



# CAPRISA

CENTRE FOR THE AIDS PROGRAMME OF RESEARCH IN SOUTH AFRICA

Newsletter

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## Japan awards Salim & Quarraisha Abdool Karim the distinguished 4th Hideyo Noguchi Africa Prize

### In this Issue

On page 1 we congratulate Profs Quarraisha and Salim Abdool Karim as the first South African recipients of the prestigious Hideyo Noguchi Africa Prize.

On page 2 we feature the recently published *Oxford Textbook of Global Public Health 7th Edition*; page 3 highlights the Editorial, *Time to Stop Using Ineffective Covid-19 Drugs*, published in the *New England Journal of Medicine*.

Page 4 features a CAPRISA-led study that shows rapid antigen tests remain an important tool for management of the pandemic; & Prof Salim Abdool Karim is honoured by the Mangosuthu University of Technology.

On page 5 we report on three visits from CAPRISA's global collaborators and partners; and on page 6 Prof Ayesha Kharsany reports on AIDS 2022 & we congratulate Ms Khosi Mdladla on competing the gruelling Comrades Marathon.

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In their acceptance speech as the recipients of the prestigious Fourth Hideyo Noguchi Africa Prize in the Medical Research category, Director and Associate Scientific Director of CAPRISA, Professors Salim and Quarraisha Abdool Karim said it was 'with humility that they jointly accepted this distinguished and singular award'.

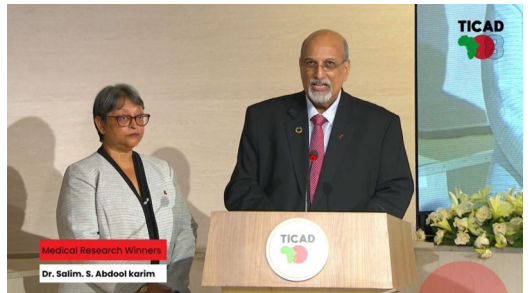
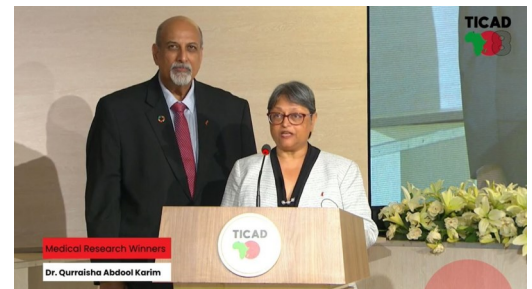
"It is only when our research changes the lives of the most vulnerable for the better that we know that our research is having an impact. Science offers us one more opportunity to unleash the full potential of Africa for a better future for all."

On 28<sup>th</sup> August the Government of Japan awarded the Fourth Hideyo Noguchi Africa Prize in the Medical Research category to the Abdool Karims at the high level Eighth Tokyo International Conference on African Development (TICAD 8) held jointly with African Heads of State and governments under the African Union and the Government of Japan, in Tunisia.

The Hideyo Noguchi Africa Prize (HNAP) Committee said the award recognised the Abdool Karims' global contributions in HIV/AIDS prevention and treatment, capacity development of African scientists and unwavering scientific leadership in the Covid-19 response in Africa.

HE Prime Minister of Japan Fumio Kishida extended his 'heartfelt congratulations to Dr. Salim Abdool Karim and Dr. Quarraisha Abdool Karim'. "I would like to commend the people who have devoted themselves to medical research and services in Africa," he said.

The Hideyo Noguchi Africa Prize is composed of a citation and a medal for each



Photos: Profs Quarraisha and Salim Abdool Karim deliver their acceptance speech following the presentation of the Hideyo Noguchi Africa Prize

laureate and an honorarium of 100 million yens.

South Africa's President HE President Cyril Ramaphosa, said in his congratulatory letter "I am truly proud of this latest recognition of the extraordinary contribution you are making individually and collectively to medical science and socio-economic development in our country, as well as to the expansion of human knowledge globally. I thank you for your commitment to science and public health in South Africa, and to greater socio-economic equity in the world."

The prize, which is one of the most prestigious by Japan...

Continued on page 2



# JAPAN Honours the Abdool Karims

...was established in honour of an outstanding Japanese medical scientist, Dr Hideyo Noguchi (1876-1928) and will be awarded every three years to coincide with TICAD hosted alternately in Africa and Japan. 'The Prize aims to honor individuals or organizations with outstanding achievements in the fields of medical research and medical services to combat infectious and other diseases in Africa, thus contributing to the health and welfare of the African people and of all humankind'.

