The Harvard University Center for AIDS Research

“New Directions in HIV Prevention Research”
HU CFAR Annual Symposium 2015

Wednesday April 1st, 2015 | Fenway Health, Boston MA

Featuring HU CFAR Member
Research Updates
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Krishna Reddy, MD
Mark Siedner MD, MPH and June-Ho Kim, AB
Ramnath Subbaraman, MD
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Rebecca Zash, MD
### New Directions in HIV Prevention Research

**Wednesday, April 1st, 2015**  
**11:30am-5:30pm**  
**Fenway Health, Boston, MA**

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<td>Registration and Light Lunch</td>
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<td>12:30 pm – 12:35 pm</td>
<td>Opening Remarks and Welcome: Ken Mayer, MD (Fenway Health)</td>
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<td>12:35 pm – 1:30 pm</td>
<td><strong>Keynote Presentation</strong> “Putting Together the Prevention Puzzle”</td>
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<td>Sharon Hillier, PhD</td>
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<td>University of Pittsburgh School of Medicine</td>
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<td>Professor of Obstetrics, Gynecology and Reproductive Sciences and</td>
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<td>Microbiology and Molecular Genetics</td>
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<td>1:30 pm – 4:00 pm</td>
<td><strong>HU CFAR Member Research Updates</strong></td>
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<td>1:30 pm – 1:45 pm</td>
<td>Maud Deruaz, PhD (Massachusetts General Hospital)</td>
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<td>“Role of immune cell trafficking in HIV transmission following</td>
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<td>intravaginal exposure”</td>
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<td>1:45 pm – 2:00 pm</td>
<td>Radiana Trifonova, PhD, MD (Boston Children’s Hospital)</td>
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<td>“Role of myeloid cell subsets in the human cervix during HIV mucosal</td>
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<td>2:00 pm – 2:15 pm</td>
<td>Julia Raifman, Doctoral Candidate (Harvard T.H. Chan School of Public</td>
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<td>“Preventing Unintended Pregnancy and HIV Transmission: The HIV</td>
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<td>Treatment Cascade and Contraceptive Choices”</td>
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<td>2:15 pm – 2:30 pm</td>
<td>Lynn Matthews, MD (Massachusetts General Hospital)</td>
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<td>“Developing a safer conception intervention for HIV-infected men</td>
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<td>reporting uninfected or unknown serostatus partners: qualitative</td>
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<td>2:30 pm – 3:00 pm</td>
<td><strong>Coffee Break</strong></td>
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<td>3:00 pm – 3:15 pm</td>
<td>Rebecca Zash, MD (Beth Israel Deaconess Medical Center)</td>
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<td>“Reassuring Birth Outcomes Data with Atripla used for PMTCT in</td>
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<td>Botswana”</td>
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3:15 pm – 3:30 pm Shahira Ahmed, MPH, PhD Candidate (Harvard T.H. Chan School of Public Health)

“Predictors of HIV Testing and Counseling Behaviors in Botswana: Implications for Prevention Efforts”

3:30 pm – 3:45 pm Kelli O’Laughlin, MD, MPH (Brigham and Women’s Hospital)

“Predictors of HIV-Infection in Nakivale Refugee Settlement in SW Uganda”

3:45 pm – 4:00 pm Nadia Abuelezam, ScD (Harvard T.H. Chan School of Public Health)

“Getting to 90-90-90 in South Africa: Predictions from the HIV-CDM Simulation Model”

4:00 pm – 5:30 pm Poster Session and Wine and Cheese Reception

4:00 pm – 4:45 pm Poster Group A (Posters 1-12)

Shahira Ahmed, MPH, PhD
Katie Biello, PhD, MPH and Jowanna Malone, BA
Maud Deruaz, PhD
Stella Gukasyan, EdM
Doug Krakower, MD
Julie Levison, MD, MPhil, MPH
Enrique Martin-Gayo, PhD
Lynn Matthews, MD
Julia Raifman, Doctoral Candidate
Angela Robertson Bazzi, PhD, MPH
Frank Schildberg, PhD
Radiana Trifonova, PhD, MD

4:45 pm – 5:30 pm Poster Group B (Posters 1-12)

Nadia Abuelezam, ScD
Deborah Anderson, PhD
Ellen Caniglia, SD
Sebastien Haneuse, PhD
Ingrid Katz, MD
Anne Neilan, MD, MPH
Kelli O’Laughlin MD, MPH
Krishna Reddy, MD
Mark Siedner MD, MPH and June-Ho Kim, AB
Ramnath Subbaraman, MD
Gustavo Velasquez, MD
Rebecca Zash, MD
Keynote Speaker and Symposium Organizer

Keynote Speaker: Sharon Hillier, PhD
University of Pittsburgh School of Medicine

Sharon L. Hillier, Ph.D., is the Richard Sweet Professor of Reproductive Infectious Disease and vice chair for faculty affairs in the department of obstetrics, gynecology and reproductive sciences at the University of Pittsburgh School of Medicine. In addition, she holds secondary appointments in the School of Medicine’s department of microbiology and molecular genetics, and is a senior investigator at the University of Pittsburgh-affiliated Magee-Womens Research Institute. Dr. Hillier is a principal investigator for the Microbicide Trials Network, an HIV/AIDS clinical trials network established by the NIH in 2006. In that role, she oversees clinical trials of new HIV prevention products on 4 continents.

Symposium Organizer: Kenneth Mayer, MD
Fenway Health

Dr. Mayer is a Professor at Harvard Medical School and the Harvard T.H. Chan School of Public Health, and Attending Physician at Beth Israel Deaconess Medical Center in Boston and Director of HIV Prevention Research there. He is the founder, Co-Chair and Medical Research Director of The Fenway Institute, the research, training and health policy division of Fenway Health, the largest ambulatory facility caring for HIV-infected patients in New England. He previously was a Professor of Medicine and Community Health at Brown University, and Director of its AIDS Program. Dr. Mayer has served on the national boards of the HIV Medicine Association, the American Foundation for AIDS Research and the Gay and Lesbian Medical Association. He is a member of the Governing Council of the International AIDS Society, and Co-Chair of the Scientific Advisory Board of the Center for Global Health Policy of the Infectious Disease Society of America.

Acknowledgements: Thank you to Bruce Walker and Max Essex as HU CFAR Directors; Kenneth Mayer as the Symposium Organizer; the Planning Committee: Ken Freedberg, Rochelle Walensky, Steve Safren, Laura Bogart, George Seage, Victor DeGruttola, Shahin Lockman, and David Bangsberg; and the HU CFAR Administrative Core and Andrea Karis at Fenway Health for coordinating the event.
Maud Deruaz, PhD, Massachusetts General Hospital

Maud Deruaz received her PhD in Biochemistry from the University of Geneva in Switzerland and is currently an Instructor in Medicine at Harvard Medical School at the Center for Immunology and Inflammatory Disease at the Massachusetts General Hospital. Over the past 5 years, her research has been focused on the acute phase of HIV infection in humanized mice following intravaginal exposure and understanding how the cellular and molecular response influences viral dissemination in vivo.

Radiana Trifonova, PhD, MD, Boston Children’s Hospital

Radiana Trifonova, M.D., Ph.D., Research Fellow, Lieberman Laboratory, Program in Cellular and Molecular Medicine, Boston Children’s Hospital
I received my MD degree from the Medical University of Sofia, Bulgaria in 1999 and my Ph.D. degree at the Institute of Biology and Immunology of Reproduction, Sofia, Bulgaria and Center for Molecular Medicine, Maine Medical Center, Scarborough, ME, USA in 2005. I did a PostDoctoral training until 2009 at Fichorova lab, Brigham and Women’s Hospital where I studied epithelial innate immunity and worked in the field of preclinical assessment of anti-HIV-1 vaginal microbicides. In 2009 I joined the Laboratory of Dr. Judy Lieberman at the Immune Disease Institute/Program in Cellular and Molecular medicine at BCH where I have been working on the development of a siRNA-based microbicide for prevention of HIV-1 and HSV-2 by silencing viral and host genes involved in the viral transmission. I study also the mucosal transmission of HIV-1 in the human female genital tract using a polarized human cervical explants model and I am interested in the immune cells composition of the human cervical mucosa including the different subsets of dendritic cells and their role in the early events of the mucosal transmission of HIV in humans.

Julia Raifman, Doctoral Candidate, Harvard T.H. Chan School of Public Health

Julia Goldberg Raifman is a doctoral candidate at the Harvard T.H. Chan School of Public Health. She focuses her research on HIV prevention and treatment among marginalized populations in
the United States and abroad. Her current research interests include the impacts of ART scale-up on women and children in sub-Saharan Africa, the impacts of human rights policies on HIV among men who have sex with men, and interventions to improve HIV prevention and treatment among men who have sex with men.

**Lynn Matthews, MD, Massachusetts General Hospital**

Lynn T. Matthews MD, MPH is a clinician-scientist at Massachusetts General Hospital in the Division of Infectious Disease and the Center for Global Health. She is also an Instructor at Harvard Medical School. Her research aims to understand HIV-risk behavior in the context of fertility desires and to develop safer conception programs for HIV-infected men and women and their at-risk partners. Her research is based in Durban, South Africa and Mbarara, Uganda.

**Rebecca Zash, MD, Beth Israel Deaconess Medical Center**

Rebecca Zash is an Infectious Diseases Fellow at Beth Israel Deaconess Medical Center (BIDMC) in Boston. After graduating from Wesleyan University in 1999, Rebecca worked for several years in East London, South Africa as the assistant director of an NGO to prevent mother to child transmission of HIV (PMTCT). She then attended medical school at the University of North Carolina at Chapel Hill and completed internal medicine residency at BIDMC prior to starting ID fellowship. During fellowship she lived for 18 months in Gaborone, Botswana with her family. In Botswana, she conducted her research with the Botswana-Harvard AIDS Institute Partnership under the mentorship of Dr. Roger Shapiro. Her primary research interests include the safety and efficacy of antiretroviral therapy in pregnancy, improving birth outcomes among HIV-infected women and birth defects surveillance in resource-limited settings.

**Shahira Ahmed, MPH, PhD Candidate, Harvard T.H. Chan School of Public Health**

Dr. Shahira Ahmed is a Research Fellow at the Department of Global Health and Population, Harvard T.H. Chan School of Public Health, where she received her doctorate in Global Health and Population. Her research interests include examining the supply and demand sides of HIV testing and counseling delivery systems in resource-
constrained settings and the linkages to HIV prevention, treatment and care services. These interests fall within a broader research agenda of applying mixed methods to assess implementation and delivery of integrated services at different levels of a health system, and evaluation of quality, equity and access to improve health systems performance. Dr. Ahmed has worked and consulted globally and nationally with international agencies such as UNAIDS and WHO and governments on policy development, implementation, monitoring and evaluation.

