



Achieving HIV epidemic control – the importance of HIV prevention in women

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Overview

- **Is epidemic control achievable?**
- **Can treatment alone end the AIDS epidemic?**
- **What is combination prevention?**
- **The evolving HIV epidemic:**
 - **Where are new infections occurring?**
 - **Where and what are the challenges for epidemic control?**
- **Conclusion**

What is Epidemic Control?

- **Reduction of disease incidence, prevalence, morbidity or mortality to a locally acceptable level as a result of deliberate intervention measures**
- **Point where HIV no longer represents a public health threat and is no longer among the leading causes of country's disease burden**
- **Mathematically defined as the point at which the reproductive rate of infection (R_0) is below 1**

Can treatment alone end the AIDS epidemic?

The case of Botswana



Botswana's progress toward achieving the 2020 UNAIDS 90-90-90 antiretroviral therapy and virological suppression goals: a population-based survey

Tendani Gaolathe, Kathleen E Wirth, Molly Pretorius Holme, Joseph Makhema, Sikhulile Moyo, Unoda Chakalisa, Etienne Kadima Yankinda, Quanhong Lei, Mompoti Mmalane, Vlad Novitsky, Lillian Okui, Erik van Widenfelt, Kathleen M Powis, Nealia Khan, Kara Bennett, Hermann Bussmann, Scott Dryden-Peterson, Refeletswe Lebelonyane, Shenaaz el-Halabi, Lisa A Mills, Tafreyi Marukutira, Rui Wang, Eric J Tchetgen Tchetgen, Victor DeGruttola, M Essex, Shahin Lockman, and the Botswana Combination Prevention Project study team

THE LANCET HIV

Is the UNAIDS target sufficient for HIV control in Botswana?

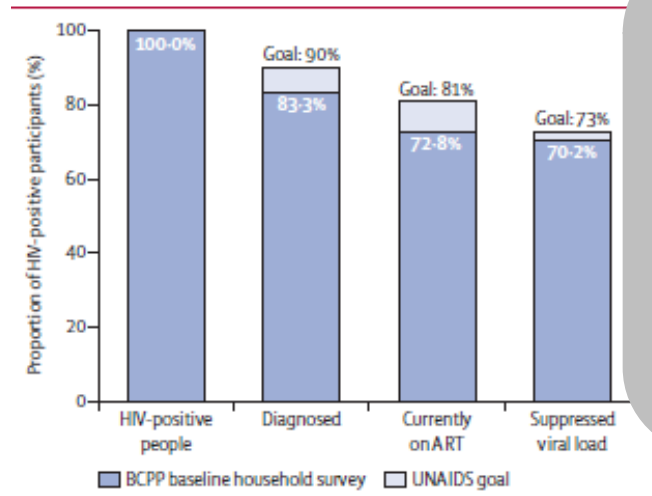


Figure 3: Proportions of HIV-infected individuals enrolled in the Botswana Combination Prevention Project meeting the UNAIDS 90-90-90 targets at baseline

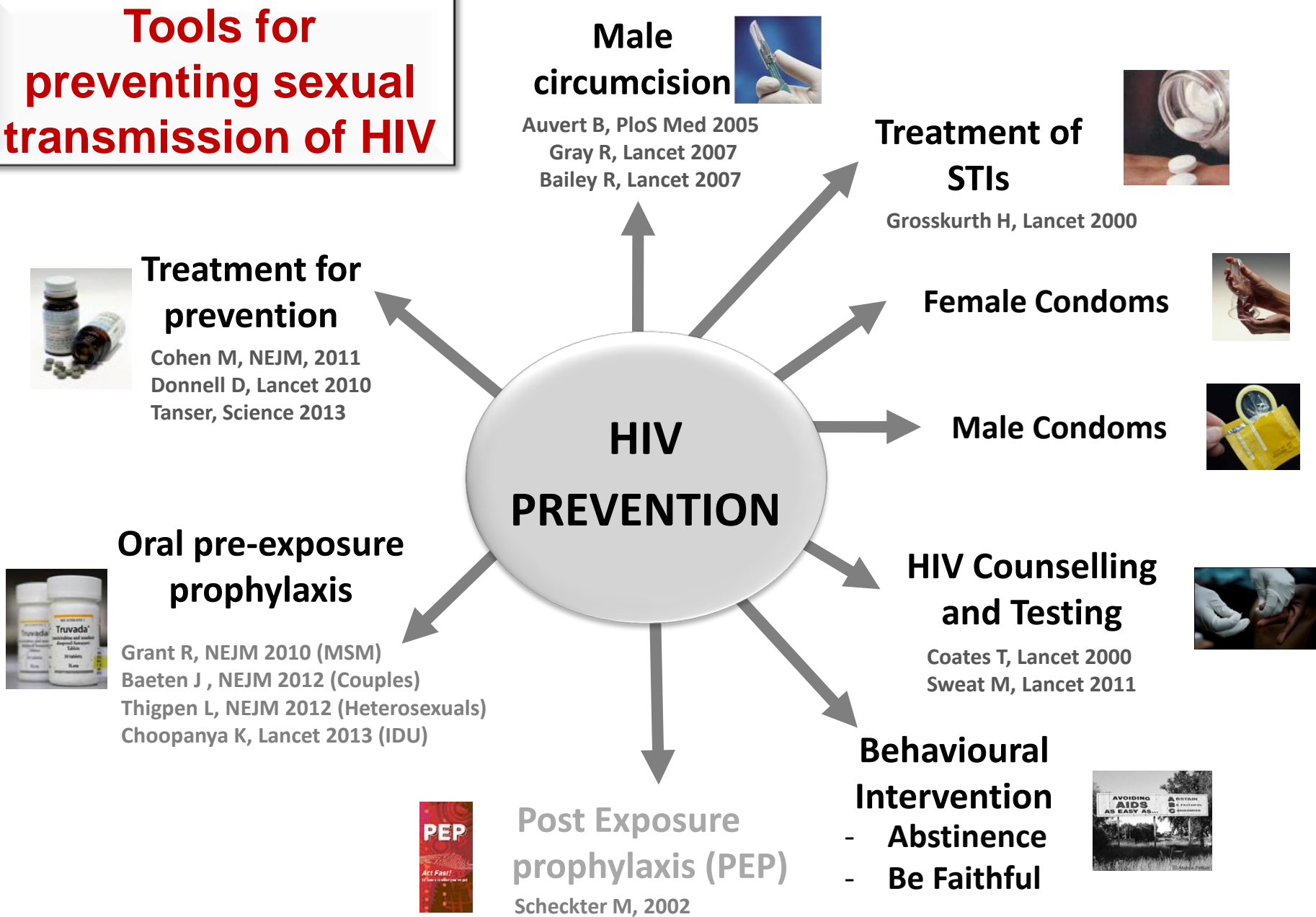
Despite being very close to the UNAIDS targets of 90-90-90, Botswana still has unacceptably high community HIV incidence rates. ... at 3.1%.