South Africa's honourable Minister of International Relations and Cooperation, Dr Naledi Pando led the South Africa delegation at TICAD8. "This wonderful achievement augers well for strengthening our relations with Japan and contributes to the health security and welfare of Africa and all of humankind," she said.

The second category on Medical Services, was awarded to the Carter Centre in the US for its work on Guinea worm eradication. The award was accepted by Mr Adam Weiss, Director of the Guinea-worm eradication program at the Centre.

TICAD 8 is co-organized by the Government of Japan, the United Nations Development Programme, the United Nations Office of the Special Advisor on Africa, the World Bank and the African Union Commission.



Photo: (L-R) Prof Quarraisha Abdool Karim, Prof Salim Abdool Karim, Mr Adam Weiss, Director of the Guinea-worm eradication program at the Carter Centre and Dr Kiyoshi KUROKAWA, Chairperson of the Noguchi Prize selection committee.

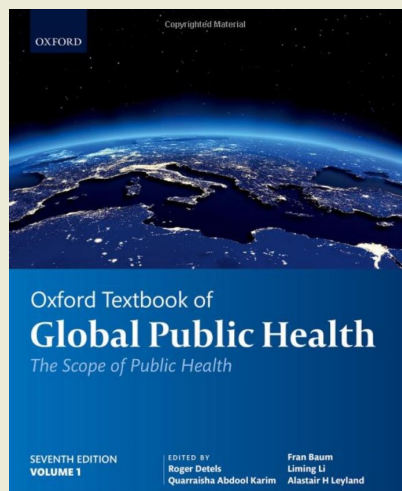
Discussions at TICAD 8 focused on three themes: achieving sustainable and inclusive growth with reduced economic inequalities; realizing a sustainable and resilient society based on human security; and building sustainable peace and stability through supporting Africa's own efforts.

## Quarraisha Abdool Karim is an Editor of the Oxford Textbook of Global Public Health – Seventh Edition

Associate Scientific Director of CAPRISA Professor Quarraisha Abdool Karim is one of five editors of the revised and updated version of the *Oxford Textbook of Global Public Health* (7th edition) described as the 'ultimate resource' on the scope of public health, which continues to evolve and epidemiology.

This edition printed in hard cover and bound in three volumes follows from the acclaimed 6<sup>th</sup> Edition in 2015 features a comprehensive perspective on public health needs and priorities to deal with emerging and re-emerging new challenges.

Three new editors: Liming Li (China), Fran Baum (Australia), and Alastair H Leyland (UK), joined the



editors of the 6<sup>th</sup> edition, Quarraisha Abdool Karim (South Africa) and Roger Detels (USA), bringing a global and wide-ranging perspective on public health.

The *Oxford Textbook of Global Public Health* is split into three main topics. *The Scope of Public Health* covers the development of the discipline, determinants of health and disease, and policies, law, and ethics. The second volume focuses on *The Methods of Public Health*, including the science of epidemiology, social science techniques, and environmental techniques. Finally, *The Practice of Public Health* is

fully explored, with sections on specific public health problems, ways of prevention and control, the varying needs of different populations, and the functions of public health services and professionals'.



# Time to Stop Using Ineffective Covid-19 Drugs

The editorial, 'Time to Stop Using Ineffective Covid-19 Drugs', published in the *New England Journal of Medicine* calls for rigorous, randomised controlled clinical trials to provide unquestionable evidence on the efficacy of new treatments. The authors, Salim Abdool Karim and Nikita Devnarain call for journals to publish the results of inefficacious drugs as physicians continue to prescribe Covid-19 interventions that are not evidence-based – this despite the WHO guidelines on *Therapeutics and Covid-19*.

The editorial, based on the publication of *Bramante et al.*<sup>6</sup>, examines the results of the COVID-OUT randomized, controlled trial of oral metformin, ivermectin, and fluvoxamine for the early treatment of SARS-CoV-2 infection in 1323 outpatients. The

investigators found no reliable evidence of reductions in hypoxemia, emergency department visits, hospitalization, or death associated with any of the three drugs. The editorial raises alarm that inappropriate prescription of these drugs for Covid-19 would lead to shortages for patients who need the medications for other medical conditions; denying patients with Covid-19 appropriate treatment; and side effects without any therapeutic benefit. The study provides additional data on these interventions, which are ineffective in preventing progression to severe disease.

