



CAPRISA

CENTRE FOR THE AIDS PROGRAMME OF RESEARCH IN SOUTH AFRICA

Newsletter

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Study shows high burden of STIs among women living with HIV and need for integrated HIV and STI care

In this Issue

On page 1 we feature a study that shows a high burden of STIs among women living with HIV and need for integrated HIV care.

On page 2 we report on the NRF Science Lecture delivered by Prof Quarraisha Abdool Karim; and congratulate Prof Nigel Garrett on his honorary professorship at UKZN.

We highlight CAPRISA's participation at the 7th SA TB conference on page 3 and the visit of officials from the USAID Microbicides Branch.

On page 4 We feature CAPRISA's patronage to the University of Botswana's Graduate Scholarship Endowment Fund & the establishment of the PHASA Susser-Stein Distinguished Lecture. And we report on and showcase the achievements of our students at conferences

On page 5 we report on strengthening partnerships with communities and feature a recent study by the NICD.

A CAPRISA-led study entitled **'Burden of sexually transmitted infections from acute HIV infection among women in South Africa: Evidence from a prospective cohort study'** showed a high prevalence and incidence of four curable sexually transmitted infections (STIs) *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, *Trichomonas vaginalis*, and *Mycoplasma genitalium* in this cohort of women from acute to chronic HIV infection and on antiretroviral therapy (ART) in KwaZulu-Natal, South Africa.

Results from this CAPRISA 002 acute HIV infection study were published in the *Annals of Epidemiology* Journal.

HIV and other STIs often co-occur, but less is known about the long-term STI dynamics among persons living with HIV in sub-Saharan Africa.

The CAPRISA 002 study enrolled women with acute HIV infection and performed STI testing and treatment bi-annually from 2004-2020. The study team estimated STI prevalence, incidence and re-infections before and after ART initiation, and fitted Cox regression models to identify factors associated with STIs.

Researchers followed 235 women with a median age of 25 years for a median of 7.5 years. New STI and re-infection cases per 100 person-years were 5.1 and 9.5 for *Neisseria gonorrhoeae*, 7.4 and 14.7 for *Chlamydia trachomatis*, 8.0 and 26.6 for *Trichomonas vaginalis*, 7.7 and 16.7 for *Mycoplasma genitalium* and 25.2 and 37.3 for any of these STIs.

STI incidence, was associated with HIV viral load (aHR=1.24, 95%CI 1.06-1.44), active syphilis (aHR=16.55, 95%CI 7.49-36.55), a positive HSV-2 PCR (aHR=1.54, 95%CI 1.01-2.35), bacterial vaginosis (aHR=1.48, 95%CI 1.01-2.18), recent regular sexual partners at enrolment (2+ vs none: aHR=3.68, 95% CI 1.79-7.59) and age (5-year fold: aHR=0.80, 95% CI 0.70-0.92).

Mr Kwabena Asare, lead author and PhD student at CAPRISA/UKZN, supervised by Prof Nigel Garrett, Head of Vaccines and Pathogenesis concluded that the high STI/HIV co-infection burden among these women showed that early HIV diagnosis and ART initiation needs to be combined with better STI care for women and their partners to prevent HIV and STI complications and transmissions.

Table 2a Incidence of STIs among WLHIV

Variable	N	First cases (n)	Person years (PYs)	cases per 100 PYs (95% CI)	Cumulative incidence % (n)	(95%CI)
<i>Neisseria gonorrhoeae</i>	223	59	1165.8	5.1 (3.9-6.5)	26.5 (59/223)	(20.8-32.8)
<i>Chlamydia trachomatis</i>	220	75	1014.0	7.4 (5.9-9.3)	34.1 (75/220)	(27.9-40.8)
<i>Trichomonas vaginalis</i>	219	78	973.0	8.0 (6.4-10.0)	35.6 (78/219)	(29.3-42.4)
<i>Mycoplasma genitalium</i>	222	78	1013.3	7.7 (6.2-9.6)	35.1 (78/222)	(28.9-41.8)
*STI (CT/NG/TV/MG)	215	146	578.2	25.2 (21.5-29.7)	67.9 (146/215)	(61.2-74.1)

Table 2b Incidence of STI re-infection among WLHIV (recurrences after the first new case)

