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HIV Risk Behaviours among Foreign- and Native-Born Ethnic Minority Gay and Bisexual Men in the North America and Europe: A Systematic Review

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HIV Risk Behaviours among Foreign- and Native-Born Ethnic Minority Gay and Bisexual Men in the North America and Europe: A Systematic Review

Abstract

HIV surveillance systems show that gay, bisexual, and other men who have sex with men (MSM) bear a disproportionate burden of HIV in North American and European countries. Within the MSM category, HIV prevalence is often elevated among ethnic minority (i.e., Latino, Asian, and Black) MSM, many of whom are also foreign-born immigrants. Few studies have focused specifically on foreign-born populations, though those that provide data on the nativity of their samples offer an opportunity to investigate the potential role of transnational migration in informing HIV risk among ethnic minority MSM. This systematic review of ethnic minority MSM studies where the nativity of the sample is known provides a robust alternative to single studies measuring individual-level predictors of HIV risk behaviour. In this review, HIV prevalence, unprotected sex, drug use, and HIV testing are analysed in relation to the ethnicity, nativity, and location of the samples included. The results, which include high rates of HIV, unprotected sex, and stimulant use in foreign-born Latino samples and high rates of alcohol and club drug use in majority foreign-born Asian Pacific Islander (API) samples, provide baseline evidence for the theory of migration and HIV risk as syndemics within ethnic minority populations in North American and European countries. The findings also suggest that further research on the contextual factors influencing HIV risk among ethnic minority MSM groups and especially immigrants within these groups is needed. These factors include ethnic networks, individual post-migration transitions, and the gay communities and substance use cultures in specific destination cities. Further comparative work may also reveal how risk pathways differ across ethnic groups.

Keywords: gay; MSM; HIV; substance use; testing; ethnicity; migration; systematic review

Introduction

Gay, bisexual, and other men who have sex with men (MSM) account for the majority of HIV cases in most North American and European countries and ethnic minority groups within the MSM category often bear a disproportionate burden of HIV infection (CDC 2015; PHE 2015; PHAC 2013). In addition, foreign-born MSM often have higher rates of HIV risk behaviours than native-born Euro-American MSM (Folch et al. 2009; George et al. 2007; Elford et al. 2012). Most studies, however, frame HIV risk behaviours as products of an individual's psycho-social orientation to an "ethnic" or "mainstream" (e.g., American) culture and few compare HIV prevalence or associated risk behaviours across ethnic groups (but see Wei et al. 2011; Paul et al. 2014) or between foreign-born and native-born MSM within specific ethnic minority groups (but see Mizuno et al. 2012; Nehl et al. 2015; Oster et al. 2013; Tran et al. 2015; Wong et al. 2012). It is therefore difficult to disentangle the effects of psycho-social characteristics, ethnicity, and nativity on the sexual health of ethnic minority MSM, many of whom are also immigrants.

In this review, we begin to address this gap by examining available studies of HIV and associated risk behaviours among ethnic minority MSM of known nativity in North America and Europe. This review provides a baseline of prevalence data for risk behaviours across ethnic minority groups and considers these data in relation to both migration status and the locations where available studies take place. The review therefore provides a robust alternative to single studies measuring relationships between individual psycho-social characteristics and risk behaviours and offers a starting point for further consideration of the contextual factors influencing HIV risk for ethnic minority MSM who are often also immigrants.

Ethnic Minority Status, Migration, and HIV Risk as Syndemic

Researchers are increasingly framing HIV and other sexual health outcomes among MSM as “syndemic” with depression, substance use, and other health issues that disproportionately affect this population (Carey et al. 2009). Recently, researchers have posited that both ethnicity and migration are implicated in these syndemics. MSM who are ethnic minorities (i.e., Latino, Black and Asian) experience disproportionate racism and economic deprivation, and those who are born in-country (rather than migrating later in life) face these challenges from an early age (Warren et al. 2008; Kobrak et al. 2015). Ethnic minority MSM consequently have high rates of homelessness, engaging in sex work, HIV non-testing, and late HIV diagnosis (Millett et al. 2006; Duran et al. 2010; Chen et al. 2011; VanDevanter et al. 2011).

Migrant MSM, meanwhile, may experience social and economic upheaval, loss of family support, and exposure to unfamiliar social and sexual scenes upon arrival in a new place. Although many of the studies in this area focus on MSM migration within countries and regions (Kipke et al. 2007; Bruce and Harper 2011; Egan et al. 2011; Lewis 2014), some have also examined transnational migrations (Bianchi et al. 2007; Lewis 2016) or even compared these two types of migrations (Kobrak et al. 2015). For transnational migrants who are also ethnic minorities, the instabilities that precipitate substance use, poor mental health, and HIV infection in internal MSM migrants are potentially further amplified by ethnic and racial discrimination, language barriers, and cross-country employment transitions (Oster et al. 2013; Nehl et al. 2015).

The ways in which the migration-HIV syndemic might unfold among ethnic minority MSM are complex. Recent work on migration and sexual health reiterates concepts such as the “healthy immigrant effect” and “Latino Paradox”, in which immigrants arrive healthier than the native-born population but ultimately converge downward toward the general population due to

stress, occupational shifts, and adoption of “Western” behaviours (Cunningham 2008; Dean and Wilson 2008). Studies of both heterosexual Latino men (Levy et al. 2005; Winett et al. 2011) and Latino MSM (Oster et al. 2013) report higher rates of unprotected sex among established immigrants (more than 5 years post-arrival) compared to recent immigrants. Many studies have also suggested that migration, because of the social and financial security it creates, can amplify pre-existing HIV risk behaviours such as injection drug use (Deren et al. 2003) or introduce new ones such as engaging in sex work (Mole et al. 2013).

Both individual and contextual factors mediate the relationships between ethnicity, migration and HIV risk. While some studies report that individual acculturation toward one’s “ethnic” culture is correlated with substance use (Fernandez et al. 2007; Ratti et al. 2000) and unprotected sex (Warren et al. 2008), others suggest that it may protect against substance use (Fernandez et al. 2009; Nehl et al. 2015). Others find that greater orientation toward a majority or mainstream culture (e.g., “Americanism”) can be associated with substance use and unprotected sex (Fernandez et al. 2005; Akin et al. 2008; Nehl et al. 2015) but also higher self-esteem and lower rates of risk behaviors (Zea et al. 2009; Gilbert and Rhodes 2013). These relationships may also change depending on whether language preference or the predominant ethnicity of one’s social network is used as the indicator of acculturation (Gilbert and Rhodes 2013). Other studies emphasize contextual factors such as the migrant’s destination environment, observing different substance use behaviours among migrant MSM located in different cities (Mizuno et al. 2011; Ramirez-Valles et al. 2008) as well as the specific HIV risk factors for MSM migrants in rural areas (Rhodes et al. 2012). The following review takes stock of how these complex factors influence risk in ethnic minority and immigrant MSM populations.

Methods

Requirements for initial inclusion were publication in English, use of a general sample of MSM from one or more ethnic minority groups, measurement of the prevalence (%) of HIV risk factors and reporting the percentage of foreign-born men in each sample. Studies were limited to North American and Western European countries as these are typically countries of immigration with overall low HIV prevalence and similar legal equalities (e.g., same-sex marriage) for gay and bisexual men. Following PRISMA guidelines for systematic reviews, publications were collected from searches of the PubMed Central[®] database conducted between January and March 2016. We searched using the linked terms “HIV”, “MSM” and each of: Latino, API, Black, or South Asian. These initial four searches were duplicated using “gay” in place of MSM to produce another four searches. Next, “Latin American” and “Hispanic” were searched in place of Latino, and “Asian” in place of API for both the “MSM” and “gay” searches to produce another six searches. As the term Black elicited mostly African American studies with few foreign-born men and no mention of nativity, the terms “African” and then “Caribbean” replaced Black in both the “MSM” and “gay” searches to produce the final four searches.