Kelli O'Laughlin, MD, MPH, Brigham and Women’s Hospital

Kelli O'Laughlin, MD, MPH, is a research fellow with the Medical Practice Evaluation Center at Massachusetts General Hospital and she conducts implementation science research in low-resource settings working to expand access to HIV testing and related care for refugees. She is an emergency medicine physician at Brigham & Women’s Hospital/ Harvard Medical School in Boston, Massachusetts, and is faculty at the Harvard Humanitarian Initiative. She attended medical school at Oregon Health & Science University, emergency medicine residency at UCLA/Oliveview-UCLA Medical Center, and received her Masters of Public Health with a concentration in global health at Harvard T.H. Chan School of Public Health.

Nadia Abuelezam, ScD, Harvard T.H. Chan School of Public Health

Nadia Abuelezam is a postdoctoral research fellow at the Harvard T.H. Chan School of Public Health in the Department of Epidemiology. She graduated in May 2014 with her Doctor of Science (ScD) in Epidemiology from the Harvard T.H. Chan School of Public Health with emphasis on biostatistics and infectious disease epidemiology. Her research interests primarily focus on using mathematical models to understand trends in HIV treatment and prevention programs and using novel internet-based methods to quantify risky sexual behavior among populations experiencing stigma domestically and internationally. Nadia is a 2009 graduate of Harvey Mudd College with a B.S. in Mathematical Biology.
Katie Biello, PhD, MPH, Fenway Health and Harvard T.H. Chan School of Public Health

Dr. Biello is an epidemiologist and research scientist at The Fenway Institute (TFI), a division of Fenway Health, and the Harvard T. H. Chan School of Public Health. She received her PhD in Epidemiology from Yale University. Her research interests are in identifying and understanding the underlying risk factors for disparities in HIV/STIs and developing behavioral interventions to reduce risk among racial and sexual minorities and those in resource limited settings, both domestically and globally. She has been involved with numerous projects focused on understanding and reducing HIV risk in disadvantaged populations, including as PI of two studies that aim to understand the sexual and drug networks of individuals at high risk for HIV infection. Furthermore, Dr. Biello works on a number of intervention development studies to reduce HIV risk among high-risk men who have sex with men.

Jowanna Malone, BA, Fenway Health

Jowanna Malone is an Epidemiology Research Assistant at The Fenway Institute (TFI), a division of Fenway Health in Boston, MA. She has been involved in HIV prevention research, including collecting data on the acceptability and feasibility of conducting a sexual network study among a racially diverse group of men who have sex with men. She was also involved in starting a Racial Justice Training Series for TFI. She graduated from Harvard University with a Bachelor of Arts degree in Sociology with a Secondary in Classics. During her undergraduate years she focused much of her coursework and research on health disparities that afflict both sexual and racial minorities. Jowanna plans to go to graduate school to continue her studies in Epidemiology.

Stella Gukasyan, EdM, AIDS Project Los Angeles

Stella Gukasyan is the Principal Investigator and Program Evaluation Manager at AIDS Project Los Angeles (APLA). She received a Masters degree in Human Development and Psychology from the Harvard Graduate School of Education and her Bachelor’s degree in Biology from the University of California San Diego (UCSD). She is managing the monitoring and evaluation
components for a project on access to HIV medical care in collaboration with Johns Hopkins Bloomberg School of Public Health and AIDS United. In addition, she is the Chair of the Women’s Committee at APLA. Prior to her work in domestic HIV research she worked at the Harvard University Center for AIDS Research both in administrative capacity and on international HIV/AIDS projects in South Africa and Tanzania.

**Douglas Krakower**, MD, Beth Israel Deaconess Medical Center

Dr. Douglas Krakower is a member of the Division of Infectious Diseases at Beth Israel Deaconess Medical Center and an Instructor in Medicine at Harvard Medical School. His research focuses on ways to optimize HIV prevention in care settings. Currently, he is conducting an NIH-funded study to enhance patient-provider communication and clinical decision making regarding the use of pre-exposure prophylaxis. His clinical practice encompasses general infectious diseases and HIV treatment and prevention.

**Julie Levison**, MD, MPhil, MPH, Massachusetts General Hospital, Harvard Medical School

Julie Levison, MD, MPhil, MPH, FACP, an Instructor in Medicine at Harvard Medical School, is a clinical investigator in the Massachusetts General Hospital Division of General Internal Medicine. Her research focuses on linkage and retention in HIV care in multicultural populations. She was a recipient of a HU CFAR Scholar Award, which led to a National Institute of Mental Health K23 career development award focused on overcoming barriers to retention in HIV care for HIV-infected Hispanic immigrants. She is board certified in internal medicine and infectious disease and is a practicing infectious disease specialist at MGH Chelsea Healthcare Center, where she also co-chairs the MGH Chelsea Research Council. Dr. Levison received her undergraduate degree in history from Wellesley College and a master’s degree in social history of medicine from Oxford University. She earned her medical and public health degrees from Harvard University. She was a resident in primary care/ internal medicine at Brigham and Women’s Hospital, and completed infectious disease subspecialty training in the combined BWH and MGH Infectious Diseases fellowship. She worked on clinical and public health projects in Brazil, Puerto Rico, Switzerland, and South Africa.
Enrique Martin-Gayo, PhD, Ragon Institute of MGH, MIT and Harvard

Enrique Martin-Gayo obtained his PhD in basic immunology at the Centro de Biologia Molecular Severo Ochoa from the Universidad Autonoma de Madrid, where he specialized in immunology and studied the role of human intrathymic dendritic cells establishing central tolerance. After finalizing his doctorate, Enrique moved to Boston and joined Dr. Xu Yu's laboratory at the Ragon Institute where he has focused on studying cell-intrinsic responses against HIV-1 occurring in dendritic cells from HIV-1 elite controllers. In fact, one of his projects was awarded with a HU CFAR scholarship, which allowed him to develop mechanistic studies about innate immunity in human dendritic cells leading to effective T cell responses associated with immune control of HIV-1 infection. In addition, Enrique has continued to study different aspects of dendritic cell biology, such as their ability to prime T follicular helper cells, which might be key for the development of a protective vaccine against HIV-1.

Angela Robertson Bazzi, PhD MPH, Fenway Health and Boston University School of Public Health

"Angela Robertson Bazzi, PhD, MPH, is Assistant Professor, Department of Community Health Sciences, BU School of Public Health. She received her doctorate in Global Health from the University of California, San Diego and completed postdoctoral training at the Harvard T.H. Chan School of Public Health and Fenway Institute. The objective of her research is to illuminate the social and structural determinants of infectious disease transmission and prevention using quantitative, qualitative, and mixed methods. Her current Harvard University CFAR project is exploring adherence to pre-exposure prophylaxis (PrEP) and antiretroviral treatment for HIV prevention among male-male couples."

Frank Schildberg, PhD, Harvard Medical School

Dr. Schildberg grew up in Neuwied, a city in the Rhine valley of western Germany. My interest in life science led me to major in Molecular Biomedicine at the University of Bonn, Germany. After obtaining my Diploma in 2008, I completed my PhD in Immunology at the Institutes of Molecular Medicine and Experimental Immunology in Bonn in 2012. My research interests tend towards the clinical aspects and applications of basic immunological research, specifically immune regulation and stroma immunology.
Deborah Anderson, PhD, Boston University School of Medicine

Deborah Anderson is a reproductive immunologist and Professor of Microbiology, Obstetrics and Gynecology, and Medicine (Infectious Diseases) at Boston University School of Medicine, Boston, USA. She is also a Lecturer in Medicine at Harvard Medical School and a founding member of the Harvard CFAR. She heads a research program that addresses immunologic aspects of human reproductive health and has contributed to advances in understanding the immunological mechanisms underlying the sexual and vertical transmission of HIV-1. Her research is focused on the development of vaccines and topical microbicides for the control of sexually-transmitted pathogens including HIV-1. Towards this end, her group is studying mechanisms of cell-associated HIV transmission and fundamental features of local immune defense functions at genital mucosal surfaces that affect HIV-1 pathogenesis and transmission.

Ellen Caniglia, SD, Harvard T.H. Chan School of Public Health

Ellen received her bachelor’s degree in Mathematics from Bryn Mawr College before coming to the Harvard T.H. Chan School of Public Health to pursue a doctorate degree in Epidemiologic Methods. Her research interests include HIV and perinatal epidemiology. The goal of her dissertation project is to compare CD4 and RNA monitoring strategies in HIV-infected individuals in developed countries, using methods from causal inference.

Sebastien Haneuse, PhD, Harvard T.H. Chan School of Public Health

Dr. Haneuse is an Associate Professor of Biostatistics at the Harvard T.H. Chan School of Public Health. His primary research interests involve the development and use of novel observational study designs in public health research.
**Ingrid Katz, MD, Brigham and Women’s Hospital**

Dr. Katz is currently an Assistant Professor at Harvard Medical School, Associate Physician at Brigham and Women's Hospital, and a research scientist at the Center for Global Health at Massachusetts General Hospital. She obtained a B.A. from Amherst College, and a Master's in Health Science from Johns Hopkins Bloomberg School of Public Health before pursuing her degree in Medicine at University of California at San Francisco. After completing her medical training in Internal Medicine and Infectious Diseases, she received a Global Women's Health Fellowship to study HPV vaccine uptake among adolescents in Soweto, South Africa. Her current research focuses on factors affecting refusal to participate in HIV treatment programs among HIV-infected, treatment eligible adults presenting for testing, for which she received a K23 Career Development Award.

**Anne M. Neilan, MD, MPH Massachusetts General Hospital**

Anne M. Neilan, MD MPH is a Clinical and Research fellow in the Division of Infectious Diseases and a graduate assistant in Pediatrics at the Massachusetts General Hospital. Dr. Neilan joined the MPEC in 2014. Her research interests include HIV-infected children and adolescents, and current projects include the development of a simulation model of HIV infection in perinatally HIV-infected adolescents in the US. She is board certified in pediatrics and internal medicine. Previously she conducted research on tuberculosis diagnostics as a Fogarty Scholar in Peru, as well as research on organ allocation as public health Fulbright fellow in Italy. Dr. Neilan earned her MD and MPH from The Mount Sinai School of Medicine in New York.

**Krishna Reddy, MD, Massachusetts General Hospital**

Krishna Reddy, MD, is a fellow in Pulmonary and Critical Care Medicine at Massachusetts General Hospital, Brigham and Women's Hospital, and Beth Israel Deaconess Medical Center. His research interests include tuberculosis diagnostics and lung diseases in people with HIV. Previously he conducted research on tuberculosis diagnostics as a Fogarty Scholar in Peru. Dr. Reddy earned an MD from Harvard Medical School.
Mark Siedner, MD, MPH, Massachusetts General Hospital

Dr. Siedner is an infectious disease clinician and researcher in the Division of Infectious Diseases at the Massachusetts General Hospital. His academic investigations are focused in southwestern Uganda with the Massachusetts General Hospital Center for Global Health, where he pursues research aimed at mitigating the complex causes of morbidity and mortality among people living with HIV in low and middle-income countries. His primary research activities include 1) directing clinical trials to evaluate mobile-health based interventions to address structural barriers to care, including transportation costs and poor communication systems, and 2) directing a longitudinal cohort study of aging HIV-infected persons and age- and gender-matched HIV-uninfected controls to understand the intersection between HIV infection and non-communicable disease risk in rural Uganda.

