The DST-NRF Centre of Excellence in HIV Prevention aims to understand and ameliorate the high risk of HIV in women, especially young women, in South Africa. The CoE focuses on research and development of new prevention technologies to protect women from acquiring HIV infection.

Transmission Networks and HIV Risk

A community-wide phylogenetic study of 9,812 rural people revealed a cycle of HIV transmission where teenage girls and young women had the highest incidence rates, largely as a result of transmission from older men in their 30’s. Most of these men were unaware that they had recently acquired HIV, mostly from women in their 30’s. These findings were published in *Lancet HIV* on World AIDS Day in 2016 and have already impacted on global policy, influencing the UNAIDS global strategy and shaping the global HIV response.

Transmission networks and risk of HIV infection in KwaZulu-Natal, South Africa: a community-wide phylogenetic study


Most HIV transmission is likely from higher prevalence (men 25-40 years old) to lower prevalence (women under 25 years old). Most HIV transmission is likely from higher prevalence (women 25-40 years old) to lower prevalence (men 25-40 years old).
Vaginal bacteria Impact HIV Prevention in Women

One of the CoE’s ground-breaking studies was published in the journal *Science* in June 2017 and presented to acclaim at the 2016 International AIDS conference, showing that HIV prevention in women is being compromised by vaginal bacteria (microbiome). It found that the anaerobic bacteria *Gardnerella vaginalis*, which predominate when the ‘healthy’ lactobacilli levels are low in the vagina, absorbs tenofovir and breaks it down thereby reducing the availability of this antiretroviral drug to prevent HIV infection in women. This evidence, based on state-of-the-art proteomics, is influencing new directions in topical prophylaxis for HIV prevention in women.

Vaginal bacteria modify HIV tenofovir microbicide efficacy in African women

Nichole R. Klett1,2, Ryan Cheu2, Kenzie Birse2,3, Alexander S. Zevin1,2, Michelle Perne2,3, Laura Noll-Romas2,3, Anneke Grobler4, Garrett Westmacott5, Irene Y. Xie2,3, Jennifer Butler2,3, Leila Mansoor2, Lyle R. McKinnon2,4, Jo-Ann S. Passmore2,4, Quarraisha Abdool Karim1,2, Salim S. Abdool Karim1,2, Adam D. Burgener2,3,4,2

Above: Prof Salim Abdool Karim, Director of CAPRISA presented findings by a CAPRISA consortium of South African and North American researchers at a Special Session at the AIDS 2016 Conference in Durban shedding new light on why young women in South Africa have high rates of HIV infection. The session was chaired by Ambassador Deborah Birx US Global AIDS Coordinator and Dr Anthony Fauci Director NIAID (right in the photograph).
OVERVIEW

The DST-NRF Centre of Excellence (CoE) in HIV Prevention, established in April 2015, is hosted by the Centre for the AIDS Programme of Research in South Africa (CAPRISA) and co-hosted by the University of KwaZulu-Natal (UKZN). It includes the University of Cape Town (UCT), National Institute for Communicable Diseases (NICD), and the University of the Western Cape (UWC) as local partners. The international partners of the CoE are Columbia University and the Ragon Institute of MGH, MIT and Harvard University.

Above: Dr Naledi Pandor, Minister of Science and Technology launching the CoE in HIV Prevention at the Press Conference in Durban in April 2015. The press conference and announcement included senior officials of the NRF, UKZN, CAPRISA as well as two senior members of the CAPRISA Scientific Advisory Board - Professor Françoise Barré-Sinoussi (Nobel Laureate) and Professor Cate Hankins (ex-Chief Scientific Advisor: UNAIDS).
INFORMATION BROKERAGE

Journal publications (April 2015 to July 2017):

- 136 journal publications, including:
  - 48% in journals with impact factor ≥5
  - 43% of the publications were in the top 10% of most cited worldwide, including:
    - 6 in the New England Journal of Medicine (Impact Factor: 72)
    - 15 in the Lancet group of journals, including The Lancet (IF: 44), Lancet Global Health (IF: 18) or Lancet HIV (IF: 10)
    - 2 in the Science group of journals, including Science (IF: 37) or Science Translational Medicine (IF: 17)
    - 5 in the Nature group of journals, including Nature Medicine (IF: 30), Nature Reviews Genetics (IF: 40) or Nature Structural and Molecular Biology (IF: 13)
    - 3 in the Journal of Infectious Diseases (IF: 6)
    - 9 in AIDS (IF: 5)
    - 6 in the Journal of Virology (IF: 5)

