



Published in final edited form as:

Curr Opin Infect Dis. 2018 February ; 31(1): 25–32. doi:10.1097/QCO.0000000000000415.

HIV outcomes among migrants from low- and middle-income countries living in high-income countries: a review of recent evidence

Jonathan Ross, MD, MS^{1,*}, Chinazo O. Cunningham, MD, MS¹, and David B. Hanna, PHD²

¹Division of General Internal Medicine, Department of Medicine, Montefiore Medical Center / Albert Einstein College of Medicine, Bronx, NY, USA

²Department of Epidemiology and Population Health, Albert Einstein College of Medicine, Bronx, NY, USA

Abstract

Purpose of review—Migrants living in high-income countries are disproportionately affected by HIV infection and frequently have characteristics associated with poor HIV clinical outcomes. HIV epidemiology among migrants is influenced by changes in migration patterns and variations in transmission risk behaviors. Here we review the recently published literature on known HIV outcomes among migrants from low- and middle-income countries living in high-income countries.

Recent findings—High proportions of migrants acquire HIV after migration, and this group frequently presents to care late. Once established in care, migrants are often more likely to experience worse HIV treatment outcomes compared to native populations. Multiple individual and structural factors influence HIV diagnosis and treatment outcomes among migrants, including disruption of social networks, increased sexual risk behaviors, communication barriers, limited access to care, and stigma. Few studies have examined interventions targeted at improving HIV outcomes among migrants.

Summary—Stigma and limited access to care appear to be primary drivers of poor HIV outcomes among migrants in high-income countries. Addressing these disparities is limited by difficulties in identifying and monitoring this population as well as a lack of evidence regarding appropriate interventions for migrants living with HIV. Improving outcomes for this group requires interventions that are specifically targeted at this marginalized and growing population.

Keywords

HIV; migrants; immigrants; care continuum; late diagnosis

*Corresponding author: 111 E. 210th Street, Bronx, NY 10467; +1.718.920.7064; joross@montefiore.org.

Conflicts of interest

Dr. Cunningham's husband is an employee of Quest Diagnostics and they own stock and stock options in Quest Diagnostics. All other authors report no potential conflicts of interest.

Introduction

Worldwide, there are an estimated 244 million migrants, defined as people living temporarily or permanently outside their country of birth [1]. While 75% of migrants were born in low and middle-income countries, over half reside in high-income countries in Europe, North America and Australasia [1]. Migrants in high-income countries face particular circumstances associated with poor health outcomes, including restricted access to healthcare, poverty, limited education, linguistic and cultural barriers to accessing care, and stigma [2–5]. These factors place migrants at risk for acquiring HIV infection and experiencing poor HIV-related outcomes.

Migrants living in high-income countries are disproportionately affected by HIV infection. The proportion of new HIV diagnoses who are migrants exceeds the percentage of foreign-born persons in the general population in nearly all high-income countries, and is as high as 70% in some European countries [6–8] (Figure 1). Migrant persons living with HIV (PLWH) frequently have characteristics associated with poor HIV clinical outcomes [11–18]. Migrants are also more likely than non-migrants to die from HIV [19].

The epidemiology of HIV among migrants is influenced by characteristics of the migrating population, motivations for relocation, and environments of both the origin and host countries. Furthermore, these factors may change over time given political and economic conditions [6, 10, 20, 21]. A current understanding of HIV outcomes among migrants and the factors driving them is necessary to target interventions to improve health outcomes of these important and growing populations. Here, we summarize information published since 2015 on known HIV outcomes among migrants, focusing on persons from low- and middle-income countries who are living in high-income countries.

Place of HIV acquisition

Prior research based largely on self-report or CD4 testing suggested that most migrants living with HIV were infected prior to migration [22–24]. Recent investigations from Europe utilizing more robust methods indicate that high proportions of migrants acquire HIV infection after migration. Alvarez-Delarco, et al, estimated place of acquisition among migrants in 9 European countries diagnosed with HIV in the preceding 5 years. Using Bayesian models incorporating migration history, HIV risk factor and clinical characteristics, the authors estimated that 63% of patients studied acquired HIV after migration [25*]. Similarly, in the ANRS PARCOURS study, French investigators used survey data, medical records and laboratory data to assess place of HIV acquisition for African PLWH in Paris, determining that 49% had been infected after migration [26].

Data from North America regarding place of acquisition are similar, though more limited. A large, nationally representative transmission network analysis of HIV-1 polymerase sequences reported to the U.S. National HIV Surveillance System between 2001–2013 found that among foreign-born persons linked to at least one other person in the network, 62% had partners who were born in the U.S [27*]. Wiewel, et al., analyzed interview data from persons newly diagnosed with HIV in New York City, estimating that 61% of migrants

were infected after arrival in the United States (US) [28]. Small phylogenetic studies of migrant groups in the US have provided additional evidence for local HIV transmission [29, 30].

In both the European and North American studies cited, post-migration infection was highest among migrants from Latin America and the Caribbean and lowest among Africans. Place of acquisition also varied by HIV risk factor, with post-migration infection highest among injection drug users and men who have sex with men (MSM), and lowest among persons who reported heterosexual sex as their primary HIV risk factor. Other predictors of post-migration HIV acquisition include young age, male sex, and longer duration of residence in host country as predictors of post-migration HIV acquisition [25, 26, 31].

The disproportionate risk of acquiring HIV infection that migrants face in their host countries likely results from a combination of factors, including stigma, increased risk behaviors, and limited access to HIV prevention services. Qualitative research with migrant communities in Canada and New Zealand found that migrants understood how HIV is transmitted and ways to prevent infection, yet expressed reluctance to use condoms or undergo HIV testing because of the high degree of stigma surrounding HIV in their communities [32, 33]. Zhang, et al., conducted a study conducted at the US-Mexico border examining sexual practices of male migrants at various stages of migration. Compared to participants in the pre-departure phase of migration, those in transit or returning from the US were more likely to report sex with casual female partners, sex with female sex workers, unprotected vaginal or anal sex, and substance use before or during sex [34**]. Additionally, migrants face isolation, disruption of social networks, hostility, and unique social and legal circumstances, all of which may act as barriers to accessing HIV prevention services [35–37, 38*]. For example, a recent study of MSM in the US found that, compared to those born in the US, migrant MSM were less likely to use pre-exposure prophylaxis for HIV prevention [39].

