



In this Issue

Our feature story this month we focus on the research published in the journal, *Nature Communications*, that focuses on the importance of understanding and the underlying pathways in the shared increased risk of HPV and HIV infections.

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A report on the 10th HIV Prevention meeting hosted by Ragon Institute, CAPRISA, AHRI and the HPP is provided on page 3.

On page 4 we congratulate Salim Abdool Karim and Lynn Morris on being named in the 2019 Web of Science list of highly cited researchers and we report on World AIDS Day.

We report on encouraging young girls to pursue careers in statistics and data analytics and congratulate our colleagues on their achievements on page 5.

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CAPRISA

CENTRE FOR THE AIDS PROGRAMME OF RESEARCH IN SOUTH AFRICA

Newsletter

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HIV acquisition may be enhanced by HPV infection through genital inflammatory pathways

Young women in sub-Saharan Africa have a high burden of human papillomaviruses (HPV) infection, a virus associated with cervical cancer. The behavioural risks of HPV infection are also risk factors for human immunodeficiency virus (HIV). HPV has been found to be associated with an increased risk of HIV acquisition, but it was unclear whether this is due to behaviours that lead to both HPV and HIV or whether it is due to a shared biological mechanism.

To better understand the underlying biological mechanisms for this association, HPV infection and cytokine biomarkers of genital inflammation were assessed in women at high risk of HIV infection (CAPRISA 004 trial; N=779).

The study, published in the journal *Nature Communications*, observed a high prevalence of HPV in the population (74%) and showed an epidemiological link between HPV status (prevalence, clearance, persistence, acquisition, multiple concurrent HPV infection, or infection with oncogenic or vaccine-type HPV) and increased risk of HIV acquisition (Figure).

Female genital tract cytokines associated with HPV infection status were distinct from those observed in HPV negative women, and overlapped substantially with cytokines associated with HIV risk; indicating that immune responses directed at clearing or controlling HPV infection may inadvertently promote susceptibility to HIV infection.

The data show a relationship between the acquisition or clearance of any one sub-type of HPV and subsequent HIV acquisition with an indication that inflammatory cytokines may be a mechanism

by which the two infections have an epidemiological association. The findings also point to the potential impact of HPV vaccination on HIV acquisition, if this relationship is causal. It highlights the importance of HPV vaccination and of understanding the immune impact of HPV infection in vaccinated individuals and its relation to HIV risk.

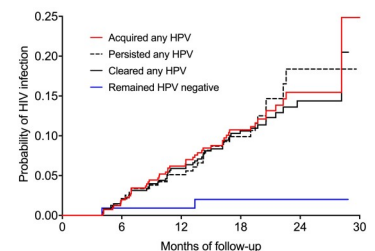
Overall, the data suggest that in addition to preventing cervical cancer, HPV prevention may have an impact on HIV acquisition. More effective ways to prevent and/or treat HPV infection or modify its immunological effects, could have potential HIV prevention benefits.

- Lenine Liebenberg (PhD)

For further reading:

Liebenberg, L.J.P., McKinnon, L.R., Yende-Zuma, N. et al. HPV infection and the genital cytokine milieu in women at high risk of HIV acquisition. *Nat Commun* (2019) doi:10.1038/s41467-019-13089-2

<https://www.nature.com/articles/s41467-019-13089-2>



	0/405	8/397	25/348	40/251	48/83	49/
Acquired any HPV	0/405	8/397	25/348	40/251	48/83	49/
Persisted any HPV	0/236	5/231	12/200	21/142	28/37	28/
Cleared any HPV	0/477	10/467	28/408	46/302	53/99	54/
Remained HPV negative	0/108	1/106	1/100	2/72	2/30	2/0

Figure: Kaplan-Meier curves representing the relationship between HPV infection and HIV risk. Associations of HIV incidence were determined by modeling time to HIV infection with multivariable Cox proportional hazards regression models, where time spent in the study was calculated from randomization to the estimated



Study shows high rates of drug-induced liver injury in people living with HIV co-infected with TB

The results of the the Starting Antiretroviral Therapy at Three Points in Tuberculosis randomised trial, published in the journal, *Clinical Infectious Diseases*, showed the worsening of drug-induced liver injury complicates the management of TB-HIV co-infected patients receiving concomitant antiretroviral therapy (ART) and tuberculosis therapy.

Researchers conducted post-hoc analysis within the CAPRISA 003 Starting Antiretroviral Therapy at Three Points in Tuberculosis trial. Incidence, risk factors, and resolution of liver injury was assessed among patients randomized to initiate ART either early or late during TB treatment, or, after TB treatment completion. Among 642 patients enrolled, 472 had complete baseline and six-monthly follow-up laboratory monitoring. 17.6% had baseline CD4+ cell counts <50 cells/mm³.