What is combination prevention?

“Prevention packages that... combine various arrays of evidence-based strategies... tailored to the needs of diverse subgroups and... targeted to achieve high coverage... for a measurable reduction in population-level HIV transmission”

Source: Kurth et al, Current HIV/AIDS Reports 2011

Tools for preventing sexual transmission of HIV



Note: PMTCT, Screening transfusions, Harm reduction, Universal precautions, etc. have not been included – this is on sexual transmission

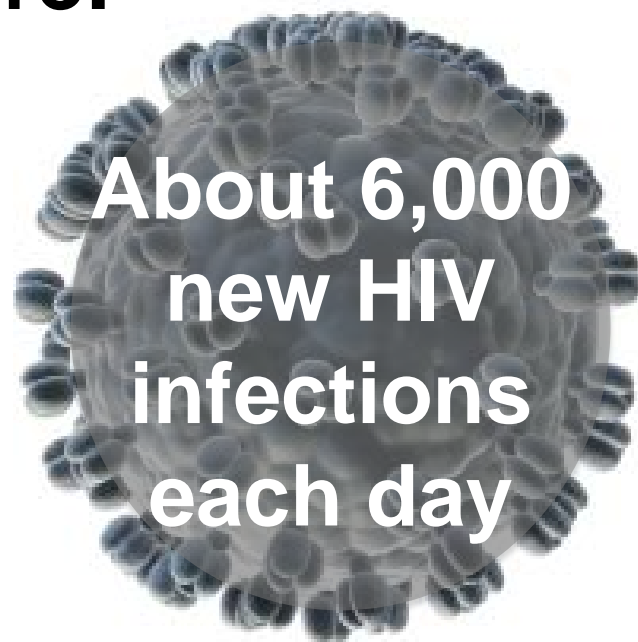
The world has made impressive progress in the HIV response, but the spread of HIV has yet to be controlled!

In 2015, worldwide there were:

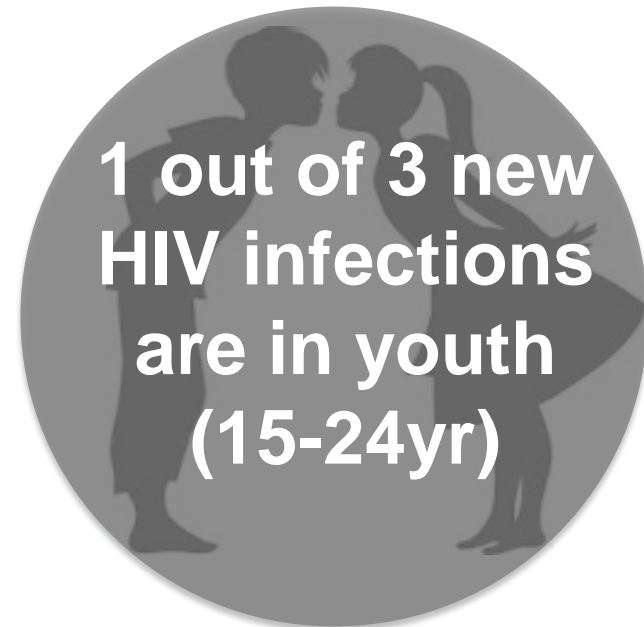
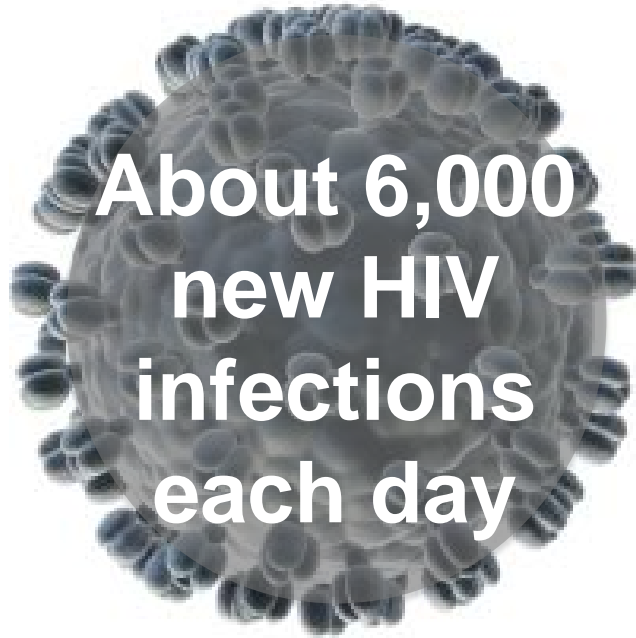
1.2 million HIV deaths