Entry into HIV care

Regardless of place of acquisition, migrants present late to care. In two very large, multi-country European cohort studies, the median CD4 count at entry to care was substantially lower among migrants compared to European natives [6, 40**]. In both studies, migrants from sub-Saharan Africa – who comprised over half of migrants in each analysis – were more likely to be diagnosed with AIDS and had the lowest median CD4 counts. In the Netherlands from 1996–2014, the proportion of late presenters (defined as CD4 count < 350 cells/mm³) among migrants ranged from 63–79%, depending on region of origin [41]. More worrisome, in a German national cohort from 1999–2013, while median CD4 count at HIV diagnosis increased for native Germans and migrants from Central Europe, it did not change for other migrant groups over this time period [42].

Limited information on disease stage at diagnosis among migrants is available from regions outside of Europe. A cross-sectional, nationally representative survey of over 12,000 PLWH in medical care in the US found no differences between migrants and native-born persons in terms of current disease stage, but did not report on CD4 count or disease stage at entry to

care [43**]. In single cohort studies in several US states, migrants were more likely than non-migrants to be diagnosed with AIDS within 3 month of HIV diagnosis [44, 45]; migrants also entered care with lower CD4 counts [46, 47]. Among patients enrolled in the Australian HIV Observational Database cohort, median CD4 count at diagnosis was lower among migrants than among native Australians [48].

Several reasons likely contribute to migrants' late presentation to care. Migrant PLWH may not know they are infected. Nationally representative studies of Africans in Belgium and African and Caribbean migrants in the Netherlands estimated that 73% and 48% of migrants did not know their HIV status [49*, 50], compared to 20% and 34% of the general populations, respectively [49*, 51]. In a representative sample in the US, 49% of Black and Hispanic migrants had never been tested for HIV [52**], despite these groups being at disproportionately high risk [53, 54].

Multiple individual, structural and cultural barriers limit access to HIV testing, including lack of insurance, cost of medical care, being undocumented, stigma surrounding testing itself and potentially positive results, and lack of social support [32, 55–59**]. In a qualitative study exemplifying many of these themes, East African women living in the US endorsed feeling that HIV testing implied they had engaged in 'bad' behavior, that their community would judge them negatively for getting tested, that getting tested might signal distrust or infidelity, and that information regarding HIV diagnosis is not confidential [59**].

HIV outcomes once in care

Once established in care, there is mixed evidence with respect to migrants' clinical outcomes. In Europe, migrant PLWH tend to fare worse than native-born persons. In the Netherlands, African migrants were nearly three times as likely to not attend clinic visits as Dutch natives [60]. Despite having access to medical insurance, undocumented migrants with HIV infection in Italy were eight times more likely to be lost to follow-up than persons born in Italy [61]. Recently published data from the COHERE collaborative demonstrate that, depending on region of origin, migrant men were 25–45% less likely to initiate antiretroviral therapy (ART) even when adjusting for baseline CD4 count [40, 62]. In several European studies, migrants were also more likely than native-born persons to experience virologic failure [63, 64].

Data from regions outside of Europe are fewer and inconsistent. In a Medical Monitoring Project study comparing migrant and US-born PLWH, migrants had equal rates of ART prescription (91%) and slightly higher rates of viral suppression (77% vs. 73%) [43**]. In several single-cohort studies from Florida, migrant PLWH were less likely to be retained in care or virally suppressed compared to native-born persons [65, 66]. However, in studies conducted in Massachusetts and New York, migrants – including undocumented migrants – had similar rates of retention in care and viral suppression compared to native-born PLWH [46, 67]. In a single study from 10 clinics in Ontario, Canada, migrant status was predictive of retention in care [68]. In an Australian study, no significant differences were found

between migrants and native Australians with respect to viral suppression, loss to follow up, or progression to AIDS [48].

Linguistic and cultural barriers, poverty, poor health literacy, lack of social support, and lack of HIV disclosure are major barriers for migrants to accessing HIV services (69, 70*, 71–75). Differences in care outcomes may also be secondary to variability in social service availability; even when present, migrants may lack familiarity with available social services, and may be hesitant to seek out these services if they are undocumented [76]. HIV outcomes may be influenced by multiple barriers migrants face in accessing mental health care [77], however, the burden of psychiatric disease among migrants living with HIV has not been well-characterized. A study in France found lower prevalence of depression among African migrants living with HIV compared to other PLWH [78], and several U.S. studies have demonstrated a lower prevalence of substance use disorders among migrants compared to non-migrants [43**, 47]. Additionally, some geographical differences in HIV outcomes among migrants are likely related to policies affecting their access to HIV services. Considerable differences exist among countries in Europe with regards to provision of ART to migrants, particularly undocumented migrants [79, 80], and medical insurance coverage for migrant PLWH in the US varies substantially between states [81].

Once in care, migrants also face unique barriers to retention in care, adherence to ART and viral suppression. Migrants' high level of mobility is predictive of poor engagement in HIV care and ART disruption [82, 83]. Lack of social support, which is associated with poor adherence to ART and medical appointments among general populations [84], may be particularly influential in migrant communities, where many rely on support from their social networks for daily survival [85]. Although depression has been identified as a risk factor for poor treatment adherence, a Canadian study found no association between symptoms of depression and ART adherence for migrants, while native Canadians with depression had worse adherence to medications [86]. A large, representative multi-country survey in Europe is currently underway that should provide additional insight about clinical, structural, cultural and financial barriers to HIV diagnosis and access to care [87].

Interventions to improve outcomes and gaps in the literature

The literature reviewed suggests that migrant PLWH migrants are increasingly acquiring HIV infection after migration, that they are presenting to care late, and that being a migrant is frequently a predictor of poor engagement in care (Table 1). These findings hint at important targets for interventions to improve HIV outcomes for migrants; however, few studies have evaluated interventions to improve these outcomes among migrants.

Interventions for HIV prevention and testing

The limited research on interventions to prevent HIV and diagnose HIV early among migrants has largely been conducted in the US. Two studies by Rhodes, et al., examined the effect of training Spanish-speaking peer navigators on HIV prevention and testing behaviors among Latinos in North Carolina. In adjusted analyses, participants in the intervention arm were substantially more likely to report condom use or HIV testing than those in the control arm [88**, 89]. Investigators in Washington State studied an intervention promoting HIV

testing in traditional and social media, coupled with free home HIV testing kits. Participants exposed to the intervention reported increased HIV testing, though there was no change in condom use [90]. An intervention targeting African and Caribbean migrants in Philadelphia that bundled HIV testing with diabetes and hypertension screening found very high uptake (92%), compared to prior uptake of stand-alone HIV testing (20%) [91]. Together, these studies suggest methods that reduce stigma surrounding HIV prevention – by utilizing peers, or normalizing testing – can be effective in promoting desired outcomes.

