

# HIV & AIDS Research Challenges in Sub-Saharan Africa

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## HIV and AIDS research consists of:

- **Basic and clinical research** to understand and treat HIV infection and its related conditions;
- **Social and behavioural research** to track and prevent the spread of HIV, understand the behaviours that put people at risk for HIV infection, and develop interventions to change these behaviours;
- **Health services and policy research** to address the nexus between scientific research and the application of that research into health care services.

## Milestones in HIV and AIDS research

1. Identification of the human immunodeficiency virus (HIV),
2. Development of drugs to treat HIV infection,
3. Advances in the treatment and prevention of several HIV-related diseases and infections,
4. Identification of barriers to access to prevention of HIV,
5. The discovery that the use of antiretroviral drugs can dramatically reduce the risk of transmission of HIV from a pregnant woman to a foetus and
6. A reduction in the number of new HIV infections in some countries

Source: Soriano and Kates, 2002

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# Identification of the human immunodeficiency virus (HIV)

- Luc Montagnier of the Pasteur Institute and Robert Gallo of the National Cancer Institute isolated the human immunodeficiency virus (HIV), the viral agent causing AIDS as early as 1984.

# Development of drugs to treat HIV infection

- The first antiretroviral drug, **Zidovudine or AZT** (a nucleoside analogue) was approved by US FDA in 1987;
- **AZT** was approved for paediatric use in 1990.
- US FDA approved the **first Protease Inhibitor, Saquinavir**, in a record time in 1995, ushering in a new era of highly active antiretroviral therapy (HAART);
- The first Non-Nucleoside Reverse Transcriptase Inhibitor (NNRTI), **Nevirapine**, was approved for use in 1996.
- In 2003, the SA Government announced a **comprehensive antiretroviral treatment programme** to treat HIV/AIDS.

# Advances in the treatment and prevention of HIV-related diseases

- The first guidelines for the **prevention of Pneumocystis Carinii Pneumonia (PCP)**, a major cause of morbidity and mortality for people with HIV, were issued by the Centres for Disease Control (CDC) in 1989;
- The first guidelines for the **prevention of opportunistic infections** in persons infected with HIV were issued in 1995.
- Advances in the **treatment of CMV retinitis, and toxoplasmosis.**
- Scientists at Harvard Medical School discovered **a gene that blocks the transmission of HIV in old world monkeys\***.

Sources: Sorian and Kates, (2002) and *reference*

\*Stremlau, Owens, Perron et al., (2004)

## Identification of barriers to access to prevention of HIV

- U.S FDA approved the **female condom** for sale in 1993;
- The development of a **test to detect the presence of antibodies to HIV in blood** and other tissues. The FDA licensed this test in 1985;
- In 1996, the FDA approved an **HIV urine test** and first **HIV home testing and collection kit**. In the same year, a **viral load test**, a test that measures the level of HIV in the body, was also approved.
- The first large scale human trials or **phase III trials for an HIV vaccine** began in 1998.
- **OraQuick**, a rapid HIV-1 antibody test, was approved as the first rapid test to use finger prick in 2002

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Source: Sorian and Kates, (2002).



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# PMTCT

- In 1994, the U.S. Public Health Service recommended the use of AZT by pregnant women to reduce perinatal transmission of HIV, based on “076” study showing up to 70% reduction in transmission;
- Dual therapy for PMTCT

## A reduction in the number of new HIV infections in some countries

- HSRC (2005) study indicated that there was a reduction in the number of new HIV infections in South Africa due to successful community and individual level prevention interventions.
- Dramatic reductions in HIV prevalence have also been reported in:
  - Uganda (from 25% in 1990's to 6% in 2003)
  - Kenya (from 9.4% in late 1990's to 6.7% in 2004).

Source: (Shisana and Simbayi, 2003)

# Impact of AIDS research on other areas of medical science

- The development of flu drug, **Relenza** directly benefited from AIDS research.
- The drug known as **3TC**, developed to treat AIDS, is now the most effective therapy for chronic hepatitis B infection.
- Drugs developed to prevent and treat AIDS-related opportunistic infections also provide benefit to patients undergoing **cancer chemotherapy** or receiving **anti-transplant rejection therapy**.
- AIDS is also providing new understanding of the **relationship between viruses and cancer**.