The analysis showed a high incidence of the new-onset liver injury following TB treatment initiation, but prior to ART initiation, in 146/472 patients. Post-ART initiation incidence of liver injury was 27.4, 19.0, and 18.4 per 100 person-years in the early, late, and sequential arms in patients with CD4+ cell counts <200 cells/mm³ and 32.1, 11.8, and 28.2 per 100 person-years among patients with CD4+ cell counts ≥200 cells/mm³, in patients randomized to the early, late, and se-

quential treatment arms, respectively. Interestingly, severe and life-threatening liver injury occurred in only a few patients.

Older age and hepatitis B positivity were predictors of liver injury and the high incidence rates of liver injury among co-treated TB-HIV coinfecting patients. The researchers recommend that clinical guidelines and policies provide guidance on frequency of liver function monitoring for HIV-TB coinfecting patients receiving co-treatment.



Prof Kogie Naidoo, lead author and principal investigator

For further reading:

Naidoo K et al. *Clin Infect Dis*. 2019 Oct 17. pii: ciz732. doi: 10.1093/cid/ciz732 <https://www.ncbi.nlm.nih.gov/pubmed/31622456>

Delegation meets with Governor of Telangana state in India to discuss HIV and TB control



CAPRISA Deputy Director Professor Nesri Padayatchi joined a delegation of eminent scientists to meet with the Governor of Telangana State Dr Tamilisai Soundararajan in Hyderabad, India to discuss controlling the epidemics of TB and HIV in that region. Dr Soundararajan, delivered the opening address at the 50th Union World Conference on Lung Health in Hyderabad. The delegation (L-R): Bobby Ramakant Citizen news; Prof Anand Maurya, Department of Microbiology, All In-

dia Institute of Medical Sciences (AIIMS), Bhopal; Prof Surya Kant, Head, Department of Respiratory Medicine, King George's Medical University; Dr Ishwar Gilada, President of AIDS Society of India; Governor of Telangana State Dr Tamilisai Soundararajan. Hyderabad, India; Dr Erlina Burhan, Head of MDR-TB, Persahabatan Hospital in Indonesia; Prof Nesri Padayatchi (CAPRISA), Ms Shobha Shukla, Executive Director of CNS.



10th Annual HIV Prevention Workshop 2019 hosted by CAPRISA, Ragon Institute, AHRI & HPP



The 10th anniversary of the HIV Prevention Workshop hosted by CAPRISA, Ragon Institute, AHRI and the HPP, took place in the Drakensberg mountains at the foot of the Sani Pass from 11-14th November.

The meeting opened with Prof Salim Abdool Karim, Director of CAPRISA giving an overview of the HIV epidemic, and Dr Bruce Walker, Director of Ragon Institute discussing the durable, natural CTL-mediated immune control of HIV observed in exceptional elite controllers and its potential for vaccine and cure development.

Abdool Karim discussed the burden of HIV in KZN rural communities with overall HIV prevalence of 36.3% and proposed a bold new approach of mass drug administration to treat and prevent HIV. Prof Kharsany started the PrEP session by further highlighting the high incidence of HIV in the region and the urgent need for novel drug delivery systems. This session included an overview of the current PrEP trials (Dr Tanuja Gengiah), delivery and distribution of the drugs in mucosal tissues (Dr Carolina Herrera) as well as the use of PrEP and HIV risk during pregnancy (Dr Rene Heffron).

The two vaccine sessions covered various aspects of HIV and TB vaccine design, including the potential of scRNA-Seq use in providing insight into vaccine biology and improving antibody cloning efforts (Dr Steven Bosinger), and the mechanism of RhCMV/SIV vaccine efficacy (Dr Louis Picker).

Shifting the focus from HIV to TB, Dr Robert Seder presented exciting data showing that IV BCG vaccination induces both systemic and mucosal immune response and prevents TB infection in non-human primate models.

The final session of the day focused on HIV reservoir and immunological strategies for HIV remission and eradication with Dr Steve Deeks discussing the potential of CCR5-disruption in peripheral T cells for sustained virus control.

The second day of the conference started with delegates engaging in activities such as paragliding, horse riding, hiking and a road trip to Lesotho up the Sani Pass. Following an exhilarating and thrilled filled morning the afternoon sessions began with highlights in broadly neutralizing antibodies (bNAbs) with Dr Julie Ledgerwood providing an update on the VRC HIV bNAb clinical trials.

Through the history of CAP256 antibody, from its identification to its production for the ongoing clinical trial testing, Dr Nicole Doria-Rose demonstrated the success of a truly collaborative and multinational effort between researchers from South Africa, Europe and USA.

The microbiome session highlighted the potential of targeting vaginal inflammation through the use and manipulation of vaginal microbiota and its metabolites, and final session for the day focused on the nature and enhancement of antibody responses and immunogen design with presentations from Dr Masaru Kenekiyo, Dr Aaron Schmidt, Dr Darrell Irvine and Dr Gabriel Victoria.