These approaches are promising, although they face potential limitations. Scalability of peer navigator interventions is a concern given their time-intensive nature. Questions also remain regarding generalizability outside the US, given differences in social policies across countries and in the epidemiology of the HIV epidemic among migrants. Despite the higher proportion of PLWH in Europe who are migrants, no published studies from this region have examined interventions that target migrants and focus on HIV prevention and early diagnosis. While European investigators and policy makers have proposed routine, provider-initiated HIV testing or community-based testing as ways to reach patients not in regular medical care [92–94], these approaches have not been rigorously tested in migrants.

Improving access to and engagement in HIV care for migrants

Barriers affecting linkage to and retention in HIV care for migrants include systems-level barriers (e.g. health insurance, lack of migrant-friendly health settings) and individual barriers (e.g. stigma, depression). Few studies have directly evaluated approaches for reducing these barriers. Evidence exists that increasing access to health insurance can promote achievement of health outcomes for migrant PLWH. In New York, where medical insurance is available to undocumented migrant PLWH, one study demonstrated that migrants and non-migrants achieved HIV care cascade outcomes at similar rates [67]. Access to health insurance for undocumented PLWH differs among states in the US, and additional research examining the effect of state policies on HIV outcomes among migrants is needed.

Similarly, few studies have examined interventions promoting engagement in HIV care for migrants. The use of linkage specialists and strength-based counseling to promote re-engagement in HIV care has been successful in reconnecting patients to HIV care [95, 96]. Developing similar programs for migrants might be successful in addressing potential misconceptions about healthcare delivery and reducing stigma. Targeting interventions at HIV care providers could reduce communication barriers for migrants. Two systematic reviews suggest that provider-focused cultural competency interventions increase provider awareness of cultural barriers and change provider behavior [97, 98]. However, few of the studies included in these reviews examined patient outcomes, and none of the studies specifically included migrants with HIV.

Improving our knowledge/understanding of migrant populations

Finally, our understanding of the epidemiology of HIV among migrants is limited by difficulties identifying migrants. our ability to identify them. While HIV surveillance in most European countries accounts for country of origin, migrants may be under-represented

even among these data [95]. In North America and Australasia, country of origin is not always systematically collected or available; this may result in improper attributions if data on race/ethnicity are used as a proxy for migrant status [100*]. Migrants may relocate within host countries/regions, and therefore be disproportionately considered lost to care [101]. In all settings, few data are available on undocumented migrants, who frequently avoid interaction with healthcare or public health authorities [102]. Consideration should be given to creative ways to collect data on immigration status and country of origin [47]. Doing so in patient-centric ways that do not further stigmatize migrants would help document and ultimately address inequities in health care and health outcomes for this group.

Conclusion

Migrants from low- and middle-income countries residing in high-income countries are disproportionately affected by HIV. High levels of HIV-related stigma and limited access to care lead to insufficient engagement with HIV prevention and treatment services, placing migrants at risk of poor clinical outcomes. Interventions focused on reducing HIV stigma among migrant populations and expanding access to care are necessary to reduce disparities for this important group.

Acknowledgments

Dr. Ross is supported by the National Institute of Mental Health (K23 MH114752); Dr. Cunningham is supported by the National Institute on Drug Abuse (K24 DA036955); Dr. Hanna is supported the National Heart, Lung and Blood Institute (K01 HL137557). Additional support for this project was provided by the Einstein-Rockefeller-CUNY Center for AIDS Research (P30-AI124414) which is supported by the following NIH Co-Funding and Participating Institutes and Centers: NIAID, NCI, NICHD, NHBL, NIDA, NIMH, NIA, FIC and OAR.

References

1. United Nations, Department of Economic and Social Affairs, Population Division. International Migration Report 2015: Highlights (ST/ESA/SER.A/375). 2016.
2. Bowsher GM, Krishnan RA, Shanahan TA, et al. Immigration Act 2014 challenges health of migrants in the UK. *Lancet*. 2015; 385(9971):852–3. [PubMed: 25773085]
3. Ramirez SM, Villarejo D. Poverty, housing, and the rural slum: policies and the production of inequities, past and present. *Am J Public Health*. 2012; 102(9):1664–75. [PubMed: 22813088]
4. Geltman PL, Adams JH, Cochran J, et al. The impact of functional health literacy and acculturation on the oral health status of Somali refugees living in Massachusetts. *Am J Public Health*. 2013; 103(8):1516–23. [PubMed: 23327248]
5. Rechel B, Mladovsky P, Ingleby D, et al. Migration and health in an increasingly diverse Europe. *Lancet*. 2013; 381(9873):1235–45. [PubMed: 23541058]
6. Hernando V, Alvarez-del Arco D, Alejos B, Monge S, Amato-Gauci AJ, Noori T, et al. HIV Infection in Migrant Populations in the European Union and European Economic Area in 2007–2012: An Epidemic on the Move. *J Acquir Immune Defic Syndr*. 2015; 70(2):204–11. [PubMed: 26068723]
7. Prosser AT, Tang T, Hall HI. HIV in persons born outside the United States, 2007–2010. *JAMA*. 2012; 308(6):601–7. [PubMed: 22820630]
8. European Centre for Disease Prevention and Control/WHO Regional Office for Europe. HIV/AIDS surveillance in Europe 2015. Stockholm: ECDC; 2016.
9. Public Health Agency of Canada. [Accessed 10 September 2017] HIV in Canada: Surveillance summary tables, 2014–2015. Available from: <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/hiv-in-canada-surveillance-summary-tables-2014-2015.html>