In total, 18 searches returned 979 results (see Figure 1). Duplicate articles were then removed from the list for 731 results total. Results were further screened in a three-part process to operationalize the inclusion criteria. First, 623 of the remaining 731 results were eliminated due to the absence of data on HIV risk factors (e.g., articles focusing on treatment adherence rather than risk behaviours), atypical samples (e.g., only injection drug users) that pre-determined observed risk behaviour prevalence, or study locations outside of North America or Europe. Next, the remaining 103 results were screened by reading the abstracts, methods sections, and demographic data within each article. First, 30 studies that did not separate findings

for ethnic groups or did not report the nativity of the sample were eliminated. Finally, another 40 studies that did not report descriptive prevalence data (e.g., reported only regression analysis results) were eliminated, leaving 33 articles for review. Although meta-analysis was considered as a potential method for analysis, the high level of heterogeneity in the study strategies, designs, target populations, and sampling frames makes statistical comparisons difficult. While it may be interesting in the future to conduct a meta-analysis of variance in risk behavior between foreign-born and native-born ethnic minority men, only four of the available publications were designed in a way to facilitate such comparisons.

--Insert Figure 1 here--

Results

A total of 33 relevant publications were collected. The 33 publications comprised 24 studies (i.e., multiple publications were often produced from the same study) and 47 separate samples based on ethnic group, location, and foreign-born/native-born status where available. The studies were conducted in the United States, Canada, the United Kingdom, and Spain between 1999 and 2014 (see Table 2, and Table 1 for a key of abbreviations). We selected studies from this 15-year window to ensure they were conducted in roughly the same epidemiological time frame, after the height of the AIDS epidemic. Most studies also included a requirement that participants had had sex with a man, usually during the past 6 months, 1 year, or 5 years. Samples ranged in size from 81–1734 and comprised MSM identifying as Latino or Latin American (29), Asian/Pacific Islander (API)/East Asian (10), Black (5), South Asian (1), Eastern European (1) and other (1). Each of these samples was categorised according to the proportion of foreign-born MSM in the sample: 0% (3), 1–24% (3), 25–49% (6), 50–74% (11),

75–99% (7), and 100% (7). Where reported, the mean/median time since arrival among the foreign-born MSM in the samples ranged from 3–17 years. In all figures, samples are displayed from left to right according to this gradient of nativity. Since HIV risk and substance use indicators (or the timeframes for which they were reported) are not consistent across the studies, figures generally include fewer than the total of 47 samples and show prevalence for only the most commonly reported timeframe for each risk factor (prevalence ranges for different time frames are shown in the notes following each figure).

HIV Prevalence and HIV Risk Indicators

Reported rates of HIV infection are generally higher in the Latino/Latin American samples (6–43%) and Black/Caribbean samples (14–51%) than the API (3–13%), South Asian (6%) and Eastern European (5%) samples (see Figure 2). Among the Latino samples, the mostly native-born groups have a prevalence range of 16–43% while those with a majority of foreign-born MSM range from 6–37% and those with only foreign-born MSM range from 14–31%. In the API samples, the highest HIV rates are reported in the groups with the highest proportions of native-born men. In the Black samples, the two mostly native-born African American samples (19% and 51%) diverge considerably, with the higher rate possibly due to recruitment from ASOs in New York City and Philadelphia (Marks et al. 2009). The mostly foreign-born African and Caribbean samples in Canada and the United Kingdom report a narrower range (14–24%).

--Insert Figure 2 here--

The 3-month prevalence of unprotected anal intercourse (UAI) ranged from 35–55% in the Latino/Latin American samples and 21–36% in the API samples, and 35–42% in the Black samples (see Figure 3). Among the Latino samples, the highest rate of UAI (55%) appears in the

most recent study, suggesting potential influences of epidemic fatigue and the introduction of pre-exposure prophylaxis (PrEP) as a preventive medication (Spadafino et al. 2016).

Interestingly, the next highest UAI rate (52%) is in a sample of relatively recently arrived Latino MSM in rural North Carolina (Rhodes et al. 2012), indicating that high levels of UAI are not necessarily connected to involvement in an established urban gay scene. A high 30-day prevalence rate for UAI (72%) was also observed in North Carolina (Sun et al. 2015), suggesting that newer migration destinations may represent a distinct risk context for Latino MSM. The remainder of UAI rates for Latino MSM and those for Black, South Asian, and Eastern European MSM are relatively consistent at 35–45%. The rates for API/East Asian men are comparably low (21–36%). Interestingly, the gradient of UAI prevalence for API MSM *increases* as the proportion of foreign-born men in the sample increases even though the gradient of HIV infection declines.

--Insert Figure 3 here--

As shown in Figure 4, Latino MSM have consistently high lifetime testing rates (86–95%) across studies, while testing rates for Black men are somewhat lower (77–92%), and Asian men (including API, Chinese, and South Asian) have the lowest rates (67–90%) barring one 7-city U.S. study where many participants were recruited from community-based organizations that promote testing (Wong et al. 2012). While Asian MSM testing rates are generally lower in studies with higher proportions of immigrants, this trend is reversed for Black men. This difference is consistent with within-study nativity comparisons that observe higher testing rates among foreign-born Black men (George et al. 2014). The UK study samples also have consistently lower testing rates than the U.S. and Canadian samples.

--Insert Figure 4 here--

Substance Use Indicators

The 6-month prevalence of any alcohol use is higher in the API samples (74–89%) compared to the Latino samples (58–65%) and the Black sample (56%, see Figure 5), a trend that is repeated for other prevalence timeframes. The range of 6-month prevalence for any marijuana use was relatively consistent across samples regardless of ethnicity (27–40%), though there is a larger difference for marijuana use in the past 12 months between Latino MSM (53%) and API MSM (22–47%). For cocaine use, the 6-month prevalence is generally higher in the Latino samples (9–19%) than in the API samples (9–10%) or the Black sample (7%, see Figure 6). Among Latinos, rates are also higher in Chicago and Miami (12–19%) than Los Angeles and San Francisco (8–12%). The 6-month prevalence of any methamphetamine use is generally higher in the API samples (13–20%) compared to the Latino samples (9–19%). This trend, which is again repeated across alternate prevalence timeframes, may also be related to location as methamphetamine use rates are consistently higher on the U.S. west coast, where the API studies were conducted (see Thiede et al. 2003). As shown in Figure 7, the prevalence of amyl nitrate (poppers) use is relatively consistent across all samples (8–18%) with the exception of two studies of Latino MSM in Miami where the reported rate was much higher (27–32%). The prevalence of ecstasy use is exceptionally high in a study of API men in San Francisco (44%) compared to all other samples. Among Latino MSM, there are higher rates of ecstasy use in Miami (8–14%) than San Francisco (8%) and Chicago (7%).

--Insert Figures 5, 6, and 7 here--

Discussion

The results reveal high rates of both HIV prevalence and associated risk factors among ethnic minority MSM. The high prevalence of HIV, substance use, and especially UAI in many of the samples comprised mostly or entirely of foreign-born MSM also lends evidence to the theory that transnational migration and HIV risk are syndemic. The findings here bolster hypotheses that high-risk sexual activity occurs within the immediate post-migration period (despite later HIV diagnosis) and that the first few years after immigration are a critical window of opportunity for HIV prevention interventions (Choi et al. 2004; Bianchi et al. 2007; Oster et al. 2013). As UAI rates are high even in locations where exposure to a developed gay scene is unlikely (e.g., Rhodes et al. 2012), individual post-migration factors (e.g., depression, isolation, loss of self-esteem) may be more important than destination. Access to substances, in contrast, may be more common among native-born ethnic minority men and more established immigrants, and appears more dependent on locational context.

The factors driving these syndemics may also differ between ethnic groups. High HIV prevalence among Latino MSM, for example, may stem from contracting HIV before leaving a high-prevalence country, returning to that country periodically after migrating, or contracting HIV after arrival (Akin et al. 2008; Oster et al. 2013). The high rates of UAI among Latino MSM reiterate past work suggesting that UAI is related to both cultural factors (e.g., *machismo* ideals emphasizing penetrative sex, fulfilling sexual urges, and having multiple partners) and structural factors such as racism, poverty, and consequent self-devaluation (Diaz et al. 2004; Zea et al. 2009). UAI is consistently high in Latino samples where most of the men are foreign-born, suggesting that Latino immigrant MSM may engage in UAI after arrival as a form of stress relief or social connection (Fernandez et al. 2009; Rhodes et al. 2012). Latino MSM also have the

highest rates of cocaine use, suggesting the need for preventive interventions focused on narcotic use. Rates of use for other substances are more variable, with high rates of club drug use in Miami (Fernandez et al. 2004, 2005, 2007, 2009; Akin et al. 2008) but no reported club drug use in rural North Carolina (Rhodes et al. 2012). The lifetime prevalence of being tested for HIV was generally highest in Latino and Latin American samples, potentially due to emigration from regions where HIV testing is normalized due to higher HIV prevalence rates (Akin et al. 2008; Spadafino et al. 2016).

