.
6. Sosman J, Macgowan R, Margolis A, Gaydos CA, Eldridge G, Moss S, et al. Sexually transmitted infections and hepatitis in men with a history of incarceration. *Sex Transm Dis.* **2011**;38(7):634–9.
7. Javanbakht M, Murphy R, Harawa NT, Smith LV, Hayes M, Chien M, et al. Sexually transmitted infections and HIV prevalence among incarcerated men who have sex with men, 2000–2005. *Sex Transm Dis.* **2009**;36 2 Suppl:S17–21.
8. Pantazis N, Thomadakis C, Del Amo J, Alvarez-Del Arco D, Burns FM, Fakoya I, et al. Determining the likely place of HIV acquisition for migrants in Europe combining subject-specific information and biomarkers data. *Stat Methods Med Res.* [cited 2017 Jan 1] 962280217746437 <https://doi.org/10.1177/0962280217746437>
9. Alvarez-Del Arco D, Fakoya I, Thomadakis C, Pantazis N, Touloumi G, Gennotte AF, et al. High levels of postmigration HIV acquisition within nine European countries. *AIDS.* **2017**;31(14):1979–88.
10. Desgrées-du-Loû A, Pannetier J, Ravalihasy A, Gosselin A, Supervie V, Panjo H, et al. Sub-Saharan African migrants living with HIV acquired after migration, France, ANRS PARCOURS study, 2012 to 2013. *Euro Surveill.* **2015**;20(46). <https://doi.org/10.2807/1560-7917>
11. Deblonde J, Sasse A, Del Amo J, Burns F, Delpech V, Cowan S, et al. Restricted access to antiretroviral treatment for undocumented migrants: a bottle neck to control the HIV epidemic in the EU/EEA. *BMC Public Health.* **2015**;15:1228.
12. Davtyan M, Olshansky EF, Brown B, Lakon C. A grounded theory study of HIV-related stigma in U.S.-based health care settings. *J Assoc Nurses AIDS Care.* **2017**;28(6):907–22.
13. Munro L, Marshall Z, Bauer G, Hammond R, Nault C, Travers R. (Dis)integrated care: barriers to health care utilization for trans women living with HIV. *J Assoc Nurses AIDS Care.* **2017**;28(5):708–22.
14. Nöstlinger C, Rojas Castro D, Platteau T, Dias S, Le Gall J. HIV-Related discrimination in European health care settings. *AIDS Patient Care STDS.* **2014**;28(3):155–61.
15. Wagner AC, Girard T, McShane KE, Margolese S, Hart TA. HIV-related stigma and overlapping stigmas towards people living with HIV among health caretrainees in Canada. *AIDS Educ Prev.* **2017**;29(4):364–76.
16. Stojisavljevic S, Djikanovic B, Matejic B. 'The Devil has entered you': a qualitative study of Men Who Have Sex With Men (MSM) and the stigma and discrimination they experience from healthcare professionals and the general community in Bosnia and Herzegovina. *PLoS One.* **2017**;12(6):e0179101.
17. Vijay A, Earnshaw VA, Tee YC, Pillai V, White Hughto JM, Clark K, et al. Factors associated with medical doctors' intentions to discriminate against transgender patients in Kuala Lumpur, Malaysia. *LGBT Health.* **2018**;5(1):61–8.
18. DeBeck K, Cheng T, Montaner JS, Beyrer C, Elliott R, Sherman S, et al. HIV and the criminalisation of drug use among people who inject drugs: a systematic review. *Lancet HIV.* **2017**;4(8):e357–74.
19. Altice FL, Azbel L, Stone J, Brooks-Pollock E, Smyrnov P, Dvoriak S, et al. The perfect storm: incarceration and the high-risk environment perpetuating transmission of HIV, hepatitis C virus, and tuberculosis in Eastern Europe and Central Asia. *Lancet.* **2016**;388(10050):1228–48.
20. Saigal P, Weait M, Poulton M. Criminalisation of HIV transmission: an overview for clinicians. *Sex Transm Infect.* **2018**;94(6):399–400.
21. Mayer KH, Bradford JB, Makadon JH, Stall R, Goldhammer H, Landers S. Sexual and gender minority health: what we know and what needs to be done. *Am J Public Health.* **2008**;98(6):989–95.
22. Stahlman S, Grosso A, Ketende S, Sweitzer S, Mothopeng T, Taruberekerana N, et al. Depression and social stigma among MSM in Lesotho: implications for HIV and sexually transmitted infection prevention. *AIDS Behav.* **2015**;19(8):1460–9.
