

In this issue...

Our feature article this month focuses on the phylogenetic study that demonstrates that adolescent girls and young women's vulnerability to HIV is driven by high rates of new HIV infections from men who are, on average, eight years older.

On page 2 we summarise the highlights from the HIV Prevention workshop held in Magaliesburg, South Africa, which was co-hosted by the Ragon Institute, CAPRISA and the HPP.

A summary of the annual CAPRISA Scientific Advisory Board meeting and the appointment of Prof Quarraisha Abdool Karim as the Vice-Chairperson of the South African Medical Research Council Board is provided on page 3.

On page 4 we report on Prof Quarraisha Abdool Karim's presentation at the 8th Falling Walls conference held in Berlin and congratulate Dr Linda Fried on her recent award.



CONTACT DETAILS

CAPRISA
Doris Duke Medical
Research Institute (DDMRI)
2nd Floor
University of KwaZulu-Natal
Private Bag X7, Congella 4013
South Africa

T: +27-31-260 4555

F: +27-31-260 4566

E-mail: caprisa@ukzn.ac.za

www.caprisa.org.za

 [caprisaofficial](https://www.facebook.com/caprisaofficial)

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Transmission networks and risk of HIV infection

Research from the US Centers for Disease Control and Prevention-sponsored study known as HIV Incidence Provincial Surveillance System (HIPSS), was published in the November 30 issue of *Lancet HIV*.

The study showed that sexual partnering between young women and older men, who might have acquired HIV from women of similar age, is a key feature of the sexual networks driving transmission.

This large-scale community-wide phylogenetic study aimed to examine the underlying HIV transmission dynamics and the source and consequences of high rates of HIV infection in young women in South Africa. A cross-sectional household survey of almost 10,000 randomly selected individuals aged 15–49 years was conducted in two neighbouring sub-districts (one urban and one rural) with a high burden of HIV infection in KwaZulu-Natal, South Africa. HIV prevalence (weighted) was 59.8% in 2835 women aged 25–40 years, 40.3% in 1548 men aged 25–40 years, 22.3% in 2224 women younger than 25 years, and 7.6% in 1472 men younger than 25 years.

HIV genotyping was done in 1589 individuals with a viral load of >1000 copies per mL. A total of 90 clusters of probable male–female transmission were identified, and within those clusters were 123 women and 103 men.

The sexual partners of women <25 years were on average 8.7 years older, with 62% of these men aged 25 to 40, while for women aged 25 to 40

years, their sexual partners were on average just one year older. Among the men aged 25 to 40 linked to a woman under 25, 39% were linked simultaneously to a woman aged 25 to 40.

The most probable direction of transmission among these individuals was inferred by the levels of HIV prevalence within this community. HIV transmission was most likely to occur from high to low prevalence.

Together, these data suggest that men aged 25 to 40 living with HIV may have acquired HIV from a woman aged 25 to 40, and that most of the women under 25 living with HIV may have acquired HIV from a man aged 25 to 40 (Figure). Over time, as the younger women grow older, this cycle is expected to continue.

Young women are uniquely vulnerable to infection and understanding the cycle of HIV transmission for this key population is a public health imperative.

This study provides scientific evidence to guide targeted HIV preven-

tion interventions to break the cycle of HIV transmission and impact the course of the HIV epidemic in South Africa and potentially in other high burden settings. In particular, expansion of antiretroviral therapy and combination prevention strategies that include interventions to address age-disparate sexual partnering is crucial to reducing HIV incidence and enabling Africa to reach the goal of ending AIDS as a public health threat.