10. Kerani, RP., Johnson, AS., Buskin, S., et al. The epidemiology of HIV in people born outside the United States, 2010–2014. Conference on Retroviruses and Opportunistic Infections; Seattle, WA. 2017;
11. Pecoraro A, Royer-Malvestuto C, Rosenwasser B, et al. Factors contributing to dropping out from and returning to HIV treatment in an inner city primary care HIV clinic in the United States. *AIDS care*. 2013; 25(11):1399–406. [PubMed: 23428205]
12. Hall HI, Gray KM, Tang T, Li J, Shouse L, Mermin J. Retention in care of adults and adolescents living with HIV in 13 U.S. areas. *J Acquir Immune Defic Syndr*. 2012; 60(1):77–82. [PubMed: 22267016]
13. Olatosi BA, Probst JC, Stoskopf CH, et al. Patterns of engagement in care by HIV-infected adults: South Carolina, 2004–2006. *AIDS*. 2009; 23(6):725–30. [PubMed: 19197194]
14. Israelski D, Gore-Felton C, Power R, et al. Sociodemographic characteristics associated with medical appointment adherence among HIV-seropositive patients seeking treatment in a county outpatient facility. *Preventive medicine*. 2001; 33(5):470–5. [PubMed: 11676589]
15. Castel, AD., Kalmin, MM., Hart, RL., et al. Disparities in achieving and sustaining viral suppression among a large cohort of HIV-infected persons in care. Washington, DC: *AIDS Care*; 2016. p. 1-10.
16. Hall HI, Frazier EL, Rhodes P, et al. Differences in human immunodeficiency virus care and treatment among subpopulations in the United States. *JAMA Intern Med*. 2013; 173(14):1337–44. [PubMed: 23780395]
17. McFall AM, Dowdy DW, Zelaya CE, et al. Understanding the disparity: predictors of virologic failure in women using highly active antiretroviral therapy vary by race and/or ethnicity. *J Acquir Immune Defic Syndr*. 2013; 64(3):289–98. [PubMed: 23797695]
18. D’Almeida KW, Lert F, Spire B, Dray-Spira R. Determinants of virological response to antiretroviral therapy: socio-economic status still plays a role in the era of cART. Results from the ANRS-VESPA 2 study, France. *Antivir Ther*. 2016; 21(8):661–670. [PubMed: 27355137]
19. Ikram UZ, Mackenbach JP, Harding S, et al. All-cause and cause-specific mortality of different migrant populations in Europe. *Eur J Epidemiol*. 2016; 31(7):655–65. [PubMed: 26362812]
20. Deane KD, Parkhurst JO, Johnston D. Linking migration, mobility and HIV. *Trop Med Int Health*. 2010; 15(12):1458–63. [PubMed: 20958895]
21. Folch C, Casabona J, Espelt A, et al. High Prevalence and Incidence of HIV and HCV Among New Injecting Drug Users With a Large Proportion of Migrants--Is Prevention Failing? *Subst Use Misuse*. 2016; 51(2):250–60. [PubMed: 26820260]
22. Del Amo, J., Perez-Cachafeiro, S., Hernando, V., et al. Migrant health: Epidemiology of HIV and AIDS in migrant communities and ethnic minorities in EU/EEA countries. Stockholm, Sweden: European Centre for Disease Prevention and Control; 2010 Mar.
23. Hamers FF, Downs AM. The changing face of the HIV epidemic in western Europe: what are the implications for public health policies? *Lancet*. 2004; 364(9428):83–94. [PubMed: 15234861]
24. Rice BD, Elford J, Yin Z, Delpech VC. A new method to assign country of HIV infection among heterosexuals born abroad and diagnosed with HIV. *AIDS*. 2012; 26(15):1961–6. [PubMed: 22781226]
- **25. Alvarez-Del Arco D, Fakoya I, Thomadakis C, et al. High levels of post-migration HIV acquisition within nine European countries. *AIDS*. 2017 Jun 23. [Epub ahead of print]. This study from 57 clinics in 9 European countries provides robust and representative estimates of the proportion of HIV-positive migrants who acquired HIV post-migration.
26. Desgrees-du-Lou A, Pannetier J, Ravalihasy A, et al. Sub-Saharan African migrants living with HIV acquired after migration, France, ANRS PARCOURS study, 2012 to 2013. *Euro Surveill*. 2015; 20(46)
- *27. Valverde EE, Oster AM, Xu S, Wertheim JO, Hernandez AL. HIV transmission dynamics among foreign-born persons in the United States. *J Acquir Immune Defic Syndr*. 2017 Sep 7. [Epub ahead of print]. This large, nationally representative transmission network analysis using nucleotide sequence data from 77,608 people living with HIV, including 12, 064 migrants, provides strong evidence of post-migration HIV acquisition among migrants living in the U.S.