Variable	N	Re-infections (n)	Person years (PYs)	cases per 100 PYs (95% CI)	Cumulative incidence % (n)	(95%CI)
<i>Neisseria gonorrhoeae</i>	52	21	221.4	9.5 (6.2-14.6)	32.7 (17/52)	(20.3-47.1)
<i>Chlamydia trachomatis</i>	70	52	353.7	14.7 (11.2-19.3)	42.9 (30/70)	(31.1-55.3)
<i>Trichomonas vaginalis</i>	72	101	380.3	26.6 (21.9-32.3)	68.1 (49/72)	(56.0-78.6)
<i>Mycoplasma genitalium</i>	73	63	376.5	16.7 (13.1-21.4)	46.6 (34/73)	(34.8-58.6)
*STI (CT/NG/TV/MG)	135	261	699.2	37.3 (33.1-42.1)	72.6 (98/135)	(64.3-79.9)

*STI included CT, NG, TV, or MG. CT=*Chlamydia trachomatis*, NG=*Neisseria gonorrhoeae*, TV=*Trichomonas vaginalis*, MG=*Mycoplasma genitalium*, STI=Sexually Transmitted Infection, HIV=Human Immunodeficiency Virus, WLHIV=Women Living with HIV, N=number of women, CI= Confidence Interval.

For more reading see: Asare K, et al. *Annals of Epidemiology* 2022; 74:132-139. <https://pub-med.ncbi.nlm.nih.gov/35977656/>

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Prof Quarraisha Abdool Karim delivers the annual National Research Foundation 2022 Science Lecture

Professor Quarraisha Abdool Karim (*left in the photo*), Associate Scientific Director delivered the Science Lecture at the prestigious annual 2022 National Research Foundation (NRF) Awards ceremony held on Thursday 1st September in Cape Town. The NRF Awards which recognises and celebrates South Africa’s leading researchers for excellence demonstrated in their research was held under the 2022 United Nations theme: International Year of Basic Science for Sustainable development.

Abdool Karim’s lecture titled: ‘Basic Science for Sustainable Development: HIV, TB and Covid-19’ highlighted the findings from South African led basic science research in HIV, TB and Covid-19 that have made both a national and global impact in terms of saving lives.

Reducing high rates of HIV in young women in Africa is key to controlling the global HIV epidemic and new HIV prevention tools for women including long-acting new strategies remain a high priority, said Abdool Karim. The development of prevention technologies was the first step in addressing social challenges underpinned

by trust & partnerships with communities to ensure that prevention products reach those in need.

Multidisciplinary teams and synergy between teams nationally and internationally were an imperative to research and knowledge exchange and sharing, she said. “In an era of increasing incomplete epidemics and pandemics resilience and the rapid ability to pivot to address new challenges is critical,” she said. “The NRF Awards evening was evidence that excellent and impactful science was alive and well in South Africa,” she said.



Dr Nigel Garrett earns an honorary Associate Professorship at UKZN



Dr Nigel Garrett (*left in the photo*) CAPRISA’s Head of HIV Pathogenesis and Vaccine Research has been appointed Honorary Associate Professor in Public Health at the University of KwaZulu-Natal.

A Specialist Physician in HIV and Sexual Health, Garrett has conducted more than 20 randomized clinical trials and large cohort studies related to HIV prevention

and COVID-19 vaccines.

Garrett trained as a clinician in the UK and completed his PhD in Public Health Medicine in the College of Health Sciences at UKZN, where he now lectures on the biostatistics module “It is a real pleasure to share my experience with students at UKZN while advancing

public health in South Africa,” he said.

He played a leading role during the Covid-19 pandemic as Co-Chair of the Sisonke Covid-19 vaccine implementation study and currently serves as the international chair on the COVPN 3008 Ubuntu mRNA vaccine trial and the HVTN108 HIV vaccine study.

Garrett is a Technical Expert Consultant of the South African National Strategic Plan (NSP) Development: NSP for HIV, TB and STIs 2023 – 2028 and provides input on objectives and interventions on reducing STIs, cervical cancer and hepatitis.

He is the CAPRISA Investigator of Record for the HIV Vaccine Trials Network (HVTN) studies and Principal Investigator on several HVTN and COVPN vaccine trials. He also leads US National Institute of Health self-initiated grants on point-of-care technology.

Garrett has published more than 100 manuscripts on a range of topics including COVID-19 vaccines, HIV prevention and sexual health.

He currently supervises four PhD and three MSc students.



7th SA TB conference galvanised scientists and community to get TB response back on track



CAPRISA’s Professor Kogie Naidoo, Deputy Director (left in the photo), and Head of Treatment Research delivered a plenary titled: “State of the art: New TB regimen for Treatment and Prevention”, at the opening session of the 7th SA TB conference attended by local and global scientists and community representatives. “We have an estimated 300 000 cases of TB and 61 000 deaths in South Africa

each year,” said Naidoo. “South Africa is one of 30 high-burden TB countries, and these countries account for 86% of the estimated new TB cases worldwide.”

