Redefining "high-risk" behavior by clustering multiple factors associated with HIV acquisition

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Overview

- Definitions of HIV risk such as engagement in condomless anal intercourse (CAI) may not adequately characterize risk.

- This study examined clustering patterns among 15 risk indicators or behaviors among a sample of HIV-negative men who have sex with men (MSM).

- A small group of MSM were at the highest risk for HIV acquisition. These men were also the most likely to be substance users, to be depressed, and to have a history of intimate partner violence (IPV), incarceration, and homelessness.

Introduction

- Novel strategies to prevent HIV acquisition require more refined characterizations of behaviors considered high-risk. For example, practice of CAI may be inadequate for PrEP users. To identify those at truly high risk for acquiring HIV, redefinitions of risk are needed.

Methods

- This study included baseline data from HIV-negative MSM participating in the mStudy cohort. All participants self-reported engagement in CAI within six months prior to enrollment.

- Fifteen behaviors or indicators of risk for acquiring HIV were identified in the dataset (see Table 1). Latent class analysis (LCA) was utilized to search for clustering patterns in risk variables. The optimal LCA model was selected based on model fit and entropy statistics.

- Classes were named based on the patterns and types of risk indicators that were associated with each class. Each participant was assigned to their most probable class.

- Demographic, psychosocial, substance use, and other behavioral variables were tested for differences between classes.

Figure 1. Sample distribution of HIV risk classes

Behavior/Risk indicator	% of total
6 or more new sex partners in past 6 months	28%
2 or more partners at the same time	54%
Had a partner with multiple partners	47%
RAI with 4 or more partners in past 6 months	30%
4 or more unknown partners in past 6 months	25%
3 or more one-time partners in past 6 months	28%
4 or more times having RAI in past month	27%
Did not use PrEP in past 6 months	76%
Used drugs (except marijuana) before sex two or more times in past six months	17%
Had anal sex for money/drugs in past 3 months	22%
Drank heavily two or more times before sex in past 6 months	19%
Last sex partner was HIV+ or unknown	41%
Had 2 or more trade partners in past 6 months	10%
Tested positive for any STI	17%
Did not test for HIV in past year	6%

Table 1. Fifteen HIV risk behaviors and indicators used to identify the latent classes
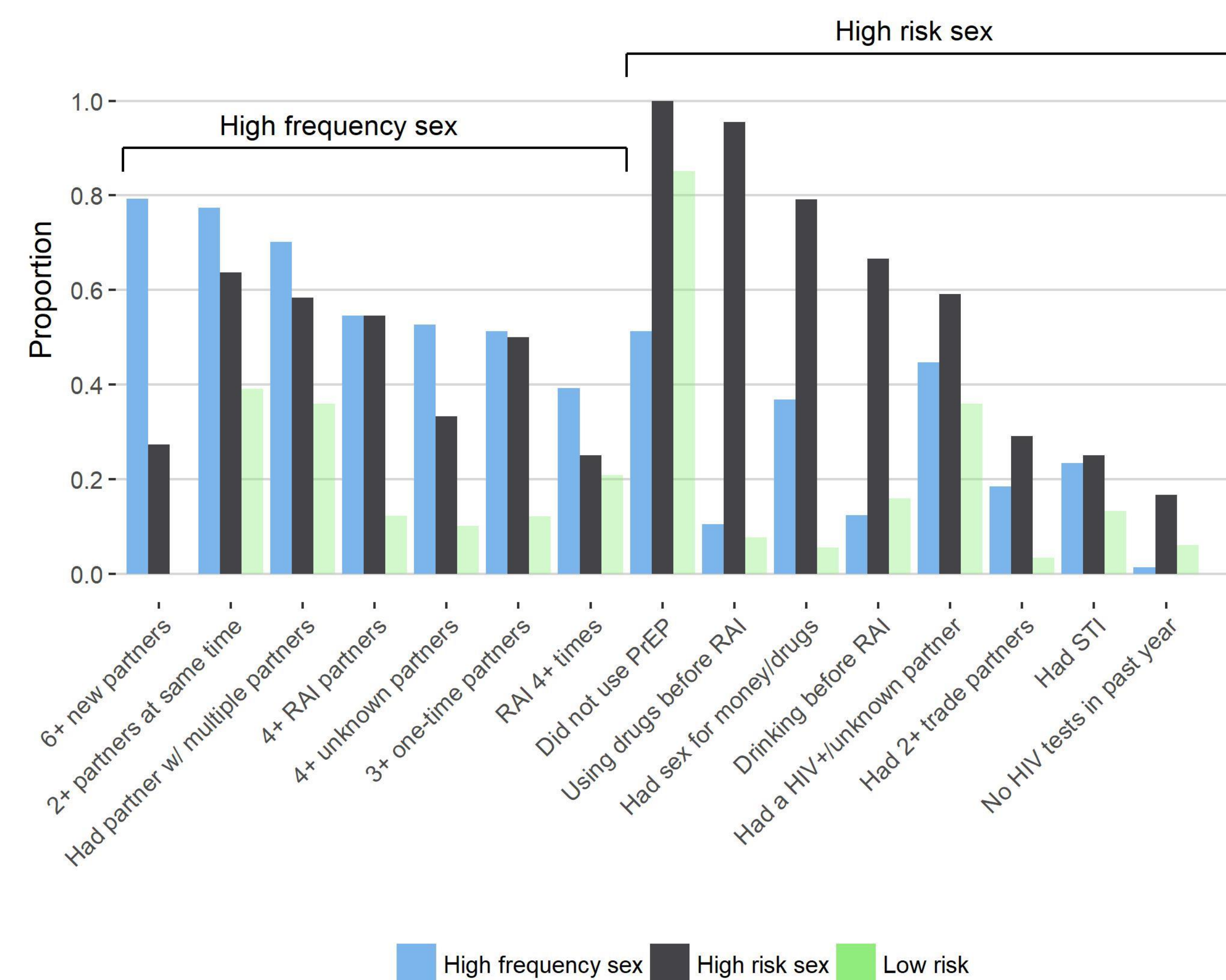

