

Figure 1. Transmission of pre-treatment drug resistance in the Cologne-Bonn region. A) The color indicates the reported risk group. B) and individuals living in the city center (in orange) or suburban areas (in yellow) of Cologne-Bonn. All edges represent a genetic distance of $\leq 1.5\%$. Lines in bold red indicate individuals who shared DRMs. Squares and circles indicating male and female. Only shared DRM are labeled with each nodes. N|NRTIs indicate the presence of ≥ 1 nucleoside or non-nucleoside reverse transcriptase inhibitor resistance(s).

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1284. Study of Single Nucleotide Polymorphisms Associated with HIV-1 Set-Point Viral Load in Antiretroviral Therapy-Naïve HIV-Positive Participants of the START Study

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Background. HIV-1 set-point viral load (SPVL) is predictive of disease progression and shows variability across HIV-1-positive (HIV+) persons. Various factors may influence SPVL including viral features, environmental exposure and host genetics. To identify single nucleotide polymorphisms (SNPs) associated with SPVL, we performed a genome-wide association study (GWAS) on a subset of participants from the Strategic Timing of Antiretroviral Treatment (START) study covering a demographically diverse population.

Methods. Consenting participants were antiretroviral therapy (ART)-naïve and SPVL was taken as \log_{10} (HIV RNA) at study entry. Genotypic data were generated on a custom content Affymetrix Axiom SNP array covering 770,558 probes. The Ensembl Gene database, assembly GRCh37.p13, was used for annotation. Principal component analysis (PCA) was used to identify population structures, and analysis of variance (ANOVA) was performed to detect associations between SNPs and SPVL. SNPs with zero variance or minor allele frequency (MAF) ≤ 0.05 were removed.

Results. Among the 2,544 participants, PCA showed distinct population structures with strong separation between black ($n = 578$) and nonblack ($n = 1,966$) participants, Figure 1. ANOVA was performed independently on both subsets. Two SNPs located in the Major Histocompatibility Complex (MHC) class I region of chromosome six reached genome-wide significance ($P < 5 \times 10^{-8}$) in the non-black population: rs4418214 ($P = 1.74 \times 10^{-10}$), and rs57989216 ($P = 3.96 \times 10^{-8}$), Figure 2. Two additional SNPs, rs9264942 ($P = 5.99 \times 10^{-8}$) and rs7356880 ($P = 9.69 \times 10^{-8}$), in the same region approached significance. The minor alleles of all four SNPs were associated with lower SPVL, Figure 3. While no SNPs reached genome-wide significance in the black group, we observed similar trends toward lower SPVL for both rs4418214 and rs57989216.

Conclusion. In this study we confirm the association of a previously reported SNP (rs4418214) and identify a novel candidate SNP (rs57989216) associated with lower SPVL in a population of nonblack, ART-naïve HIV+ persons. Current findings suggest that the effects of these SNPs are consistent across race groups, but further studies are required to confirm this. Our results support previous findings that variation in the MHC class I region is a major host determinant of HIV-1 control.

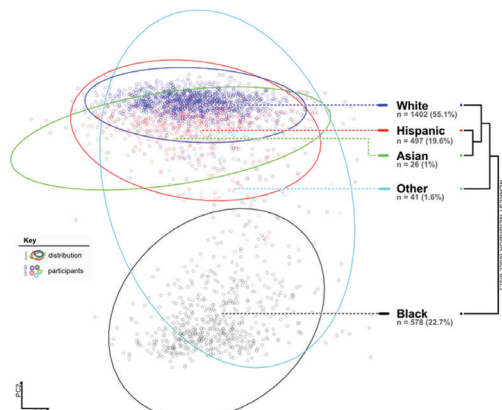


Figure 1. Population structure of the study participants. LEFT: The population structure is illustrated by a principal component analysis (PCA) plot. Each study participant is illustrated by a point that is coloured by race; blue = White, red = Hispanic, green = Asian, black = Black and aqua blue = other. Gaussian estimates are used to visualise the distributions of races in relation to one another (large ellipses). RIGHT: A nearest neighbour dendrogram, calculated on the Euclidean distance between population means, highlights the differences between races.

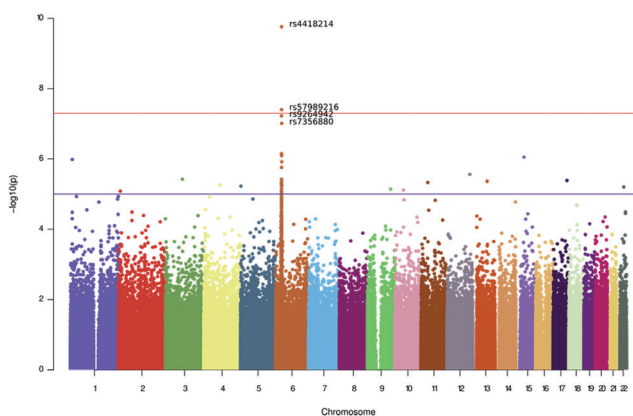


Figure 2. SNPs associated with SPVL in the non-black population. The Manhattan plot shows the association between SNPs and SPVL. Each SNP is represented by a point and plotted by chromosomal location (x-axis), and $-\log_{10}(P)$ per SNP is shown on the y-axis. Genome-wide significance is indicated by the horizontal red line ($P = 5 \times 10^{-8}$).