The comparably lower HIV prevalence rates in Asian/API MSM may reflect lower background prevalence in Asia compared to other regions, but could also reflect a lack of diagnosis due to lower testing rates (Choi et al. 2004; Do et al. 2006; Elford et al. 2012) or the avoidance of unprotected sex due to perceived shame associated with becoming HIV-positive (Yoshikawa et al. 2004). Similarly, low rates of HIV testing among API MSM may owe to anti-HIV stigma and fears of bringing shame to the family if found to be HIV-positive (Elford et al. 2012; Ratti et al. 2000; Wong et al. 2012). The high rates of alcohol use in API MSM, who have the lowest prevalence of UAI and HIV, is consistent with past research suggesting that HIV prevalence is often lower in groups that drink because non-drinkers are often using higher-risk hard drugs instead of alcohol (Paul et al. 2014). Ecstasy use was highest among API MSM, suggesting the need for research on the use of ecstasy in API MSM social scenes and particularly on the U.S. west coast (Thiede et al. 2003). Further research could investigate, for example, whether the relatively low rates of UAI despite high usage of alcohol and club drugs among API MSM reflects greater sexual discrimination and (thus fewer sexual opportunities) within gay scenes despite involvement in those scenes (Vu et al. 2011; Yoshikawa et al. 2004).

Black MSM have an unusual risk profile. The relatively low HIV testing rates among Black MSM may owe to limited sexual health knowledge among MSM who remain closeted due to prejudice from their cultural communities (Millett et al. 2006; Marks et al. 2009). Black MSM were less likely than other groups to use alcohol, club drugs, and the stimulants included here but typically also have higher rates of crack cocaine use than other ethnic groups (Paul et al. 2014). Black MSM also have among the highest HIV rates despite low rates of substance use and lower overall rates of UAI than Latinos, suggesting that they may be disproportionately involved in other high-risk situations such as injection drug use or UAI with partners of unknown HIV status (Millett et al. 2006; Marks et al. 2009; Wei et al. 2011). Intra-group ethnic partnering may also explain both why Black MSM populations maintain high HIV prevalence rates despite more moderate UAI rates and why Asian/API MSM have such low HIV prevalence despite UAI rates that are not completely dissimilar from other ethnic groups (Marks et al. 2009; Wei et al. 2011).

Further research is needed to explore the effect of the migration destination on HIV risk behaviours among immigrant MSM. The high rates of UAI in the Latino samples from rural North Carolina, for example, may reflect a lack of social supports for Latinos and MSM as well as the rural background and lower educational attainment of Latino immigrants who move to this region rather than New York, Texas, or California (Rhodes et al. 2012; Gilbert and Rhodes 2013). The fact that the sum of the insertive and receptive UAI rates in one of these studies (Rhodes et al. 2012) only slightly exceeds the total UAI rate suggests that Latino MSM who are rural-to-rural transnational migrants may remain more prescriptive in their sex roles. Similarly, the low rates of HIV testing in the UK samples may reflect provider-level barriers such as physician anxiety about providing HIV tests and unnecessary referral to sexual health clinics rather than onsite testing (Deblonde et al. 2010). The preliminary evidence for ethno-specific

substance use cultures in specific cities (e.g., ecstasy use among API MSM in San Francisco and ecstasy and poppers use Latino MSM in Miami) suggests the need for further research on how these cultures become established and diffuse to immigrant MSM.

There are also some important limitations to this review that must be considered. First, the analytical methods employed were limited by the dissimilar study designs and reporting methods across the publication used. A more robust statistical analysis of inter-ethnic or foreign-born vs. native-born differences was not possible as few of the studies were designed specifically for these purposes. Second, maintaining comparability across the studies may have limited the range of studies included. As an objective of the review was to observe trends in risk behavior and HIV prevalence according to both ethnicity and nativity, studies that did not report nativity data or pre-determined prevalence rates (i.e., by sampling only HIV-positive individuals or only injection drug users) were not included. Consequently, the overall picture of risk behavior presented in this review may be somewhat attenuated. As previous work has delineated migration as a factor that can amplify risk behavior in groups such as injection drug users and sex workers (Deren et al. 2003; Mole et al. 2013), future work is needed to compare the dynamics of HIV risk between foreign-born and native-born MSM within these groups. Third, the studies here tend to report on broad categories of ethnic minority MSM (e.g., Latino) without assessing variation between more specific ethnic or national origin groups. Yet previous work has found, for example, significantly higher club drug use in Vietnamese and Korean MSM compared to Chinese MSM (Operario et al. 2006) and significantly higher UAI in Central Americans compared to other Latino MSM groups (Oster et al. 2013). Fourth, while many studies recorded bisexual or transgender identity, they did not report differences in risk behaviors compared with men who self-report as gay. Given that bisexual and transgender populations

have been identified as having different HIV risk profiles, further study of ethnic minorities within these groups is needed. As research on HIV risk among ethnic minority and immigrant MSM is still in its infancy (Paul et al. 2014), the field will benefit from research that differentiates between these various sub-groups while continuing to consider both individual and contextual factors (Deren et al. 2005). This type of research will be essential to shaping interventions geared toward increasingly diverse populations of ethnic minority MSM in North America and Europe.

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Table 1. Abbreviations Used

Demographic abbreviations	
MSM	men who have sex with men
MTF	male-to-female transgender
FB	foreign-born
NB	native-born
API	Asian and Pacific Islander
Risk Indicator Abbreviations	
UAI	unprotected anal intercourse
IUAI	insertive unprotected anal intercourse
IUAIO	insertive unprotected anal intercourse only
RUAI	receptive unprotected anal intercourse
RUAIO	receptive unprotected anal intercourse only
SDUAI	serodiscordant unprotected anal intercourse
TES	tested for HIV
Substance Use Abbreviations	
ALC	any alcohol use
HAU	heavy alcohol use (more than 6 drinks per occasion)
BIN	any binge drinking
MAR	any marijuana use
COC	any cocaine use
MET	any methamphetamine use
POP	any amyl nitrate/poppers use
ECS	any ecstasy use
DRU	any drug use
CDRU	any club drug use
IDU	any injection drug use
ABS	any alcohol use before or during sex
DBS	any drug use before or during sex

ADBS	any alcohol or drug use before or during sex
MARBS	any marijuana use before or during sex
COCBS	any cocaine use before or during sex
METBS	any methamphetamine use before or during sex
POPBS	any amyl nitrate/poppers use before or during sex
ECSBS	any ecstasy use before or during sex
Prevalence Timeframe Abbreviations	
L	lifetime
12	in the past 12 months
6	in the past 6 months
3	in the past 3 months
2	in the past 2 months
30	in the last 30 days
LE	at last sexual encounter

Table 2. Summary of Attributes for Reviewed Articles

Reviewed Articles	Study site	Year(s)	Design	N	Ethnic Group	% Foreign-born	HIV and HIV risk prevalence (%)	Substance use prevalence (%)
Spadafino et al. 2016	New York City, USA	2014	Purposive stratified sample, in-person or phone questionnaire	176	Latino	71	HIV: 34 UAI-3: 55	
Beymer et al. 2016	Los Angeles, USA	2009–2014	Clinic-based sample, interviewer-administered behavioral risk assessment (w/ HIV test)	3111	Latino	31	HIV: 6 IUAI-LE: 24 RUAI-LE: 24	COC-12: 10 MET-12: 6 POP-12: 15 ECS-12: 8 ABS-12: 42
Sun et al. 2015	North Carolina, USA	2011–2012	Convenience intervention sample, self-administered written questionnaire	135 MSM, 32 MTF	Latino	76	HIV: 2 TES-12: 94 UAI-1: 72	MAR-6: 14 DRU-6: 31
Paul et al. 2014	Los Angeles, USA	2008–2009	Venue-based sample, computer-assisted questionnaire	400	Latino	39	HIV: 43	ALC-6: 65 MAR-6: 38 COC-6: 26 MET-6: 22 POP-6: 13 ECS-6: 8
				393	API	57	HIV: 13	ALC-6: 74 MAR-6: 31