Concluding a decade of HIV prevention meetings delegates departed with a sense of high accomplishment and optimism for the future of HIV treatment and prevention.

- *Aida Sivro (PhD)*



CAPRISA researchers ranked among the world's most Highly Cited Researchers in 2019 by Web of Science

Professors Salim Abdool Karim and Lynn Morris were named in the 2019 list of the world's most Highly Cited Researchers published by the Web of Science's Clarivate Analytics.

Each year, the Web of Science produces a list of the world's most highly cited researchers – a list of about six thousand names, comprising < 0.1% of researchers globally. This year, the list includes 6,217 Highly Cited Researchers in various fields from nearly 60 nations and includes 23 Nobel laureates. The analysis includes 21 broad research fields (including social sciences) and includes cross-field performance, as some Highly Cited Researchers appear in more than one field.

According to David Pendlebury, Senior



Citation Analyst at the Institute for Scientific Information, "The Highly Cited Researchers list contributes to the identification of that small fraction of the researcher population that contributes disproportionately to extending the frontiers of knowledge. These researchers create gains for society, innovation and knowledge that make the world healthier, richer, more sustainable and more secure."



The United States is home to the highest number of Highly Cited Researchers, followed by the United Kingdom and China.

There are about 15 researchers from Africa on the list, including one from UKZN. Researchers from UCT, Stellenbosch, Pretoria and the NICD are some of the other South Africans featuring on the list.

Communities Make the Difference – World AIDS Day symposium



The University of KwaZulu-Natal held a symposium to commemorate World AIDS Day on 29th November and adopted the UNAIDS theme: communities make a difference. The panel discussion, led by Salim Abdool Karim CAPRISA Director, Francois Venter, RHI, WITS, Thumbi N'dungu, Deputy Director AHRI and Ms Gethwana Mahlase (left in the photo), CAPRISA community representative recognised the major gains made but emphasised that complacency could have serious consequences.

While the global HIV epidemic is widely viewed as triumph over tragedy, the estimated 37.9 million people living with HIV, 770 000 AIDS-related deaths, and 1.7 million new infections (> 4,500 new cases of HIV infection occurring each day) in 2018 is a reminder that HIV remains a serious global health challenge. South Africa has one out of every 5 people living with HIV in the world – it is the country with the highest number of people living with HIV (about 7.9 million). In our country teenage girls bear the brunt of the HIV epidemic. About 1,500 adolescent girls and young women are infected with HIV every week in South Africa. These girls are twice as likely to be living with HIV than young men of the same age.

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Research Clinician awarded scholarship

Research Clinician, Dr Nivashnee Naicker, has been awarded a scholarship through the SAMRC/Swiss Vaccine Research Institute collaboration for the International Master in Vaccinology (IMVACC) programme at the University of Lausanne, in Switzerland. Naicker is one of five South African students selected for the distance learning programme. We wish her every success.





Motivating young girls in data analytics and statistics



Dr Non-hlanhla Yende-Zuma, provided an overview of her life story, from humble beginnings to PhD statistics graduate and head of Biostatistics at CA-

PRISA. Yende-Zuma shared her personal journey with top performing grade 11 school girls at UKZN's School of Mathematics, Statistics and Computer Science information session held at the Oyster Box in Durban. 'I come from Ntambahlope, a deep rural area near Es-court,' said Yende-Zuma. 'I was the first person in the whole area to go to university. The school I attended had no science lab and all learning was theoretical. I had never used a computer before I came to UKZN. Yet I succeeded.'

'It was self-motivation and mental strength that kept me going. I knew I had to focus and work hard. Maths was my safe place.'

Prof Delia North head of School at UKZN explained: 'Our aim is to attract a critical mass of high performing students to UKZN, to take up the challenge of data analytics and statistics – a field that offers endless exciting career opportunities and which needs female representation.'

Scientist selected as a Young Physician Leader



Photo: (L-R) Professor Detlev Ganten (Founding President of the World Health Summit) and Dr Rubeshan Perumal

Dr Rubeshan Perumal, CAPRISA honorary scientist, was recently selected as a 2019 Young Physician Leader and was a speaker at the World Health Summit held in Berlin, Germany. Perumal who was nomination by the Academy of Science of South Africa (ASSAf) attended a Leadership Programme hosted by the European School of Management and Technology,

The award by InterAcademy Partnership and M8 Alliance, represents the largest network of national and regional academies in the world.

CAPRISA research fellow pursues masters at Oxford

Dr Reshania Naidoo plans to complete her master's dissertation at the WHO in Geneva. The former CAPRISA fellow is pursuing a master's in the field of International Health and Tropical Medicine, a full-time taught degree, at Oxford university in the United Kingdom after practising as a medical doctor for five years. 'My inspiration and interest in the field started as a research fellow at CAPRISA during my undergraduate medical degree under Dr Nesri Padayatchi's phenomenal mentorship, said Naidoo.