June-Ho Kim, AB

June-Ho Kim is currently in his final year of study at the Johns Hopkins University School of Medicine and will graduate with a Doctor of Medicine degree in May 2015. He completed his undergraduate studies in biochemistry at Harvard University where he wrote an honors thesis in immunology with Harvey Cantor, MD at the Dana-Farber Cancer Institute. June-Ho is a 2013-2014 Doris Duke International Clinical Research Fellow and a 2014 Benjamin H. Kean Travel Fellow. Through these opportunities, he spent the past year in Mbarara, Uganda where he worked with the Massachusetts General Hospital Center for Global Health and a team of Ugandan clinicians and researchers to study the epidemiology of cardiovascular disease in people infected with HIV. Next year, June-Ho will be a resident in internal medicine at the Brigham & Women's Hospital.

Ramnath Subbaraman, MD, Brigham and Women’s Hospital

Ramnath Subbaraman is an Associate Physician in the Division of Infectious Diseases at Brigham and Women’s Hospital and a Research Fellow at Harvard Medical School. He is also a Research Advisor at Partners for Urban Knowledge, Action, and Research (PUKAR), a Mumbai-based research collective. From 2010-2012, Ramnath worked in Mumbai at PUKAR, helping to lead interdisciplinary research efforts on slum health in the Kaula Bandar community, partly with support from the NIH Fogarty International Research Fellows program. In 2005-2006, he performed HIV and tuberculosis research at the YRG Center for AIDS Research and Education (YRG CARE) in Chennai, India. Ramnath is a graduate of the Yale School of Medicine, the
UCSF internal medicine residency program, and Massachusetts General Hospital and Brigham and Women's Hospital infectious diseases fellowship. His current research focuses on implementation science to address gaps in the tuberculosis cascade of care in India.

**Gustavo Velásquez**, MD, Brigham and Women’s Hospital

Dr. Gustavo Velásquez earned his M.D. from Northwestern University’s Feinberg School of Medicine and his M.P.H. with a concentration in Quantitative Methods and an interdisciplinary concentration in Infectious Disease Epidemiology from the Harvard T.H. Chan School of Public Health in 2009. He completed the Doris and Howard Hiatt Residency in Global Health Equity and Internal Medicine at Brigham and Women’s Hospital in 2013; during that time he worked at the Botsabelo MDR-TB Hospital in Maseru, Lesotho caring for MDR-TB patients. He is currently a second year Clinical and Research Fellow at the MGH/BWH Combined Infectious Diseases Fellowship, and is supported by the T32 Program for AIDS Clinical Research Training. Working under the mentorship of Dr. Megan Murray, his research focuses on MDR-TB treatment outcomes in Lima, Peru.
**GROUP A Poster Session  4:00-4:45 pm**

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<th>Group A Board Assignment #1</th>
<th>Shahira Ahmed, MPH, PhD Candidate, Harvard T.H. Chan School of Public Health</th>
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<tr>
<td><strong>Title:</strong></td>
<td>Predictors of HIV Testing and Counseling Behaviors in Botswana: Implications for Prevention Efforts</td>
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<tr>
<td><strong>Authors:</strong></td>
<td>Shahira Ahmed, Till Barnighausen, Norman Daniels, Richard Marlink, Marc J. Roberts</td>
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<tr>
<td><strong>Background:</strong></td>
<td>Botswana’s HIV testing and counseling strategy has shown success in linking people to treatment yet less is understood about its effectiveness on primary prevention efforts. The aim of this study was to examine predictors of HIV testing behavior among men and women to better understand the implications of these factors on prevention efforts.</td>
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<td><strong>Methods:</strong></td>
<td>We used the 2008 nationally-representative population-based survey, Botswana AIDS Impact Survey (n=13,365). Multivariate logistic regression models were developed, adjusting for clustering at the household level and including district-level fixed effects. Outcome measures included: self-reported having ever-tested and testing in the last 12 months. Models controlled for socio-demographic characteristics, risk behaviors, and health status.</td>
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<td><strong>Results:</strong></td>
<td>Sixty seven percent of women and 52% of men reported ever testing. Of those ever tested, 63% of women and 62% of men reported testing in the last 12 months. Among men, 88% knew where to get an HIV test, 49% were aware of ART availability, and 24% held misperceptions about treatment (incorrectly believed that ARTs cured AIDS). Among women, 93% knew where to get an HIV test, 53% were aware of ART availability, and 25% held misperceptions about treatment. In adjusted models (outcome = reporting having ever tested), knowledge of where to test doubled the odds of testing (aOR 2.162, 95% CI 1.0-4.7), and misperceptions about treatment reduced the odds of testing by 44% (aOR 0.56, 95% CI 0.39-0.80). Age, education, and income also predicted ever testing behaviors in men. In adjusted models, women’s knowledge of where to test increased the odds of ever testing five-fold (aOR 5.8, 95% CI 2.1-16.19). Other predictors included age, education, pregnancy, residency (rural versus urban) and health status. For the second outcome (testing in the last 12 months), knowledge variables did not predict testing behavior in men. However in women, knowledge of where to test tripled the odds of testing in the last year (aOR 3.6, 95% CI 1.29-10.29), and misperceptions about treatment reduced the odds of testing in the last year by 22% (aOR 0.78, 95% CI 0.6-1.0).</td>
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<td><strong>Conclusions:</strong></td>
<td>We found that men tested less than women, and that there were important differences in the predictors of ever testing and testing in the last year among men and women that needs to be better understood. Along with education, HIV and ART knowledge were important predictors of ever testing and more recent testing. These findings have clear implications for prevention efforts in Botswana: 1) More targeted HIV testing efforts towards men are needed; 2) testing approaches should be designed that are appropriate and attractive to poor, less educated, and rural populations; and 3) HIV and ART knowledge should be improved through social marketing campaigns, school interventions, etc., to counteract incorrect perceptions, and should be appropriately tailored to increase more frequent testing among men and women.</td>
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**Jowanna Malone** presenting for **Katie Biello**, PhD, MPH, Fenway Health and Harvard T.H. Chan School of Public Health

**Title:** Designing a sexual network study of men who have sex with other men: exploring racial and ethnic preferences in study design and methods

**Authors:** Katie B. Biello, Jowanna Malone, Kenneth H. Mayer, Angela Robertson Bazzi, Matthew J. Mimiaga

**Background:** Black and Latino gay, bisexual and other men who have sex with men (MSM) have higher rates of HIV and other sexually transmitted infections (STIs) compared to their White counterparts. Differences in sexual networks, which might be important determinants of HIV/STI transmission, have been hypothesized to play an important role in the observed racial/ethnic disparities in risk. However, concerns about the acceptability and feasibility of conducting sociocentric sexual network studies, in which every individual in a network is recruited and enrolled, have left a dearth of data on the structure of sexual networks of MSM. If concerns that contact tracing and other necessary procedures are unacceptable among populations of interest, biases may be introduced. Moreover, any racial differences in acceptability and resulting participation could further bias results, precluding a thorough understanding of racial differences in network structures.

**Methods:** Qualitative interviews and brief quantitative assessments were conducted with 30 self-identified Black, Hispanic/Latino, and White sexually active MSM that were purposively sampled via community-based service organizations in the Greater Boston area. Interviews were conducted to assess acceptability and feasibility of potential procedures for a sociocentric sexual network study. Interviews were audio-recorded and interviewers wrote detailed summary notes on key findings and emergent themes post-study visits. Content analysis of interview summaries contributed to the development of codes to categorize the data, which were then applied using ATLAS.ti software.

**Results:** Among 30 MSM, 12 were Black, 9 were White, and 9 were Latino. Mean age was 32 years (SD=11.7) and participants reported an average of 8 sexual partners in the past 6 months (SD=8.3). Acceptability of referring recent sexual partners as part of a sociocentric network study was generally high across racial/ethnic groups. In pre-interview surveys, 80% reported that they would be willing to provide names and direct contact information of their sexual partners if they were kept anonymous during the referral process. Similarly, 83% reported that they would likely participate in a sexual network study if they knew that a recent sexual partner had referred them. However, in qualitative interviews, differences by racial/ethnic groups emerged regarding preferences for methods on strategies for approaching and recruiting their sexual partners. While the majority of Black participants (7 out of 12) reported that they would not want their name disclosed to their sexual partners approached for study participation, most Latino participants (7 out of 9) preferred to have the opportunity to inform referrals themselves about the study prior to study staff contacting them. White participants (8 out of 9) also favored having study staff disclose their name when recruiting referrals into the study, emphasizing the importance of transparency. Conversely, Black participants expressed the need for sensitivity around contacting referrals who were not open about their same-sex behaviors or who were in heterosexual relationships (7 out of 12 Black participants had such partners). Overall, participants preferred having the ability to choose referral procedures that best suited their specific situation, suggesting that this would allow for greater project acceptability and potentially higher rates of network-recruited participation.

**Conclusions:** While important racial/ethnic inequities in HIV/STI transmission persist, studies examining racial and ethnic differences in sexual network structures are lacking. This qualitative study revealed that there was widespread support for conducting sexual network studies among Black, Latino and White MSM. However, we identified racial differences in
preferences regarding particular study methods, most notably the recruitment of their sexual partners. Our findings suggest that, in order to reduce differential rates of participation, increase scientific validity, and reduce risks of social harm, researchers studying sexual networks among MSM should be aware of these potential differences, engage communities in study design, and provide participants with a variety of options for reaching out to their sexual partners.

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<tr>
<th>GROUP A Board Assignment #3</th>
<th>Maud Deruaz, PhD, Massachusetts General Hospital</th>
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<tr>
<td><strong>Title:</strong> Role of immune cell trafficking in HIV transmission following intravaginal exposure</td>
<td></td>
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<tr>
<td><strong>Authors:</strong> M. Deruaz, T. T. Murooka, V. D. Vrbanac, S. Tanno, A. M. Tager and A. D. Luster</td>
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<tr>
<td><strong>Background/Methods:</strong> Worldwide, the majority of HIV-1 infections are acquired by vaginal transmission. We have studied the kinetics of HIV-1 infection in humanized mice reconstituted with human bone marrow, liver, and thymus (BLT mice), during the first two weeks after intravaginal (IVAG) viral exposure.</td>
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<td><strong>Results:</strong> By tracking the presence of HIV RNA, DNA and protein p24 in tissues, we have found that following acquisition in the cervicovaginal tissues (CVT), the virus spreads to the lymphatic compartment within 2 to 6 days to establish a systemic infection detectable in plasma by 2 weeks. In addition, immunostaining revealed the accumulation of CD4⁺ and CD8⁺ T cells and CD123⁺ pDCs into in the CVT following HIV-1 infection. We also found that there was a marked induction of inflammatory cytokines and chemokines in the CVT prior to their induction in the draining LNs. Using Pertussis toxin (PTX) treatment of BLT mice following IVAG HIV-1 exposure, we asked if chemoattractant receptor-induced immune cell trafficking was important for HIV-1 dissemination.</td>
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<td><strong>Conclusion:</strong> We found that PTX-treatment prevented or markedly delayed peripheral blood viremia. HIV-1 RNA copy number in tissues suggested that PTX treatment did not inhibit the establishment of a local HIV-1 infection in the CVT but blocked HIV-1 spread to the lymphoid compartment and peripheral tissue, which resulted in the inhibition of a systemic infection. We are now determining the role for specific chemoattractant receptors, such as CCR7 and S1P1R, in HIV-1 dissemination following IVAG exposure in this model.</td>
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<th>GROUP A Board Assignment #4</th>
<th>Stella Gukasyan, EdM, AIDS Project Los Angeles</th>
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<tr>
<td><strong>Title:</strong> Care and Access Network: Designing, Implementing, and Evaluating the Patient Navigation Model for HIV Continuum of Care in Los Angeles County</td>
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<td><strong>Objective:</strong> Treating HIV is only manageable with access to adequate medical care and effective treatment. Gardner et al. (2011) developed a cascade of engagement, treatment, and retention in HIV care. This report stated that only 19% of HIV-positive individuals have been able to attain viral suppression in the United States. The 2009 surveillance data showed that only 26% of the 61,700 individuals estimated to be living with HIV in Los Angeles County (LAC) had an undetectable viral load. Although patient navigation has been utilized in various settings, there is no evidence-based model that has been evaluated for linking and retaining PLWHA in medical care. Our intervention was designed as a modified</td>
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Anti-Retroviral Treatment and Access to Services (ARTAS) to identify and link PLWHA in LAC to medical care. Our patient navigators are trained professionals conducting a minimum of four structured sessions over an 18-month period with rigorous evaluation and cost analysis component in partnership with Johns Hopkins Bloomberg School of Public Health.