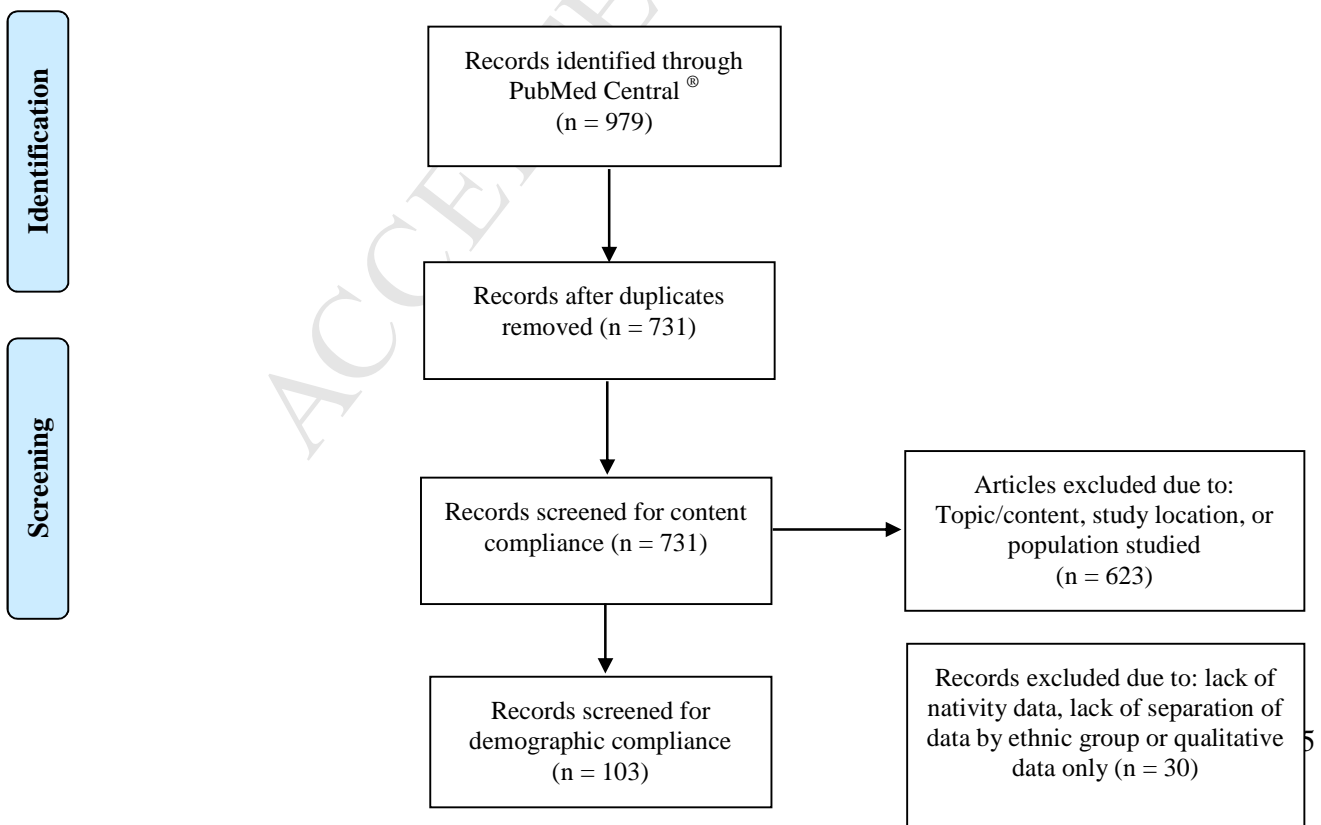
								COC-6: 16 MET-6: 16 POP-6: 18 ECS-6: 13
				400	Black	6	HIV: 50	ALC-6: 55 MAR-6: 30 COC-6: 6 MET-6: 11 POP-6: 8 ECS-6: 4
De Santis et al. 2011	Miami, USA	2009–2010	Venue-based sample, self-administered survey	100	Latino	83	HIV: 6 TES-L: 92	
Wong et al. 2012; Nehl et al. 2015; Tran et al. 2015	7 urban areas, USA	2007–2009	Community-based organization sample, self-administered questionnaire (w/ HIV test)	445	API	52	HIV: 10 TES-L: 92	ALC-12: 80 MAR-12: 34 COC-12: 9 MET-12: 8 POP-12: 16 ECS-12: 15
				207 NB	API	0	HIV: 7 TES-L: 90	ALC-12: 84 MAR-12: 47 COC-12: 8 MET-12: 8 POP-12: 17 ECS-12: 19
				233 FB	API	100	HIV: 11 TES-L: 94	ALC-12: 76 MAR-12: 22 COC-12: 9 MET-12: 8 POP-12: 15 ECS-12: 11
Rhodes et al. 2012; Gilbert and Rhodes 2013	Rural North Carolina, USA	2008	Respondent-driven sample, interview-administered assessment	159 MSM, 31 MTF	Latino	85	UAI-3: 52 IUAI-3: 27 RUAI-3: 28 TES-12: 68	MAR-12: 53 COC-12: 22
Oster et al. 2013	20 urban areas, USA	2008	Venue-based time-space sample, assistant-administered interview (w/HIV test)	1734	Latino	44	HIV: 19 UAI-12: 58 TES-L: 90 TES-12: 60	
				962 NB	Latino	0	HIV: 16 UAI-12: 57 TES-L: 91 TES-12: 62	
				753 FB	Latino	100	HIV: 22 UAI-12: 60 TES-L: 90 TES-12: 56	
Elford et al. 2012	United Kingdom	2007–2008	Internet- and venue-based convenience sample, online self-administered questionnaire	311	Black	30	HIV: 14 UAI-3: 41 TES-L: 79	
				303	South Asian	36	HIV: 6 UAI-3: 40 TES-L: 68	
				262	Chinese/ Other Asian	83	HIV: 5 UAI-3: 36 TES-L: 73	
				136	Latin American	100	HIV: 19 UAI-3: 44 TES-L: 90	

				207	Eastern European	100	HIV: 5 UAI-3: 45 TES-L: 75	
Wei et al. 2011	San Francisco, USA	2007–2008	Venue-based time-space sample, computer-assisted interview	242	Latino	31	HIV: 19	
				146	API	57	HIV: 12	
				81	Black	3	HIV: 6	
George et al. 2014	Toronto, Canada	2007–2008	Event- and internet-based sample, self-administered questionnaire	168	Black	70	HIV: 24 TES-L: 87 TES-12: 56 TES-6: 42	
				49 NB		0	TES-L: 77	
				114 FB		100	TES-L: 93	
Nemoto et al. 2010 (MSM sample only)	San Francisco, USA	2002–2007	Venue- and street-based sample, assistant-administered questionnaire	645	API	68	HIV: 6 UAI-6: 56 TES-L: 90	MAR-L: 90 COC-L: 32 MET-L: 36 IDU-L: 4 ALC-1: 75 COC-1: 8 MET-1: 25 IDU-1: 2
Nakamura and Zea 2010	USA	2006	Internet-based survey	226	Latino	50	IUAI-1: 30 RUAI-1: 25	ADBS-30: 24 ABS-30: 16 DBS-30: 22 MARBS-30: 7 COCBS-30: 1 METBS-30: 0 POPBS-30: 6 ECSBS-30: 1
Folch et al. 2009	Barcelona, Spain	2006	Venue-based sample, written questionnaire	173 FB	Latin American	100	UAI-12: 45	
					Other	100	UAI-12: 41	
Marks et al. 2009	New York City and Philadelphia, USA	2005–2006	Respondent-driven sample, computer-assisted self-assessment (w/ HIV test)	1140	Black	9	HIV: 53 UAI-3: 42 TES-L: 91 TES-12: 43	ALC-3: 65 MAR-3: 46 COC-3: 33 MET-3: 3 POP-3: 3
	New York City and Los Angeles, USA			1065	Latino	56	HIV: 39 UAI-3: 43 TES-L: 85 TES-12: 44	ALC-3: 66 MAR-3: 34 COC-3: 11 MET-3: 13 POP-3: 19
Mizuno et al. 2012				870		60	HIV: 43 SDUAI-3: 19	DRU-3: 35 BIN-3: 42
				344 NB		0	HIV: 23 SDUAI-3: 18	DRU-3: 39 BIN-3: 43
				526 FB		100	HIV: 56 SDUAI-3: 20	DRU-3: 32 BIN-3: 42
Reisen et al. 2007; Zea et al. 2009	New York City, USA	2004–2005	Snowball sample, computer-assisted questionnaire	482	Latino	100	HIV: 31 UAI-3: 45 UAI-LE: 25	
Fernandez et al. 2009; Fernandez et al. 2007	Miami, USA	2003–2005	Venue- and internet-based sample; computer-assisted	566	Latino	88	HIV: 16 UAI-6: 45 TES-L: 84	COC-6: 11 MET-6: 7 ECS-6: 13

