# Professor Glenda Gray, President of the SA Medical Research Council and Recipient of Rhodes University’s Honorary Doctorate of Law, Pharmacy and Commerce

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The Chancellor, Justice Lex Mpati

The Vice-Chancellor, Dr Sizwe Mabizela

The Chairperson and members of the Rhodes University Council

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Deputy Vice-Chancellor, Dr Chrissie Boughey

The Registrar, Dr Moodley

The Public Orator, Distinguished Prof Paul Maylam

Deans, Academics, Support Staff, and Students

Distinguished guests, ladies and gentlemen

And, not least, new graduates, and families and guardians of graduates,

And my family – Diane and Albert

Congratulations are in order for you, the new graduates and your families and friends who have supported you to achieve this major milestone in your life!

It is wonderful to be here and feel the energy of Rhodes University at the time of graduation. I have perused the history of Rhodes by the book from Prof Paul Maylam, and this institution has a lot to be proud of from nanotechnology to performing arts. Rhodes University is the jewel of the Eastern Cape.

This Honorary Doctorate, Doctor of Law, Pharmacy and Commerce, bestowed upon me at the graduation ceremony is a wonderful gesture from Rhodes University. I am deeply honoured and I thank you sincerely for this tribute.

There is a natural synergy between Law and Medicine, so getting this Honorary Doctorate today during this graduation is doubly special as Law has played an integral part in asserting the right to health in our country. This has been emphasized by the role that law played in forcing the government to provide antiretrovirals to pregnant HIV infected women to prevent, them from transmitting the virus to their babies. The first major lead achievement was through the famous constitutional court-case battle, that the Treatment Action Campaign brought against the then National Minister of Health, Dr Manto Tshabalala-Msimang in 2002. The outcome of which was a clear instruction to roll out these antiretroviral interventions, that would eventually lead to the virtual control of paediatric HIV in South Africa.

In addition, through international legal agreements and advocacy, antiretrovirals became affordable during the early 2000s which consolidated the national roll out of antiretrovirals that has saved many lives in South Africa.

So, you can see very quickly how medical evidence can be used in legal battles, to achieve success in the courts of law, and how medical science has been the basis of this. So medical science literally saves lives, and this has been especially evident in the field of HIV.

Today, I will briefly sketch my path in HIV science, from a clinical researcher in the field of mother-to-child-transmission of HIV to the work I currently do as a part of the global endeavor to find an HIV vaccine.

My life as a scientist began when I was young paediatrician at the Chris Hani Baragwanath Hospital in Soweto on the outskirts of Johannesburg. I was confronted by the HIV epidemic in the wards of my hospital, in infants and children, who were infected at the time of birth through breastfeeding. I was propelled into medical science by necessity and with an obsession to curb the carnage I was seeing in my hospital. As a young doctor in 1993, HIV became the epidemic of my time. HIV has:

* Consumed the energy of the world in both the 20th and 21st century;
* It exposed both our medical deficiencies and global south inequalities;
* It formulated careers and institutions;
* The weapons created to fight HIV have been novel: Global Fund, UNAIDS, TAC, TAG, PEPFAR;
* This epidemic has affected me personally as has been the case for almost all of my colleagues;
* As mentioned before HIV pulled me into medical research from a paediatrician;
* For me, my experience with HIV revolved around young women and their children; and
* It has in some ways enriched me, and in some ways embattled my life.

It is difficult to talk about HIV in the early years in South Africa, especially in the lates 1990s and early 2000s. As we battled the disease in the wards of hospitals, there was a different battle being played out in the public domain: one of AIDS denialism.

AIDS denialism had a significant impact on public health policy from 1999 to 2008, during the presidency of Thabo Mbeki. Mbeki criticized the scientific consensus that HIV caused AIDS beginning shortly after his election to the presidency. As a president, Mbeki continued to express sympathy for HIV/AIDS denialism, and instituted policies that denied antiretroviral drugs to AIDS patients.

The Mbeki government even withdrew support from clinics that started using AZT to prevent mother-to-child transmission of HIV and for post-exposure prophylaxis for women who had been raped. He restricted the use of a pharmaceutical company’s donated supply of nevirapine, a drug that helped keep newborns from contracting HIV. Instead of providing these drugs which he described as “poisons,” shortly after he was elected to the presidency, he appointed Dr Manto Tshabalala-Msimang as the country’s health minister, who promoted the use of unproven herbal remedies such as garlic, beetroot, and lemon juice to treat AIDS.

These policies have been blamed for the preventable deaths of about 350 000 people from AIDS: an HIV genocide.

* 35 000 per year x 10 years;
* 100 per day; or
* 4 people per hour.