**Methods:** We have identified and successfully enrolled 245 clients, not in medical care and or individuals who have not reached viral suppression. The implementation of this intervention includes emphasis on the importance of treatment as prevention, follow-up, retention in medical care beyond the initial appointment, addressing non-HIV medical needs, and understanding barriers to attaining viral suppression. A local and national rigorous mixed-methods evaluation is embedded in the thread of the intervention, tracking outcomes at six-month intervals, over an 18-month period.

**Results:** We have been able to obtain desired changes in health and clinical outcomes for our cohort over an eighteen–month period. The viral load for our cohort has trended from 47% undetectable at baseline to 59% within six-months, 70% within 12-months, and 61% after 18-months of enrollment (client racial demographic 26% White, 25% African-American, 40% Latino). At six-months after enrollment, 87% of clients were retained in medical care. By conducting an extensive local and national evaluation, our model clearly highlights and refines best practices and lessons learned for training patient navigators to implement a navigation program to link and retain PLWHA in medical care and on treatment.

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**GROUP A Board Assignment #5**

**Title:** Frontline Practices with HIV Prevention: A Survey of US Infectious Disease Physicians

**Authors:** Douglas S. Krakower, Susan E. Beekmann, Philip M. Polgreen, Kenneth H. Mayer

**Background:** Early initiation of antiretroviral therapy (early ART) for HIV+ patients (pts) and preexposure prophylaxis (PrEP) for at-risk, HIV(-) persons decreases HIV transmission, but little is known about how clinicians implement these strategies. The Emerging Infections Network (EIN), a national network of infectious diseases (ID) physicians, was surveyed in September 2014 to assess practices with early ART, PrEP and other HIV prevention methods.

**Methods:** An online survey of members assessed intentions and practices with early ART, PrEP, and risk reduction counseling. Analyses were restricted to HIV providers (i.e., treat ≥ 1 HIV+ patient/year). Chi-square tests measured associations between categorical variables.

**Results:** Almost half (47%) of 1198 members completed surveys; 73% were HIV providers. The sample was regionally diverse; 63% practiced at teaching hospitals, 53% had ≥ 15 years ID experience and 42% treated > 50 HIV+ pts/year. Most providers (87%) said they recommended ART initiation at diagnosis irrespective of CD4 count. However, for pts with CD4 > 500 cells/μL, clinicians would defer ART if a patient was not ready to initiate (97%) or has untreated depression/psychiatric illness (47%) or substance abuse disorder (68%), or if resources for ART/HIV care are limited (50%). For HIV serodifferent couples (SDC), 59% of providers had counseled HIV+ pts about PrEP for partners, 41% had offered visits for partners to discuss PrEP, and 32% had prescribed PrEP. Physicians recommended PrEP when the HIV+ partner is viremic (79%) or aviremic on ART (35%). Respondents supported offering sterile syringes (80%), opiate substitution therapy (68%), and PrEP (42%) to persons injecting drugs, but few felt prepared to provide these (10%, 7% and 26%). Most physicians (78%) provided risk reduction counseling to > 90% of pts newly diagnosed with HIV, yet only 30% did so for established pts. Those with higher volumes of HIV+ pts were more likely to have provided interventions to SDC, including counseling, offering visits to HIV(-) partners,
Conclusions: ID physicians almost universally recommend early ART, and many have adopted aspects of PrEP provision into practice. However, clinicians may defer ART based on patient readiness or psychosocial factors, and only 1/3 of providers have prescribed PrEP. Interventions that help physicians motivate pts to start ART, identify and overcome missed opportunities to provide PrEP, and routinely deliver risk reduction counseling are needed.

**GROUP A Board Assignment #6**

**Julie Levison**, MD, MPhil, MPH, Massachusetts General Hospital, Harvard Medical School

**Title:** Barriers to Retention in Longitudinal HIV medical Care for HIV-infected Hispanic Immigrants in Metropolitan Boston

**Authors:** JH Levison, LM Bogart, IF Khan, H Amaro, M Alegria, S Safren

**Objective:** Attendance in regular medical follow-up, called retention in care, is associated with improved clinical outcomes for HIV-infected individuals and decreased HIV transmission. Little is known regarding factors influencing retention in HIV care for HIV-infected Hispanic immigrants. We evaluated barriers to retention in HIV care for this population.

**Methods:** We collected qualitative data from 31 HIV-infected Hispanic immigrants in metropolitan Boston. Individuals were eligible if they were HIV-infected, aged ≥18 years, and were born in Puerto Rico or other Latin American Spanish-speaking countries. Bilingual research staff assessed barriers to HIV care and health beliefs through semi-structured interviews. Retention in HIV care was defined as self-reported attendance at ≥1 routine visit with an HIV provider in the past 6 months or medical record review indicating ≥1 HIV visit every 6 months in the 12 months prior to the interview (the latter consistent with national guidelines). We also measured missed routine HIV visits from the medical record. We employed an inductive approach to category construction guided by an adapted version of the Andersen Model of Health Care Utilization to analyze the data.

**Results:** Most participants were from Puerto Rico (45%) or the Dominican Republic (20%) with the remainder from Mexico, Colombia, and Central America. Half (48%, N=15) of the cohort either was not retained in HIV care, defined above, or had missed ≥1 HIV medical visit in the past year. HIV-related stigma in the Hispanic community was frequently reported as a significant barrier to retention in HIV care by inhibiting disclosure of HIV status. Men who reported sex with men cited strict cultural beliefs in masculinity (machismo) as a factor promoting HIV-related stigma. Other key barriers to keeping HIV care appointments were mental health-related (e.g. episodes of substance abuse or severe depression), and structural (e.g. transportation costs and inconvenient clinic location or clinic hours). Trust and respect in the HIV provider as well as family support facilitated retention in care.

**Conclusions:** HIV-infected Hispanic immigrants in this sample experienced significant barriers to retention in care linked to HIV-related stigma, cultural norms, and logistical constraints in accessing HIV care. These barriers suggest the need for interventions at the level of the individual, health system, and community.

**GROUP A Board Assignment #7**

**Enrique Martin-Gayo**, PhD, Ragon Institute of MGH, MIT and Harvard

**Title:** HIV-1 Infection Induces Potent Type I IFN Signatures in Conventional Dendritic Cells from HIV-1- Elite Controllers

**Authors:** Enrique Martin-Gayo, Taylor Hickman, Zhengyu Ouyang, Dina Pimenova, Florencia Pereyra, Bruce D. Walker, Mathias Lichterfeld, Xu G. Yu
Introduction: Recent data suggest that in most HIV-1-infected individuals, cell-intrinsic immune responses to HIV-1 are blocked by host proteins such as Samhd1 and trex1 in conventional dendritic cells (cDC). Elite controllers (EC) control HIV-1 replication in the absence of treatment, but immune defense mechanisms in these patients are not well understood. Here, we investigated cell-intrinsic innate immune responses to HIV-1 in cDCs from these specific patients.

Methods: PBMC from EC, untreated chronic progressors (CP), HAART-treated and HIV-1 negative subjects were ex vivo infected with HIV-1. cDCs were isolated and expression of viral replication products, Samhd1, Trex1, type I IFNs and 30 IFN stimulated genes (ISGs) were subsequently analyzed by qPCR. Type I IFN transcriptional signatures were obtained by unsupervised hierarchical clustering and co-expression analyses.

Results: cDC from HIV-1 negative persons were moderately susceptible to HIV-1, while cDC from CP only weakly supported HIV-1 replication, likely due to high-level Samdh1 expression and impaired reverse transcription. cDC from EC also showed low susceptibilities to productive HIV-1 infection, but reverse transcription in these cells was largely unaltered, while restriction of viral replication seemed to preferentially occur at the level of viral integration. Importantly, in contrast to CP, HIV-1 infection of cDCs from EC induced a unique transcriptional signature of type I IFN-stimulated genes, and a selective upregulation of four putative cell-intrinsic sensors of microbial DNA. Functionally, these altered patterns of viral restriction and potent IFN signatures in cDC from EC were associated with increased cellular immune activation, and improved abilities to prime T cell responses in vitro.

Conclusion: cDC from EC can mount cell-intrinsic immune responses against HIV-1 thought effective sensing of HIV-1 DNA, which may support the generation of highly effective HIV-1-specific T cell responses in these patients.

GROUP A
Board Assignment #8

Lynn Matthews, MD, Massachusetts General Hospital

Title: Developing a safer conception intervention for HIV-infected men reporting uninfected or unknown serostatus partners: qualitative data exploring feasibility

Authors: LT Matthews, L Rambally, FN Mosery, M Mathenjwa, L Pillay, C Psaros, A Harrison, SA Safren, DR Bangsberg, JA Smit

Background. Many men living with HIV want to have children and thus risk infecting their partners and, therefore, their future children with HIV. Advances in HIV-prevention offer men living with HIV strategies to reduce the risk of sexual HIV transmission while attempting conception including antiretroviral therapy (ART) for the infected partner, pre-exposure prophylaxis (PrEP) for the uninfected partner, timing sex without condoms to peak fertility, and sperm processing with assisted reproductive technologies. Whether men in HIV-endemic settings are interested in adopting these strategies remains unknown.

Methods. In order to inform a safer conception intervention for men living with HIV, we conducted focus group discussions with men accessing clinical care in Durban, South Africa. Eligible men were 25-40 years old, HIV-infected, not on antiretroviral therapy (ART), and interested in having a child in the next year with a stable partner of HIV-negative or unknown serostatus. Focus group discussion guides explored motivations for having a healthy baby, feasibility of engaging a partner in a safer conception intervention, and knowledge and acceptability of safer conception strategies. English transcripts were reviewed using content analysis.

