Presentations Made at International AIDS Society Conference, 2011

1. Refining the calculation of community viral load (CVL): decreases in CVL, assessed by time-weighted averaging, are associated with reductions in new HIV diagnoses, 2004-2009, in San Francisco, CA

Authors: Das M, Vittinghoff E, Chu P, Santos GM, Scheer S, McFarland W, Colfax G

Summary: We have previously reported that decreases in annual mean CVL, calculated as the mean of an individual’s most recent viral load (VL) measurement, are associated with reductions in new HIV diagnoses in San Francisco. We hypothesized that calculating CVL using all available VL values per individual would be a more precise measurement of CVL. We assessed the relationship between the time-weighted average CVL with reductions in new HIV diagnoses in San Francisco from 2004-2009. There was a statistically significant decline (p=0.001) in mean log-transformed time-weighted CVL from 2.86 (2004) to 2.13 (2009). In the Poisson model, the mean log-transformed time-weighted CVL (p<0.0005), was significantly associated with the reduction in the numbers of new reported cases from 864 (2004) to 506 (2009). The decrease in this refined measure of CVL, calculated as the time-weighted average of all available VL values, is strongly associated with reductions in new HIV diagnoses in San Francisco.

2. Geographic Disparities in Community Viral Load, 5-year Survival and Poverty in San Francisco

Authors: Das, M. Chu, P. Santos, GM. Scheer, S. Hsu, L. Colfax, G.

Summary: We have reported that decreases in community viral load (CVL) are associated with reductions in new HIV diagnoses and documented significant geographic differences in CVL in San Francisco. Here, we explored the relationship of CVL with 5-year survival and with poverty. CVL for San Francisco was 25,378 copies/mL. The geographic disparities in CVL were similar in spatial distribution with the 5-year survival of AIDS patients. Homeless individuals (40, 478 copies/mL) had the highest CVL and the poorest 5-year survival. The two neighborhoods with the poorest 5-year survival and the highest concentration of residents below the federal poverty line had high CVL values; (Bayview: 38,548 copies/mL; Tenderloin 31,197 copies/mL). Even in relatively richly-resourced San Francisco, disparities in CVL track with poor 5-year survival and neighborhood concentration of poverty. CVL may be a useful marker for public health departments to target resources and address geographic disparities in HIV transmission and survival.
3. Social network differences between HIV-positive and HIV-negative methamphetamine-using men who have sex with men in San Francisco
Authors: Santos GM, Das M, Santos D, Chu P, Colfax G

**Summary**: Social networks influence an individual's sexual risk and substance use patterns. We collected network-level data to assess risk engagement of methamphetamine-using MSM within their peer networks. HIV-positive indexes identified 97 unique network members (mean=2.7 [SD=1.9]); HIV-negative indexes identified 133 (mean=2.71 [SD=1.3])—network sizes did not significantly differ (p=0.41). HIV-positive indexes had more methamphetamine-network members than HIV-negative participants (mean=2.3 [SD=0.8] versus mean=1.9 [SD=0.9]; p=0.03). HIV-positive indexes also had more unprotected anal sex (44% versus 16%; p<0.001), unprotected insertive anal sex (27% versus 14%; p=0.017), unprotected receptive anal sex (33% versus 7%; p<0.001), HIV-serodiscordant anal sex (25% versus 9%; p=0.002), and HIV-serodiscordant unprotected anal sex (18% versus 6%; p=0.009) partners within their networks compared to HIV-negative indexes (figure). In our network-level data, HIV-positive participants maintained more extensive methamphetamine networks than HIV-negative participants. Furthermore, HIV-positive indexes engaged in significantly higher sexual risk behaviors overall, and with HIV-serodiscordant partners, than their HIV-negative counterparts. These findings indicate high potential for HIV and other STD transmission within HIV-positive networks. Different network-level interventions to promote risk-reduction may be needed for HIV-positive and HIV-negative methamphetamine-using MSM.