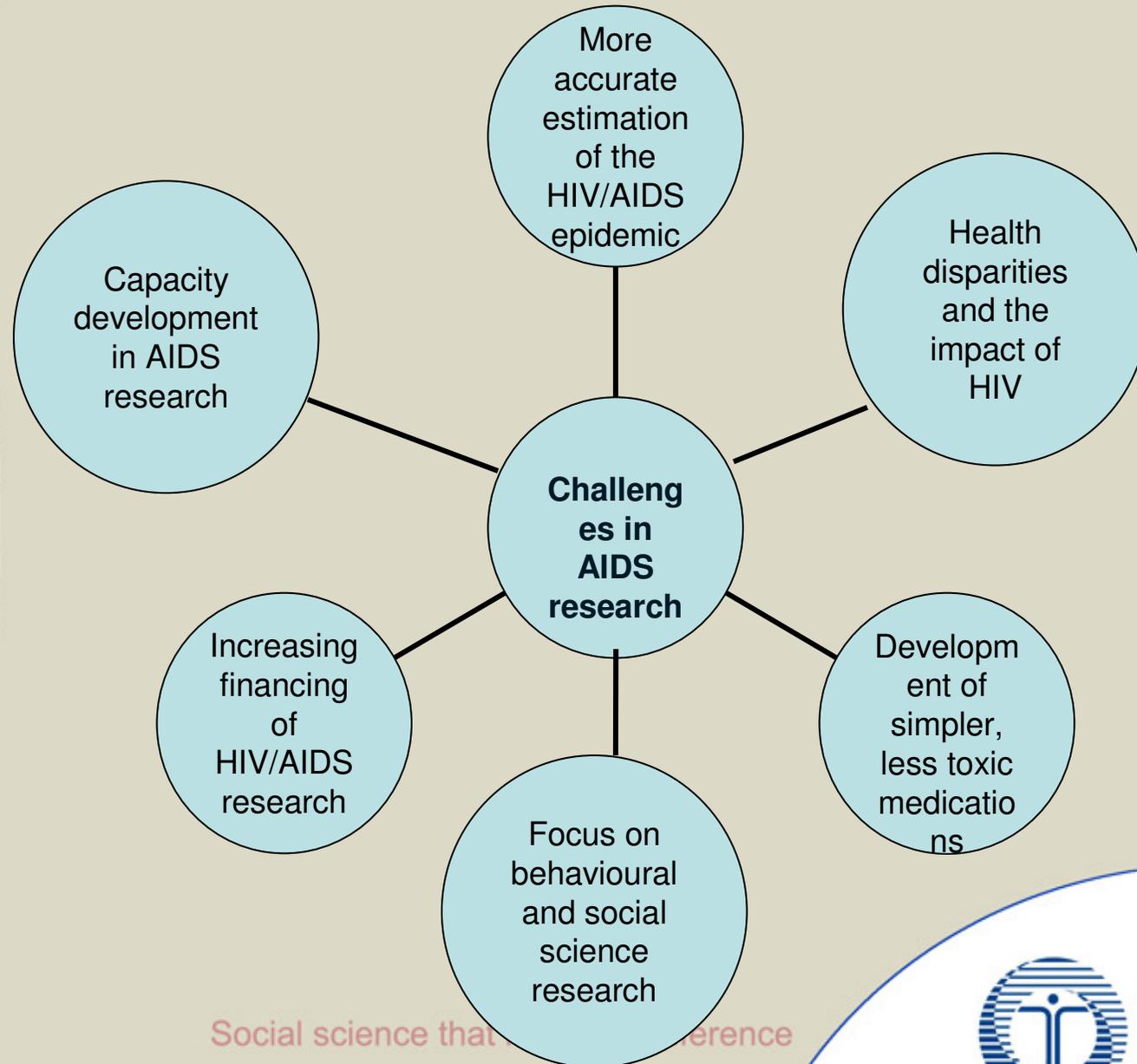
## Other impacts of HIV research

- Accelerated **research into viruses** and retroviruses;
- Provided insight into treatment with **PI** of other conditions including **bone loss and heart muscle damage**;
- Enhanced understanding of the **spread of infectious agents through the blood/brain barrier** (which has implications for research on Alzheimer's disease, dementia, encephalitis, and meningitis);
- Improved treatment and **prevention of infections among people with advanced breast cancer**, organ transplants, or autoimmune conditions;
- Improved **diagnostic tests to detect cancer cells and TB**.