Results. Twelve participants from 3 focus group discussions had a median age of 26 (range
25-44) years, half (n=6) had completed secondary school, a third (n=9) reported full- or part-time employment, and all identified as black South Africans. Men reported a median of 2 (range 1-4) sexual partners and 1 (range 1-3) desired pregnancy partner(s). Two thirds (n=9) reported concordant fertility desires with the identified partner, less than half (n=5) had disclosed his HIV-serostatus to the pregnancy partner. A third reported sex without condoms at last sex act.

Emergent themes included poor general knowledge of HIV transmission and confusion around HIV-serodiscordance. Men expressed great interest in safer conception, but did not have knowledge of specific safer conception strategies. Men expressed concerns about being able to disclose HIV-positive serostatus to a pregnancy partner and that sex without condoms would be deleterious to his own health. Men expressed that timing sex without condoms to peak fertility would be feasible and some men thought that delaying sex without condoms until achieving a suppressed viral load with ART was feasible. Some men, however, were skeptical that viral load suppression could protect a partner. The concept of risk reduction (versus safe and unsafe behaviors) was unfamiliar.

**Conclusions.** Men living with HIV are interested in safer conception and willing to attend additional clinic sessions to learn about strategies. Safer conception programs will need to promote serostatus disclosure to partners. Prevention counseling in the clinics makes it difficult for men to conceptualize risk reduction. Promotion of HIV prevention strategies other than condoms and abstinence should be integrated into public health messages about HIV prevention.

**GROUP A**

**Board Assignment #9**

**Julia Raifman**, Doctoral Candidate, Harvard T.H. Chan School of Public Health

**Title:** Preventing Unintended Pregnancy and HIV Transmission: The HIV Treatment Cascade and Contraceptive Choices

**Authors:** Julia Raifman, Terusha Chetty, Frank Tanser, Tinofa Mutevedzi, Philippa Matthews, Kobus Herbst, Deenan Pillay, Till Bärnighausen

**Background:** Access to reproductive healthcare is important for all women, and women living with HIV face additional reproductive healthcare concerns. For women living with HIV, contraception using condoms prevents unintended pregnancy, acquisition of other sexually transmitted diseases, and onward transmission of HIV. Dual-method dual protection contraception (condoms with other contraceptive methods) has greater contraceptive effectiveness than single-method dual protection contraception (condoms alone) and is also preferable to single protection (non-condom methods), which only protect against unintended pregnancy without preventing HIV and other STI transmission. We estimate the effect of progression along the HIV treatment cascade on contraceptive use and choice among HIV-infected women in a high prevalence rural South African setting.

**Methods:** We linked population-based surveillance data on contraception collected by the Wellcome Trust-funded Africa Centre for Health and Population Studies to data from the local antiretroviral treatment (ART) program in Hlabisa sub-district, KwaZulu-Natal. We estimated a bivariate probit model of the effects of progressing through the cascade on contraceptive choice among HIV-infected, sexually active women aged 15-49 years (N=3169), controlling for potential confounders based on individual and household characteristics.

**Findings:** Overall contraception use increased across the cascade from <40% among HIV-infected women who did not know their status to >70% among women on ART for 4-7 years. Table 1 shows the average marginal effects (AME) of movement through the treatment cascade on contraceptive choice. We found that becoming aware of HIV-positive status increased the probability of women using single-method dual protection by 4.6 percentage
points (pp, p=0.030) and the probability of using dual-method dual protection by 3.5 pp (p=0.001) relative to women who were unaware of their HIV-positive status. Being on ART for less than a year increased the probability of using single-method dual protection by 10.3 pp (p=0.003) and the probability of dual-method dual protection by 5.2 pp (p=0.007), while being on ART for 4-7 years increased the probability of using single-method dual protection by 21.6 pp (p<0.001) and dual-method dual protection by 11.2 pp (p<0.001)

**Conclusion:** We conclude that movement along the HIV treatment cascade significantly increased the likelihood of contraception in general and contraception with condoms in particular. HIV counseling and treatment programs are likely to contribute to HIV prevention through the behavioral pathway of changing contraception use and choice.

**GROUP A Board Assignment #10**

**Angela Robertson Bazzi,** PhD MPH, Fenway Health and Boston University School of Public Health

**Title:** Male-male couples’ experiences using antiretroviral preexposure prophylaxis as a tool for HIV prevention

**Authors:** Angela Robertson Bazzi, Jowanna Malone, Kirk Fergus, Steven A. Safren, Kenneth H. Mayer, Matthew J Mimiaga

**Background:** Men who have sex with men (MSM) experience elevated HIV risk; it is estimated that about a 1/3 of new infections among U.S. MSM are attributed to primary partnerships. Unprotected sex among male-male couples is linked to relationship dynamics (intimacy, trust, commitment); these relationship dynamics may also influence the uptake and adherence of HIV biomedical prevention interventions. Antiretroviral preexposure prophylaxis (PrEP) is a promising biomedical HIV prevention strategy, but efficacy is dependent on excellent adherence (one pill, once per day). Data suggest that trust and partner support reinforce PrEP adherence among heterosexual couples, and it’s likely that this relationship extends to male-male couples as well. The objective of this qualitative study was to explore relationship dynamics among male-male couples that may promote or hinder PrEP uptake and adherence.

**Methods:** We used purposive sampling to recruit adult (≥18 years) MSM (both male-male couples and individual male PrEP users) at an urban community health center in Boston, MA with varied relationship types. A brief survey was administered to collect demographic and behavioral profiles including current or prior PrEP use. Semi-structured interviews lasting ~1hr were digitally recorded and transcribed verbatim. We identified themes through content coding of qualitative transcripts. An initial codebook was based on key domains of the interview guide and additional emergent themes.

**Results:** Interviews with 10 male-male couples and 5 individual MSM highlight how PrEP use has spurred enhanced communication and honesty about sexual agreements (e.g., having sex partners outside of their primary relationship), particularly within longer-term, committed open relationships. Couples have identified simply forgetting, travelling, and substance use as challenges to PrEP adherence. Specific facilitators included partner support (reminders, encouragement), mobile reminders, coupling PrEP with other daily medications/vitamins, and scheduling PrEP use with other daily routine activities. Several participants described experienced or perceived challenges with accessing PrEP, such as difficulty identifying providers knowledgeable about or experience prescribing PrEP. Notably, participants described the importance of their social and sexual networks in obtaining PrEP-related information, locating providers who are familiar with prescribing PrEP, and weighing the pros and cons to PrEP uptake.
**Discussion:** Preliminary findings highlight some PrEP uptake and adherence challenges that can be addressed via strategies involving education, partner support and other reminder systems. Findings may inform future couples-based PrEP uptake and adherence interventions among MSM.

**GROUP A Board Assignment #11**

**Frank Schildberg, PhD, Harvard Medical School**

**Title:** Human lymph node stromal cells induce myeloid derived suppressor cells

**Authors:** Frank A. Schildberg, Filippos Porichis, Bruce D. Walker, Arlene H. Sharpe

**Background:** Lymph node stromal cells (LNSCs) form the architecture and lymph-draining conduit system of lymph nodes. They build a scaffold to provide essential guidance cues to immune cells: orchestrating immune cell migration, maintaining immune cell homeostasis and exerting several immunosuppressive mechanisms to regulate local and systemic immune responses. LNSCs are widely known to modulate adaptive immune cells and regulate their activation status. In the present study we investigated if human LNSCs are able to alter the phenotype of myeloid immune cells and if there are functional differences between LNSCs from healthy and HIV-infected patients.

**Methods/Results:** We used a co-culture system with healthy PBMCs and LNSCs from healthy or HIV-infected patients. Interestingly, co-culture of PBMCs with LNSCs from healthy and HIV patients led to CD14+ cells with reduced expression of HLA-DR, a marker for myeloid derived suppressor cells (MDSCs). MDSCs are a heterogeneous population which is highly immunosuppressive and able to suppress and regulate the phenotype of several immune cell types. Using time and dose kinetic experiments, we showed that LNSCs from HIV patients induced significant higher frequencies and absolute numbers of CD14+ HLA-DR- cells. Subsequent functional assays revealed that the CD14+ HLA-DR- cells resemble MDSCs isolated from cancer patients in other studies and show comparable immune suppressive properties.

**Conclusion:** In summary, LNSCs are able to induce an immune regulatory myeloid cell type, and LNSCs from HIV patients induce MDSCs more potently than LNSCs from healthy individuals. These data suggest that LNSCs from HIV-infected patients could lead to increased MDSCs, which may severely compromise the patient’s effector function against HIV and may enable better survival and persistence of HIV.

**GROUP A Board Assignment #12**

**Radiana Trifonova, PhD, MD, Boston Children’s Hospital**

**Title:** Role of myeloid cell subsets in the human cervix during HIV mucosal infection

**Background:** The mucosal immune cell composition of the human female genital tract is an important factor for the susceptibility to HIV-1 infection.

**Methods:** We have developed an optimized procedure to retrieve immune cells from the mucosa while preserving cell surface markers used for immunophenotyping by multicolor flow cytometry. Using this approach we have characterized the abundance of all major immune cells in human cervix looking at the variations in healthy women and the changes in the immune cell populations after menopause.

**Results:** A surprising finding in our study was that the CD14+ myeloid cells were the most abundant hematopoietic cells in the cervix comprising about half of CD45+ mononuclear cells. Most of the CD14+ cells were conventional CD11c- macrophages, and about a third were CD11c+ dendritic cells (DCs), most of which were CD103-CD11b+CX3CR1+DC-
Previous studies suggested that the myeloid cells represented only \ (~10\%) of the hematopoietic cells in the genital mucosa but this could be due to suboptimal recovery from the tissue stroma with routine protocols for tissue dissociation.

**Conclusion:** Our data suggests that due to their abundance in the genital tract myeloid cells and specifically the DCs expressing the HIV-binding coreceptors CX3CR1 (the fractalkine receptor) and DC-SIGN, might be important in HIV-transmission by either sensing the virus and inducing an innate and adaptive immune response and/or in transferring the virus to T cells. Although some studies suggest that myeloid cells are one of the first cells infected during HIV mucosal transmission and they can capture the virus and transfer it to T cells, the importance of their role in HIV infection has not been resolved. The current model of sexual transmission of HIV is based on studies of SIV transmission in female Rhesus macaques, however results in the macaque SIV model might not translate to human HIV transmission. HIV is restricted from replicating efficiently in macrophages and DCs by the host factor SAMHD1, but an accessory protein Vpx in SIV and HIV-2 causes SAMHD1 degradation allowing viral replication in these cells and could be responsible for the different clinical course of the infection. We are now looking at the role of myeloid cells in the human cervical mucosa during HIV transmission and the effect of the viral Vpx protein in mucosal myeloid and T cells during HIV-1 infection.