4. Implementing rapid HIV testing with or without risk-reduction counseling in drug treatment centers: results of a randomized trial

**Summary**: In the United States, more than one-fifth of HIV cases are undiagnosed. Multiple efforts have been undertaken to increase HIV testing, but the efficacy of risk-reduction counseling in these efforts is controversial and warrants further examination. Our objective was to examine the efficacy of on-site rapid HIV testing with risk-reduction counseling on increasing receipt of HIV test results and reducing HIV risk behaviors among persons in drug treatment. Of the 1,281 participants, 39% were women; 20.5% were African-American; 64.4% were white. 63% reported unprotected anal or vaginal sex with at least one partner in the prior 6 months. Retention at 1-month was 99.2% and at 6-months 93.7%; there was no statistical difference among study arms. The combined on-site rapid testing participants received more HIV test results than off-site testing referral participants (p < 0.001, adjusted RR 4.47, 97.5% CI (3.54, 5.64)). At 6-month follow-up, there were no significant differences in unprotected intercourse among the three groups (p = 0.66). This study demonstrated the value of on-site rapid HIV testing in drug treatment centers and found no additional benefit from HIV sexual risk-reduction counseling.

5. The Cost-effectiveness of On-site Rapid HIV Testing in Substance Abuse Treatment: Results of the CTN 0032 Randomized Trial
Authors: Schackman BR, Metsch LR, Colfax GN, Leff JA, Wong AY, Scott CA, Feaster DJ, Gooden L, Matheson T, Mandler RN, Haynes LF, Paltiel AD, Walensky RP

Summary: We evaluated cost-effectiveness of 3 HIV testing strategies in a randomized trial in 12 community-based substance abuse treatment programs (CTPs). Compared to no intervention, life expectancy for HIV+ increases by 0.8 years for off-site referral, 3.7 years for on-site test offer with information, and 3.4 years for on-site test offer with risk-reduction counseling which had lower test completion. The cost-effectiveness ratio for on-site testing with information is $60,300/QALY (quality-adjusted life year) and ranges from $45,200-$96,300/QALY when HIV prevalence and mean CD4 are varied simultaneously. Offering on-site rapid HIV testing with information in CTPs is cost-effective compared to the US benchmark <$100,000/QALY. CTPs should seek funding to implement on-site rapid HIV testing.

Authors: Alison Hughes and Susan Scheer

Summary: We identified a subpopulation of young men in HIV care in SF with a constellation of risk behaviors including drug use, sexual risk taking and discontinuation of ART. Efforts to increase our understanding of the factors underlying the motivation to engage in high risk behaviors are warranted. In addition, providing direct support to patients who need assistance adhering to ART and programs addressing substance use may be needed to increase ART adherence.
(note: this is from the Medical Monitoring Project -- a study of people receiving HIV care)

7. An Emerging Population: People fifty years or older now account for the majority of AIDS case in San Francisco, California
Authors: Susan Scheer, Mia Chen, Alison Hughes and Sharon Pipkin

Summary: Increased use of anti-retroviral therapy has resulted in significant declines in mortality and an increased time from HIV to AIDS. As a result, older persons are the fastest growing population of people living with AIDS. In 2010, for the first time the majority of PLWA in SF were over the age of 50. The aging nature of the HIV/AIDS epidemic is significant and will continue given trends in older age at diagnosis and declining deaths. Faced with both HIV/AIDS-related and age-related co-morbidities, the growing population of older persons with AIDS presents new challenges for research, medical care and support services.

8. Risk Compensation and Pre-Exposure Prophylaxis (PrEP): A Post-iPrEx Survey of US Men who have Sex with Men (MSM)
Authors: Risha Irvin, Albert Liu, Liz Kroboth, Eric Vittinghoff, Russ Tarver, Patrick Sullivan, Sarit Golub, Beryl Koblin, Susan Buchbinder

Summary: This abstract details a post i-PrEx survey on men's thoughts on risk practices/compensation. Most respondents did not anticipate changing their risk practices on PrEP but there was a substantial minority that might adjust their risk practices, potentially offsetting benefit. It will be important to educate MSM populations on PrEP's partial efficacy and offer ongoing risk reduction counseling.
9. **Adherence/Drug Detection Rates and Study Participant Experiences of Counseling Support among MSM in the iPrEx pre-exposure prophylaxis (PrEP) trial in San Francisco, United States**  
**Authors:** Hailey Gilmore, Albert Liu, Rivet Amico, Vanessa McMahan, Pedro Goicochea, Lorena Vargas, David Lubensky, Kim Koester, Peter Anderson, David Glidden, Susan Buchbinder, Robert Grant  