Denying appropriate treatment for Covid-19 is wrong. The editorial highlights the need for evidence-based medical practice and an end to misinformation on ineffective Covid-19 interventions.

### Time to stop using ineffective Covid-19 drugs

Salim S. Abdool Karim and Nikita Devnarain

Supplementary online Table 1: World Health Organisation recommendations on which medications should or should not be used to treat Covid-19 (adapted from the WHO living guidelines for therapeutics and Covid-19, 14 July 2022)<sup>6</sup>

	Strong recommendation against	Recommendation against	No recommendation for or against	Recommendation for	Strong recommendation for
Non-severe disease	<ul style="list-style-type: none"> <li>• Convalescent plasma</li> <li>• Hydroxychloroquine</li> <li>• Lopinavir-ritonavir</li> <li>• Colchicine</li> </ul>	<ul style="list-style-type: none"> <li>• Corticosteroids<sup>a</sup></li> <li>• Ivermectin<sup>b</sup></li> <li>• Fluvoxamine<sup>b</sup></li> <li>• Nirmatrelvir and ritonavir<sup>a,c</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Heparin</li> <li>• Metformin</li> </ul>	<ul style="list-style-type: none"> <li>• Molnupiravir<sup>a,d</sup></li> <li>• Sotrovimab<sup>a,d,e</sup></li> <li>• Remdesivir<sup>a,d</sup></li> <li>• Casirivimab and imdevimab<sup>a,d,f</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Nirmatrelvir and ritonavir<sup>d</sup></li> </ul>
Severe disease	<ul style="list-style-type: none"> <li>• Hydroxychloroquine</li> <li>• Lopinavir-ritonavir</li> </ul>	<ul style="list-style-type: none"> <li>• Ruxolitinib and tofacitinib<sup>a</sup></li> <li>• Ivermectin<sup>b</sup></li> <li>• Convalescent plasma<sup>b</sup></li> </ul>		<ul style="list-style-type: none"> <li>• Casirivimab and imdevimab<sup>a,f</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Corticosteroids</li> <li>• IL-6 receptor blockers or Baricitinib</li> </ul>

Note: Severe disease is defined as oxygen saturation <90% on room air, pneumonia or respiratory distress

<sup>a</sup> Conditional recommendation

<sup>b</sup> Only recommended for use within the context of a clinical trial

<sup>c</sup> In non-severe patients at low risk of hospitalization

<sup>d</sup> In non-severe patients at highest risk of hospitalization

<sup>e</sup> Excluding pregnant or breastfeeding women, and children

<sup>f</sup> If seronegative for SARS-CoV-2 antibodies (note: evidence of limited efficacy for omicron BA.1 variant)

<sup>6</sup>Agarwal A, Rochweg B, Lamontagne F, Siemieniuk RA, Agoritsas T, Askie L, et al. A living WHO guideline on drugs for covid-19. *BMJ*. 2020;370:m3379.

### For further reading see:

Abdool Karim SS, Devnarain N. Time to Stop Using Ineffective Covid-19 Drugs. *NEJM*. 2022; 387(7):654-655. <https://www.nejm.org/doi/full/10.1056/NEJMe2209017>

## Shared N417-Dependent Epitope on SARS-CoV-2 variants



Dr. Thandeka Moyo-Gwete and colleagues at the NICD published a study in the *Journal of Virology* that sought to understand the antibody responses elicited by different SARS-CoV-2 variants and to define shared epitopes. As SARS-CoV-2 variants of concern (VOCs) have arisen, they have shown variable escape from antibody responses and have been shown to trigger qualitatively different antibody responses during infection. The team at the NICD studied plasma from individuals infected with either the D614G, Beta or Delta variants. Although the Beta and Delta variants elicited antibody responses that were overall more cross-reactive than those triggered by D614G, the Beta and Delta variants did not elicit cross-reactive responses to each other. However, Beta-elicited plasma was highly cross-reactive against Delta Plus, which differs from Delta by a single K417N mutation, suggesting that the plasma response targets the N417 residue. They then isolated monoclonal antibodies from an individual with plasma responses against VOCs which possess the N417 residue. The team isolated a novel, cross-reactive N417-dependent antibody which utilised the IGHV3-23\*01 germline gene and had somatic hypermutations similar to those of previously described public antibodies which target the 417 residue. Understanding antibodies targeting escape mutations, such as K417N, may aid in the development of next-generation antibody therapeutics and vaccines.