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**GROUP B Poster Session  4:45-5:30 pm**

**GROUP B Board Assignment #1**

Nadia Abuelezam, ScD, Harvard T.H. Chan School of Public Health

**Title:** Getting to 90-90-90 in South Africa: Predictions from the HIV-CDM Simulation Model

**Authors:** Nadia N. Abuelezam, Alethea W. McCormick, Thomas Fussell, George R. Seage III

**Background:** By 2020, countries around the world have been tasked with reaching the 90-90-90 targets of 90\% tested, 90\% treated, and 90\% suppressed resulting in a 73\% overall suppression rate within the HIV+ population.

**Methods:** We examined the feasibility of reaching these targets in a South African context using testing, treatment, and suppression based programs and projected the potential impact of these targets on HIV prevalence, incidence, and infections averted from 2015 to 2020. We used the HIV-CDM, an individual based simulation model, that has been calibrated to historical sexual and transmission networks from 1990-2013. We calculated the HIV incidence, prevalence, infections averted and the proportion of the population tested, treated, and virally suppressed for the testing and treatment interventions that yield the greatest progress towards these goals.

**Results:** When all elements of the treatment cascade are perfected (perfect suppression, no LTFU, and rapid scale up of ART distribution) but no changes are made to the testing cascade, 85\% suppression is achieved by 2020 with little impact on incidence and prevalence. The combination of a 3-month testing interval, the removal of the CD4 threshold for starting ART and a reduction in LTFU to zero results in 61\% suppression, short of 90-90-90 goals. When all possible elements of the testing and treatment cascades (testing interval, test acceptance and return, initiation and linkage to ART, suppression and LTFU) are perfected, 94\% of those with HIV are suppressed in South Africa by 2020. In this scenario, prevalence in the simulation dropped by 4\% and incidence decreased from 12.9 cases to 4.2 cases per 1000 person-years between 2015 and 2020.
**Discussion:** When multiple testing and treatment programs are aggressively combined, achieving the 90-90-90 targets can reduce both prevalence and incidence and alter the trajectory of the HIV epidemic in South Africa.

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<th>GROUP B Board Assignment #2</th>
<th>Deborah Anderson, PhD, Boston Medical Center</th>
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<tr>
<td><strong>Title:</strong> <strong>T</strong>Monoclonal Antibody-Based Microbicides for HIV Prevention</td>
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<td><strong>Authors:</strong> Anderson DJ, Whaley K, Moench T, Cone R, Mayer KH.</td>
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<tr>
<td><strong>Background:</strong> We are using an innovative transgenic human monoclonal antibody (mAb) production platform (Nicotiana) to produce mAbs for inclusion in vaginal and rectal topical microbicides.</td>
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<td><strong>Methods/Results:</strong> Our prototype mAb microbicide contains VRCO1, an HIV neutralizing mAb, and HSV8, a mAb against Herpes Simplex Virus 2. Another mAb under development is directed against CD52g, an antigen on sperm and seminal leukocytes. Our research indicates that mAbs maintain activity in the vaginal environment and are retained for up to 24 hours in the vagina due to interactions with apical epithelial cells and mucus. VRCO1/HSV8 MAb gel was effective in preventing SHIV vaginal transmission in a macaque model, and animal toxicology studies indicate that the formulation is safe.</td>
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<td><strong>Summary:</strong> Preparations are underway to test VRCO1/HSV8 mAb films and rings in Phase 1 clinical trials.</td>
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<th>GROUP B Board Assignment #3</th>
<th>Ellen Caniglia, SD, Harvard T.H. Chan School of Public Health</th>
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<td><strong>Title:</strong> <strong>When to monitor CD4 cell count and HIV-RNA to reduce mortality, AIDS-defining illness, and virologic failure in HIV-infected persons in developed countries</strong></td>
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<tr>
<td><strong>Authors:</strong> Ellen Caniglia, Miguel Hernán on behalf of the HIV-CAUSAL Collaboration</td>
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<td><strong>Background:</strong> CD4 cell count and HIV-RNA are monitored in HIV-infected individuals on antiretroviral therapy (ART), but clinical guidelines vary with regards to the optimal monitoring frequency.</td>
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<td><strong>Methods:</strong> The HIV-CAUSAL Collaboration includes prospective cohort studies from 6 European countries and the United States. Our analysis was restricted to antiretroviral-therapy naive individuals who initiated ART in 2000 or later and became virologically suppressed (two consecutive HIV-RNAs≤200 copies/ml) within 12 months. Baseline was defined as the date of virologic suppression. Our analysis included individuals who were 18 years or older, had no history of AIDS, and were not pregnant (when information was available) at baseline. For each individual, follow-up ended at the event of interest, pregnancy (if known), the cohort-specific administrative end of follow-up, or censoring, whichever occurred first.</td>
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<td>We compared four CD4 cell count and HIV-RNA monitoring strategies: (i) every 3±1 months, (ii) every 6±1 months, (iii) every 9±1 months, and (iv) every 12±1 months. No restrictions were placed on monitoring frequency between a switch from the first-line treatment regimen and virologic suppression. At baseline, we made four replicates of each individual (1 per strategy) and censored replicates if and when their data were no longer consistent with their corresponding strategy. We used IP weighted models to estimate hazard ratios of death and</td>
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AIDS-defining illness or death, and risk ratios of virologic failure (HIV-RNA>50 copies/ml) at 18 months. The IP-weighted estimates were adjusted for measured baseline and time-varying confounders (CD4 count, HIV-RNA, AIDS, and history of monitoring frequency).

**Results:** 35,195 individuals were included in our analysis. At 14 months of follow-up, there were 10,523, 3,289, 2,050 and 1,945 replicates remaining in the 3, 6, 9, and 12 months strategies, respectively. At any given month, monitoring was more likely in older individuals, in those with lower CD4 cell counts, higher HIV-RNA, and a diagnosis of an AIDS-defining illness, and in those with a history of more frequent monitoring. The hazard ratios of both clinical outcomes were similar for all strategies. Compared with monitoring every 3 months, the risk ratios of virologic failure were higher for 6 months, 9 months, and 12 months (Table).

**Conclusions:** We found little evidence for an effect of monitoring frequency on death and AIDS-defining illness or death among individuals who achieve virologic suppression within 12 months of ART initiation. However, we estimated that monitoring every 3 months results in the lowest incidence of virologic failure at 18 months. In this presentation, we will discuss scenarios under which our estimates may be biased by unmeasured confounding and sensitivity analyses that may reduce this bias.

**Table.** Hazard ratios and 18-month risk ratios by monitoring strategy, HIV-CAUSAL Collaboration 2000-2013

<table>
<thead>
<tr>
<th>Monitoring strategy</th>
<th>Death Hazard ratio (95% CI)</th>
<th>AIDS-defining illness or death Risk ratio (95% CI)</th>
<th>Virologic failure Risk ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3±1 months</td>
<td>1.00 (reference)</td>
<td>1.00 (reference)</td>
<td>1.00 (reference)</td>
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<tr>
<td>6±1 months</td>
<td>1.03 (0.90, 1.19)</td>
<td>1.03 (0.91, 1.16)</td>
<td>1.21 (1.13, 1.30)</td>
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<tr>
<td>9±1 months</td>
<td>1.14 (0.87, 1.51)</td>
<td>1.04 (0.87, 1.23)</td>
<td>1.23 (1.11, 1.37)</td>
</tr>
<tr>
<td>12±1 months</td>
<td>1.17 (0.90, 1.52)</td>
<td>1.04 (0.88, 1.23)</td>
<td>1.26 (1.14, 1.40)</td>
</tr>
</tbody>
</table>

**GROUP B Board Assignment #4**

Sebastien Haneuse, PhD, Harvard T.H. Chan School of Public Health

**Title:** Strategies for monitoring and evaluation of resource-limited national antiretroviral therapy programs: the two-phase design

**Authors:** Haneuse S, Hedt-Gauthier, B, Chimbwandira F, Makombe S, Tenthani L, Jahn, A.

**Background:** In resource-limited settings such as sub-Saharan Africa, monitoring and evaluation (M&E) of antiretroviral treatment (ART) programs often relies on routinely collected aggregated facility-level data. Such data are limited, however, because of the potential for ecological bias, although collecting detailed patient-level data on a routine basis is prohibitively expensive. To resolve this dilemma, we propose the use of the two-phase design. Specifically, when the outcome of interest is binary, the two-phase design provides a framework within which researchers can resolve ecological bias through the collection of patient-level data on a sub-sample of individuals while obtaining potentially substantial efficiency gains, over a standard case-control design, by making use of the routinely
collected aggregated data.

**Methods:** Between 2005-2007, the Malawian Ministry of Health conducted a one-time cross-sectional survey of 82,887 patients registered at 189 ART clinics. Using these patient data, an aggregated dataset is constructed to mimic the type of data that it routinely available. A hypothetical study of risk factors for patient outcomes at 6 months post-registration is considered. Analyses are presented based on: (i) the full patient-level data; (ii) the aggregated data; (iii) a hypothetical case-control study; (iv) a hypothetical two-phase study that stratifies on clinic type; and, (v) a hypothetical two-phase study that stratifies on clinic type and year of registration. To examine efficiency gains associated with the two-phase design, a simulation study is conducted to investigate statistical power to detect an interaction between clinic type and year of registration.

**Results:** Analyses and conclusions based solely on aggregated data may suffer from ecological bias. Collecting and analyzing patient data using either a case-control or two-phase design resolves ecological bias to provide valid conclusions. To detect the interaction between clinic type and year of registration, the case-control design would require a prohibitively large sample size. In contrast, a two-phase design that stratifies on clinic and year of registration achieves greater than 85% power with as few as 1,000 patient samples.

**Conclusions:** Two-phase designs have the potential to augment current M&E efforts in resource-limited settings by providing a cost-efficient framework for the collection and analysis of patient data.

<table>
<thead>
<tr>
<th>GROUP B</th>
<th>Board Assignment #5</th>
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<tbody>
<tr>
<td><strong>Ingrid Katz, MD, Brigham and Women's Hospital</strong></td>
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</tr>
<tr>
<td><strong>Title:</strong> Impact of South Africa’s HIV Treatment Guidelines on Early Losses: A cohort analysis</td>
<td></td>
</tr>
<tr>
<td><strong>Authors:</strong> Ingrid T. Katz, Richard Kaplan, Garrett Fitzmaurice, Dominick Leone, David R. Bangsberg, Linda-Gail Bekker, Catherine Orrell</td>
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</tr>
<tr>
<td><strong>Background:</strong> South Africa (SA) has the world’s largest antiretroviral treatment (ART) program. Prior to 2011, the immunological threshold for ART eligibility in adults was a CD4 count ≤ 200 cells/µL. In September, 2011 the CD4 threshold was increased to ≤ 350 cells/µL, and starting in 2015 it will again be increased to ≤500 cells/µL. While access to ART has increased, it is unknown if these changes have influenced patients’ willingness to initiate treatment, or discontinue treatment early (&lt;16 weeks in care). We hypothesized that increasing the CD4 threshold to access ART would increase early loss due to a “healthy cohort” effect.</td>
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<td><strong>Methodology:</strong> We performed a retrospective cohort analysis of treatment-naive, non-pregnant, individuals who tested positive for HIV and were referred to the Hannan Crusaid Treatment Centre in Cape Town, SA over a five-year period, inclusive of the period when CD4 guidelines were changed. Data were abstracted from electronic records and paper charts, including baseline CD4 at referral, World Health Organization (WHO) stage, decision-making regarding ART initiation, and early discontinuation of treatment (&lt; 16 weeks on ART, confirmed through patient tracking involving up to 3 home visits).</td>
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</table>
| **Results:** 4025 HIV-infected individuals who underwent CD4 testing between Jan 2, 2009 - Dec 31, 2013 were included. Overall, 90.4% initiated ART, of whom 1.6% died upon initiating ART, and 17.7% had early discontinuation of treatment. Patients in the later sub-
cohort were significantly more likely to discontinue care <16 weeks into treatment (19.8% vs. 15.8%, p=.002, see Table 1). After controlling for baseline CD4, WHO stage, and age this effect remained significant (AOR= 1.30, 95%CI: 1.09 – 1.55). When the analysis was restricted to only the individuals who would have qualified in either cohort (CD4<200 cells/µL), the effect was slightly enhanced (AOR=1.34, 95% CI: 1.06-1.67).