**Summary:** This abstract describes results from focus groups among men who have sex with men (MSM) enrolled in the San Francisco site of iPrEx, the first study to demonstrate a daily pill can help prevent HIV (also known as pre-exposure prophylaxis, or PrEP). Study participants found counseling helpful and appreciated interactions with staff and regular health monitoring provided. Rates of pill use and drug level detection were high in this cohort. Maintaining support to promote pill taking and reduce risk will be critical in upcoming PrEP studies and implementation programs.

**Authors:** Albert Liu, Eric Vittinghoff, Risha Irvin, Liz Kroboth, Doug Krakower, Matthew Mimiaga, Kenneth Mayer, Javier Lama, Russell Tarver, Patrick S Sullivan, Susan Buchbinder  

**Summary:** We administered an online survey to men who have sex with men (MSM) in the United States regarding their sexual frequency and planning, to help inform potential intermittent dosing strategies for pre-exposure prophylaxis (PrEP) for HIV prevention. Most survey respondents reported having anal sex less than twice in the past week, and approximately half reported that their last anal sex was planned, allowing them an opportunity to take PrEP prior to sexual activity. Intermittent PrEP may be an appropriate strategy for some MSM in the US.

11. **No evidence of sexual risk compensation among HIV-uninfected men who have sex with men (MSM) participating in a tenofovir pre-exposure prophylaxis (PrEP) trial**  
**Authors:** Albert Liu, Eric Vittinghoff, Kata Chillag, Kenneth Mayer, Lisa Grohskopf, Melanie Thompson, Sonal Pathak, Roman Gvetadze, Brandon O'Hara, Brandi Collins, Marta Ackers, Lynn Paxton, Susan Buchbinder.  

**Summary:** We evaluated changes in risk behaviors associated with daily pill use among men who have sex with men (MSM) participating in a US pre-exposure prophylaxis (PrEP) HIV prevention study. Numbers of partners, and rates of unprotected anal sex decreased significantly from the baseline visit through 9 months of the study. Use of amphetamines, sexual performance-enhancing drugs, and poppers were each strongly associated with unprotected anal sex. While no evidence of risk compensation was seen among HIV-uninfected MSM in this PrEP trial, additional studies are recommended now that PrEP has been shown to be efficacious and will be provided in an open-label context.

12. **Short Message Service (SMS)-based strategies to support adherence to pre-exposure prophylaxis (PrEP) among men who have sex with men (MSM)**  
**Authors:** Jonathan Fuchs, MD, MPH; Liz Kroboth, Eric Vittinghoff, PhD; Albert Liu, MD, MPH; Patrick Sullivan, DVM, PhD; Russell Tarver; and Susan Buchbinder, MD
Summary: The need to identify patterns of mobile phone use, including use of texting or short message service (SMS) among men who have sex with men (MSM) is important to help define the appropriateness of using this communication tool to support HIV prevention efforts. We recently learned that pre-exposure prophylaxis, or PrEP, involving daily use of an anti-HIV medication to prevent HIV was partially effective. How well it works depends heavily on adherence to the regimen. There is significant interest in using SMS-based approaches to support adherence, so from November through December of 2010 we conducted an internet survey in MSM recruited from Facebook and Black Gay Chat. We learned that most respondents, half of whom reported unprotected anal sex at last anal sex, own a mobile phone (90%), and of those, text at least weekly using unlimited texting plans. About 10% do share cell phones and 21% reported their mobile service was disconnected in the last year. Half of mobile phone owners take pills daily and about half (47%) would be interested in SMS reminders to support pill taking. Younger individuals and those with unlimited texting plans, who take a daily medication, and who seek HIV/STI information online are more likely to be interested in SMS-based reminders. Although a substantial proportion of HIV-uninfected MSM own mobile phones, have unlimited texting plans, and express interest in SMS-based reminders, this technology-focused adherence strategy may not support all at-risk MSM taking daily PrEP. Therefore, diverse approaches to enhance PrEP adherence should be explored.