The conference themed ‘working together to get TB control back on track’, held from 14th - 16th September in Durban highlighted the impact of the Covid-19 pandemic on increasing TB associated mortality while reducing TB case finding, treatment and prevention.

Presentations covered diverse topics in TB prevention and treatment, drugs vaccines and diagnosis, breaking down barriers to achieving HIV, TB and STIs solutions

and social and community aspects of TB.

Also, on the first day of the conference CAPRISA’s PhD Research Fellow Ms Thando Maseko (top right in the photo), supervised by Dr Aida Sivro CAPRISA Senior Scientist won a best oral abstract award for her oral presentation, ‘Changes in natural killer cell phenotypes in TB/HIV co-infection’ and Ms Senamile Ngeema (bottom right in the photo), PhD Research Fellow supervised by Prof Naidoo presented a poster, ‘Isoniazid resistance-conferring mutations are associated with highly variable phenotypic resistance’.



On 15th September Naidoo was a panellist in the session, TB Host Response: Options for Uptake and Patient Care and CAPRISA’s honorary Senior Scientist, Dr Halima Dawood gave a talk- in a satellite session on the ‘Implementation of Urine TB-LAM – Experience sharing from an Academic Hospital, KZN’.

MATRIX Project to Advance the Research and Development of Innovative HIV Prevention Products for Women



Photo: The Epidemiology and Prevention team at the CAPRISA eThekweni Research site with officials from USAID’s Microbicides Branch. In the photo: third row, fourth from the left Dr Mary Latka, Branch Chief; Front Row first from the left Dr Leila Mansoor Senior Scientist, CAPRISA; second row, second from the far right Dr Chelsea Solmo, Health Science Specialist; and in the second row far right Dr Antoinette Nelson, Technical Advisor

CAPRISA Senior Scientist Dr Leila Mansoor hosted a delegation from the USAID’s Microbicides Branch on 22nd September at CAPRISA’s eThekweni Clinical Research site where the first MATRIX Phase I Clinical trial (MATRIX 001 – Tenofovir alafenamide/elvitegravir vaginal insert) will be conducted, together with a site in Kenya and the United States. The USAID delegation, Dr Mary Latka (Microbicides Branch Chief), Dr Chelsea Solmo (Health Science Specialist) and Dr Antoinette Nelson (Technical Advisor) also met with Professor Salim Abdool Karim at CAPRISA’s headquarters. MATRIX, is a 5-year Project to Advance the Research

and Development of Innovative HIV Prevention Products for Women, funded by the U.S. Agency for International Development (USAID) and implemented by Magee-Women’s Research Institute and Foundation (MWRIF).

“The aim is to develop a range of HIV prevention products which are acceptable, affordable, scalable, and deliverable and meet the unmet needs of women at risk of HIV infection through equitable North-South partnerships and rigorous evaluation of project research and development (R&D) activities,” explained Mansoor.



The Abdool Karims address the University of Botswana Foundation dinner

Professor Salim Abdool Karim, Director CAPRISA was the keynote speaker at the University of Botswana's 20th Annual Foundation Fundraising Dinner on 9th September to raise funds for the Graduate Scholarship Endowment Fund. The event held in the university's 40th anniversary year was attended by the President and First Lady of Botswana and eminent industry and scientific leaders. "As the University of Botswana celebrates 40 years of academic excellence and aspiring to be a research-intensive institution, it was an honour and privilege to our guests, students and other stakeholders to learn from a renowned researcher in you," said Mr Abdul Dada Chairman of the UB Foundation and Vice-Chancellor Prof David Norris.



Photo Top: Prof Salim Abdool Karim, First Lady Neo Masisi, Prof Quarraisha Abdool Karim & President Mokgweetsi Masisi at the University of Botswana event

PHASA Susser-Stein Keynote Lecture

On 12th September Prof Salim Abdool Karim, delivered the Susser and Stein Distinguished keynote lecture at the 17th PHASA annual conference in Durban, titled 'The fifth wave and beyond: Where to from here?'

"PHASA is extremely grateful to CAPRISA and Prof Quarraisha Abdool Karim for working with the South African Medical Research Council to create and sponsor the bi-annual PHASA Susser-Stein Distinguished Lecture", said Dr Harsha Somaroo which honours the "legacies of two South African public icons.