Figure 2. Results of the latent class analysis. Participants in the "high frequency sex" class often reported many partners and sex acts (variables on the left side of the graph), and those in the "high risk sex" class commonly reported using drugs and alcohol before sex and transactional sex (variables on the right side of the graph).

Results

- 252 HIV-negative MSM were included. Participants were an average of 29 years old (range 18 to 46), 47% were Hispanic, 41% were Black, and 12% were White or another Race.

- LCA resulted in three risk classifications (see Figures 1 and 2):
  1. High frequency sex (HF: 30% of participants, n = 77), characterized by reports of many sexual partners, multiple partners at the same time, and many sex acts.
  2. High risk sex (HR; 10%, n = 24), characterized by reports of not using PrEP, using drugs and alcohol with sex, and engaging in transactional sex.
  3. Lower risk (LR; 60%, n = 151), those reporting comparatively few risk indicators.

- More HR participants reported an early sexual debut, a history of incarceration, and experience of homelessness, rape, and intimate partner violence within the previous year than HF and LR participants. HR participants also reported the highest levels of depression, homonegativity, and prevalence and frequency of methamphetamine use (see table 2).

- There were few differences between HF participants and LR participants with the exception of higher mean depression and substance use.

	High risk n = 24 mean(sd)/n(%)	High frequency n = 77	Low Risk n = 151	p
Age	28 (7)	29 (7)	29 (6)	.99
Race				.69
Black	7 (29%)	30 (39%)	66 (44%)	
Hispanic	13 (54%)	37 (48%)	69 (45%)	
Other	4 (17%)	10 (13%)	16 (11%)	
Methamphetamine use (urine toxicology)	5 (21%)	9 (12%)	8 (5%)	.02
Frequency of methamphetamine use (self-reported)				<.01
Daily or weekly	13 (54%)	9 (12%)	10 (7%)	
Monthly or less	5 (21%)	13 (17%)	24 (16%)	
Never	6 (25%)	55 (71%)	116 (77%)	
Frequency of binge drinking (self-reported)				.32
Daily or weekly	5 (21%)	9 (12%)	24 (16%)	
Monthly or less	8 (33%)	42 (54%)	82 (54%)	
Never	11 (46%)	26 (34%)	45 (30%)	
Homonegativity	20.2 (8.7)	15.5 (9.0)	17.0 (9.4)	.09
"Out" to at least one family member	15 (62%)	71 (92%)	113 (75%)	<.01
Depression (CESD)	25.2 (12.3)	19.4 (12.9)	16.0 (9.4)	<.01
Experience of homelessness in past year	15 (63%)	30 (39%)	43 (29%)	<.01
Experience of IPV in past year	9 (38%)	13 (17%)	22 (15%)	.03
History of incarceration	16 (67%)	23 (30%)	44 (29%)	<.01
Sexual debut at age 12 or younger	11 (46%)	14 (18%)	28 (19%)	.01