For further reading see:

de Oliveira T, Kharsany ABM, et al. *Lancet HIV* 2016 November; doi: 10.1016/S2352-3018(16)30186-2. [http://www.thelancet.com/pdfs/journals/lanhiv/PIIS2352-3018\(16\)30186-2.pdf](http://www.thelancet.com/pdfs/journals/lanhiv/PIIS2352-3018(16)30186-2.pdf)

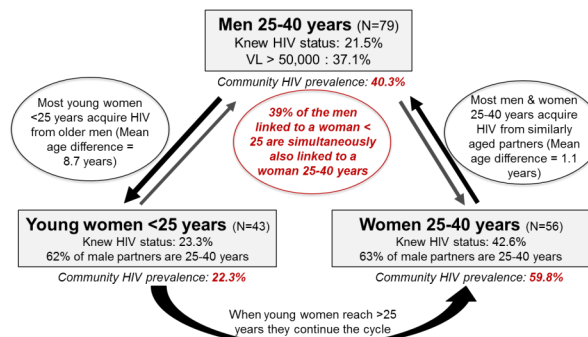


Figure: Schematic presentation of the sexual networks of HIV-positive men and women in phylogenetically identified heterosexual transmission clusters



HIV Prevention Workshop



Delegates attending the HIV Prevention Workshop in Magaliesburg, South Africa, included **Front row (L-R):** Shiv Pillai, Galit Alter, Dan Barouch, Penny Moore, Mary Carrington, Bruce Walker, Salim Abdool Karim, Thumbi Ndung'u, Dennis Burton, Facundo Batista, Lynn Morris, Ashley Haase, Tom Hope. **Second Row (L-R):** Kimone Fisher, Leila Mansoor, Kamini Gounder, Nono Mkhize, Carolyn Williamson, Pamela Gumbi, Darryl Irvine, Emily Wong, Christina Gosmann, Laurel Lagenaur, Gustavo Doncel, Zaza Ndhlovu, Todd Allen, Bill Schief, Katlego Sojane, Heather Jaspan. **Third Row (L-R):** Jaclyn Mann, Helen Hingle, Kathy Mngadi, Arman Bashirova, Zanele Ditse, Cheryl Baxter, Kogie Naidoo, Alex Cusson, Caroline Mitchell, Boris Juelg, Desh Archary, Tanuja Gengiah, Ayesha Kharsany, Michelle Mulder, Aida Sivro, Omolara Baiyegunhi, Sylvie Le Gall, Sinaye Ngcapu, Bongiwwe Ndlovu, Kiera Clayton, Al Leslie, Doug Kwon, Jinal Bhiman, Simone Richardson, Philip Goulder, Wendy Burgers, Sharana Mahomed. **Back Row (L-R):** Natasha Samsunder, Lyle McKinnon, Frank Tanser, Nigel Garrett, Marylyn Addo, Arup Chakraborty, Deenan Pillay, Louis Picker, Craig Cohen, Gabriel Victora, Faatima Laher, Catherine Koofhethile, Kathleen Donnelly, Daniel Lingwood, Katy Stephenson

The 7th annual HIV Prevention Workshop, which was hosted by CAPRISA, the Ragon Institute, and the HIV Pathogenesis Program, took place in Magaliesburg, South Africa from 18 - 30 November 2016. More than 80 scientists and students participated from local and international research institutions.

Sessions focused on latest research on PrEP for young women, understanding HIV transmission at the mucosal level, the role of the vaginal microbiome in HIV risk, characterizing and inducing broadly neutralizing HIV antibodies, strategies for cure, and a variety of other pathogenesis and basic immunology topics.

CAPRISA's Director, Salim Abdool Karim, set the scene by reminding the delegates that HIV incidence remains unacceptably high with 2.1 million new HIV infections globally each year, with young women being disproportionately affected. He explained that while Truvada, as daily oral PrEP, is licensed, WHO-recommended, and currently implemented by CAPRISA and others, PrEP efficacy could vary substantially with adherence, level of genital inflammation and the vaginal microbiome. Long-acting PrEP would help address some of the underlying behavioural and biological risk factors for HIV acquisition.

In the HIV transmission session, Ashley Haase highlighted the role of the mucosal barrier in protecting against HIV transmission and Tom Hope showed the need to prevent HIV from reaching Th17 cells, which are often the first cells that HIV infects. Desh Archary presented on how topical PrEP can affect mucosal antibodies levels, and Aida Sivro discussed the role of the mucosal homing receptor $\alpha 4\beta 7$ in HIV transmission.