28. Wiewel EW, Torian LV, Hanna DB, Bocour A, Shepard CW. Foreign-Born Persons Diagnosed with HIV: Where are They From and Where Were They Infected? *AIDS Behav.* 2015; 19(5):890–8. [PubMed: 25524308]
29. Kerani RP, Herbeck JT, Buskin SE, et al. Evidence of Local HIV Transmission in the African Community of King County, Washington. *J Immigr Minor Health.* 2017 Aug; 19(4):891–896. [PubMed: 27395379]
30. Dennis AM, Hue S, Learner E, et al. Rising prevalence of non-B HIV-1 subtypes in North Carolina and evidence for local onward transmission. *Virus Evol.* 2017 May 24.3(1):vex013. [PubMed: 28567304]
31. Brannstrom J, Sonnerborg A, Svedhem V. A high rate of HIV-1 acquisition post immigration among migrants in Sweden determined by a CD4 T-cell decline trajectory model. *HIV Med.* 2017 Oct; 18(9):677–684. [PubMed: 28444865]
32. Henrickson M, Fisher M, Ludlam AH, Mhlanga F. What do African new settlers in New Zealand ‘know’ about HIV? *N Z Med J.* 2016 May 6; 129(1434):36–43.
33. Narushima M, McLaughlin J, Barrett-Greene J. Needs, Risks, and Context in Sexual Health Among Temporary Foreign Migrant Farmworkers in Canada: A Pilot Study with Mexican and Caribbean Workers. *J Immigr Minor Health.* 2016; 18(2):374–81. [PubMed: 25784142]
- **34. Zhang X, Rhoads N, Rangel MG, et al. Understanding the Impact of Migration on HIV Risk: An Analysis of Mexican Migrants’ Sexual Practices, Partners, and Contexts by Migration Phase. *AIDS Behav.* 2017; 21(3):935–48. This study describes sexual risk behaviors of male migrants through multiple phases of migration. The authors conclude that sexual behaviors vary during migration, with riskier behaviors more likely among migrants in transition or living in host countries. [PubMed: 27888370]
35. Kobrak P, Ponce R, Zielony R. New arrivals to New York City: vulnerability to HIV among urban migrant young gay men. *Arch Sex Behav.* 2015 Oct; 44(7):2041–53. [PubMed: 25896489]
36. Althoff MD, Theall K, Schmidt N, et al. Social Support Networks and HIV/STI Risk Behaviors Among Latino Immigrants in a New Receiving Environment. *AIDS Behav.* 2017 Jul 21. [Epub ahead of print].
37. Lewis NM, Wilson K. HIV risk behaviours among immigrant and ethnic minority gay and bisexual men in North America and Europe: A systematic review. *Soc Sci Med.* 2017 Apr.179:115–128. [PubMed: 28260636]
- *38. Galeucia M, Hirsch JS. State and Local Policies as a Structural and Modifiable Determinant of HIV Vulnerability Among Latino Migrants in the United States. *American J Public Health.* 2016; 106(5):800–7. This review article explores the literature on HIV vulnerability of Latino migrants in the US as well as state policies that affect migrants. The authors identify climates of hostility towards Latinos and ability to access beneficial institutions as key pathways through which state and local policies affect HIV vulnerability.
39. Mayer, KH., Biello, KB., Novak, DS., et al. Disparities in PrEP uptake in an online U.S. sample of men who have sex with men. *Conference on Retroviruses and Opportunistic Infections; February 13–16, 2017; Seattle, WA.* 2017;
- **40. Timing of combined antiretroviral treatment initiation in male and female migrants living with HIV in Western Europe. *AIDS.* 2017 Mar 27; 31(6):835–846. This large cohort study of over 150,000 people living with HIV in Europe demonstrated that probability of combined antiretroviral treatment initiation is lower in migrants compared with natives. [PubMed: 28272136]
41. Op de Coul EL, van Sighem A, Brinkman K, et al. Factors associated with presenting late or with advanced HIV disease in the Netherlands, 1996–2014: results from a national observational cohort. *BMJ Open.* 2016 Jan 4.6(1):e009688.
42. Zeitlmann N, Gunsenheimer-Bartmeyer B, Santos-Hovener C, et al. CD4-cell counts and presence of AIDS in HIV-positive patients entering specialized care—a comparison of migrant groups in the German ClinSurv HIV Cohort Study, 1999–2013. *BMC Infect Dis.* 2016 Dec 7.16(1):739. [PubMed: 27927190]
- **43. Myers TR, Lin X, Skarbinski J. Antiretroviral Therapy and Viral Suppression Among Foreign-Born HIV-Infected Persons Receiving Medical Care in the United States: A Complex Sample, Cross-Sectional Survey. *Medicine (Baltimore).* 2016; 95(11):e3051. This study describes

antiretroviral therapy (ART) prescription and viral suppression in a nationally-representative cohort in the US. Equivalent rates of ART prescription were observed between foreign-born and US-born persons, and a higher percentage of foreign-born persons achieved viral suppression. [PubMed: 26986128]

44. Sheehan DM, Trepka MJ, Fennie KP, Maddox LM. Rate of new HIV diagnoses among Latinos living in Florida: disparities by country/region of birth. *AIDS Care*. 2015; 27(4):507–11. [PubMed: 25397859]
45. Sheehan DM, Trepka MJ, Fennie KP, et al. Racial/ethnic disparities in delayed HIV diagnosis among men who have sex with men, Florida, 2000–2014. *AIDS Care*. 2017; 29(3):311–8. [PubMed: 27455856]
46. Levison JH, Regan S, Khan I, Freedberg KA. Foreign-born status as a predictor of engagement in HIV care in a large US metropolitan health system. *AIDS Care*. 2017; 29(2):244–51. [PubMed: 27469972]
47. Ross J, Hanna DB, Felsen UR, et al. Emerging from the database shadows: characterizing undocumented immigrants in a large cohort of HIV-infected persons. *AIDS Care*. 2017 Mar 27.:1–8. [Epub ahead of print].
48. Tilley DM, Griggs E, Hoy J, et al. Treatment and disease outcomes of migrants from low- and middle-income countries in the Australian HIV Observational Database cohort. *AIDS Care*. 2015; 27(11):1410–7. [PubMed: 26679270]
- *49. Loos J, Nostlinger C, Vuylsteke B, et al. First HIV prevalence estimates of a representative sample of adult sub-Saharan African migrants in a European city. Results of a community-based, cross-sectional study in Antwerp, Belgium. *PloS One*. 2017; 12(4):e0174677. This study estimates HIV prevalence among a representative sample of adult sub-Saharan African migrants in Belgium. HIV prevalence was 5.9% among women and 4.2% among men; 65% of HIV-positive migrants were possibly undiagnosed. [PubMed: 28380051]
50. Op de Coul EL, Schreuder I, Conti S, et al. Changing Patterns of Undiagnosed HIV Infection in the Netherlands: Who Benefits Most from Intensified HIV Test and Treat Policies? *PloS One*. 2015; 10(7):e0133232. [PubMed: 26185998]
51. Van Beekhoven D, Florence E, Ruelle J, et al. Good continuum of HIV care in Belgium despite weaknesses in retention and linkage to care among migrants. *BMC Infect Dis*. 2015 Nov 3.15:496. [PubMed: 26530500]
- **52. Ojikutu BO, Mazzola E, Fullem A, et al. HIV Testing Among Black and Hispanic Immigrants in the United States. *AIDS Patient Care STDS*. 2016 Jul; 30(7):307–14. This study explored HIV testing patterns among black and Hispanic immigrants in the US, finding that nearly half of the sample had never been tested for HIV. [PubMed: 27410494]
53. Blanas DA, Nichols K, Bekele M, et al. HIV/AIDS among African-born residents in the United States. *Journal Immig Minor Health*. 2013; 15(4):718–24.
54. Gray KM, Valverde EE, Tang T, et al. Diagnoses and Prevalence of HIV Infection Among Hispanics or Latinos - United States, 2008–2013. *MMWR Morb Mortal Wkly Rep*. 2015; 64(39):1097–103. [PubMed: 26448539]
55. Adedimeji AA, Asibon A, O'Connor G, et al. Increasing HIV testing among African immigrants in Ireland: challenges and opportunities. *Journal Immig Minor Health*. 2015; 17(1):89–95.
56. De Jesus M, Carrete C, Maine C, Nalls P. “Getting tested is almost like going to the Salem witch trials”: discordant discourses between Western public health messages and sociocultural expectations surrounding HIV testing among East African immigrant women. *AIDS Care*. 2015; 27(5):604–11. [PubMed: 25616443]
57. Henrickson M, Dickson N, Mhlanga F, Ludlam A. Stigma, lack of knowledge and prevalence maintain HIV risk among Black Africans in New Zealand. *Aust N Z J Public Health*. 2015 Feb; 39(1):32–7. [PubMed: 25559049]
58. Guiguet M, Dionou S, Volant J, Samba MC, Benammar N, Chauvin P, et al. Men from Sub-Saharan Africa Living in Worker Hostels in France: A Hidden Population with Poor Access to HIV Testing. *Journal of immigrant and minority health*. 2016
- *59. De Jesus M, Carrete C, Maine C, Nalls P. Attitudes, perceptions and behaviours towards HIV testing among African-American and East African immigrant women in Washington, DC:

- implications for targeted HIV testing promotion and communication strategies. *Sex Transm Infect.* 2015 Dec; 91(8):569–75. A qualitative study that explores themes around barriers to HIV testing among East African immigrant women, highlighting the role played by individual- and community-level stigma. [PubMed: 25897146]
60. van Andel E, Been SK, Rokx C, van der Ende ME. Risk factors in an HIV-infected population for refraining from specialist care. *AIDS Care.* 2016; 28(10):1255–60. [PubMed: 27055103]
 61. Ridolfo AL, Oreni L, Vassalini P, Resnati C, Bozzi G, Milazzo L, et al. Effect of Legal Status on the Early Treatment Outcomes of Migrants Beginning Combined Antiretroviral Therapy at an Outpatient Clinic in Milan Italy. *J Acquir Immune Defic Syndr.* 2017 Jul 1; 75(3):315–321. [PubMed: 28418991]
 62. de Monteynard LA, Dray-Spira R, de Truchis P, et al. Later cART initiation in migrant men from sub-Saharan Africa without advanced HIV disease in France. *PLoS One.* 2015; 10(3):e0118492. [PubMed: 25734445]
 63. Saracino A, Lorenzini P, Lo Caputo S, et al. Increased risk of virologic failure to the first antiretroviral regimen in HIV-infected migrants compared to natives: data from the ICONA cohort. *Clin Microbiol Infect.* 2016 Mar; 22(3):288.e1–8. [PubMed: 26551839]
 64. Reyes-Uruena J, Campbell C, Hernando C, et al. Differences between migrants and Spanish-born population through the HIV care cascade, Catalonia: an analysis using multiple data sources. *Epidemiol Infect.* 2017 Jun; 145(8):1670–1681. [PubMed: 28270252]
 65. Sheehan DM, Fennie KP, Mauck DE, et al. Retention in HIV Care and Viral Suppression: Individual- and Neighborhood-Level Predictors of Racial/Ethnic Differences, Florida, 2015. *AIDS Patient Care STDS.* 2017; 31(4):167–75. [PubMed: 28414260]
 66. Cyrus E, Dawson C, Fennie KP, et al. Disparity in Retention in Care and Viral Suppression for Black Caribbean-Born Immigrants Living with HIV in Florida. *Int J Environ Res Public Health.* 2017 Mar 9; 14(3)
 67. Ross J, Felsen UR, Cunningham CO, et al. Outcomes along the HIV care continuum among undocumented immigrants in clinical care. *AIDS Res Hum Retroviruses.* 2017 Apr 26. [Epub ahead of print].
 68. Rachlis B, Burchell AN, Gardner S, et al. Social determinants of health and retention in HIV care in a clinical cohort in Ontario, Canada. *AIDS Care.* 2017; 29(7):828–37. [PubMed: 28027668]
 69. Shangase P, Egbe CO. Barriers to accessing HIV services for Black African communities in Cambridgeshire, the United Kingdom. *J Community Health.* 2015 Feb; 40(1):20–6. [PubMed: 24878614]
 - *70. Been SK, van de Vijver DA, Nieuwkerk PT, Brito I, Stutterheim SE, Bos AE, et al. Risk Factors for Non-Adherence to cART in Immigrants with HIV Living in the Netherlands: Results from the Rotterdam Adherence (ROAD) Project. *PLoS one.* 2016; 11(10):e0162800. This study highlighted low social support and low self-efficacy as major predictors of non-adherence to antiretroviral therapy. [PubMed: 27706251]
 71. Arrey AE, Bilsen J, Lacor P, Deschepper R. “It’s my secret”: fear of disclosure among sub-Saharan African migrant women living with HIV/AIDS in Belgium. *PLoS One.* 2015; 10(3):e0119653. [PubMed: 25781906]
 72. Whembolua GL, Conserve DF, Thomas K, Handler L. A Systematic Review of HIV Serostatus Disclosure Among African Immigrants in Europe. *J Immigr Minor Health.* 2017 Aug; 19(4):947–958. [PubMed: 27388442]
 73. Kankou JM, Bouchaud O, Lele N, et al. Factors Associated with HIV Status Disclosure in HIV-Infected Sub-Saharan Migrants Living in France and Successfully Treated with Antiretroviral Therapy: Results from the ANRS-VIHVO Study. *J Immigr Minor Health.* 2017 Aug; 19(4):843–850. [PubMed: 27125911]
 74. Spiers J, Smith JA, Poliquin E, et al. The Experience of Antiretroviral Treatment for Black West African Women who are HIV Positive and Living in London: An Interpretative Phenomenological Analysis. *AIDS Behav.* 2016; 20(9):2151–63. [PubMed: 26767539]
 75. Okoro ON, Whitson SO. HIV risk and barriers to care for African-born immigrant women: a sociocultural outlook. *Int J Womens Health.* 2017; 9:421–9. [PubMed: 28652821]