Conclusion: Over one-quarter of this cohort never achieved the long-term benefits of ART and viral load suppression due to early mortality, ART discontinuation < 16 weeks, or ART non-initiation. Early discontinuation of ART was significantly higher in the later cohort, although this trend did not appear to be based on CD4 counts at ART initiation alone. These findings support continued research on understanding socio-behavioral and structural factors driving early losses in care over time in South Africa.

Table 1: Early Losses in Care in Cape Town, South Africa

<table>
<thead>
<tr>
<th></th>
<th>Total Cohort (n=4025)</th>
<th>Adults who qualified for ART before CD4 guideline change (n=2123)</th>
<th>Adults who qualified for ART after CD4 guideline change (n=1902)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiated ART</td>
<td>3640/4025 (90.4%)</td>
<td>1924/2123 (90.6%)</td>
<td>1716/1902 (90.2%)</td>
<td>0.70</td>
</tr>
<tr>
<td>In care for &gt;16 wks</td>
<td>2938/3640 (80.7%)</td>
<td>1577/1924 (82.0%)</td>
<td>1361/1716 (79.3%)</td>
<td>0.05</td>
</tr>
<tr>
<td>Stopped care &lt;16 wks</td>
<td>644/3640 (17.7%)</td>
<td>305/1924 (15.8%)</td>
<td>339/1716 (19.8%)</td>
<td>0.002</td>
</tr>
<tr>
<td>Died &lt;=16 weeks</td>
<td>58/3640 (1.6%)</td>
<td>42/1924 (2.2%)</td>
<td>16/1716 (0.9%)</td>
<td>0.004</td>
</tr>
<tr>
<td>No ART Initiated</td>
<td>385/4025 (9.6%)</td>
<td>199/2123 (9.4%)</td>
<td>186/1902 (9.8%)</td>
<td>0.70</td>
</tr>
<tr>
<td>Died pre-ART</td>
<td>99/385 (25.7%)</td>
<td>68/199 (34.2%)</td>
<td>31/186 (16.7%)</td>
<td>0.0002</td>
</tr>
</tbody>
</table>

Anne M. Neilan, MD, MPH Massachusetts General Hospital

Title: Testing adolescents and young adults for HIV: a cost-effectiveness analysis to inform guidelines

Background: Of the 50,000 yearly incident HIV infections in the United States (US), 26% occur in adolescents and young adults aged 13-24. The US Centers for Disease Control (CDC) estimates that 58.3% of the 181,000 undiagnosed HIV-infections in the US are occurring in the same age group. Uptake of the most recent CDC guidelines (2006) for
routine testing in adolescents is poor, with 11.9% of high school students having ever been tested for HIV in 2006 and 12.9% of high school students having ever been tested for HIV in 2012. The clinical impact, cost, and cost-effectiveness of CDC guideline-concordant care are unclear. In January 2015, CDC and the Cost-Effectiveness of Preventing AIDS Complications (CEPAC) investigators began a collaborative project to assess the cost-effectiveness of testing strategies in adolescents and young adults. We are in the initial phase of data collection.

Objective: To compare the clinical outcomes and cost-effectiveness of routine adolescent HIV testing strategies in the US, compared to the current guidelines of beginning routine testing at age 13.

Design: Cost-effectiveness analysis from a societal perspective, linking simulation models of HIV testing to published reports of HIV transmission risk, with and without antiretroviral therapy. The CDC will provide us with national incidence and prevalence data, based on state, age, and risk group, to conduct this microsimulation model-based assessment.

Methods: We will compare current HIV detection practices to strategies increasing the age of initiation of routine testing in US adolescents and young adults ages 13 through 24, as well as increasing the frequency of testing. We will assess high-risk subgroups, including homeless, lesbian, gay, bisexual, and transgender (LGBT), and region- and ethnicity-specific populations of adolescents and young adults. Sensitivity analyses will assess the impact of variable uptake of the guidelines, costs of testing, and costs of antiretroviral therapy. Model inputs will be derived from CDC data as soon as they become available, and from the published literature.

Results: We will project life expectancy (life-years (LY)), quality adjusted life expectancy (QALE), and mean life costs per person ($) for all US adolescents as well as for HIV-infected adolescents. We will report reduction of secondary HIV transmission (number of cases over ten and fifty years), as well as quality-adjusted life months (QALM) and costs associated with transmission. Incremental cost-effectiveness ratios ($/QALY) with and without secondary transmission will be reported, discounting both LY and costs at 3%/year. We will also report these key outcomes for specific populations, as noted above.

Conclusions: The results of this analysis will inform planned revisions of the CDC guidelines for age- and prevalence- specific strategies of routine testing for HIV in adolescents and young adults in the US.

GROUP B
Board Assignment #7

Kelli O’Laughlin, MD, MPH, Brigham and Women’s Hospital

Title: Predictors of HIV-Infection in Nakivale Refugee Settlement in SW Uganda

Authors: O’Laughlin KN, Kasozi J, Basset IV, Faustin ZM, Parker RA, Greenwald K, Omara Owino C, Walensky RP

Background: Though HIV prevalence in refugee settlements in sub-Saharan Africa is usually unknown, the majority of refugees come from neighboring countries where HIV prevalence is high. The instability faced by refugees places them at increased risk of exposure to HIV infection. In Nakivale Refugee Settlement in southwestern Uganda, there are 64,000 refugees from 12 countries; the prevalence of HIV is unknown. We implemented a routine HIV testing program in Nakivale and examined factors associated with new HIV diagnosis.

Methods: From Mar-Sept 2013, research assistants routinely offered free HIV-testing to all clients in the Nakivale Clinic Outpatient Department while they waited for their clinic visit. Tested participants were surveyed to obtain demographic information, mode of transport and travel time to clinic. We compared variables for HIV-infected clients and clients not infected with HIV using the Wilcoxon rank sum and Fisher’s exact test (continuous, categorical data).
We used a logistic regression model to identify predictors of a new diagnosis of HIV-infection among those tested.

**Findings:** Over the 6-month intervention, 155 (4.4%) of 3,558 individuals tested were identified with HIV infection. Compared to those without HIV infection, HIV-infected clients had a similar median age (30 vs 29, p=0.3), were more likely female (68% vs 56%, p=0.0047), less often refugee (41% vs 71%, p<0.0001), and had longer median travel time to clinic (90 min vs 60 min, p<0.0001). Of those tested, males were 0.56 times as likely, those not traveling to clinic on foot were 1.65 times as likely, and those taking longer to reach clinic were 1.07 times (per 15 minutes of travel time) as likely to be found HIV-infected. Likelihood of testing as HIV-infected was significantly associated with country of origin (Table 1). People from Uganda had the highest prevalence among the individual countries reported, with 93/1,069 (8.7%).

**Table 1. Predictors of testing as HIV-infected**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio (95% CI)</th>
<th>P-value</th>
</tr>
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<tbody>
<tr>
<td>Gender (males compared to females)</td>
<td>0.560 (0.388-0.807)</td>
<td>0.0019</td>
</tr>
<tr>
<td>Travel (not on foot compared to on foot)</td>
<td>1.648 (1.138-2.388)</td>
<td>0.0083</td>
</tr>
<tr>
<td>Time (increase per 15 minutes)</td>
<td>1.066 (1.019-1.114)</td>
<td>0.0051</td>
</tr>
<tr>
<td>Country</td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Uganda (reference)</td>
<td>1</td>
<td></td>
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<tr>
<td>DRC</td>
<td>0.410 (0.236-0.711)</td>
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</tr>
<tr>
<td>Rwanda</td>
<td>0.325 (0.203-0.520)</td>
<td></td>
</tr>
<tr>
<td>Burundi</td>
<td>0.211 (0.096-0.468)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1.263 (0.521-3.061)</td>
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**Interpretation:** In a routine HIV screening program in a refugee settlement in Uganda, Ugandan nationals are at higher risk than most refugees tested. Decentralized testing throughout the refugee settlement may help to identify more individuals with HIV that live further from a health clinic. Given the close physical proximity of refugees and the surrounding Ugandan nationals, future studies should aim to discern if there is HIV transmission and HIV viral mixing among these populations.

**GROUP B Board Assignment #8**

**Krishna Reddy, MD, Massachusetts General Hospital**

**Title:** The Impact of Cigarette Smoking on Life Expectancy of People with HIV in the United States

**Authors:** Krishna P. Reddy, Robert A. Parker, Kenneth A. Freedberg, Rochelle P. Walensky

**Introduction:** Cigarette smoking is a major cause of mortality among people with HIV in settings where antiretroviral therapy is accessible and may account for more years of life lost than HIV itself. The projected life expectancy of HIV-infected smokers compared to nonsmokers in the US has not yet been defined, nor the life expectancy loss associated with smoking in patients with HIV been quantified.

**Methods:** We use a validated simulation model of HIV disease (CEPAC-US) to evaluate the life expectancies of a cohort of patients with HIV at the time of presentation to care in the US. We compute age-specific, all-cause mortality risk ratios by baseline smoking status (never
smoker vs. former smoker vs. current smoker), using published data from large cohort studies of cigarette smoking and mortality. Standardized mortality ratios are used to adjust for race and gender as well as for competing risks from factors such as illicit drug use.

**Results:** From a synthesis of literature-based data, the risk ratio for all-cause mortality among current smokers compared to never smokers is 3.70 and 3.21 for men and women, respectively, between ages 65-69; for ages 35-39 it is 2.21 and 2.84; for ages 55-59 it is 3.07 and 2.48. HIV-infected current smokers have a lower life expectancy than nonsmokers (model debugging, simulations, and analyses are ongoing and should be available for quantifications at time of abstract presentation).

**Conclusions:** Cigarette smoking reduces the life expectancy of HIV-infected people in the US. These results inform the massive impact that smoking cessation programs might have among people with HIV.