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Source: Sorian and Kates, (2002)

# Social Aspects of HIV/AIDS and Health



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# 1. More accurate estimation of the HIV and AIDS epidemic

- What is the **prevalence** of HIV in South Africa? Do we have an accurate estimation of the HIV prevalence?
- What about the **incidence** of HIV?
- Antenatal sero-prevalence surveys vs. Population-based surveys

## 2. Health disparities and the impact of HIV on women and young people

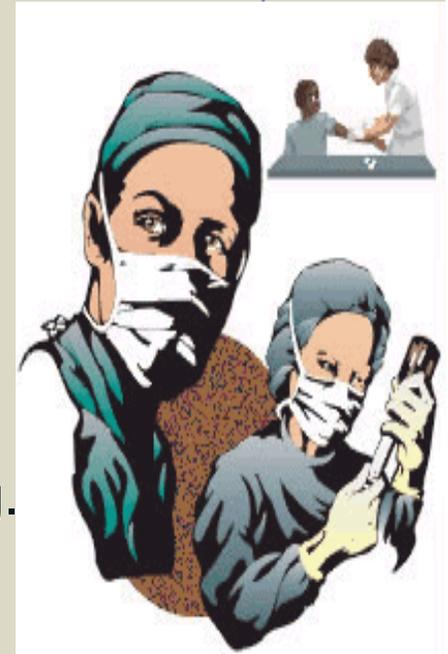
- Despite recent positive trends, HIV remains a leading cause of death among the poor, women and young people.
- Research challenges include increasing the number of Black researchers conducting behavioural and clinical research.
- Developing and evaluating prevention interventions designed to reduce HIV risk behaviors and transmission in communities disproportionately impacted by HIV;
- Reducing barriers to prevention and treatment.



### 3. Development of simpler, less toxic medications

- Clinical studies are needed to:
  - identify strategies for the long-term use of HIV antiretroviral therapy (ART);
  - answer questions such as **when to begin therapy, how to manage side effects; how to improve adherence to HIV therapy;**
  - avoid the development of **drug resistance;**
  - how to treat patients for whom therapy is failing.

Researchers should focus on the **development of new, simpler, less toxic, and less expensive drugs** to deal with side effects and complicated regimens.



## 4. Focus on behavioural and social science research

- Behavioural and social science research investigates ways to understand and change behaviours such as:
  - The tendency to have **multiple partners**
  - Having **unprotected sex**
  - Having **concurrent partners**
  - Lack of **self-efficacy skills**
  - Failure to disclose one's **sero-status** to a partner
  - **Sharing unsterile needles** with other drug users
  - Delaying **age of sexual intercourse**
- It also looks at factors that may lead to behaviours like low self-esteem, poverty and complacency.



Weapons of mass protection!



## 5. Research on prevention technologies

- How far are we from getting an **HIV vaccine**?
- What progress are we making in obtaining a user-friendly **microbicide**?
- How accessible, affordable and user-friendly are **femidoms**?
- How extensive are **male condoms** used?
- New evidence about the efficacy of **male circumcision in HIV prevention**?



## 6. Translating research into policy and practice

### Assumption:

- We conduct **good quality research** to provide evidence of effective interventions. Research is published by high-level peer-reviewed journals.
- The evidence is used to develop **good policies**.
- Policies are then implemented as **best practice interventions** and then we “defeat” the HIV epidemic.



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The AIDS epidemic has taught us to be innovative and to invent new ways of doing things.  
We think we have evidence of HIV prevention strategies that work!



*Social science that makes a difference*  
Picture source: Naidoo D (2007). Science, Technological and Innovation  
A Strategic Imperative for South Africa

However, despite our innovation, inventiveness and compelling evidence of effective strategies, the “killer virus” is still chasing and killing us!



*Social science that makes a difference*  
Picture source: Naidoo D (2007). Science, Technological and Innovation –  
A Strategic Imperative for South Africa