Dr Harsha Somaroo, Prof Salim and Quarraisha Abdool Karim with delegates at PHASA

Nonsikelelo Ndlela wins Best Poster presentation at the 11th Infectious Disease in Africa Symposium



M^s Nonsikelelo Ndlela (left in the photo), a masters research fellow mentored by CAPRISA honorary Associate Professor Lenine Liebenberg, was the winner of the best poster presentation prize at the 11th Infectious Disease in Africa Symposium held from 5-10 September 2022 in Cape Town, South Africa. The symposium aimed to translate the success of COVID-19 vaccines to the prevention of HIV, Malaria, and TB,

said Ndlela. Ndlela's poster titled "Investigating the impact of POC STI/BV treatment on genital epithelial barrier integrity," assessed the impact of treatment and the integrity of the genital epithelial barrier. Her research work is an ancillary of the CAPRISA 083 trial that demonstrated reduced cytokine biomarkers of inflammation on point-of-care treatment for sexually transmitted infections and bacterial vaginosis.

11th IDA Symposium and Flow Cytometry Workshop

Prudence Kgagudi (right top in the photo) and Boitumelo Motsoeneng (bottom right in the photo) at the NICD were awarded scholarships to attend the 11th Infectious Diseases in Africa Symposium in Stellenbosch on 5-10 September 2022. Prudence won the 3rd prize for her poster entitled: "SARS-CoV-2 Mu variant shows variable escape from humoral responses triggered by four different variants" and Boitumelo gave a talk and presented a poster entitled: "Humoral response kinetics are delayed in SARS-CoV-2 infection and vaccination in people living with HIV", where after she was invited to also attend the Flow Cytometry Workshop in Cape Town on 12-16 September.





Strengthening partnerships with communities



Mr Patrick Mdletshe CAPRISA Head of Community Programme led several community engagement programmes to strengthen partnerships and understanding of CAPRISA’s scientific studies.

Mdletshe was joined by CAPRISA’s Dr Gugu Mzobe Jnr Scientist, Dr Andile Mtshali Postdoc Fellow and Research Clinician Dr Mlungisi Khanyile at several events across KwaZulu-Natal including secondary schools, higher education institutions and rural communities. “We covered topics that are central to understanding the transmission and prevention of HIV and are often not spoken about.



These include vaginal health, gender base violence and open dialogue with young men,” explained Mdletshe. He said, “empowering communities to understand the process of scientific research and the impact of findings in saving lives was critical in building partnerships.”

We congratulate Mdletshe on his appointment as Deputy Secretary General of the Treatment Action Campaign announced

Photo: Top (L-R): Dr Gugu Mzobe , Mr Patrick Mdletshe & Dr Andile Mtshali. Photo: Bottom: Representatives from Mangosuthu University of Technology, Vukani Community Centre, Umlazi Clinic with CAPRISA staff.

Dependence on a variable residue limits the breadth of an HIV MPER neutralizing antibody

Dr Cathrine Scheepers (*right in the photo*) and colleagues at the NICD published a study in PLoS Pathogens comparing CAP206-CH12 to broadly neutralizing antibodies (bNAb)s 4E10, VRC42.01 and PGZL1.

All four antibodies target the membrane-proximal external region (MPER) of HIV gp41 envelope and share germline antibody genes (IGHV1-69 and IGKV3-20). Despite these similarities CAP206-CH12 has limited neutralization breadth compared to the bNAb)s which can neutralize >80% of viruses.

Longitudinal sequencing of the CAP206-CH12 lineage over three years revealed similar convergent evolution towards a ^{111.2}GW^{111.3} motif, known to enhance neutralization potency, among some lineage members. Mutagenesis of CAP206-CH12 from ^{111.2}GL^{111.3} to ^{111.2}GW^{111.3} and the introduction of the double GWGW (as seen in 4E10) motif into CAP206-CH12 modestly improved neutralization potency (2.5-3-fold) but did not reach the levels of potency of VRC42.01, 4E10 or PGZL1.

To explore the lack of potency/breadth, viral mutagenesis was performed to map the CAP206-CH12 epitope relative to the bNAb)s. This indicated that CAP206-

CH12 is dependent on D⁶⁷⁴, a highly variable residue at the solvent-exposed elbow of MPER.

In contrast, VRC42.01, PGZL1 and 4E10 were dependent on highly conserved residues (W⁶⁷², F⁶⁷³, T⁶⁷⁶, and W⁶⁸⁰) facing the hydrophobic patch of the MPER.



Therefore, while CAP206-CH12, VRC42.01, PGZL1 and 4E10 share germline genes and show some evidence of convergent evolution, their dependence on different amino acids, which impacts orientation of binding to the MPER, result in differences in breadth and potency.

Suggesting that somatic hypermutation within shared germline genes may not provide sufficient protection within HIV vaccines directed at the MPER epitope.

Link: <https://pubmed.ncbi.nlm.nih.gov/36054228/>

A selection of scientific papers published in 2022

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