			questionnaire					
Akin et al. 2008			Internet- and venue-based time-space sample, computer-assisted questionnaire	470	Latino	100	HIV: 15 UAI-6: 44	MAR-6: 32 COC-6: 11 MET-6: 7 ECS-6: 8
Ramirez-Valles et al. 2008	Chicago, USA	2004	Respondent-driven sample, computer-assisted questionnaire	294 MSM, 26 MTF	Latino	69	HIV: 18 UIAI-12: 24 URAI-12: 26 UIAI-2: 14 URAI-2: 14	MAR-6: 27 COC-6: 19 MET-6: 9 POP-6: 18 ECS-6: 5 HAU-6: 8 ABS-12: 56 DBS-12: 27 ABS-2: 41 DBS-2: 20
	San Francisco, USA			255 MSM, 68 MTF	Latino	86	HIV: 35 IUAI-12: 27 RUAI-12: 25 IUAI-2: 15 RUAI-2: 14	MAR-6: 33 COC-6: 10 MET-6: 9 POP-6: 18 ECS-6: 9 HAU-6: 31 ABS-12: 27 DBS-12: 19 ABS-2: 27 DBS-2: 19
Fernandez et al. 2004	Miami, USA	2003	Internet chat room time-space sample, computer-assisted self-administered questionnaire	171	Latino	89	UAI-6: 49	ALC-6: 59 MAR-6: 40 COC-6: 16 MET-6: 12 POP-6: 32 ECS-6: 14
Yoshikawa et al. 2004	New York City, USA	2002-2003	Venue-based convenience sample, self-administered survey	192	API	75	UAI-3: 31	
Fernandez et al. 2005	Miami, USA	2001	Venue-based sample, interviewer-administered assessment	262	Latino	81	HIV: 9 UAI-3: 35	COC-3: 12 MET-3: 15 POP-3: 9 ECS-3: 20 COC-L: 34 MET-L: 20 POP-L: 28 POP-3: 9
Operario et al. 2006; Choi et al. 2005; Do et al. 2005; Choi et al. 2004	San Francisco, USA	2000-2001	Venue-based space-time sample; interviewer-administered questionnaire (w/ HIV test)	496	API	70	HIV: 3 UAI-6: 47 IUAI-6: 29 RUAI-6: 35 IUAIO-6: 12 RUAIO-6: 9 IRUAI-6: 26 TES-L: 76	ALC-6: 89 MAR-6: 44 COC-6: 10 MET-6: 20 POP-6: 16 ECS-6: 47 DBS-6: 50 MAR-L: 29 COC-L: 20

								MET-L: 29 POP-L: 29 ECS-L: 58 CDRU-L: 62 IDU-L: 2
Vu et al. 2011	San Diego and Seattle, USA	1999–2002	Time-space sample, interviewer-administered assessment (w/ HIV test)	763	API	50	UAI-3: 21 TES-12: 63	
Do et al. 2006				908		49	UAI-3: 35 IUAI-3: 27 RUAI-3: 27 TES-L: 80 TES-12: 65 TES-6: 46	
Poppen et al. 2004	New York City and Washington DC, USA	1999–2002	In-person computer-based survey	155	Latino	90	IUAI-12: 48 RUAI-12: 43	ABS-1: 18 DBS-1: 13
Jarama et al. 2005	Virginia, USA	1999	Organization-based sample, self-report questionnaire	354	Latino	75	UAI-3 (casual partner) : 34	