The genital microbiome is getting much-needed new attention because of its role in altering HIV risk and the availability of tenofovir from topical PrEP. Both Christina Gosmann and Craig

Cohen highlighted the significance of lactobacilli in the vaginal microbiome. Laurel Lagenaur then presented potential solutions to modify the microbiome by using live biotherapeutic products to recolonize the vagina with *Lactobacillus crispatus*. A better understanding of the balance between the various microbes within a complex ecology, how it is impacted by the gut microbiome, sexual partners, diet, antibiotic (ab)use and vaginal practices is needed.

Broadly neutralizing antibodies (bNAbs) including VRC01 are currently being investigated in clinical trials for HIV prevention. At the workshop, Bill Schief described his efforts to develop immunogens to kick start their evolution. Other talks described additional important functions of bNAbs (Simone Richardson), and how germinal centres can be targeted (Daniel Lingwood, Facundo Batiste). These talks were augmented by engaging presentations on immunology, including a new technology to quantify cell-cell interactions (Gabriel Victora), T cell diversify and protection (Al Leslie) and regulation of TFH differentiation (Shiv Pillai).

For the first time, the Workshop included a session on HIV cure. Philip Goulder gave an update on paediatric HIV reservoir studies, Louis Picker highlighted challenges for reservoir elimination in his early and long-term treated non-human primates. This was followed by Dan Barouch's presentation on therapeutic vaccines with Ad26 mosaic vectors. Lyle McKinnon rounded the session off with $\alpha 4\beta 7$ therapy as an HIV cure strategy.

Apart from the world-class science, the delegates were treated to a hot air balloon ride and visited the Sterkfontein Caves, also known as the cradle of humankind. Overall, delegates left with great optimism for HIV prevention with several HIV vaccine clinical trials underway, and exciting new products in the pipeline for PrEP, vaccines and cure.

- Nigel Garrett



CAPRISA's 2016 Scientific Advisory Board Report



CAPRISA Scientific Advisory Board members, CAPRISA staff and several world-renowned scientists at the CAPRISA SAB Meeting held in July 2016

On 24th November 2016 the CAPRISA Board of Control approved the report of the CAPRISA Scientific Advisory Board (SAB) annual meeting held on 20 July 2016. The SAB meeting was timed to coincide with the International AIDS Conference in Durban. A number of leading scientific experts who were attending the conference were invited to attend the SAB and provide comments. The SAB undertakes a detailed review of CAPRISA's research programme every 3 years, with the last such review having been conducted in April 2015.

The 2016 SAB review was a shorter, more focused review, principally of the major studies being undertaken at CAPRISA. The SAB commended the CAPRISA team on its continuing high impact scientific contributions, the success of its scientific capacity building programme, and its effective knowledge trans-

lation strategies, bearing fruit through informing policy and practice while moving the science forward.

SAB Members in attendance at the meeting were: Françoise Barré-Sinoussi (Institut Pasteur), Peter Godfrey-Faussett (UNAIDS), Gray Handley (National Institute for Allergy and Infectious Diseases, US National Institutes of Health), Catherine Hankins (Amsterdam Institute for Global Health and Development [Chairperson]), Yogan Pillay (National Department of Health), Fareed Abdullah (South African National AIDS Council), Sibongiseni Dhlomo (KZN MEC for Health) and Thomas Quinn (Johns Hopkins University and NIAID/NIH).

The full report and recommendations from the SAB can be downloaded from the CAPRISA website at:

<http://www.caprisha.org/>

Quarraisha Abdool Karim appointed to MRC Board

Professor Quarraisha Abdool Karim was appointed Vice-Chairperson of the South African Medical Research Council (SAMRC) Board this month. She will serve on the Council's 16 member Board, appointed by Minister of Health Dr Aaron Motsoaledi, for the period 2016 to 2019. "We are, as the custodians of medical research, committed to scientific ex-

cellence by driving the imperative to find local solutions in response to our country's burden of disease", said Professor Glenda Gray President of the SAMRC. "We look forward to the diverse strategic leadership mix of the new Board," "I am confident that the SAMRC will immensely benefit from the invaluable contributions of the new leadership".



The next wall to fall - HIV infection



can achieve an AIDS-free generation". This annual conference organized by the Falling Walls Foundation since 2009, was held in Berlin on 9th November to commemorate the anniversary of the falling of the Berlin Wall on this day in 1989 and was attended by over 700 key decision-makers in science, politics, the private sector and civil society.