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**GROUP B Board Assignment #9**

**Title:** HIV infection and vascular stiffness among older-adults taking antiretroviral therapy in rural Uganda

**Authors:** Mark J. Siedner, MD MPH, June-Ho Kim, BS, Jessica E. Haberer, MD MS, Jeffrey N. Martin, MD, Yap Boum II, MD, Alexander C. Tsai MD PhD, Peter Hunt, MD PhD, David R. Bangsberg, MD MPH

**Background:** HIV infection is associated with vascular stiffness. No studies have demonstrated this relationship among people living with HIV (PLWH) in sub-Saharan Africa, the focal point of the global epidemic.

**Methods:** We enrolled older-aged PLWH taking antiretroviral therapy in Mbarara, Uganda, and a community-based, age and gender-matched control group of HIV-uninfected individuals from the clinic catchment area. We collected data on demographics, smoking history, blood for CD4 count and viral load measurements, and obtained bilateral ankle-brachial index (ABI) measurements. We calculated ABI as the greater of Doppler-detected blood pressure in the left or right dorsalis pedis artery divided by the greater of Doppler-detected blood pressure in the left or right brachial artery. Our primary outcome of interest was an elevated ABI > 1.2, which is a surrogate marker of arterial stiffness that has been correlated with increased risk of all cause and cardiovascular mortality. We fit logistic regression models to estimate the associations between HIV infection and vascular stiffness after adjusting for age, gender, smoking duration, and body mass index.

**Results:** A total of 100 HIV uninfected and 105 PLWH were enrolled during November 2013 – October 2014. The median age was 50 years (IQR 46-53), 103 (51%) were female, with no differences by HIV status. A higher proportion of HIV-uninfected persons were current or former smokers, but the difference was not statistically significant (50% versus 36%, P=0.06). The prevalence of vascular stiffness (ABI>1.2) was 27/105 (26%) among PLWH and 10/100 (10%) in the matched control group (P=0.003, Figure 1), and only one participant had an ABI<0.9. In univariable models, female gender (OR 0.34, 95%CI 0.16 – 0.74, P=0.01) was significantly associated with vascular stiffness and each cumulative year of smoking was marginally associated (OR 1.04, 95%CI 1.00– 1.08, P=0.09). In multivariable logistic regression models, HIV infection was associated with increased odds of vascular stiffness (AOR 3.64, 95%CI 1.57 – 8.43, P=0.003).

**Conclusions:** In rural southwestern Uganda, vascular stiffness is associated with HIV infection, independent of other cardiovascular disease risk factors. Increased attention to cardiovascular disease risk and morbidity among PLWH in sub-Saharan Africa should be
Ramnath Subbaraman, MD, Brigham and Women's Hospital

**Title:** Quality of tuberculosis care in India: a systematic review

**Authors:** Srinath Satyanarayana, MD, Ramnath Subbaraman, MD, Priya Shete, MD, Genevieve Gore, MLS, Jishnu Das, PhD, Adithya Cattamanchi, MD, Kenneth Mayer, MD, Richard Menzies, MD, Anthony D Harries, MD, Phillip Hopewell, MD, Madhukar Pai, MD

**Background:** India accounts for a quarter of the new TB cases worldwide and for a third of the world’s ‘missing cases’. At least 50% of TB cases seek care in the unregulated private sector made up of informal and qualified providers. We report findings of the first systematic review of studies assessing the quality of TB care in India.

**Design/Methods:** We extracted findings from studies of providers’ knowledge and practices of TB care and compared them to the recommendations of the International Standards for TB Care (ISTC). Using pre-specified terms, we searched multiple databases to identify relevant articles published between 2000 and 2014. Three reviewers independently assessed abstracts for their suitability for full-text review and extracted findings from those articles. We generated Forest Plots for each ISTC standard with data from five or more studies.

**Results:** The literature search yielded 754 non-duplicate citations. After full text review, 43 articles met criteria for inclusion in the final analysis. Thirty-one studies obtained information using questionnaires; 12 used chart abstraction; and no studies used standardized patients. Heterogeneity in the findings precluded meta-analysis for most ISTC standards. Nine out of 20 studies evaluating provider knowledge about using a sputum smear for diagnosis found that less than half of providers had correct knowledge; three out of four studies assessing provider practices found that less than one-fourth of providers correctly ordered a sputum smear for TB suspects. Ten out of 13 studies found that less than one-third of providers had correct knowledge of the standard treatment regimen for drug susceptible TB. Similar deficits were identified for 18 of the 21 ISTC standards for which findings were available. Adherence to guidelines in actual practice was generally lower than correct knowledge of those guidelines. Eleven studies evaluated both public and private sector providers. Across a

![Arterial Stiffness among Older-aged Individuals with and without HIV Infection in Rural Uganda](image)
variety of ISTC standards, nearly all of these studies found substantially higher levels of appropriate knowledge in the public sector.

Conclusions: The available evidence highlights poor quality of TB care across a variety of indicators, especially in the private sector. Inappropriate care may be contributing to delays in TB diagnosis, poor patient outcomes, and drug resistance. To improve quality of care, initiatives like the ISTC need to be disseminated widely at the country level and coupled with sound measurement approaches (e.g. standardized patient studies) to see if these guidelines can actually change practice and patient outcomes.

GROUP B Board Assignment #11

Gustavo Velásquez, MD, Brigham and Women’s Hospital

Title: Impact of HIV on mortality among patients treated for tuberculosis, Lima, Peru, 2005-2008

Authors: Gustavo E. Velásquez, J. Peter Cegielski, Megan B. Murray, Martin Yagui, Luis Asencios, Jaime Bayona, Hector O. Jave, Gloria Yale, Carmen Suarez, Christian Rojas, Sidney S. Atwood, Carmen C. Contreras, Janeth Santa Cruz, and Sonya S. Shin

Background: Human immunodeficiency virus (HIV)-associated tuberculosis (TB) deaths have decreased worldwide over the past decade. Evidence is sparse regarding the impact of HIV status on TB mortality in low HIV prevalence settings.

Methods: We conducted a prospective cohort study of patients treated for TB between 2005 and 2008 in two adjacent health districts in Lima, Peru. We constructed a multivariate Cox proportional hazards model to evaluate the effect of HIV status on mortality during TB treatment.

Results: 1701 participants were eligible for analysis, of which 136 (8.0%) died during TB treatment. HIV-positive patients constituted 11.0% of the cohort and contributed to 34.6% of all deaths. HIV-positive patients were significantly more likely to die (25.1% vs. 5.9%, P<0.001) and less likely to be cured (28.3% vs. 39.4%, P = 0.003). On multivariate analysis, positive HIV status (hazard ratio [HR]=6.06; 95% confidence interval [CI], 3.96-9.27), unemployment (HR=2.24; 95% CI, 1.55-3.25), and sputum AFB positivity (HR=1.91; 95% CI, 1.10-3.31) were significantly associated with a higher hazard of death.

Conclusion: We demonstrate that positive HIV status is a strong predictor of mortality among patients treated for TB in the early years after Peru started providing free antiretroviral therapy (ART). These findings suggest that aggressive TB control strategies, including rapid diagnosis and individualized regimens for MDR-TB, are not sufficient for TB/HIV co-infected patients in this low HIV prevalence setting. These findings provide a benchmark against which HIV-associated TB mortality can be compared as HIV diagnosis and ART provision are more widely implemented.

GROUP B Board Assignment #12

Rebecca Zash, MD, Beth Israel Deaconess Medical Center

Title: Reassuring Birth Outcomes Data with Atripla used for PMTCT in Botswana

Authors: Rebecca Zash, Jennifer Chen, Sajini Souda, Scott Dryden-Peterson, Shahin Lockman, Mompati Mmalane, Joseph Makhema, Max Essex and Roger Shapiro

Background: Prior to introduction of tenofovir/emtricitabine/efavirenz (TDF/FTC/EFV, Atripla), 3-drug antiretroviral treatment (ART) was associated with increased adverse birth outcomes compared with zidovudine (ZDV) used for prevention of mother-to-child HIV transmission (PMTCT). Given the rapid expansion of Atripla as first-line ART in both adult treatment and PMTCT programs, we evaluated adverse birth outcomes among pregnant
women initiating Atripla vs. other ART and ZDV.

**Methods.** We extracted obstetric records from HIV+ women at the 2 largest maternities in Botswana from 2009-11 when Botswana National Guidelines recommended ZDV from 28 weeks gestational age (GA) for CD4 >350 and ART for CD4 <350, and again in 2013-14 after implementation of Atripla for PMTCT regardless of CD4 or GA. Outcomes included small for gestational age (SGA) (<10th% birth weight for gestational age), preterm delivery (PTD) (<37 weeks GA) and stillbirths (SB). Using logistic regression, we compared women who initiated Atripla vs. other ART (restricting analyses CD4 <350); Atripla vs. ZDV (restricting analyses to CD4 >350); and Atripla vs. any other ARV in pregnancy. Comparisons included only ARV starts before 30 wks GA and outcomes >30 wks GA.

**Results.** Data were collected on 5219 women who initiated ARVs in pregnancy: 1461 (28%) initiated Atripla; 760 (15%) other 3-drug ART combinations; 2920 (56%) zidovudine (ZDV); and 78 (1.5%) unspecified ARVs. Pregnancy CD4 count was available in 59%, and 70% started ARVs by 30 wks GA. Prevalence of adverse birth outcomes was high overall (18% SGA, 21% PTD and 3% SB), and among women initiating Atripla (12% SGA, 22% PTD and 3% SB). Compared with initiating other ART in pregnancy, Atripla had fewer overall adverse outcomes (aOR 0.4, 95%CI 0.2, 0.7) , fewer SGA infants (aOR 0.5, 95% CI 0.3,0.8) and no significant differences in PTD (aOR 0.5, 95%CI 0.2,1.2) or SB (aOR 0.1, 95%CI 0.01,1.0). Compared with initiating ZDV, Atripla had fewer overall adverse outcomes (aOR 0.4, 95% CI 0.3, 0.6), fewer SGA infants (aOR 0.7, 95%CI 0.5,1.0) and no difference in PTD (aOR 1.1, 95%CI 0.6,2.1) or SB (aOR 0.9, 95% CI 0.4,2.1). Compared with initiating any other ARV (ART or ZDV) without CD4 restriction, Atripla had fewer overall adverse outcomes (aOR 0.4, 95%CI 0.3,0.6), fewer SGA infants (aOR 0.5, 95% CI 0.4,0.7) and no difference in PTD (aOR 0.7, 95%CI 0.5,1.1) or SB (aOR 0.6, 95% CI 0.3,1.3).

**Conclusions:** Adverse birth outcomes remain high among HIV+ women in Botswana. In this observational study, Atripla appeared to be safer than other ARVs started by 30 weeks gestation, and was associated with fewer SGA infants. Larger studies with Atripla exposures from conception are needed to evaluate earlier pregnancy outcomes and neural tube defects.
This symposium was made possible with help from the Harvard University Center for AIDS Research (CFAR), an NIH funded program (P30 AI060354), which is supported by the following NIH Co-Funding and Participating Institutes and Centers: NIAID, NCI, NICHD, NHLBI, NIDA, NIMH, NIA, NIDDK, NIGMS, FIC, and OAR. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.