Figure 1. PRISMA Inclusion Criteria for Systematic Review



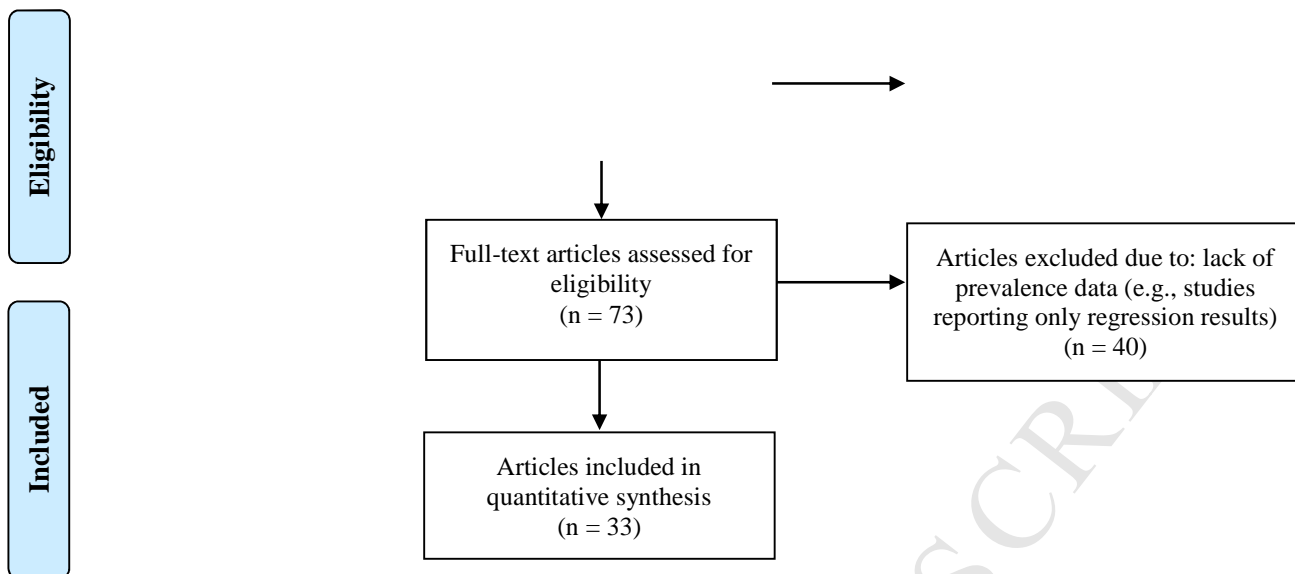
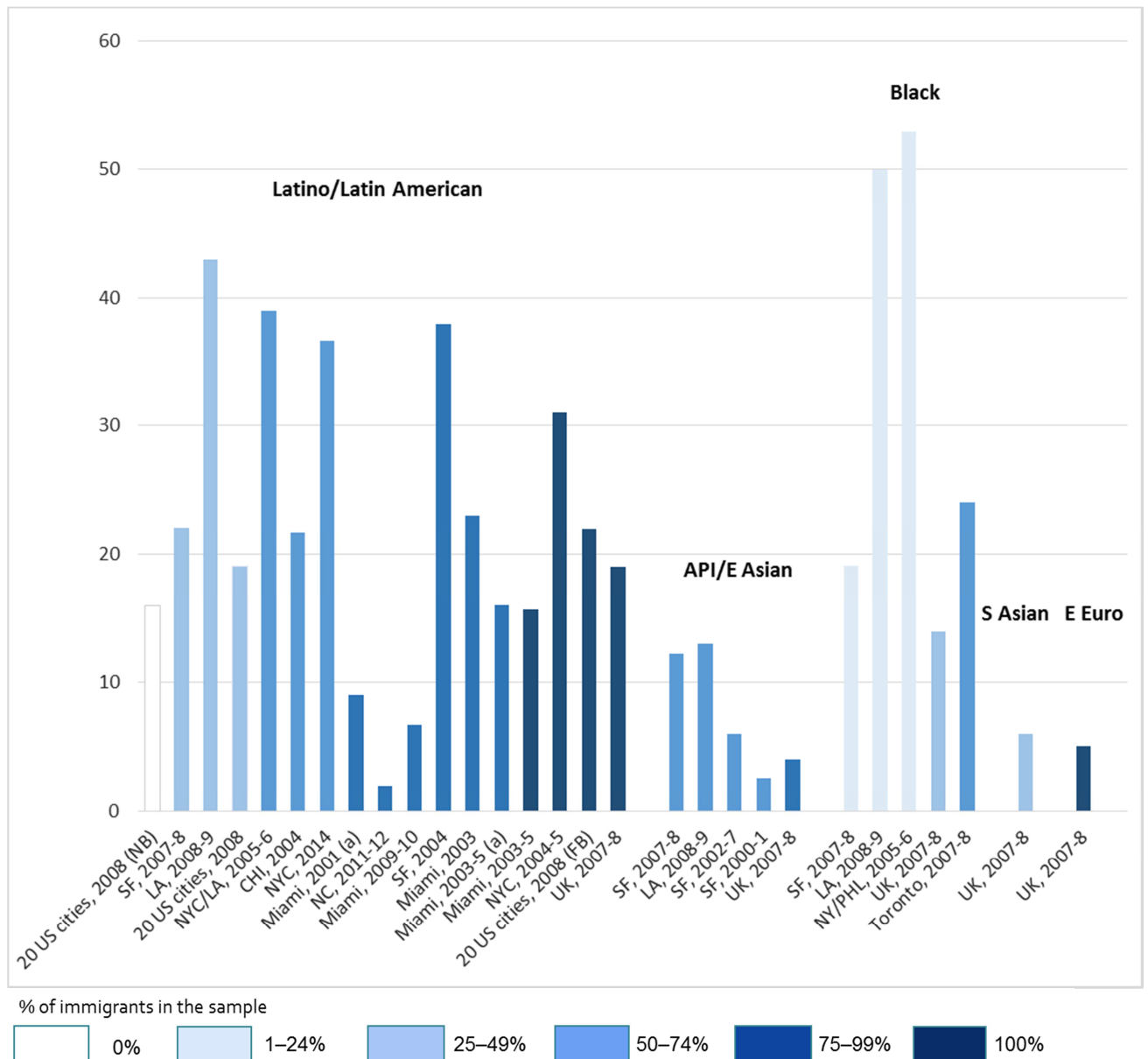
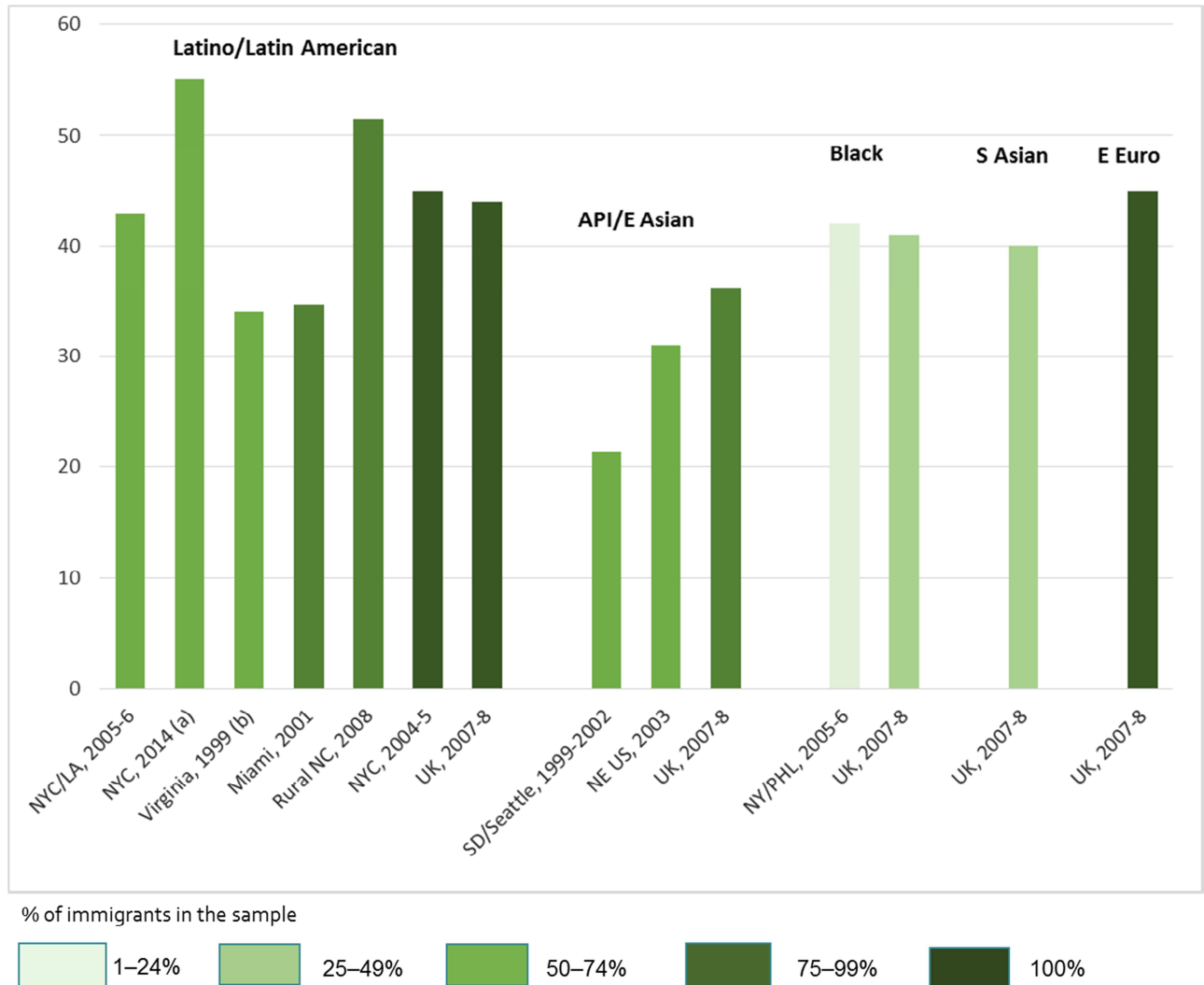


Figure 2. HIV prevalence (%) among ethnic minority MSM, United Kingdom and select U.S. and Canadian cities, 2000–2014



(a) Non-HIV-positive proportion includes both HIV-negative and unsure responses, unsure responses are excluded elsewhere

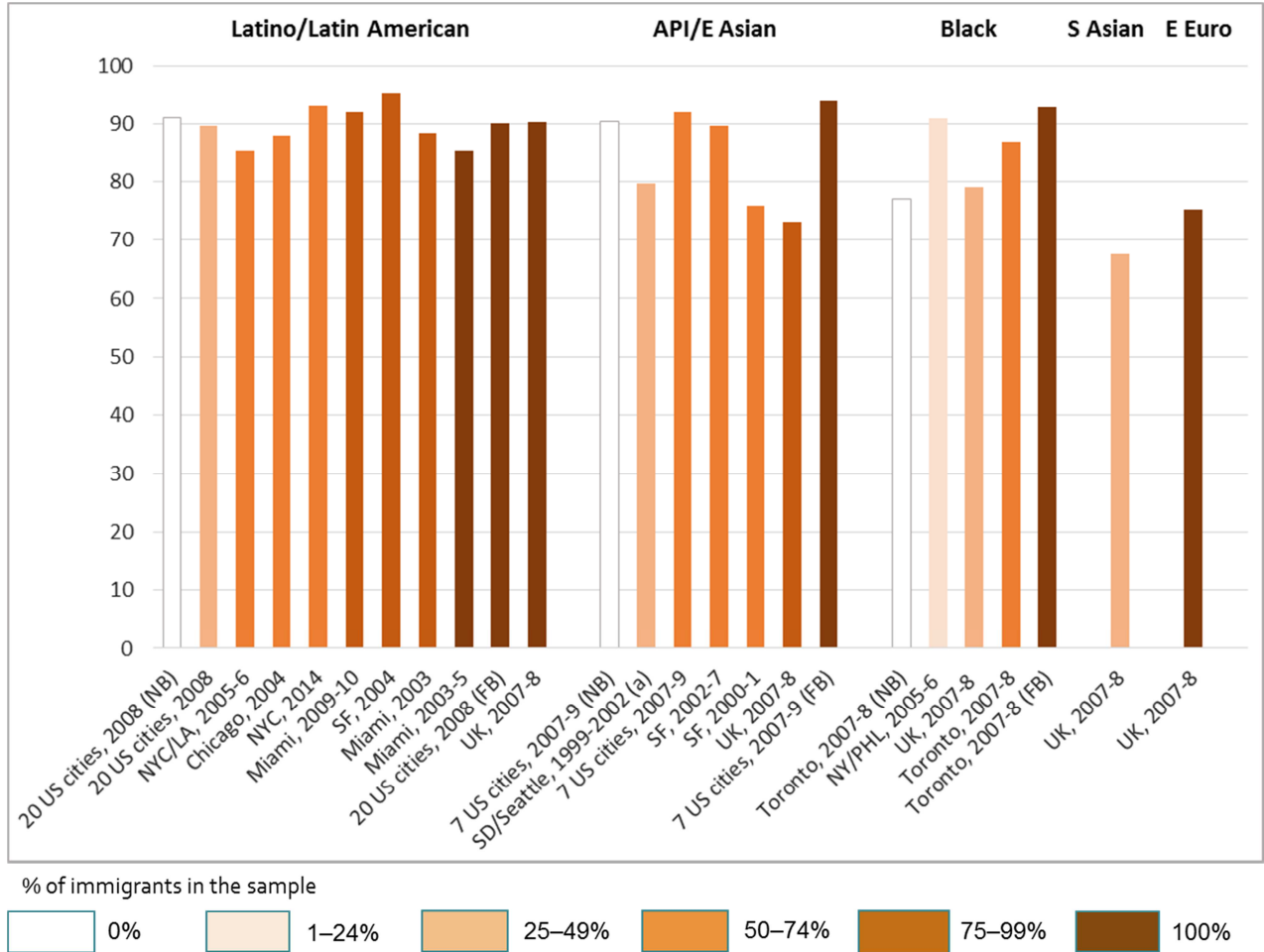
Figure 3. Prevalence (%) of any UAI in the past 3 months (UAI-3) among ethnic minority MSM, United Kingdom and Select U.S. Cities, 1999–2014