13. CD8+ T-cell responses elicited by a novel recombinant Adenovirus (Ad) Serotype 35-vectored HIV-1 vaccine are reduced in healthy Ad5-seropositive, HIV-1 uninfected persons

Authors: Jonathan D. Fuchs, Nidhi Kochar, Pierre-Alexandre Bart, Stephen C. De Rosa, Edith Swann, Cecilia Morgan, Barney Graham, Peter Gilbert, M. Juliana McElrath and the NIAID HIV Vaccine Trials Network (HVTN)

Summary: Unlike many licensed vaccines that use a weakened form of a virus to induce protective immunity, experimental HIV vaccines are different. For example, common cold viruses, such as adenoviruses, can be crippled so that can't cause a common cold, but can serve as a carriers of synthetic pieces of HIV as a way to induce immunity without causing HIV infection. Adenovirus subtype 5 (Ad5) has moved to later stages of clinical trials, but Ad5-based HIV vaccines are limited because many populations around the world have been previously exposed to Ad5 in childhood or young adulthood (as high as 80% in sub-Saharan Africa) -- a factor which we know reduces HIV-specific vaccine-induced immunity in Ad5 HIV vaccinated humans. However, there are other subtypes of adenoviruses, such as Ad35, which are the cause of far fewer adenovirus infections worldwide (e.g., less than 10% have been previously exposed to Ad35 in sub-Saharan Africa) and hold promise as HIV vaccine candidates. We conducted an early phase clinical trial of an Ad35-based HIV vaccine compared to Ad5-based HIV vaccine provided by the NIH Vaccine Research Center. The HVTN 077 trial looking at both safety and the ability of these vaccines to induce immune responses among 192 healthy, HIV uninfected men and women enrolled at trial sites in the US. From this study we learned that Ad35- and Ad5-HIV vaccines have similar safety profiles, and overall, Ad5- and Ad35-HIV provoke similar levels of immune responses in those who have never been previously exposed to those viruses in the past. But do people with previous immunity to Ad5 show blunted immune responses to Ad35-based vaccines? Our study showed that some, but not all immune responses to Ad35 HIV vaccines, were reduced in the setting of Ad5 pre-existing immunity. This suggests that cross-
reactivity between the different types of adenovirus carriers requires further exploration as this may affect the development of HIV vaccines based on these rare adenoviral subtypes, like Ad35.


Background
Authors: San Schwarcz, Ling Hsu, Annie Vu, and Susan Scheer

Summary: Evidence suggests that HIV-related inflammation may increase the risk of HIV-infected persons developing chronic age-related illnesses at younger ages than the HIV-uninfected population.

Deaths between January 1, 1992 and December 31, 2007 among persons diagnosed and reported with AIDS in San Francisco were included. We calculated the median age at death over four time periods for all causes, for HIV and non-HIV-related causes, and for the five most common non-HIV-related causes of death. The differences in the median ages at death were compared. For these five non-HIV-related causes we calculated the annual standardized mortality ratios (SMR) using California men aged 20-79 years as the standard population.

Results
There were 6301 deaths in the period 1992-1995, with continued declines through the period 2004-2007 during which there were 1171 deaths. The median age at death for all deaths increased from 41 years in the period 1992-1995 to 49 years for the period 2004-2007 (p<0.0001). The median age at death for both HIV-related and non-HIV-related deaths increased significantly (p<0.0001) over the four time periods although the median age at death was lower for persons who died from HIV disease than other causes (48 and 50 years in 2004-2007, respectively, p=0.0006). Deaths from non-AIDS cancers, cardiac and liver disease, drug overdose, and suicide were the most frequent non-HIV-related deaths. The median age at death from heart disease, non-AIDS cancers, and overdose increased between 1992 and 2007. Deaths from non-AIDS cancers and heart disease occurred at higher age than deaths from liver disease, overdose, and suicide. The overall SMR was highest for liver disease (17.10) and lowest for heart disease (1.37). The SMRs decreased over time for liver disease, increased for overdose, and remained stable for the other three causes.

Conclusion
HIV disease results in premature mortality from both HIV-related and non-HIV-related causes.