37 million living with HIV

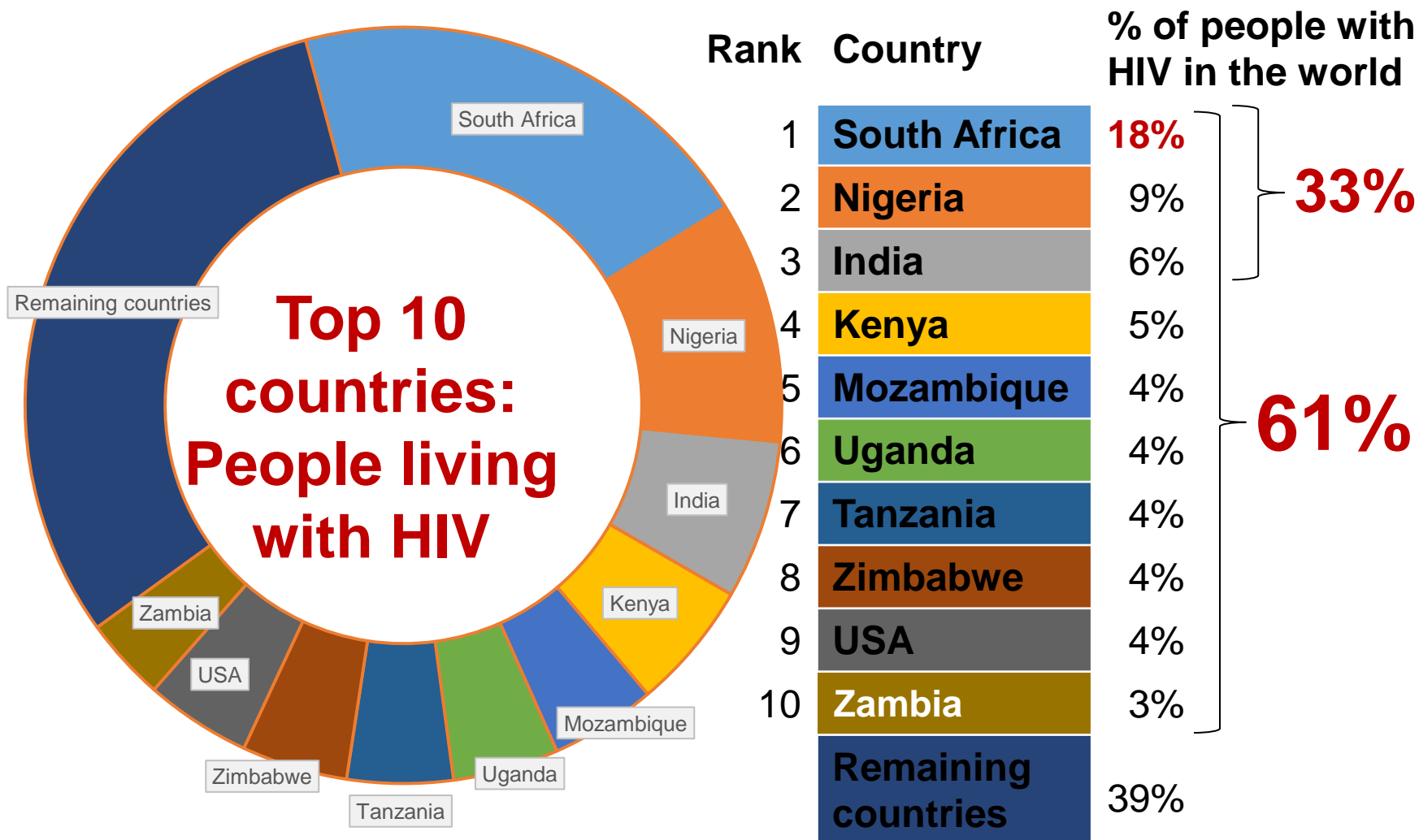
2 million new infections



Global HIV epidemic at a glance



With <1% of the world's population, South Africa has 18% of the HIV infections



35 countries account for 90% of new HIV infections globally

Source: UNAIDS Global Report 2014