- (a) Refers to condomless anal intercourse (CAI) due to the advent of pre-exposure prophylaxis (PrEP) as a protective intervention in 2012.
 (b) Refers to casual partner UAI.

Notes: Prevalence ranges for alternate indicators and timeframes: UAI-12: 45–60 (Latino/Latin American), 41 (Other); IUAI-12: 24–48 (Latino); RUAI-12: 25–43 (Latino); UAI-6: 44–49 (Latino), 47–56 (API); IUAI-6: 29 (API), IUAI-6: 12 (API), RUAI-6: 35, RUAI-6: 9, IRUAI-6: 26 (API); IUAI-3: 27 (Latino), 27 (API); RUAI-3: 28 (Latino), 27 (API); SDUAI-3: 18–20 (Latino); UAI-30: 72 (Latino); IUAI-2: 14–15 (Latino), RUAI-2: 14–15 (Latino); IUAI-30: 30 (Latino); RUAI-30: 25 (Latino), UAI-LE: 25 (Latino), IUAI-LE: 24 (Latino), RUAI-LE: 24 (Latino).

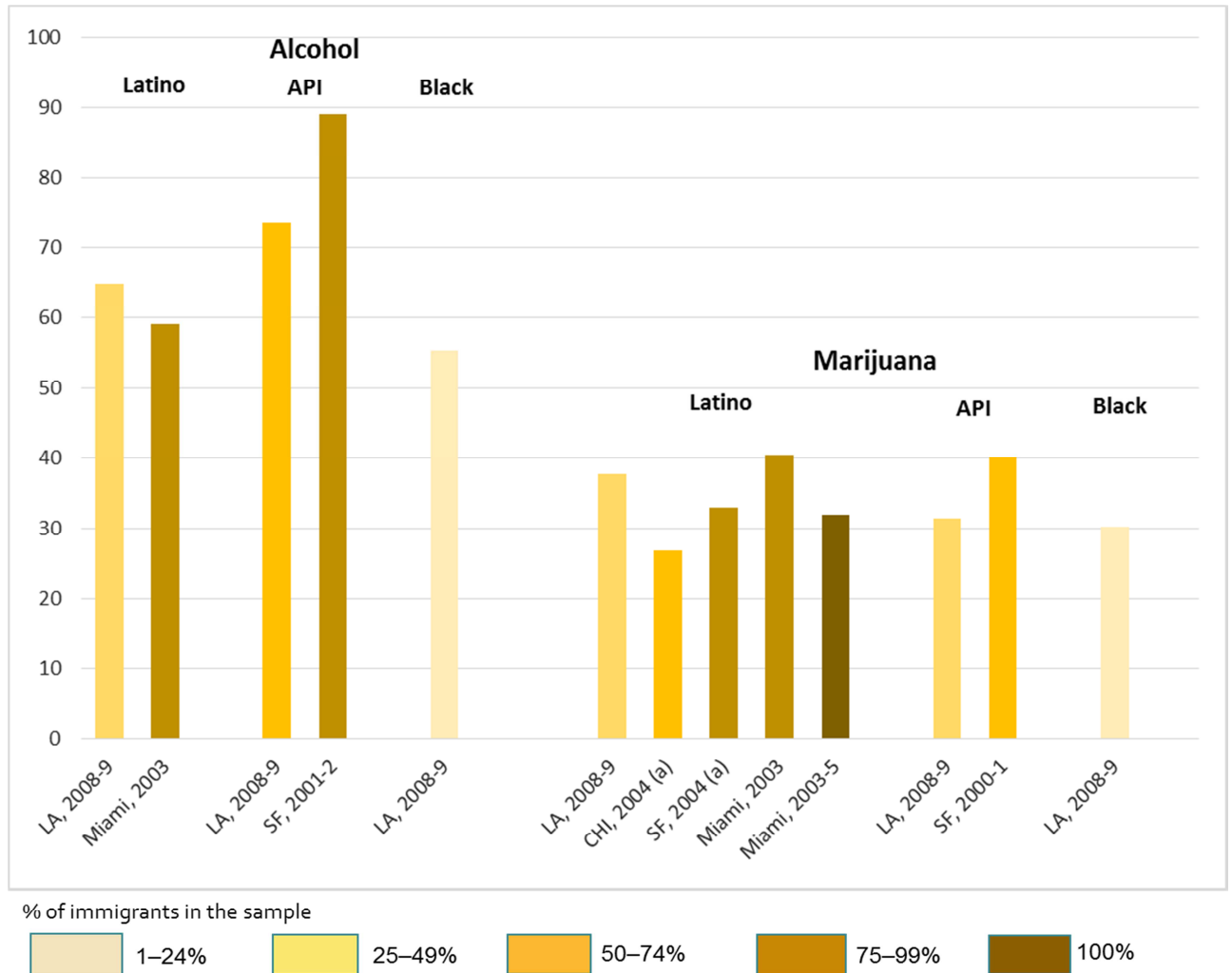
Figure 4. Lifetime prevalence of HIV testing (TES-LE), ethnic minority MSM, United Kingdom and select U.S. Cities, 1999–2014



(a) Includes 145 repeat cases among 908 respondents.

Notes: Prevalence ranges for alternate timeframes: TES-12: 44–68 (Latino), 43–56 (Black), 63–65 (API); TES-6: 46 (API), 42 (Black).