76. Remien RH, Bauman LJ, Mantell JE, et al. Barriers and facilitators to engagement of vulnerable populations in HIV primary care in New York City. *J Acquir Immune Defic Syndr*. 2015; 69(Suppl 1):S16–24. [PubMed: 25867774]
77. Chen YY, Li AT, Fung KP, Wong JP. Improving access to mental health services for racialized immigrants, refugees and non-status people living with HIV/AIDS. *J Health Care Poor Underserved*. 2015; 26(2):505–518. [PubMed: 25913347]
78. Feuillet P, Lert F, Tron L, et al. Prevalence of and factors associated with depression among people living with HIV in France. *HIV Med*. 2017; 18(6):383–394. [PubMed: 27625202]
79. Deblonde J, Sasse A, Del Amo J, 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 Dec 10.15:1228. [PubMed: 26654427]
80. European Centre for Disease Prevention and Control. Migrant health: Access to HIV prevention, treatment and care for migrant populations in EU/EEA countries. Stockholm, Sweden: European Centre for Disease Prevention and Control; 2009.
81. National Alliance of State & Territorial AIDS Directors. National ADAP Monitoring Report. Washington, D.C: 2016.
82. Taylor BS, Reyes E, Levine EA, et al. Patterns of geographic mobility predict barriers to engagement in HIV care and antiretroviral treatment adherence. *AIDS Patient Care STDS*. 2014; 28(6):284–95. [PubMed: 24839872]
83. Goldenberg SM, Montaner J, Duff P, et al. Structural Barriers to Antiretroviral Therapy Among Sex Workers Living with HIV: Findings of a Longitudinal Study in Vancouver, Canada. *AIDS Behav*. 2016; 20(5):977–86. [PubMed: 26148850]
84. Turan B, Fazeli PL, Raper JL, et al. Social support and moment-to-moment changes in treatment self-efficacy in men living with HIV: Psychosocial moderators and clinical outcomes. *Health Psychol*. 2016; 35(10):1126–34. [PubMed: 27089459]
85. Castaneda H, Holmes SM, Madrigal DS, et al. Immigration as a social determinant of health. *Annu Rev Public Health*. 2015; 36:375–92. [PubMed: 25494053]
86. Ivanova E, Coroiu A, Ahluwalia A, Alexandrov E, Lafreniere KD. Preliminary findings on the association between symptoms of depression and adherence to antiretroviral therapy in individuals born inside versus outside of Canada. *J Assoc Nurses AIDS Care*. 2016; 26(4):512–23.
87. Fakoya I, Alvarez-Del Arco D, Monge S, et al. Advancing Migrant Access to Health Services in Europe (AMASE): Protocol for a Cross-sectional Study. *JMIR Res Protoc*. 2016 May 16.5(2):e74. [PubMed: 27185491]
- **88. Rhodes SD, Leichter JS, Sun CJ, Bloom FR. The HoMBReS and HoMBReS Por un Cambio Interventions to Reduce HIV Disparities Among Immigrant Hispanic/Latino Men. *MMWR Suppl*. 2016 Feb 12; 65(1):51–6. This report describes an intervention targeted to Latino immigrants in the US. that successfully increased rates of condom use and HIV testing among participants. This intervention has been classified as a best-evidence community-level HIV prevention intervention by the US Centers for Disease Control and Prevention. [PubMed: 26916740]
89. Rhodes SD, Alonzo J, Mann L, et al. Small-Group Randomized Controlled Trial to Increase Condom Use and HIV Testing Among Hispanic/Latino Gay, Bisexual, and Other Men Who Have Sex With Men. *Am J Public Health*. 2017; 107(6):969–76. [PubMed: 28426301]
90. Solorio R, Norton-Shelpuk P, Forehand M, et al. Tu Amigo Pepe: Evaluation of a Multi-media Marketing Campaign that Targets Young Latino Immigrant MSM with HIV Testing Messages. *AIDS Behav*. 2016; 20(9):1973–88. [PubMed: 26850101]
91. Kwakwa HA, Wahome R, Goines DS, Jabateh V, Green A, Bessias S, et al. Engaging African and Caribbean Immigrants in HIV Testing and Care in a Large US City: Lessons Learned from the African Diaspora Health Initiative. *J Immigr Minor Health*. 2017 Aug; 19(4):818–824. [PubMed: 27198156]
92. Navaza B, Abarca B, Bisoffi F, et al. Provider-Initiated HIV Testing for Migrants in Spain: A Qualitative Study with Health Care Workers and Foreign-Born Sexual Minorities. *PloS One*. 2016; 11(2):e0150223. [PubMed: 26914023]

93. Alvarez-Del Arco D, Monge S, Caro-Murillo AM, et al. HIV testing policies for migrants and ethnic minorities in EU/EFTA Member States. *Eur J Public Health*. 2014 Feb; 24(1):139–44. [PubMed: 23921295]
94. Loos J, Manirankunda L, Platteau T, et al. Acceptability of a Community-Based Outreach HIV-Testing Intervention Using Oral Fluid Collection Devices and Web-Based HIV Test Result Collection Among Sub-Saharan African Migrants: A Mixed-Method Study. *JMIR Public Health Surveill*. 2016; 2(2):e33. [PubMed: 27493067]
95. Bove JM, Golden MR, Dhanireddy S, et al. Outcomes of a Clinic-Based Surveillance-Informed Intervention to Relink Patients to HIV Care. *J Acquir Immune Defic Syndr*. 2015; 70(3):262–8. [PubMed: 26068720]
96. Wohl AR, Dierst-Davies R, Victoroff A, et al. Implementation and Operational Research: The Navigation Program: An Intervention to Reengage Lost Patients at 7 HIV Clinics in Los Angeles County, 2012–2014. *J Acquir Immune Defic Syndr*. 2016; 71(2):e44–50. [PubMed: 26484741]
97. Horvat L, Horey D, Romios P, Kis-Rigo J. Cultural competence education for health professionals. *Cochrane Database Syst Rev*. 2014; (5):CD009405. [PubMed: 24793445]
98. Renzaho AM, Romios P, Crock C, Sonderlund AL. The effectiveness of cultural competence programs in ethnic minority patient-centered health care--a systematic review of the literature. *Int J Qual Health Care*. 2013; 25(3):261–9. [PubMed: 23343990]
99. Shilaih, M., Marzel, A., Schupbach, J., et al. Clustering of Swiss HIV patients not enrolled in the Swiss HIV Cohort Study (SHCS). Conference on Retroviruses and Opportunistic Infections; February 23–26, 2015; Seattle, WA. 2015.
- *100. Koku EF, Rajab-Gyagenda WM, Korto MD, et al. HIV/AIDS among African Immigrants in the U.S.: The Need for Disaggregating HIV Surveillance Data by Country of Birth. *J Health Care Poor Underserved*. 2016; 27(3):1316–29. The authors of this paper argue for disaggregating US HIV surveillance data by country of birth to more accurately estimate HIV epidemiology among sub-populations and target prevention and treatment efforts accordingly. [PubMed: 27524770]
101. Lanoy E, Mary-Krause M, Tattevin P, et al. Predictors identified for losses to follow-up among HIV-seropositive patients. *J Clin Epidemiol*. 2006; 59(8):829–35. [PubMed: 16828676]
102. Toomey RB, Umana-Taylor AJ, Williams DR, et al. Impact of Arizona's SB 1070 immigration law on utilization of health care and public assistance among Mexican-origin adolescent mothers and their mother figures. *Am J Public Health*. 2014; 104(Suppl 1):S28–34. [PubMed: 24354823]