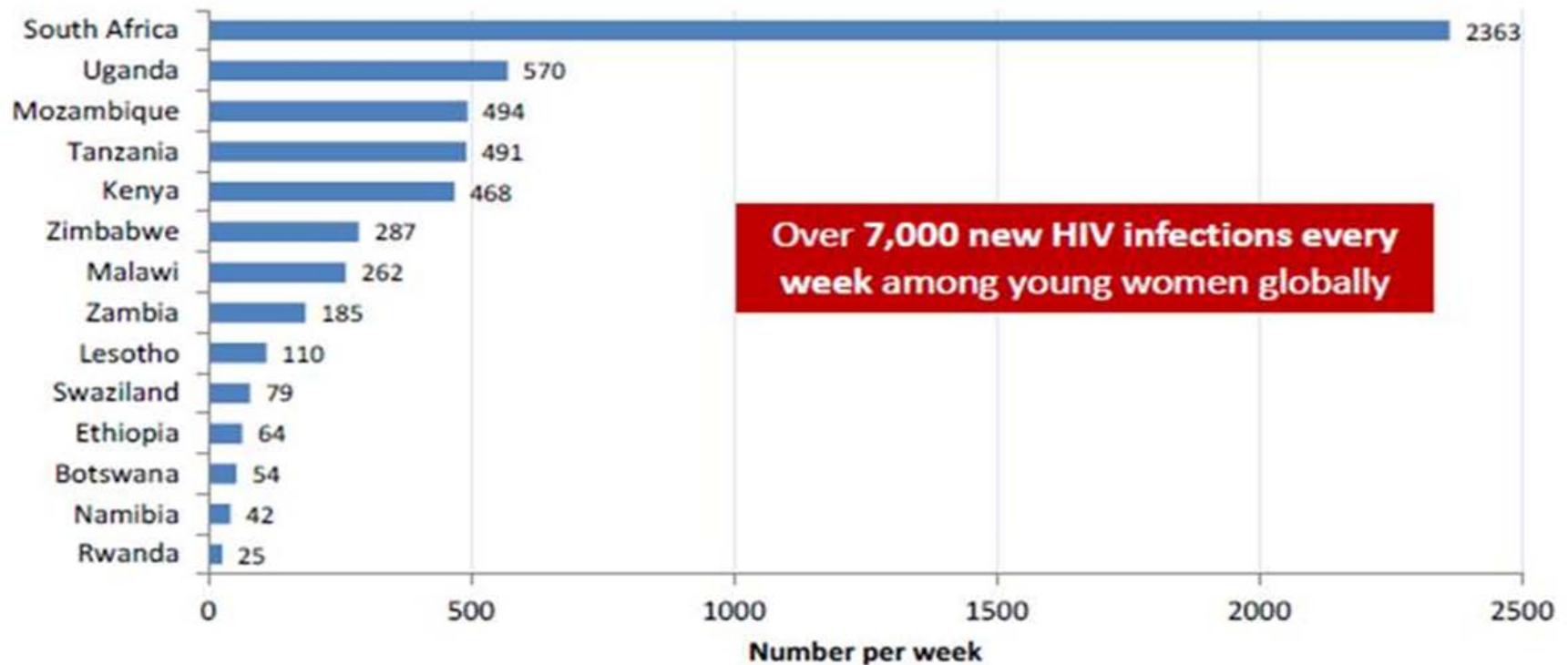
Young Women at High Risk

HIV Incidence among Young Women

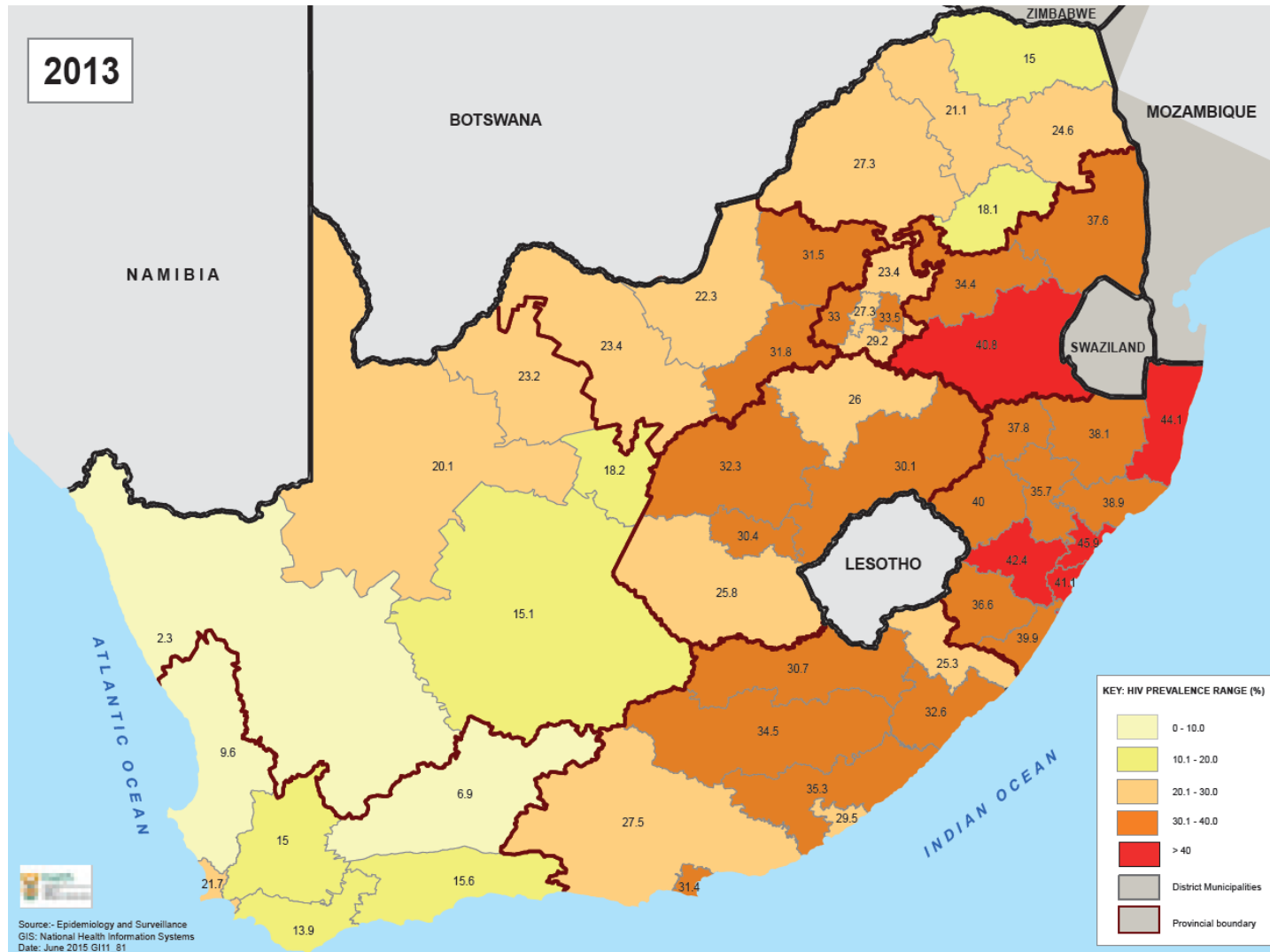
More than 1/3 New HIV Infections Globally Occur among Young Women in Africa

Estimated number of new HIV infections *per week* among young women aged 15-24 years in East and Southern Africa, 2012