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## Efficient testing strategies are key for diagnosis, clinical management, and outbreak control of SARS-CoV-2/COVID-19

A recent CAPRISA-led study evaluated the performance of SARS-CoV-2 rapid antigen tests in South Africa during the Omicron wave.

The study titled, *Clinical Evaluation of Severe Acute Respiratory Syndrome Coronavirus 2 Rapid Antigen Tests During the Omicron Wave in South Africa*, published in the *Journal of Infectious Diseases* report on the performance of nasal and nasopharyngeal Standard Q COVID-19 Ag tests (SD Biosensor) and the Panbio COVID-19 Ag Rapid Test Device (nasal, Abbott) against the Abbott RealTime SARS-CoV-2 assay during the Omicron (21M, 21K and 21L) wave in South Africa.

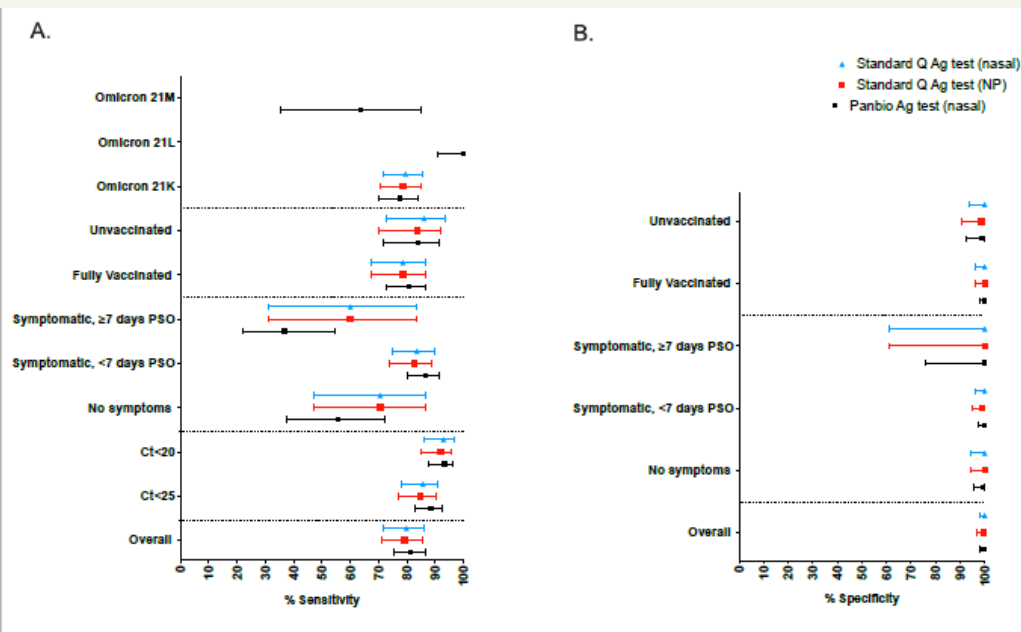
The study led by Director of CAPRISA Laboratories Ms Natasha Samsunder and Senior Scientist Dr Aida Sivro, in collaboration with Foundation for Innovative New diagnostics (FIND) showed that overall, all evalu-

ated tests performed well with high level of sensitivity (ranging from 77.78-81.42%) and excellent specificity values (>99%).

The sensitivity of rapid antigen tests increased above 90% in samples with  $C_T < 20$ , and all three tests performed best within first week of symptom onset. The Panbio Ag test performed best in the context of Omicron 21L infections, that were also characterised by significantly lower  $C_T$  values compared to infections with 21K and 21M.

Overall, the data indicates that the tested SD Biosensor and Panbio rapid SARS-CoV-2/COVID-19 antigen test performance was not negatively affected by the emergence of Omicron subtypes BA.1 and BA.2.

This shows that rapid antigen tests remain an important tool for management of the pandemic.

