each other in a chain. Data on recruitment chains and participants' characteristics were collected in real-time using Syrexcloud mobile application. Random Forest machine learning algorithm was used for predicting presence of HIV-positives within two waves of recruitment among the subset of participants who received coupons (N=22,236).
Results: Among participants who received coupons, 80% of them (n=17,872) recruited at least one peer and 35% of them (n=7,678) recruited at least one HIV-positive participant within two waves of recruitment network. The full random forest model with 17 predictors yielded an accuracy of 84.9% for classification of HIV-positives and negatives (sensitivity of 83.2% and specificity of 85.8%). The most informative predictors of recruitment of HIV-positives included size of recruited network for each participant (mean minimal depth (MMD) = 1.33), result of HIV rapid test at screening (MMD=2.00), region (MMD=2.12), experience of HIV testing before screening (MMD=2.78), and age (MMD=2.95). Sex (MMD=4.37), group of key population (MMD=3.97) and marital status (MMD=3.56) had the lowest contribution to prediction.
Conclusions: High level of prediction model accuracy suggests that application of Random Forest machine learning algorithm during recruitment could improve HIV-positive yield among recruited participants. Further validation of Random Forest prediction algorithm includes its implementation as a decision-making tool for improving recruitment strategy, such as distributing more coupons to participants with high probability of recruitment of HIV-positives.

WEAC0104

When and why? Timing and determinants of post-migration HIV acquisition among sub-Saharan immigrants in France

A. Gosselin[1,2], A. Ravalihasy[1,2], J. Pannetier[1], F. Lert[1], A. Desgrées du Loû[1,2], Parcours Study Group
[1]CEPED (Université Paris Descartes, IRD, Inserm), Paris, France, [2]Institut de Recherche pour le Développement, Marseille, France

Background: Mounting evidence has recently highlighted the fact that many HIV-positive immigrants in Europe acquired their infections post migration, in relation to experiences of social hardship that entail at-risk sexuality (e.g. transactional). However, the timing of these infections is not known. This study aims to estimate the timing of post-migration HIV infection among Sub-Saharan immigrants in France, who are particularly affected by HIV, and to understand the correlates of post-migration infection.
Methods: Life-event and clinical information were collected in 2012-2013 from a random sample of 277 HIV-infected outpatients infected after arrival in France and 431 patients not diagnosed with HIV, born in Sub-Saharan Africa and living in the Paris area. The 6th year in France was chosen as the settlement delay based on previous analysis. We assumed HIV infection after six years (i.e. after the settlement period) in France if at least one of the following criteria was fulfilled: (i) HIV diagnosis at least 11 years after the six years in France, (ii) at least one negative HIV test in the 6 first years in France, (iii) sexual debut after 6 years in France. Otherwise, time of HIV infection was based on statistical modeling of first CD4 T-cell count. We assessed the determinants of HIV acquisition after six years in France using multinomial logistic regression models.
Results: Overall, 58% of Sub-Saharan immigrants who acquired HIV in France had been infected during the first six years in the country (55% of men and 61% of women). Conversely, about 42% of immigrants had contracted HIV after settlement. Factors associated with post-settlement infection were arrival in France at a younger age (between 18 and 27 years old versus later (OR=2.40[1.08-5.31]) and arriving with a long-term permit versus being undocumented (OR=2.23[1.12-4.43]). Bivariate models showed that post-settlement infection was associated with occasional and transactional relationships (OR=1.98[1.04-3.79]) and concurrent partnerships (OR=1.91[1.01-3.60]).
Conclusions: The majority of post-migration HIV acquisition occurs during the settlement period. Therefore, HIV prevention efforts should target newly arrived immigrants. However, long-time immigrants are also at risk for HIV, and specific prevention tools and interventions should be directed at this population.

	Bivariate models		Multivariate models	
	RRR [IC 95%]	p	RRR [IC 95%]	p
Legal permit at arrival in France				
Undocumented	ref		ref	
Short term permit	1.21 [0.63-2.34]	0.557	1.11 [0.62-2.00]	0.724
Long term permit or French nationality	2.60 [1.43-4.74]	0.002	2.23 [1.12-4.43]	0.023
Had at least one casual or transactional partnership after 6 years in France (ref. No)				
Yes	1.98 [1.04-3.79]	0.039	1.49 [0.64-3.51]	0.348
Had at least one concurrent partnership after 6 years in France (ref. No)				
Yes	1.91 [1.01-3.60]	0.047	1.31 [0.67-2.56]	0.416

[Factors associated with the probability to be infected after settlement (in reference to the non infected group)]

WEAC0105

Patterns of substance use among young men who have sex with men and their associations with HIV risk behavior and sexually transmitted infections

M. Newcomb, G. Swann, B. Mustanski
Northwestern University, Medical Social Sciences, Chicago, United States

Background: Young men who have sex with men (YMSM) carry a heavy burden of HIV in the United States. Substance use predicts condomless anal sex (CAS) and HIV incidence, but little is known about patterns of polysubstance use and individual differences in patterns of use, particularly among YMSM under age 21. The current study used longitudinal data to describe patterns of polysubstance use, examine demographic differences in patterns of use, and predict HIV risk across groups of substance users.
Methods: We utilized an analytic sample of 601 YMSM aged 16-20 from the RADAR cohort study of YMSM in Chicago (N=1,125, age range 16-29). Participants completed study visits every 6 months between 2015 and 2017, at which time we assessed past 6-month substance use and sexual behavior. STI testing was conducted annually. We used latent class analysis (LCA) to empirically derive groups of individuals who tend to use similar substances. We included the most frequently endorsed substances as latent class indicators (binge-drinking, chronic marijuana use, stimulants, ecstasy, prescription drugs). We then conducted one-way ANOVA and chi-square analyses to examine demographic differences in class membership and negative binomial and logistic regression models to predict HIV risk.
Results: LCA revealed 4 latent classes of substance users. Binge-Drinkers (N=166) were more likely to be White and gay-identified; Binge-Drinkers and Prescription Drug Users (N=144) were more likely to be White; Polysubstance Users (N=70) were more likely to be gay-identified and the least likely to be Black; and Low Substance Users (N=221) were the most likely to be Black, younger and bisexual. Polysubstance Users had the highest rates of CAS and STIs concurrently and longitudinally, followed by Binge-Drinkers and Polysubstance Users, Binge-Drinkers, and Low Substance Users (all comparisons $p < .05$).
Conclusions: The YMSM groups reporting use of multiple substances had the highest HIV risk. Polysubstance use has consistently been linked to HIV, but these analyses point to prescription drug use as another important target for HIV prevention among YMSM. Importantly, low substance use and CAS among Black YMSM contrast with their high HIV incidence in Chicago. Patterns of substance use cannot fully explain racial disparities in HIV.