Data source: UNAIDS 2013



The South African HIV Epidemic: A diversity of epidemics at a district level



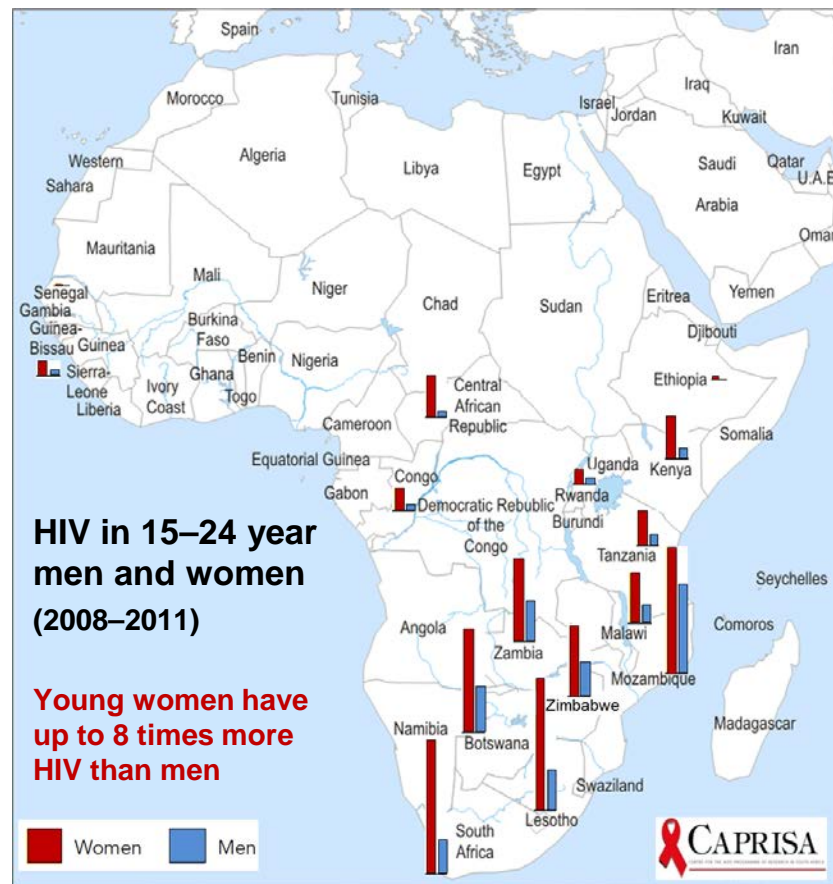
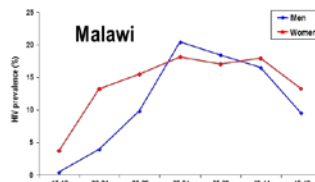
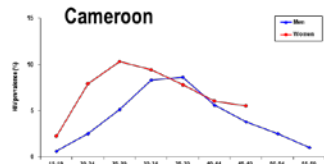
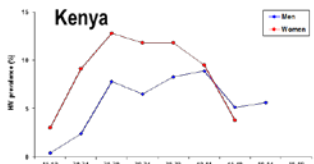
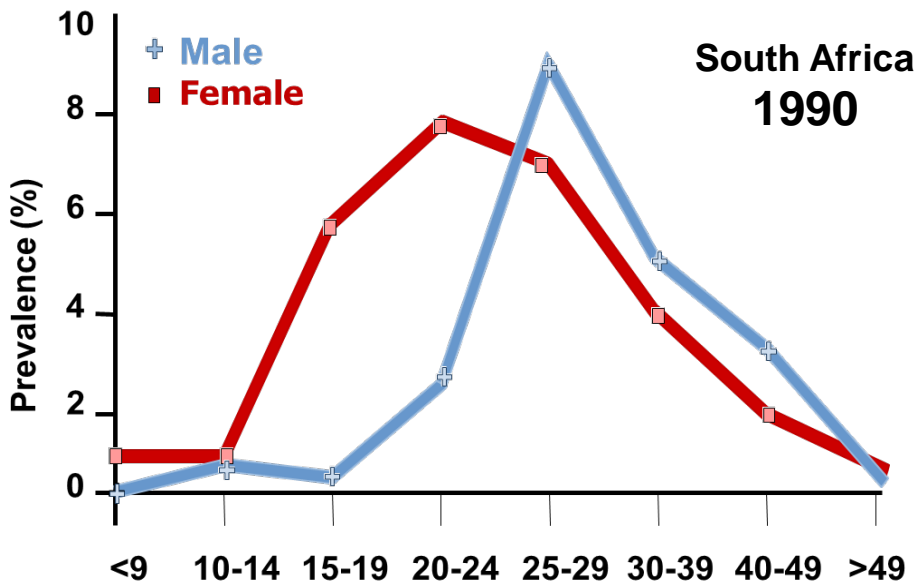
HIV in South Africa: Disproportionate burden of HIV in young women



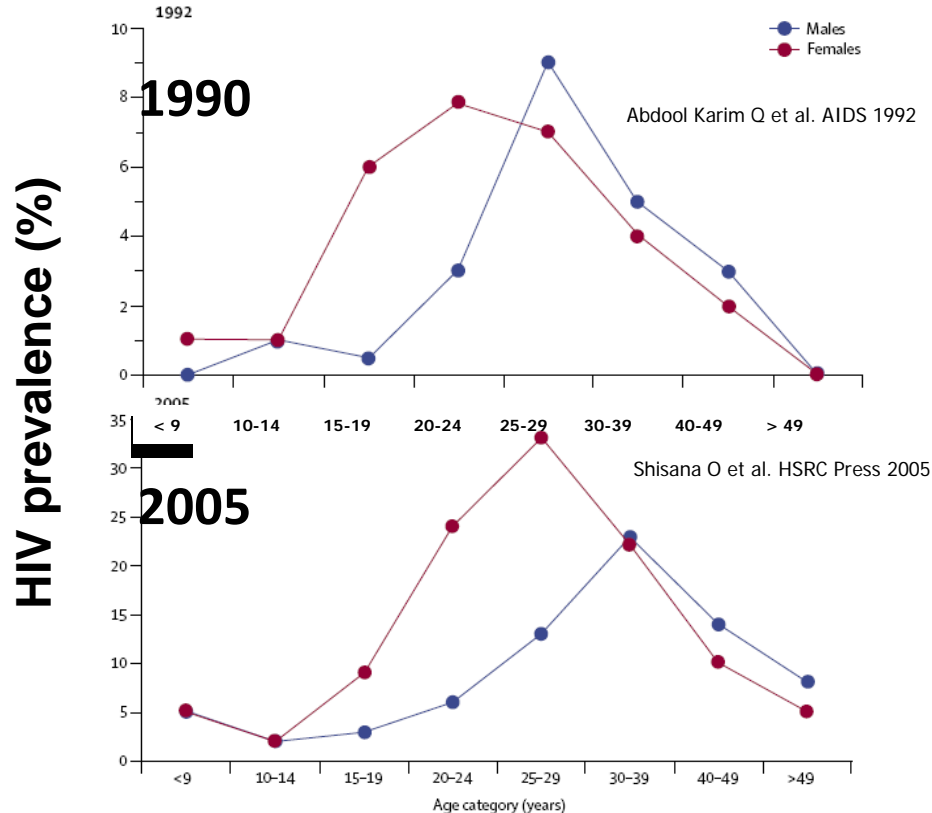
Seroprevalence of HIV infection in rural South Africa