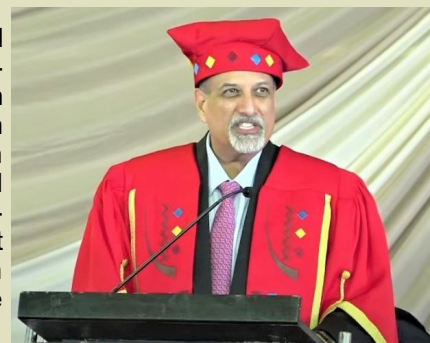


For more reading see: Samsunder N, et al. *Journal of Infectious Diseases*. 2022. <https://doi.org/10.1093/infdis/jiac333>

Figure 1. A) Sensitivity and B) specificity of the Panbio Ag test (nasal), Standard Q Ag test (NP) and Standard Q Ag test (nasal) across different categories. The error bars represent 95% Confidence interval.

## Salim Abdool Karim urges new graduates to embark on careers with passion, perseverance and excellence

Mangosuthu University of Technology (MUT) in KwaZulu-Natal dedicated the Faculty of Natural Sciences graduation ceremony in honour of Professor Salim Abdool Karim's central role in South Africa's response against Covid-19 and impact on HIV prevention and treatment. The ceremony for faculty new graduates was held on Thursday, 11 August. Addressing the ceremony Abdool Karim urged new graduates to pursue their careers with passion, excellence, and perseverance. As I leave you with today's message, I want you to know that the path that I have followed, is a path that is available and is right in front of every one of you, students. You have the opportunity to change the world. You just need to be brave enough to seize it."





## Visitors to CAPRISA Research sites

**C**APRISA research sites hosted three global delegations during the month of August. **From 15 – 26 August** in collaboration with the Vietnam University College of Health Science (VUCHS) CAPRISA hosted three medical students in an exchange programme for 12 days, as part of a new collaboration between CAPRISA and VUCHS. Professor Andrew Taylor-Robinson from the VUCHS accompanied the students to gain insight in HIV/TB prevention and treatment research in urban and rural settings. The enriching activities included visits to CAPRISA's Clinical Research Sites and meetings with CAPRISA's leadership, scientists, clinicians, students, and staff. A special highlight for the students was the opportunity to participate in community engagement programmes.



*Photo: (L-R): Dr Mishka Valjee, Research Clinician; Mr Dang Huu Thien; Ms Helen Hingle, Operations Manager; Dr Disebo Potloane, Vulindlela Site Director; Ms Nguyen Thi My Hao, Medical Student (VCHS); Mr Le Phan Khanh Huy, Medical Student (VCHS); Mr Callin Chetty, Study Coordinator; Ms Sindisiwe Mazibuko, Research Assistant; and Professor Andrew Taylor-Robinson, VCHS*



**On 24 August** Dr Sharon Achilles, Deputy Director of Reproductive Health Technologies, and Global Health at the Bill and Melinda Gates Foundation (BMGF) led a delegation on a visit to the CAPRISA Vulindlela Research site. The delegation held discussions with Dr Disebo Potloane (Vulindlela Site Director), Dr Sinaye Ngcapu (CAPRISA Senior Scientist), Professor Elizabeth Bukusi Deputy Director at Kenya Medical Research Institute (KEMRI), and the research staff from the University of Cape Town (UCT), KEMRI and CAPRISA.

The Vulindlela site is undertaking the first in human, Phase 1, experimental medicine trial to test a novel, vaginal live biotherapeutic product that promotes a Lactobacillus-dominant vaginal microbial community in women of reproductive age. The delegation visited CAPRISA's headquarters for an informative tour at the Laboratory.

*Photo front row (L-R): Ms Tanya Pidwell, Project Manager at The Creative Answer; Dr Disebo Potloane, Site Director; Ms Lindsey Baker, Finance Associate at BMGF; Ms Helen Hingle, Operations Manager; Ms Sindi Mazibuko, Research Assistant; Dr Andile Mtshali, Postdoctoral Research Fellow.*

*Back row (L-R): Mr Callin Chetty, Study Coordinator; Dr Sharon Achilles, Deputy Director Reproductive Health Technologies at BMGF; Dr Gary Means, Senior Program Officer Global Health at BMGF; Dr Jennifer Gardiner, Senior Program Officer Reproductive Health Technologies at BMGF; Dr Jonathan Arm, Deputy Director Translational Sciences at BMGF; Dr Brian Kullin, Scientist at the University of Cape Town.*

**On 30<sup>th</sup> August** CAPRISA hosted Dr Ahmed Ogwel Ouma the Director General of the Africa Centres for Disease Control and Prevention (Africa CDC). He was accompanied by Dr Theresa Madubuko (Chief of Staff), Dr Chrys Promesse Kaniki (Senior Public Health Analyst).