The response of a lot of doctors at that time was to become researchers. Together with my colleague James McIntyre, an obstetrician we started an HIV clinic for pregnant women and their children which lead to the establishment of the Perinatal HIV Research Unit (PHRU), that has since been responsible for ground breaking clinical research that has impacted on the outcome of HIV infected infants, children and adults the world over.

So, I cut my teeth on research that looked at interventions to prevent mother-to-child transmission and was fortunate to be part of a team that led to the first roll-out of PMTCT intervention in Soweto.

While I was busy with this work, the South African Medical Research Council (SAMRC) approached me to join a team of South African scientists, to work on a South African derived HIV vaccine programme. As a clinician I would help design the studies from preclinical work in animals to clinical trials in both South Africa and the US. In this programme we successfully completed two trials. This initial work catapulted me to join international collaborations working in HIV vaccine research funded by the US National Institute of Health (NIH).

Only a vaccine can end or at least control the HIV epidemic. Since HIV was first discovered in 1983, 36 years ago, this quest has proven to be far more difficult than we ever imagined. Solving the science to find an HIV vaccine is akin to landing a man on the moon. I was 5-years-old, in 1969, when the first man landed on the moon. I can remember sitting with my family listening to the radio on the night this happened. A few days later my father drove us to the Johannesburg City Hall where we saw the grainy silver pictures of Neil Armstrong descending down the ladder. JF Kennedy said that they chose to go to the moon not because it was easy, but because it was hard.

Similarly, I have seen how hard it has been to crack making an HIV vaccine. And for that reason, I have chosen to dedicate my career to finding an HIV vaccine…because it is so hard…and success is elusive. Like landing on the moon, the ideas that made the Apollo 11 initiative successful, permeate to the HIV vaccine initiative:

1. Beckoning /unknown frontier / territory
2. Urgency and plausibility
3. Cumulative strategy
4. Collaboration – 400 000 people

So why don’t we have an HIV vaccine? It takes a long time to understand pathogens and how to protect against them. It took 105 years after the discovery of the typhoid bacterium to develop a vaccine for typhoid. For whooping cough (pertussis) it took 80 years; for polio 47 years and measles 42 years.

HIV also has enormous genetic diversity, it has extraordinary ability “to replicate unrelentingly despite everything our immune system throws at it” and this makes our job incredibly hard: in fact we do not currently know what constitutes an appropriate immune response to HIV, which makes this quest all the more difficult.

We have many hurdles to jump: I list six hurdles for us:

1. there is no truly useful small animal or monkey model for studying HOV infection and the vaccine we test in monkeys have to adapt and therefore don’t correlate well with human studies;
2. we do not know with certainty which immune response will provide protection; this is a major problem;
3. We have never before attempted to develop a vaccine against a retrovirus like HIV. Retroviruses, by integrating their genome into ours, are able to hide completely from immune surveillance. This means that any vaccine has a small window of opportunity in which to prevent infection and would have to be extremely effective, repelling all attempts by HIV to attached to and infect host cells;
4. The pace of HIV replications is such we have about 24 hours after the first CD4T cell is infected by HIV in which to destroy enough infected cells to contain viral replication;
5. A large part of HIV’s genome is devoted to the production of viral proteins that ***defeat our natural immune responses***. This, despite the initial burst of viral replication, ***the immune system fails to ‘see’ the cells responsible for producing it***.
6. HIV has evolved a way of ***tricking the immune system into mounting the strongest and speediest response*** to the part of HIV that change rapidly so our immune system is always one step behind the virus.

So, today in Southern Africa, we are approaching the HIV virus in 3 different and distinct ways in the form of three different vaccine trials. Two approaches use active vaccination aimed at different parts of the immune response to see whether we can induce enough of the immune system to protect against HIV. The third approach is to use an infusion or injection of potent neutralizing antibodies to see if this can protect against HIV.

These studies are taking place in more than 30 sites in Southern Africa, from Mthatha to Blantyre, from Maputo to Masimphumelela, from Rustenberg to eThekwini, involving more than 400 research staff and over 10 000 volunteers.

What a commitment to science!

So, in conclusion, we are on the brink of discovering what it takes to protect people against HIV, we may be lucky with one of our 3 approaches, but we may well be sent back to the drawing Board.

My colleagues and I are determined to end our careers the same way we started them, without HIV, relegating HIV to our history. But for this we need you young graduates to help us, to take the baton, to run with us, after us, to find solutions in places we have not discovered yet. You have been equipped by your university to achieve great things, and hopefully tackling deadly diseases like HIV in a trans-disciplinary manner you may then achieve what I can only dream about.

Congratulations!

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