23. Sandfort TG, de Graaf R, Bijl RV, Schnabel P. Same-sex sexual behavior and psychiatric disorders: findings from the Netherlands Mental Health Survey and Incidence Study (NEMESIS). *Arch Gen Psychiatry.* **2001**;58(1):85–91.
24. Poteat T, Ackerman B, Diouf D, Ceesay N, Mothopeng T, Odette KZ, et al. HIV prevalence and behavioral and psychosocial factors among transgender women and cisgender men who have sex with men in 8 African countries: a cross-sectional analysis. *PLoS Med.* **2017**;14(11):e1002422.
25. Arasteh K, Des Jarlais DC; WHO Phase II Drug Injection Collaborative Study Group. Hazardous drinking and HIV sexual risk behaviors among injection drug users in developing and transitional countries. *AIDS Behav.* **2010**;14(4):862–9.
26. Arasteh K, Des Jarlais DC, Perlis TE. Alcohol and HIV sexual risk behaviors among injection drug users. *Drug Alcohol Depend.* **2008**;95(1–2):54–61.
27. Hoffman JA, Klein H, Eber M, Crosby H. Frequency and intensity of crack use as predictors of women's involvement in HIV-related sexual risk behaviors. *Drug Alcohol Depend.* **2000**;58(3):227–36.
28. Reilly KH, Neaigus A, Wendel T, Marshall IV DM, Hagan H. Correlates of selling sex among male injection drug users in New York City. *Drug Alcohol Depend.* **2014**;144:78–86.
29. Shannon K, Crago AL, Baral SD, Bekker LG, Kerrigan D, Decker MR, et al. The global response and unmet actions for HIV and sex workers. *Lancet.* **2018**;392(10148):698–710.
30. Baral S, Beyrer C, Muessig K, Poteat T, Wirtz AL, Decker MR, et al. Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Infect Dis.* **2012**;12(7):538–49.
31. Baggaley RF, White RG, Boily MC. HIV transmission risk through anal intercourse: systematic review, meta-analysis and implications for HIV prevention. *Int J Epidemiol.* **2010**;39(4):1048–63.
32. Kelley CF, Kraft CS, de Man TJ, Duphare C, Lee HW, Yang J, et al. The rectal mucosa and condomless receptive anal intercourse in HIV-negative MSM: implications for HIV transmission and prevention. *Mucosal Immunol.* **2017**;10(4):996–1007.
33. Bernstein KT, Marcus JL, Nieri G, Philip SS, Klausner JD. Rectal gonorrhoea and chlamydia reinfection is associated with increased risk of HIV seroconversion. *J Acquir Immune Defic Syndr.* **2010**;53(4):537–43.
34. Kim AA, Kent CK, Klausner JD. Risk factors for rectal gonococcal infection amidst resurgence in HIV transmission. *Sex Transm Dis.* **2003**;30(11):813–7.
35. Barbee LA, Khosropour CM, Dombrowski JC, Manhart LE, Golden MR. An estimate of the proportion of symptomatic gonococcal, chlamydial and nongonococcal non-chlamydial urethritis attributable to oral sex among men who have sex with men: a case-control study. *Sex Transm Infect.* **2016**;92(2):155–60.
36. Chow EP, Lee D, Tabrizi SN, Phillips S, Snow A, Cooks S. Detection of *Neisseria gonorrhoeae* in the pharynx and saliva: implications for gonorrhoea transmission. *Sex Transm Infect.* **2016**;92(5):347–9.
37. Fairley CK, Hocking JS, Zhang L, Chow EP. Frequent transmission of gonorrhoea in men who have sex with men. *Emerg Infect Dis.* **2017**;23(1):102–4.
38. Allan-Blitz LT, Konda KA, Calvo GM, Vargas SK, Leon SR, Segura ER, et al. High incidence of extra-genital gonorrhoeal and chlamydial infections among high-risk men who have sex with men and transgender women in Peru. *Int J STD AIDS.* **2018**;29(6):568–76.
39. Lyons A, Pitts M, Smith G, Grierson J, Smith A, McNally S, et al. Versatility and HIV vulnerability: investigating the proportion of Australian gay men having both insertive and receptive anal intercourse. *J Sex Med.* **2011**;8(8):2164–71.
40. Amirkhani YA. social networks, sexual networks and HIV risk in men who have sex with men. *Curr HIV/AIDS Rep.* **2014**;11(1):81–92.
41. Jolly AM, Muth SQ, Wylie JL, Potterat JJ. Sexual networks and sexually transmitted infections: a tale of two cities. *J Urban Health.* **2001**;78(3):433–45.