Professor Kogie Naidoo, Deputy Director led the discussions on CAPRISA's core research programmes and strengthening collaborations with the Africa CDC. "The rich discussions are a testament to our collective vision and goal to improve public health for all in Africa. We look forward to strengthening our collaboration through shared expertise, generating new expertise and in improvements in translating policy into practice," she said.



*Photo back Row (L-R): CAPRISA colleagues: Dr Bongeka Hlabisa, Research Clinician; Dr Nonhlanhla Yende-Zuma, Head Statistics; Professor Derseree Archary, Senior Scientist; Dr Tanuja Gengiah, Head Pharmacy & Senior Scientist; Dr Rubeshan Perumal, Senior Scientist; Dr Nigel Garret, Head: Pathogenesis and Vaccine Research. Front Row (L-R): Dr Theresa Madubuko, Chief of Staff; Professor Kogie Naidoo, CAPRISA Deputy Director; Dr Ahmed Ogwel Ouma, Director General Africa CDC; and Dr Chrys Promesse Kaniki, Senior Public Health Analyst*



## The gains made in the fight against HIV are at risk...



Despite the enormous gains made in the fight against HIV, these gains are at risk of being in jeopardy as we learned from AIDS 2022 conference in Montreal and the simultaneous release of the “In Danger: UNAIDS Global AIDS Update 2022”. At the opening of AIDS 2022, Winnie Byanyima, UNAIDS executive director highlighted the extraordinary opportunities and tools to end the AIDS crisis in a matter of years, however the report indicates that there were 1.5 million new HIV infections last year.

At the same time, challenges to access lifesaving medicines contributes to high rates of AIDS related mortality. Whilst COVID-19 pandemic resulted in considerable disruption of HIV related services, there must be renewed commitment to get the global response back on track and many donors have committed to these in many areas.

AIDS 2022 highlighted scientific innovations for the delivery of self-HIV testing as the gateway to HIV prevention and treatment, management of advanced HIV disease through integrated programmes to reduce mortality and specifically funding for communities to play a bigger role within programmes to ensure that no young girl is left behind, reject HIV related punitive and discriminatory laws and that the vision and benefits of the Global South should be the same as that of the Global north to enjoy better access to HIV prevention and care. **Prof Ayesha Kharsany, Senior Scientist CAPRISA.** *Kharsany moderated the Oral abstract session, late breaker on Epidemiology and Prevention Science*

### Research Assistant Khosi Mdladla perseveres to complete the Comrades Marathon!

Ms Khosi Mdladla Research Assistant at CAPRISA’s Vulindlela Research clinic completed the gruelling 90-kilometre Comrades Marathon race held on 28 August from Pietermaritzburg to Durban. The marathon attracts runners from around the world and estimated 15 000 people registered for the race.



This year’s training was a challenge explained Mdladla. “Athletes were not sure if Comrades will happen due to Covid 19.” said Mdladla. Khosi is a member of the University of KwaZulu Natal student’s training club and trains long distance running over the weekend. During the week and she works out on her own doing 5-10 km runs morning and afternoons. This year was her third attempt to run the Comrades, her first attempt was a “down run” in 2018 where she missed the Sherwood cut off and her second attempt was in 2019. “To be a Comrade’s runner you need to be disciplined in your daily living and, on the road, every second counts so you cannot afford to miss training” advised Mdladla.

Congratulations Khosi - this is amazing! said Prof Quarraisha Adbool Karim. “What a laudable accomplishment of endurance, persistence and perseverance.”

### Congratulations Sr Mandisa Msomi on your outstanding accomplishments!

We warmly congratulate Sr Mandisa Msomi, who rejoined CAPRISA as a registered Professional Nurse at CAPRISA’s eThekweni Research clinic after completing a BA degree in Health Sciences and Social Services with majors in Psychology from the University of South Africa.



Msomi followed her passion for research and left CAPRISA after four years as an Enrolled Nurse to pursue her studies on a full-time basis at St Mary’s Marianhill Nursing College where she studied for a Diploma in General Nursing Science. “My mother was a Professional Nurse, it was my dream to follow in her steps and in becoming a hardworking, passionate, caring and selflessly providing health services to our community.” Msomi said.

She is currently working with Dr Sharana Mahomed, CAPRISA Research Clinician and Co-Principal Investigator and Dr Leila Mansoor, Senior Scientist on several HIV prevention studies for young women. “Mandisa has displayed strength and determination, balancing the demands of work and family to execute her studies, which is laudable.” said Dr Sharana Mahomed.