Table 2. Associations between HIV risk class and demographic, psychosocial, substance use, and other behavioral variables.
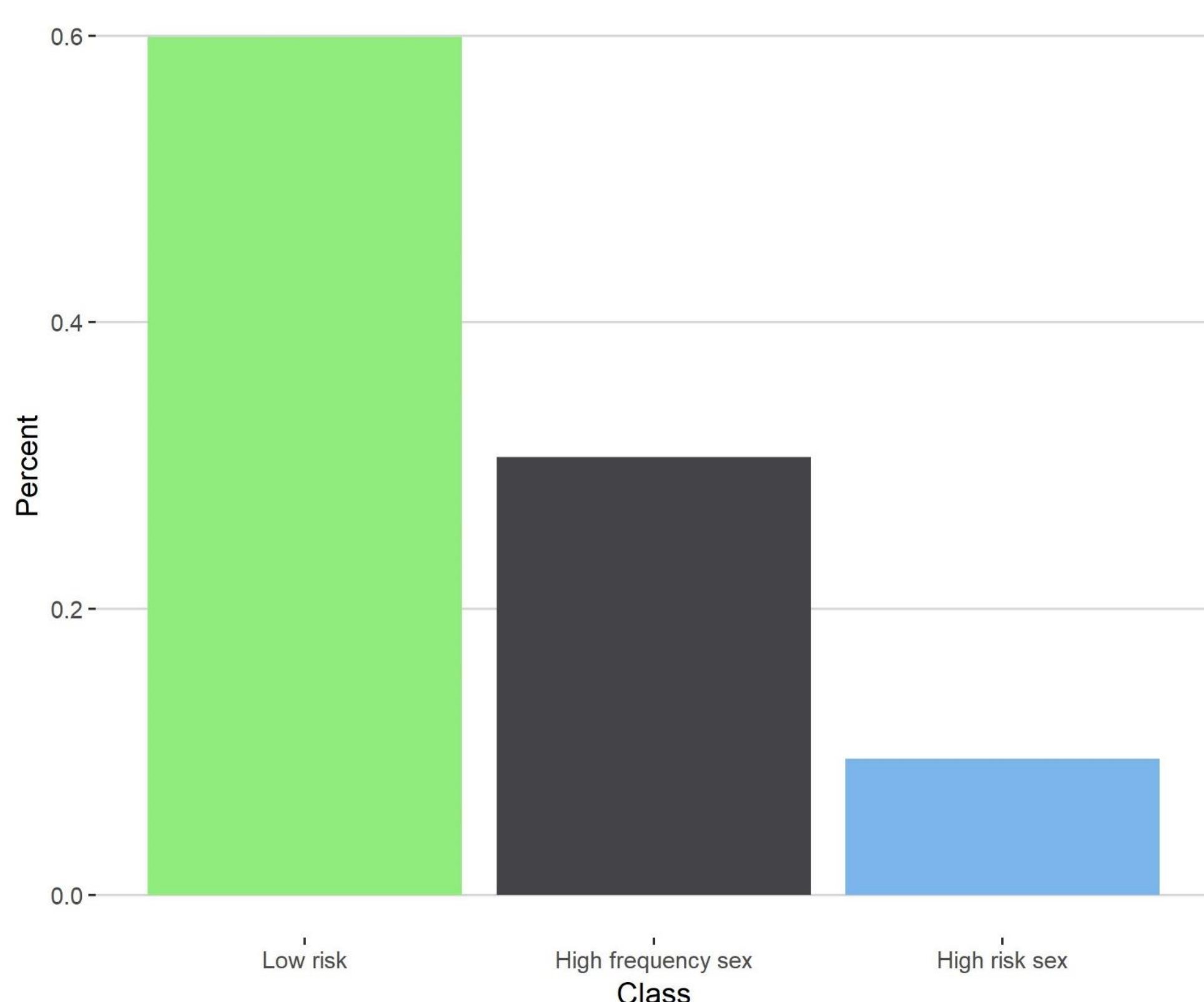
Conclusions

- Assessment of risk for HIV acquisition can be refined by considering a wide breadth of indicators and clustering patterns.

- MSM at highest actual risk may represent a relatively small percent of all MSM.

- These men may have other characteristics that reflect social and behavioral lifestyles that require broader interventions.