AIDS 1992, 6:1535-1539

Quarraisha Abdool Karim, Salim S. Abdool Karim,
Bipraj Singh*, Richard Short† and Siphon Ngxongo‡

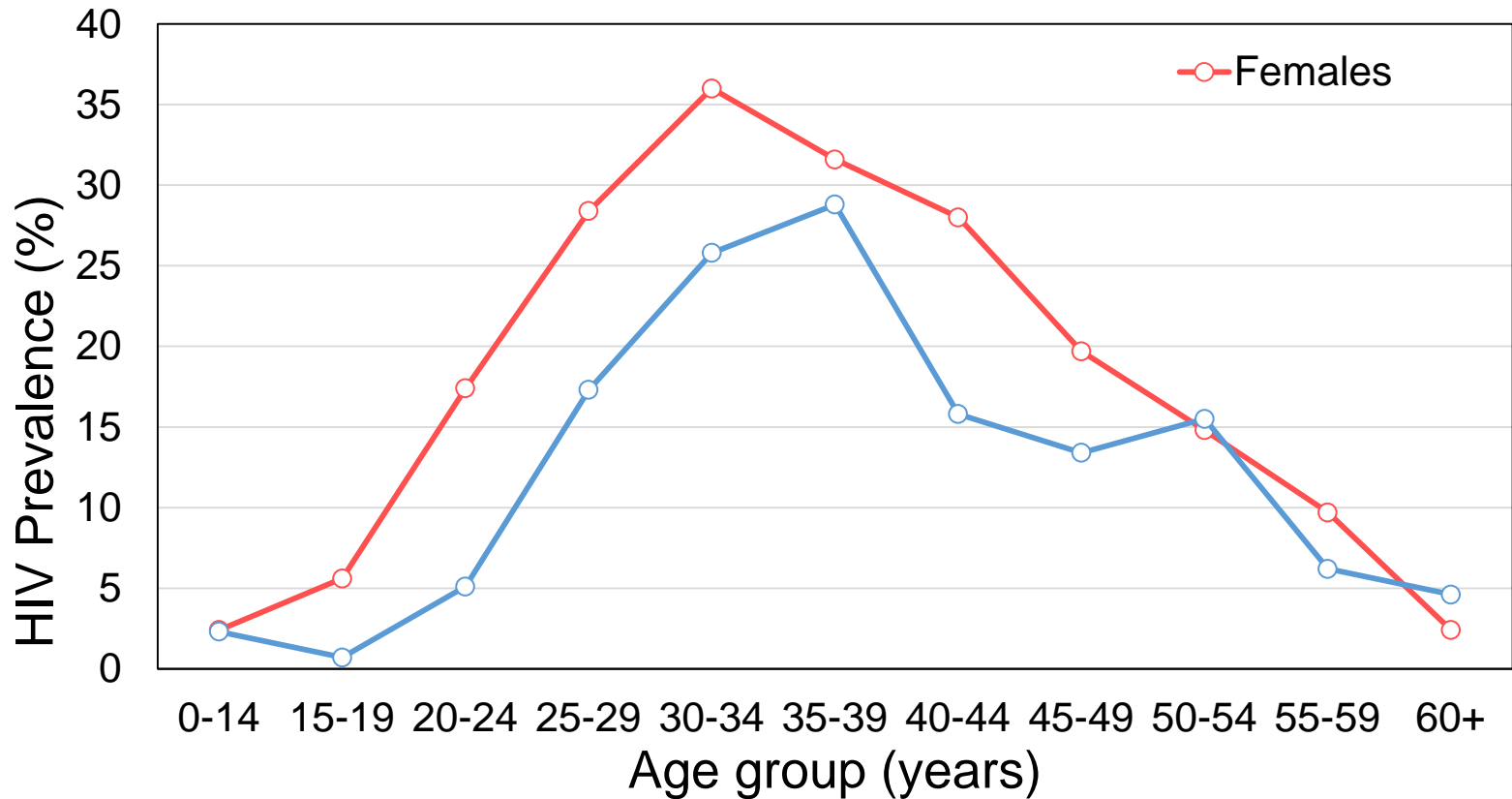


Worsening of the HIV epidemic in young women in South Africa from 1990 to 2005



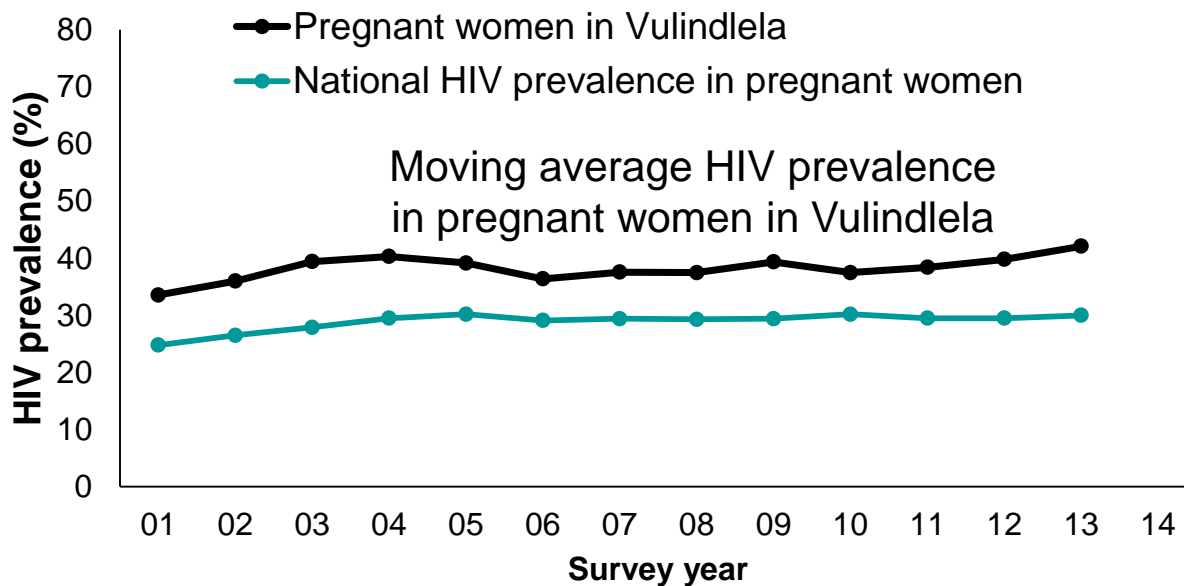
Source: Abdool Karim SS, Churchyard G, Abdool Karim Q, Lawn S. *Lancet* 2009

HSRC Survey: 2012



Adapted from Shisana O, Rehle T, Simbayi LC, Zuma K, Jooste S, Zungu N, et al. South African National HIV Prevalence, Incidence and Behaviour Survey, 2012. Cape Town, HSRC Press. 2014.

In KwaZulu-Natal, HIV prevalence declining too slowly in young women



Overall HIV prevalence in rural Vulindlela (2001-2013)

Age Group (Years)	HIV Prevalence (N=4818)
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≤16 **11.5%**

17-18 **21.3%**

19-20 **30.4%**

21-22 **39.4%**

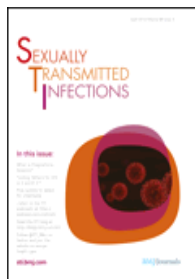
23-24 **49.5%**

>25 **51.9%**

Year	01	02	03	04	05	06	07	08	09	10	11	12	13
HIV prevalence (%)	32	35	41	43	37	38	34	41	37	40	35	40	44