# A selection of scientific papers published in 2022

- 74 **Abdool Karim SS, Devnarain N.** Time to Stop Using Ineffective Covid-19 Drugs. *New England Journal of Medicine* 2022; 387:654-655.
- 75 **Samsunder N, de Vos M, Ngcapu S, Giandhari J, Lewis L, Kharsany AB, Carwood C, de Oliveira T, Abdool Karim Q, Abdool Karim SS, Naidoo K, Escadafal C, Sivo A.** Clinical evaluation of SARS-CoV-2 rapid antigen tests during the Omicron wave in South Africa. *Journal of Infectious Diseases* 2022. doi: 10.1093/infdis/jiac333.
- 76 **van Vuuren CJJ, van Vuuren JMJ.** Perspectives of healthcare workers in South Africa on COVID-19 vaccination passports. *Health SA Gesondheid* 2022; 27:1823. doi: 10.4102/hsag.v27i0.1823.
- 77 **Ntuli L, Mtshali A, Mzobe G, Liebenberg LJ, Ngcapu S.** Role of Immunity and Vaginal Microbiome in Clearance and Persistence of Human Papillomavirus Infection. *Frontiers in Cellular and Infection Microbiology* 2022; 12:927131. doi: 10.3389/fcimb.2022.927131.
- 78 **Naicker N, Yende-Zuma N, Kharsany A, Shoji H, Nkosi D, Naidoo A, Garrett N, Abdool Karim SS.** Pregnancy rates and outcomes in a longitudinal HIV cohort in the context of evolving antiretroviral treatment provision in South Africa. *BMC Pregnancy and Childbirth* 2022; 22(1):596. doi: 10.1186/s12884-022-04829-2.
- 79 **Perumal R, Arodola-Oladoyinbo O, Naidoo A, Kawuma AN, Naidoo K, Gengiah TN, Chirehwa M, Padayatchi N, Denti P.** Altered drug exposures of first-line TB drugs in a moxifloxacin-containing treatment regimen. *International Journal of Tuberculosis and Lung Disease* 2022; 26(8):766-774.
- 80 **Loveday M, Furin J, Hlangu S, Naidoo T.** "I am alive because of her": factors affecting adherence to combination antiretroviral therapy among people living with HIV in KwaZulu-Natal, South Africa. *BMC Infectious Diseases* 2022; 22(1):680. doi: 10.1186/s12879-022-07667-x.
- 81 **Sheward DJ, Hermanus T, Murrell B, Garrett N, Abdool Karim SS, Morris L, Moore PL, Williamson C.** HIV Coinfection Provides Insights for the Design of Vaccine Cocktails to Elicit Broadly Neutralizing Antibodies. *Journal of Virology* 2022; 96(14):e0032422. doi: 10.1128/jvi.00324-22.
- 82 **Gupta A, Sun X, Krishnan S, Matoga M, Pierre S, McIntire K, Koech L, Faesen S, Kityo C, Dadabhai SS, Naidoo K, Samaneka WP, Lama JR, Veloso VG, Mave V, Laloo U, Langat D, Hogg E, Bisson GP, Kumwenda J, Hosseinipour MC; ACTG A5274/REMEMBER Study Team.** Isoniazid Adherence Reduces Mortality and Incident Tuberculosis at 96 Weeks Among Adults Initiating Antiretroviral Therapy With Advanced Human Immunodeficiency Virus in Multiple High-Burden Settings. *Open Forum Infectious Diseases* 2022;9(7):ofac325. doi: 10.1093/ofid/ofac325.
- 83 **Khan K, Karim F, Ganga Y, Bernstein M, Jule Z, Reedoy K, Cele S, Lustig G, Amoako D, Wolter N, Samsunder N, Sivo A, San JE, Giandhari J, Tegally H, Pillay S, Naidoo Y, Mazibuko M, Miya Y, Ngcobo N, Manickchand N, Magula N, Abdool Karim Q, von Gottberg A, Abdool Karim SS, Hanekom W, Gosnell BI; COMMIT-KZN Team, Lessells RJ, de Oliveira T, Moosa MS, Sigal A.** Omicron BA.4/BA.5 escape neutralizing immunity elicited by BA.1 infection. *Nature Communications* 2022;13(1):4686. doi: 10.1038/s41467-022-32396-9.



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