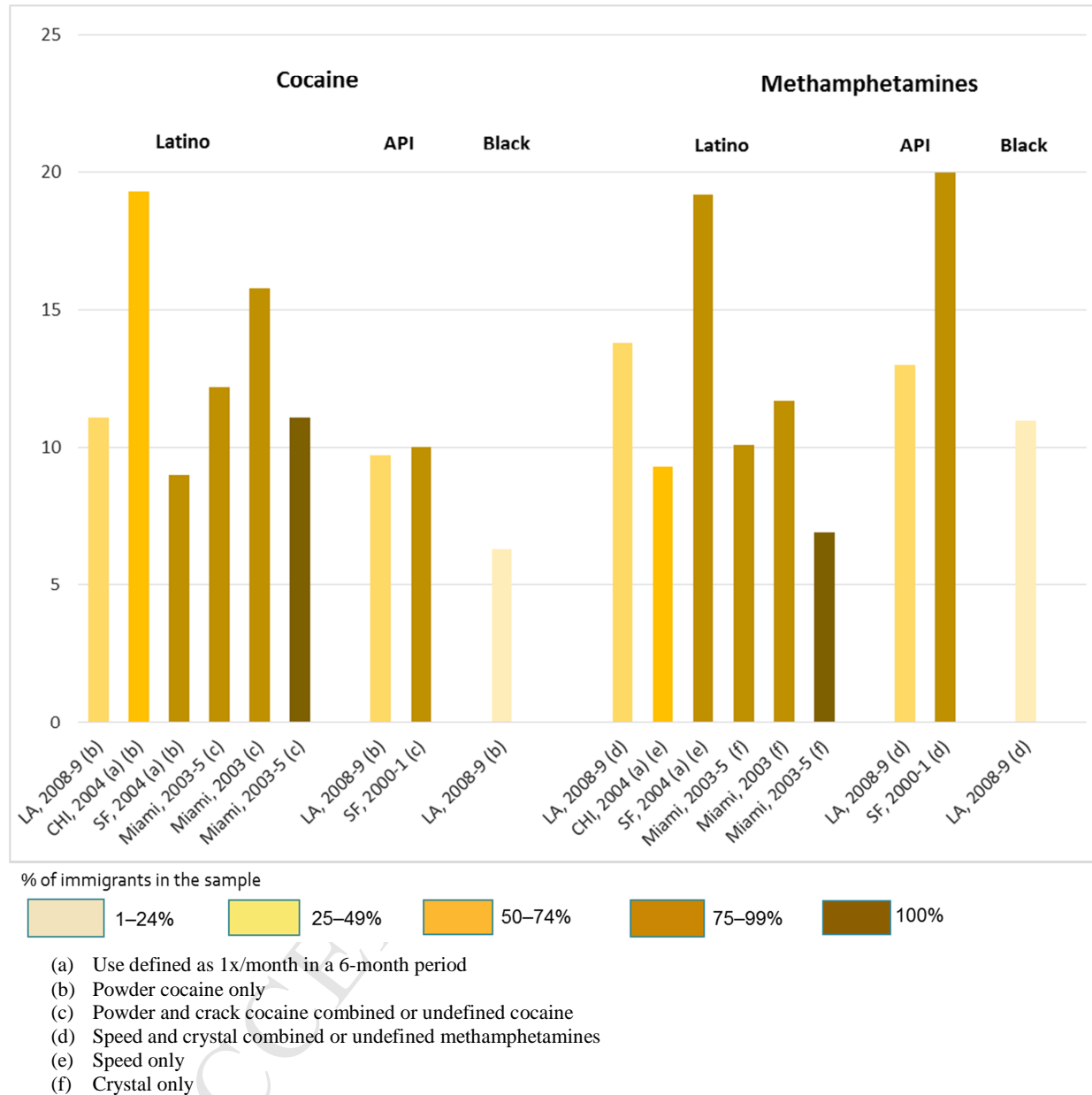
Figure 5. 6-month prevalence of any depressant use (ALC-6, MAR-6), ethnic minority MSM, Select U.S. Cities, 2000–2009



(a) Use defined as at least 1x/month in a 6-month period

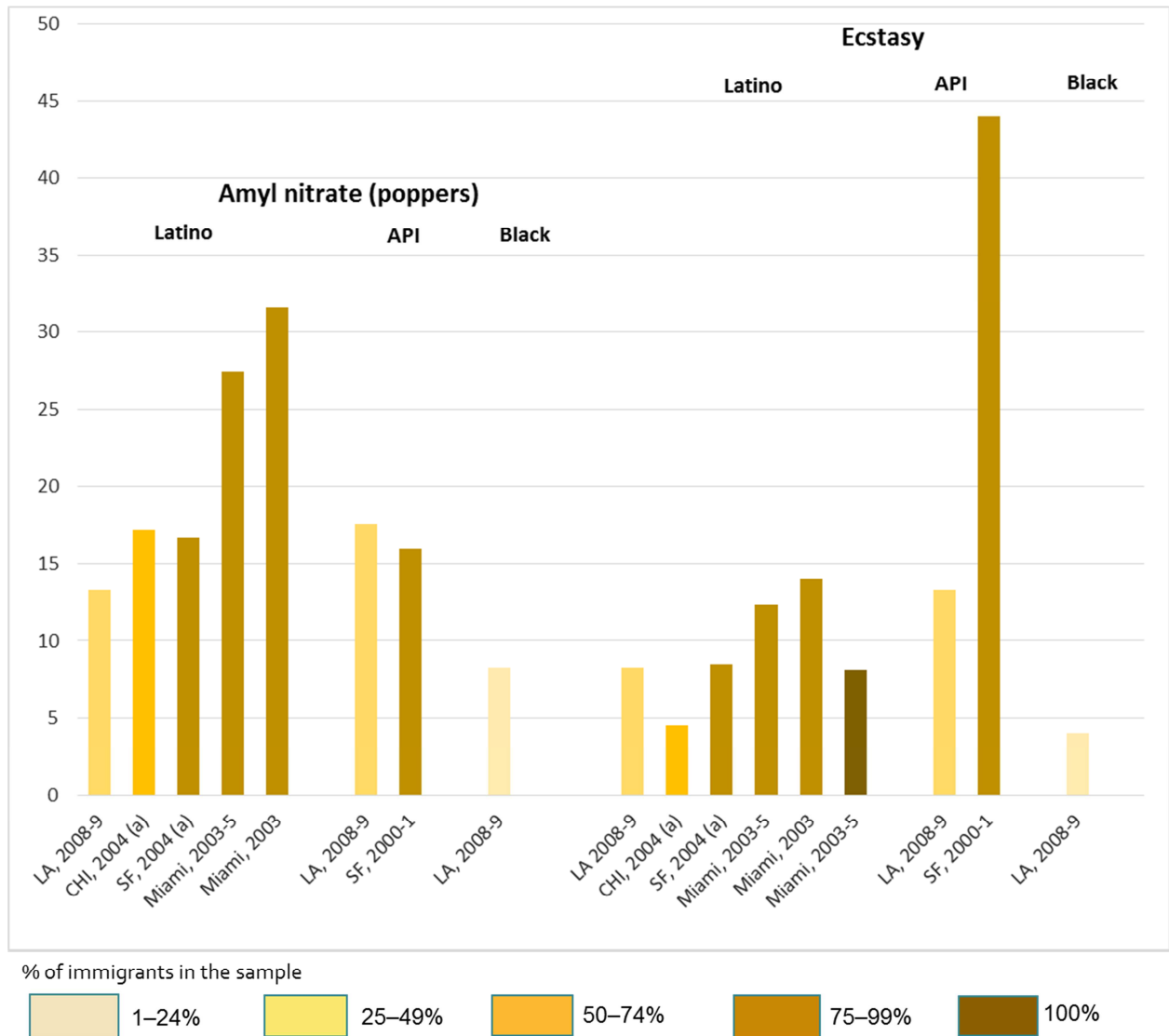
Notes: Prevalence ranges for alternate indicators and timeframes, Alcohol: ALC-12: 64 (Latino), 76–84 (API); ALC-3: 65–66 (Latino); ALC-30: 75 (API); ABS-12: 27–56 (Latino), ABS-2: 27–41 (Latino), ABS-30: 16–18 (Latino); **Prevalence ranges for alternate indicators and timeframes, Marijuana:** MAR-L: 29–90 (API); MAR-12: 53 (Latino), 22–47 (API); MAR-3: 34 (Latino), 46 (Black); MARBS-30: 7 (Latino).

Figure 6. 6-month prevalence of any stimulant use (COC-6, MET-6), ethnic minority MSM, select U.S. cities, 2000–2009



Notes: Prevalence ranges for alternate indicators and timeframes, Cocaine: COC-L: 34 (Latino), 20–32 (API); COC-12: 22 (Latino), 8–9 (API); COC-3: 11–12 (Latino), 33 (Black); COC-30: 8 (API); COCBS-30: 1 (Latino); **Prevalence ranges for alternate indicators and timeframes, Methamphetamines:** MET-L: 20 (Latino), 29–36 (API); MET-12: 6 (Latino), 8 (API); MET-3: 13–15 (Latino), 3 (Black); MET-30: 25 (API); METBS-30: 0 (Latino).

Figure 7. 6-month prevalence of any club drug use (POP-6, ECS-6), ethnic minority MSM, Select U.S. Cities, 2000–2009



(a) Use defined as 1x/month in a 6-month period

Notes: Prevalence ranges for alternate indicators and timeframes, Amyl nitrate (poppers): POP-L: 28 (Latino), 29 (API); POP-12: 15 (Latino), 15-17 (API); POP-3: 9-13 (Latino), 3 (Black); POPBS-30: 6 (Latino); **Prevalence ranges for alternate indicators and timeframes, Ecstasy:** ECS-L: 58 (API); ECS-12: 8 (Latino), 11-19 (API); ECS-3: 20 (Latino); ECSBS-30: 1 (Latino).

Highlights

- Advances a theory of transnational migration and HIV risk among MSM as syndemic
- Established baseline prevalence data for HIV risk factors among ethnic minority MSM
- Provides a point of departure for inter-ethnic comparison of HIV risk factors for MSM