42. Dos Ramos Farias MS, Garcia MN, Reynaga E, Romero M, Valet ML, Fermepein MR, et al. First report on sexually transmitted infections among trans (male to female transvestites, transsexuals, or transgender) and male sex workers in Argentina: high HIV, HPV, HBV, and syphilis prevalence. *Int J Infect Dis.* **2011**;15(9):e635–40.
43. van den Boom W, Davidovich U, Heuker J, Lambers F, Prins M, Sandfort T, et al. Is group sex a higher-risk setting for HIV and other sexually transmitted infections compared with dyadic sex among men who have sex with men? *Sex Transm Dis.* **2016**;43(2):99–104.
44. Mayer KH, Ducharme R, Zaller ND, Chan PA, Case P, Abbott D, et al. Unprotected sex, underestimated risk, undiagnosed HIV and sexually

- transmitted diseases among men who have sex with men accessing testing services in a New England bathhouse. *J Acquir Immune Defic Syndr*. **2012**;59(2):194–8.
45. Chew Ng RA, Samuel MC, Lo T, Bernstein KT, Aynalem G, Klausner JD, et al. Sex, drugs (methamphetamines), and the internet: increasing syphilis among men who have sex with men in California, 2004–2008. *Am J Public Health*. **2013**;103(8):1450–6.
46. Allen JE, Mansergh G, Mimiaga MJ, Holman J, Herbst JH. Mobile phone and internet use mostly for sex-seeking and associations with sexually transmitted infections and sample characteristics among Black/African American and Hispanic/Latino men who have sex with men in 3 US Cities. *Sex Transm Dis*. **2017**;44(5):284–9.
47. Stahlman S, Grosso A, Ketende S, Mothopeng T, Tarubekera N, Nkonyana J, et al. Characteristics of men who have sex with men in southern Africa who seek sex online: a cross-sectional study. *J Med Internet Res*. **2015**;17(5):e129.
48. Sullivan PS, Peterson J, Rosenberg ES, Kelley CF, Cooper H, Vaughan A, et al. Understanding racial HIV/STI disparities in black and white men who have sex with men: a multilevel approach. *PLoS One*. **2014**;9(3):e90514.
49. Millett GA, Peterson JL, Flores SA, Hart TA, Jeffries WL IV, Wilson PA, et al. Comparisons of disparities and risks of HIV infection in black and other men who have sex with men in Canada, UK, and USA: a meta-analysis. *Lancet*. **2012**;380(9839):341–8.
50. Bekker LG, Ratevosian J, Spencer J, Piot P, Beyrer C. Governance for health: the HIV response and general global health. *Bull World Health Organ*. **2019**;97(3):170–A.
51. Heywood M, Altman D. Confronting AIDS: human rights, law, and social transformation. *Health Hum Rights J*. **2000**;5(1):149–79.
52. Mehta A, Quinn T. Addressing future epidemics: historical human rights lessons from the AIDS pandemic. *Pathog Immun*. **2016**;1(1):1–11.
53. Mayer KH, Bekker LG, Stall R, Grulich AE, Colfax G, Lama JR. Comprehensive clinical care for men who have sex with men: an integrated approach. *Lancet*. **2012**;380(9839):378–87.
54. Gonser PA. Culturally competent care for members of sexual minorities. *J Cult Divers*. **2000**;7(3):72–5.
55. Barré-Sinoussi F, Abdool Karim SS, Albert J, Bekker LG, Beyrer C, Cahn P, et al. Expert consensus statement on the science of HIV in the context of criminal law. *J Int AIDS Soc*. **2018**;21(7):e25161.
56. Kerrigan D, Kennedy CE, Morgan-Thomas R, Reza-Paul S, Mwangi P, Win KT, et al. A community empowerment approach to the HIV response among sex workers: effectiveness, challenges, and considerations for implementation and scale-up. *Lancet*. **2015**;385(9963):172–85.
57. Fonner VA, Kerrigan D, Mnisi Z, Ketende S, Kennedy CE, Baral S. Social cohesion, social participation, and HIV related risk among female sex workers in Swaziland. *PLoS One*. **2014**;9(1):e87527.
58. Kerrigan DL, Fonner VA, Stromdahl S, Kennedy CE. Community empowerment among female sex workers is an effective HIV prevention intervention: a systematic review of the peer-reviewed evidence from low- and middle-income countries. *AIDS Behav*. **2013**;17(6):1926–40.
59. Sevelius JM. Gender affirmation: a framework for conceptualizing risk behavior among transgender women of color. *Sex Roles*. **2013**;68(11–12):675–89.
60. Hill BJ, Crosby R, Bouris A, Brown R, Bak T, Rosentel K, et al. Exploring transgender legal name change as a potential structural intervention for mitigating social determinants of health among transgender women of color. *Sex Res Social Policy*. **2018**;15(1):25–33.