In her address Professor Abdool Karim emphasised that while we have much to celebrate in our scientific and programmatic responses to the epidemic through global solidarity, preventing HIV infection remains a challenge. Despite over 18 million people on treatment globally, we still continue to see 1.1 million people dying from AIDS and 2.1 million new infections translating to just over 5,500 new infections each day. More than 70% of the new infections are in sub-Saharan Africa and young women between the ages of 15-24 years of age bear a disproportionate burden of infection. The availability of oral PrEP provides for the first time a women initiated technology that is important especially for young women who are unable to negotiate safer sex practices with their male partner. Adherence has been a challenge and newer, slow release longer lasting prevention technologies including passive immunity holds promise for the future. These technologies are an important step in reducing HIV infection in young women but it will take our collective efforts and time to address the root causes of their vulnerability that underly gender-power imbalances at a societal level. While this is challenging we cannot afford not to invest in keeping young girls HIV free.

Professor Quarraisha Abdool Karim, Associate Scientific Director at CAPRISA, was one of 16 leading global scientists from a wide range of disciplines who delivered an address at the 8th Falling Walls Conference on November 9, 2016. The metaphorical wall that she focused on breaking was the high rates of HIV infection in young women in Africa captured in the title of her talk: "How epidemiology and prevention in young women

Meet »the brightest minds on the planet.« BBC

FALLING WALLS BERLIN 8/9 NOV 2016

WHICH ARE THE NEXT WALLS TO FALL?

To watch Quarraisha's 14-minute Falling Walls talk, please go to: <http://falling-walls.com/videos/Quarraisha-Abdool-Karim-10667>

Berlin 9 November The International Conference on Future Breakthroughs in Science and Society

Professor Linda Fried honoured



Linda Fried, Dean and DeLamar Professor at the Columbia University Mailman School of Public Health and a leading expert on healthy aging, has been honoured with the prestigious 2016 Inserm International Prize, a scientific award, made each year by the French National Institute of Health and Medical Research. Professor Fried is a public health leader in the fields of epidemiology and aging and has done seminal work in defining frailty as a clinical syndrome and illuminating both its causes and the potential for prevention as keys

to optimizing health for older adults. Professor Fried's scientific discoveries have transformed science, medical care, and public health around the world, inspiring greater interest in helping older populations thrive.

Professor Fried who serves on the CAPRISA Board of Control said that her "interest in the science of healthy aging has been guided by a belief that science and society, working in concert, can optimise our innate capacity for good health".