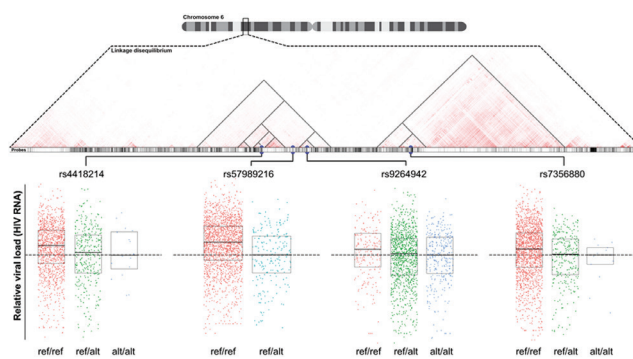


Figure 3. Summary of top four SNPs associated with SPVL. TOP: The location of the four most significant SNPs in the MHC region of chromosome 6. MIDDLE: A heatmap of linkage disequilibrium (LD) highlighting local structures of SNPs in LD with one another. The black line annotations demonstrate the pyramidal, or tree-like, structure of SNP clusters in LD with one another. The positions of the top four SNPs are shown as blue points. The barcode below the heatmap shows the probe coverage of the Affymetrix array in that region, i.e. the SNPs we were able to test for association with SPVL. BOTTOM: Boxplots of SPVL distributions for each of the four SNPs and their different genotypes.

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1285. Impact of an Educational Program on Knowledge, Attitude and Practice to Prevent HIV Infection Among HIV-Negative Heterosexual Partners of HIV-Infected Patients

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Background. Data on knowledge, attitudes, and practices to prevent HIV transmission are limited and effective strategies to improve such knowledge, change attitudes, and reduce risk behaviors are unknown among serodiscordant couples.

Methods. A quasi-experimental study was conducted among HIV-negative adult heterosexual partners of HIV-infected patients. The intervention was an educational program consisting of a 1-hour educational session on knowledge about HIV infection and transmission prevention, a condom use teaching session, group discussion and experience sharing, and free HIV testing. Self-administered survey was conducted pre- and post-intervention on the same day to assess effectiveness of the program in improving HIV knowledge and changing attitudes toward HIV prevention. The participants were invited to participate in the program again 6 months later to assess retention of the knowledge and positive attitudes and practices to prevent HIV.

Results. A total of 88 participants were enrolled. The median age was 39 years and 49 (56%) were male. The median number of correct answers to the 30 statements about HIV infection and transmission prevention was significantly higher after the program compared with before the program (28 vs. 21; $P < 0.001$). After the program, higher proportions of the participants would encourage treatment of their HIV-infected partners (77% vs. 58%), use pre-exposure prophylaxis (59% vs. 38%), have a regular HIV blood test every 6 months (94% vs. 81%) and think that they and their partners can have a baby together safely with the current HIV transmission prevention strategies (48% vs. 17%) compared with before the program (all $P < 0.05$). Among the 35 participants who participated in the educational program twice, most of the knowledge and positive attitudes were retained. The rates of regular HIV testing every 6 months and consistent condom use had increased from baseline to 6 months later (29% to 74% and 71% to 91%, respectively). None of the participants acquired HIV from their partners.

Conclusion. The educational program was shown to be effective in improving HIV knowledge, attitudes, and practices toward HIV prevention among the seronegative partners.

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1286. Evaluating Strategies to Reduce Risk of HIV Infection in the US Blood Supply

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Background. Due to risk of HIV transmission, the FDA recommends a ban on blood donation from men who have sex with men (MSM). Revised in 2015, the current restriction applies to men who have had sex with a man in the year before donation. Given advances in HIV testing and the option of risk-based screening, the current approach may not represent the optimal strategy for ensuring a safe blood supply.

Methods. Using a decision tree, we compared three strategies: (1) the current standard: a deferral for MSM followed by fourth-generation HIV antibody/antigen (Ab/Ag) and viral load (VL) testing of all donated units; (2) test-only: no deferral, with Ab/Ag and VL testing; (3) risk-based: deferral for all male donors who report condomless anal intercourse in the past 6 weeks, followed by Ab/Ag and VL testing. The primary outcome was the expected number of accepted HIV+ donations per million units of donated blood. Key input parameters include MSM prevalence (3.6%), HIV testing sensitivity for chronic (99.96%) and acute (75%) infection, and false negative rate of the current MSM deferral question and the risk-based screening question (2.6% for each). In sensitivity analyses, we assessed the impact of variation in these parameters.