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Tenofovir Gel for the Prevention of Herpes Simplex Virus Type 2 Infection

Salim S. Abdool Karim, M.B., Ch.B., Ph.D., Quarraisha Abdool Karim, Ph.D., Ayesha B.M. Kharsany, Ph.D., Cheryl Baxter, Ph.D., Anneke C. Grobler, Ph.D., Lise Werner, M.Sc., Angela Kashuba, Pharm.D., Leila E. Mansoor, Ph.D., Natasha Samsunder, B.Tech., Adrian Mindel, M.D., and Tanuja N. Gengiah, Ph.D., for the CAPRISA 004 Trial Group*

Genital Inflammation and the Risk of HIV Acquisition in Women


Distinct genital tract HIV-specific antibody profiles associated with tenofovir gel

D Archary, KE Seaton, JS Passmore, L Werner, A Deul, LJ Dunphy, KB Arnold, NL Yates, DA Lauffenburger, P Bergin, LJ Liebenberg, N Samsunder, MW Mureithi, M Altick, N Garrett, Q Abdool Karim, SS Abdool Karim, I Morris, and GD Tomaras*
EDUCATION & TRAINING

The DST-NRF CoE in HIV Prevention offers scholarships to postgraduate students at Honours, Masters, doctoral and post-doctoral levels. Research placements are also offered to undergraduate medical students to gain experience in research.

Above: Dr Sinaye Ngcapu, was a PhD student at CAPRISA under the supervision of Professor Q Abdool Karim and Professor JA Passmore. Dr Ngcapu was awarded the AIDS 2016 Women, Girls and HIV Investigator’s Prize at the AIDS 2016 conference for his winning abstract (selected from over 6700 abstracts submitted) entitled: “Effect of injectable hormonal contraceptives on vaginal epithelium thickness and genital HIV target cell density in women recently infected with HIV”. Dr Ngcapu has been awarded several grants for his post-doctoral research at CAPRISA focusing on the role of vaginal microbiome dybiosis in persistence and clearance of human papillomavirus (HPV) infections in women.

<table>
<thead>
<tr>
<th>CoE training category</th>
<th>Number</th>
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<td>Postgraduates</td>
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<td>Medical students</td>
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COE TRAINEES
The scientists of the DST-NRF CoE in HIV Prevention participate and lead international policy and practice guidelines, especially for the Joint United Nations Program on AIDS (UNAIDS) and the World Health Organisation (WHO). CoE researchers are regularly called upon to provide advice and to serve on local, national and international committees influencing the future direction of HIV prevention. They have also delivered keynote addresses at several international scientific conferences and meetings.

Note: Selected from a list of several local & international policy bodies

The CoE collaborates with researchers throughout the world and hosts an annual HIV Prevention Workshop, attended by over 60 local & international scientists and students, jointly with the Ragon Institute of MGH, MIT & Harvard University and the UKZN HPP research group.
About the DST-NRF CoE in HIV Prevention

The DST-NRF CoE in HIV Prevention was established in 2015 as a multi-institutional collaboration involving five South African partner institutions:
CAPRISA, University of KwaZulu-Natal, University of Cape Town, University of the Western Cape and the National Institute for Communicable Diseases.
Columbia University in New York and the Ragon Institute of MGH, MIT and Harvard University are the CoE’s two key international partners.

Goal of the DST-NRF CoE in HIV Prevention

To undertake research aimed at understanding and ameliorating the high risk of HIV in women, especially young women, in South Africa

CoE Steering Committee

D Ramjugernath (Chair) • SS Abdool Karim • Q Abdool Karim • C Baxter • M Khati (NRF)
P Matutu (DST) • K Mlisana • P Moore • L Morris • JA Passmore • S Travis • C Williamson

CoE and CAPRISA Scientific Advisory Board

F Barré-Sinoussi (Chair, Nobel Laureate - 2008) • T Quinn (Vice Chair, Johns Hopkins - USA)
SM Dhlomo (KZNDoH - SA) • P Godfrey-Faussett (UNAIDS) • R Hayes (LSHTM - UK) • G Hirnschall (WHO)
J Mascola (VRC-NIH) • Y Pillay (NDoH - SA) • S Swaminathan (ICMR - India)

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