Scientific papers published in 2016

- 58* Muenchhoff M, Adland E, Karimanzira O, Crowther C, Pace M, Csala A, Leitman E, Moonsamy A, McGregor C, Hurst J, Groll A, Mori M, Sinmyee S, Thobakgale C, Tudor-Williams G, Prendergast AJ, Klooverpris H, Roider J, Leslie A, Shingadia D, Brits T, Daniels S, Frater J, Willberg CB, Walker BD, Ndung'u T, Jooste P, **Moore PL, Morris L, Goulder P.** Nonprogressing HIV-infected children share fundamental immunological features of nonpathogenic SIV infection. *Science Translational Medicine* 2016 September; 8(358): 358ra125.
- 59 Nonghanphithak D, Reechaipichitkul W, Namwat W, Lulitanond V, **Naranbhai V**, Faksri K. Genetic polymorphisms of CCL2 associated with susceptibility to latent tuberculous infection in Thailand. *Int J Tuberc Lung Dis* 2016 September; 20(9):1242-8.
- 60 Taylor JG, Yates TA, Mthethwa M, **Tanser F**, Abubakar I, Altamirano H. Measuring ventilation and modelling M. tuberculosis transmission in indoor congregate settings, rural KwaZulu-Natal. *Int J Tuberc Lung Dis*. 2016 September; 20(9):1155-61.
- 61 **Moore PL, Williamson C.** 2016. Approaches to the induction of HIV broadly neutralizing antibodies. *Current Opinion in HIV and AIDS*, 2016 November, 11(6): 569-575.
- 62 **Buthelezi UE, Davidson CL, Kharsany AB.** Strengthening HIV surveillance: measurements to track the epidemic in real time. *African Journal of AIDS Research* 2016 July; 15(2): 89-98.
- 63 **Abdool Karim Q.** Colliding epidemics of communicable and non-communicable diseases during adolescence in South Africa. *South African Medical Journal* 2016 July; 106(7): 658.
- 64 Fowler MG, Qin M, Fiscus SA, Currier JS, Flynn PM, Chipato T, McIntyre J, Gnanashanmugam D, Siberry GK, Coletti AS, Taha TE, Klingman KL, Martinson FE, Owor M, Violari A, **Moodley D**, Theron GB, Bhosale R, Bobat R, Chi BH, Strehlau R, Mlay P, Loftis AJ, Browning R, Fenton T, Purdue L, Basar M, Shapiro DE, Mofenson LM. Benefits and Risks of Antiretroviral Therapy for Perinatal HIV Prevention. *New England Journal of Medicine* 2016 Nov 3; 375(18):1726-1737.
- 65 **O'Donnell MR, Padayatchi N, Metcalfe JZ.** Elucidating the role of clofazimine for the treatment of tuberculosis. *The International Journal of Tuberculosis and Lung Disease* 2016 December; 20(Suppl 1): S52-S57.
- 66 **Abdool Karim Q.** Mental health of and substance use by adolescents. *South African Medical Journal* 2016 June; 106(6): 547.
- 67 **Telisinghe L, Hippner P, Churchyard GJ, Gresak G, Grant AD, Charalambous S, Fielding KL.** Outcomes of on-site antiretroviral therapy provision in a South African correctional facility. *International Journal of STD and AIDS* 2016 Nov; 27(13):1153-1161.
- 68 **Abdool Karim SS.** Assessing progress with HIV incidence in national cohorts. *Lancet HIV*. 2016 Nov 15. pii: S2352-3018(16)30187-4. doi: 10.1016/S2352-3018(16)30187-4.

*continuation from previous newsletter

Scientific Reviews

Abstracts submitted for review		Manuscripts submitted for review		Ancillary studies submitted for review	
Total#	Cumulative ^a	Total#	Cumulative ^a	Total#	Cumulative ^a
3	370	0	210	0	73

for month, ^a since committee initiation

iSpotU and Achievement awards

The CAPRISA iSpotU Innovation Award recognises and rewards employees who contributed in an exceptional manner in respect of innovation, which demonstrate that "There Is a Better Way" of doing a task, process or system. The Achievement Award rewards and recognises employees or teams for accomplishments and achievements which received recognition from an external credible individual and/or organisation. Recipients of the award during November included:

CAPRISA Achievement Award

The CAPRISA laboratory team including Cara-Mia Corris, Ross Cromarty, Roshell Dhannoo, Keenan Govender,

Shannie Kamal, Norman Kanni, Jacqueline Kasavan, Yollande Kwitshana, Zanele Mchunu, Kunthi Naidoo, Nkosinathi Ndlovu, Renaldo Noble, Panjalai Pillay, Ashley Singh, Damien Sookoo, Phindile Tshabalala, Rajesperi

Venter, and Natasha Samsunder were recipients of a CAPRISA Achievement award in November. The team received the award in recognition of their contributions to the CAPRISA laboratories receiving an outstanding audit report.



National Research Foundation

CAPRISA hosts a DST-NRF Centre of Excellence in HIV Prevention



UNAIDS

CAPRISA is the UNAIDS Collaborating Centre for HIV Research and Policy



CAPRISA hosts a MRC HIV-TB Pathogenesis and Treatment Research Unit

Partner institutions:



Board of Control: AC Bawa (Chair) • Q Abdool Karim • SS Abdool Karim • R Bharuthram • D Clark • LP Fried (US) • S Madhi • LE Mazwai
K Naidoo • B Ntuli • N Padayatchi • M Rajab • DP Visser • ZM Yacoub

Scientific Advisory Board: C Hankins (Chair) • F Barré-Sinoussi • SM Dhlomo • P Godfrey-Faussett • FG Handley • G Hirschall • J Mascola • Y Pillay
T Quinn

Registration number: 2002/024027/08