Results. In the base case, the current strategy resulted in 5.39 HIV+ accepted blood donations per million; the testing only strategy resulted in 7.10 HIV+ accepted blood donations per million; and the risk-based strategy resulted in 2.54 HIV+ accepted blood donations per million. In sensitivity analyses, the risk-based strategy was superior across plausible ranges of HIV test sensitivity and MSM prevalence. The risk-based strategy was superior when the false negative rate generated by the risk-based screening question was $<10.4\%$; at higher rates, the current strategy was superior. The current strategy was superior when the MSM deferral question yielded $<0.8\%$ false negative rate; at higher rates, the risk-based strategy is superior. Compared with the current standard, a risk-based strategy could add 5 million low-risk MSM to the potential donor supply.

Conclusion. A risk-based screening question, combined with Ab/Ag and VL testing, may be more effective than the current strategy. The quality and ability of screening questions to accurately assess risk is key to any pre-donation screening strategy.

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1287. Seizing Opportunities for Intervention: Changing HIV Knowledge Among Men Who Have Sex With Men and Transgender Women Attending Trusted Community Centers in Nigeria

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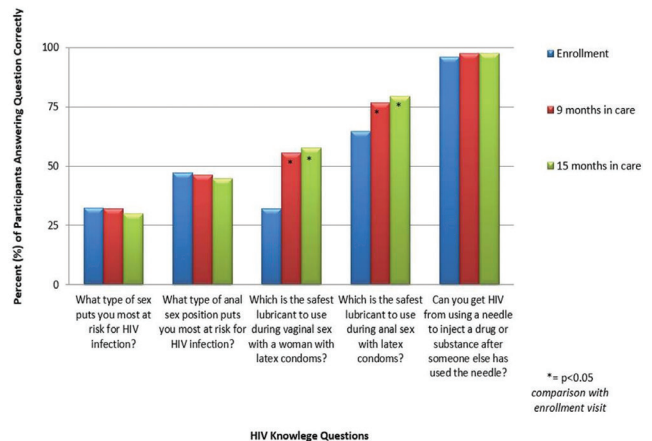
Background. Knowledge of HIV risk factors and risk reduction strategies is essential for HIV prevention in key populations, including men who have sex with men (MSM) and transgender women (TGW). We described factors associated with HIV-related knowledge and evaluated the impact of counseling and care at trusted community health centers serving Nigerian MSM and TGW.

Methods. The TRUST/RV368 cohort recruits MSM and TGW via respondent driven sampling in Abuja and Lagos, Nigeria. Participants undergo a structured interview with five knowledge-testing questions at enrollment and after 9 and 15 months. Routine HIV/STI screening, free condoms/lubricants, and counseling about safer sex practice is provided. Multivariable Poisson regression with generalized estimating equations was used to calculate risk ratios (RRs) and 95% confidence intervals (CIs) for factors associated with answering more knowledge questions correctly. Pearson's chi-squared test was used to compare the proportion of participants answering each question correctly at enrollment and subsequent visits.

Results. From March 2013 to December 2017, 2,090 biological males were enrolled with median age 23 [interquartile range 20–27] years, including 234 (11.2%) with female gender identity. Of 1691 participants with known HIV status, 836 (49.4%) were positive. The mean number of HIV knowledge questions correctly answered was 2.37, 2.98, and 3.09 at enrollment, 9, and 15 months, respectively. Participants demonstrated increased HIV knowledge after 9 (RR 1.15 [95% CI 1.03–1.28]) and 15 months (1.18 [1.05–1.32]). Factors associated with increased knowledge included HIV positivity (1.17 [1.11–1.23]), higher than senior secondary education when compared with less than senior secondary (1.24 [1.12–1.37]), and almost daily internet use when compared with never (1.17 [1.08–1.27]). Knowledge gains were driven primarily by improved understanding of condom and lubricant use (figure).

Conclusion. While HIV knowledge improved during enrollment in the cohort, it remained suboptimal. Multiple modalities may be needed to fully inform Nigerian MSM and TGW of risk reduction strategies. Interventions that involve internet access to deliver educational materials may be a useful adjunct to direct counseling at healthcare centers.

Longitudinal Responses to HIV Knowledge Questions by 513 Participants with ≥ 15 Months in Study



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1288. Adolescents' Knowledge and Acceptance of Pre-exposure Prophylaxis (PrEP) in the Capital District Region of New York

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Background. In 2015, adolescents 13–24 years were disproportionately affected and accounted for 22% of new HIV infections in the United States. In New York State (NYS), the rate of adolescents (13–19 years) living with HIV infection is more than twice the national rate (44.4 vs. 19.4 per 100,000 population). As part of the ending the epidemic (ETE) program, the NYS Department of Health spearheaded access to pre-exposure prophylaxis (PrEP) for high-risk individuals to keep them HIV negative. This study aims to test the hypothesis that adolescents at risk may not be utilizing PrEP and that there are barriers to adopting it.

Methods. A cross-sectional survey (Qualtrics) was conducted from Aug 2017 to May 2018 using a 13-item multiple choice and Likert scale validated questionnaire that takes <5 minutes to complete. Descriptive and nonparametric tests (GraphPad Prism v5.04) were used to characterize knowledge and acceptance of PrEP among adolescents in Capital District NY after the initiation of the ETE program in NYS.