Key Points

- High proportions of migrants from low- and middle-income countries living in high-income countries acquire HIV after migration.
- Migrants living in high-income countries consistently present late to care.
- European studies consistently demonstrate poorer HIV outcomes among migrants compared to native-born persons, while data from North America and Australasia are fewer and inconsistent regarding the relative outcomes of these groups.
- Stigma and limited access to care appear to be primary drivers of poor HIV outcomes among migrants in high-income countries, yet few studies have evaluated interventions aimed at addressing these problems.

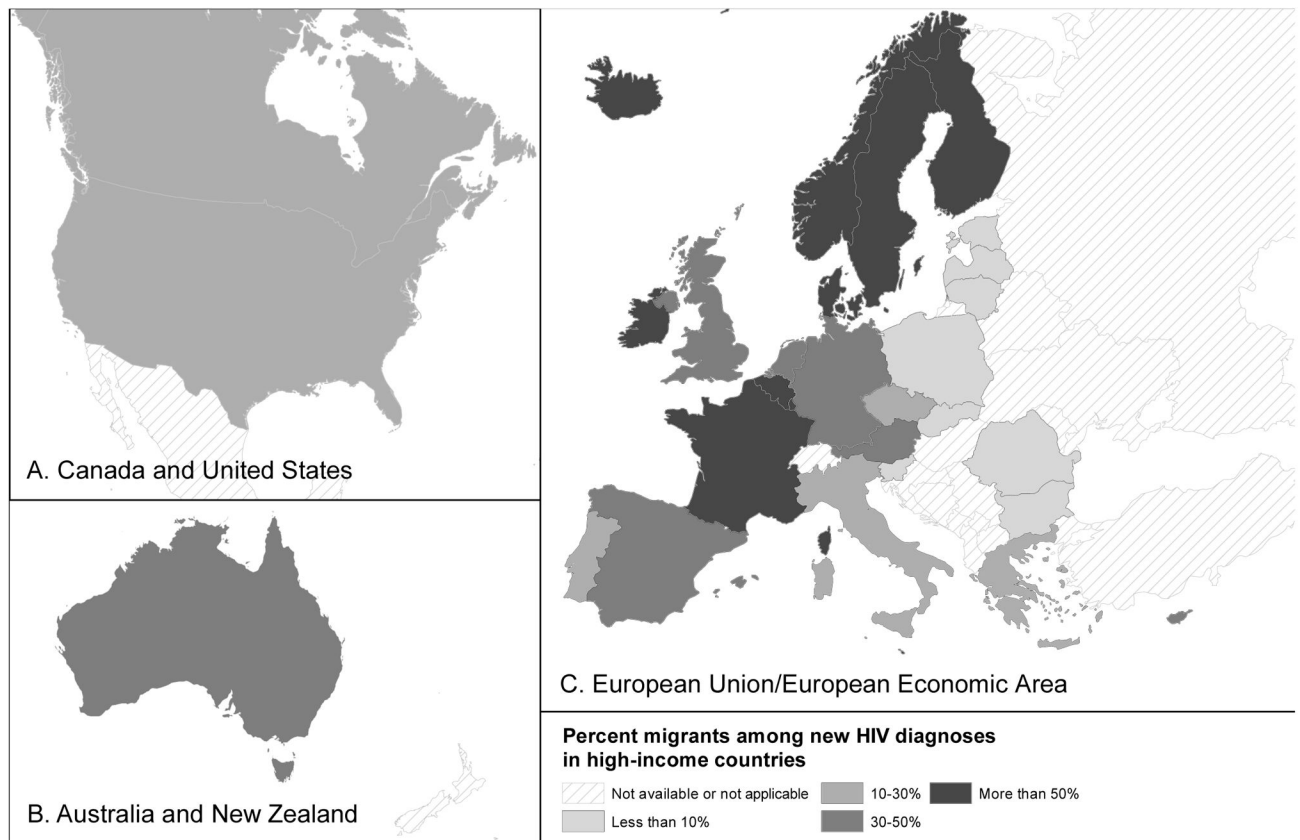


Figure 1. Map showing the percentage of migrants among new HIV diagnoses in high-income countries, based on surveillance data. (A) Canada, 2015 (migrants defined based on heterosexual contact and born in an HIV-endemic country) [9]; United States, 2010–2014 [10]. (B) Australia, 2016 [Surveillance Evaluation and Research Program, Kirby Institute, University of New South Wales Sydney, personal communication, September 2017], (C) European Union/European Economic Area, 2015 [8].
Legend: Percent migrants among new HIV diagnoses in high-income countries

Important HIV outcomes and selected determinants of outcomes among migrants from low- and middle-income countries living in high-income countries.

Table 1

Important HIV outcomes	Major findings among migrants	Selected determinants of outcomes	Key references
HIV acquisition	High proportions acquire HIV post-migration	<ul style="list-style-type: none"> • Disruption of social networks • Increased risk behaviors • Limited access to HIV prevention services 	25–28; 34; 36–38
Entry into care	<ul style="list-style-type: none"> • Limited HIV testing • Often unaware of diagnosis • Enter care late 	<ul style="list-style-type: none"> • Lack of health insurance • Limited access to/knowledge of testing • Fear of immigration authorities • Stigma related to HIV and immigration status • Lack of social support 	6; 41; 44–45; 48–51; 52; 55–59
Clinical outcomes once established in HIV care	<p>At risk of:</p> <ul style="list-style-type: none"> • Loss to follow-up • Poor adherence to ART • Lack of viral suppression 	<ul style="list-style-type: none"> • Stigma related to HIV and immigration status • Lack of social support • Linguistic and cultural barriers in health care settings • Limited access to HIV care and social services 	40; 43; 62; 64; 67–68; 70