She said she hoped to further her dream of being a "Global Health leader and advocate and contribute towards finding solutions to bettering health in South Africa and the developing world at large".

Photo: Dr Reshania Naidoo at the matriculation (enrolment) ceremony at Oxford University.



Tech Talk: Infosec: Breaking the Culture barrier

Wayne Janneker, CAPRISA's Head of IT, delivered a presentation at the annual Chief Information Security Officer (CISO) Global Alliance conference aimed at IT management. His presentation titled 'Understanding Infosec and the perceived risk' highlighted the risk IT teams are

under due to an evolving digital world. 'ICT needs to create a culture of enablement, the C level executive to understand back and empower Digital growth,' explained Janneker. Strategy Leadership Governance Regulation and Policy are the tools required to ensure a strategic and sustainable model.



Scientific papers published in 2019

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- Maughan-Brown B, George G, Beckett S, Evans M, **Lewis L**, Cawood C, Khanyile D, **Kharsany ABM**.
82 Age-disparate partnerships and HSV-2 among adolescent girls and young women in South Africa: implications for HIV infection risk. *Sexually Transmitted Infections* 2019; 95(6):443-448.
- Chappell CA, **Harkoo I**, Szydlo DW, Bunge KE, Singh D, Nakabiito C, Mhlanga F, Kamira B, Piper JM, Balkus JE, Hillier SL. Contraceptive method switching among women living in sub-Saharan Africa participating in an HIV-1 prevention trial: a prospective cohort study. *Contraception* 2019;100(3):214-218.
- 83 George G, Beckett S, Cawood C, Khanyile D, Govender K, **Kharsany ABM**. Impact of HIV testing and treatment services on risky sexual behaviour in the uMgungundlovu District, KwaZulu-Natal, South Africa: a cross-sectional study. *AIDS Research and Therapy* 2019; 16(1):20. doi: 10.1186/s12981-019-0237-z.
- 84 Mwatelah R, **McKinnon LR**, **Baxter C**, **Abdool Karim Q**, **Abdool Karim SS**. Mechanisms of sexually transmitted infection-induced inflammation in women: implications for HIV risk. *Journal of the International AIDS Society* 2019; 22 (Suppl 6):e25346. doi: 10.1002/jia2.25346.
- 85 Sacks D, Bhiman JN, Wiehe K, Gorman J, Kwong PD, **Morris L**, **Moore PL**. Somatic hypermutation to counter a globally rare viral immunotype drove off-track antibodies in the CAP256-VRC26 HIV-1 V2-directed bNAbs lineage. *PLOS Pathogens* 2019; 15(9):e1008005. doi: 10.1371/journal.ppat.1008005.
- 86 **Moosa A**, **Gengiah TN**, **Lewis L**, **Naidoo K**. Long-term adherence to antiretroviral therapy in a South African adult patient cohort: a retrospective study. *BMC Infectious Diseases* 2019; 19(1):775. doi: 10.1186/s12879-019-4410-8.
- 87 **Naidoo K**, **Hassan-Moosa R**, **Mlotshwa P**, **Yende-Zuma N**, **Govender D**, **Padayatchi N**, **Abdool Karim SS**. High rates of drug-induced liver injury in people living with HIV coinfecting with tuberculosis (TB) irrespective of antiretroviral therapy timing during antituberculosis treatment: results from the starting antiretroviral therapy at three points in TB trial. *Clin Infect Dis*. 2019 Oct 17. pii: ciz732. doi: 10.1093/cid/ciz732.
- 88 **Liebenberg L***, **McKinnon L***, **Yende-Zuma N***, **Garrett N**, **Baxter C**, **Kharsany A**, **Archary D**, **Rositch A**, **Samsunder N**, **Mansoor L**, **Passmore J-A**, **Abdool Karim S**, **Abdool Karim Q**. HPV infection and the genital cytokine milieu in women at high risk of HIV acquisition. *Nature Communication* 2019; 10: 5227. doi.org/10.1038/s41467-019-13089-2
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CAPRISA celebrates the Boks epic win as Rugby World Champions



CAPRISA staff joined the Springbok's victory parade in Durban with thousands of Durbanites to celebrate the epic win of the 2019 Rugby World Cup In Japan.

South Africans united to support the National Team's win #strongertogether, as the Boks travelled to major cities in the country with the Webb Ellis Cup. CAPRISA staff are seen standing in central Durban at the City Hall build-



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



CAPRISA is the UNAIDS Collaborating Centre for HIV Research and Policy



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

CAPRISA hosts a DoH-MRC Special Initiative for HIV Prevention Technology



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