National HIV prevalence (%)	25	27	28	30	30	29	29	29	29	30	30	30	30

Highest Priority: Reducing HIV in young girls

HIV in rural South Africa (Grade 9/10)



ORIGINAL ARTICLE

Prevalence of HIV, HSV-2 and pregnancy among high school students in rural KwaZulu-Natal, South Africa: a bio-behavioural cross-sectional survey

Quarraisha Abdool Karim,^{1,2} Ayesha B M Kharsany,¹ Kerry Leask,¹ Fanelisibonge Ntombela,¹ Hilton Humphries,¹ Janet A Frohlich,¹ Natasha Samsunder,¹ Anneke Grobler,¹ Rachael Dellar,¹ Salim S Abdool Karim^{1,2}

Age Group (years)	HIV Prevalence (2010) % (95% Confidence Interval)	
	Male (n=1252)	Female (n= 1423)
≤15	1.0 (0.0 - 2.2)	2.6 (1.2 - 4.0)
16-17	1.1 (0.2 - 2.0)	6.1 (2.6 - 9.6)
18-19	1.5 (0 - 3.7)	13.6 (9.0 - 18.1)
≥20	1.8 (0 - 3.9)	24.7 (6.3 - 43.1)

HIV & HSV-2 prevalence in students by age

Age Group (years)	HIV Prevalence % (95% Confidence Interval)	
	Male (n=1252)	Female (n= 1423)
≤15	1.0	2.6
16-17	1.1	6.1
18-19	1.5	13.6
≥20	1.8	24.7
HSV-2 Prevalence		
≤15	0.7	3.5
16-17	2.0	9.3
18-19	6.6	30.2
≥20	3.5	43.3

Risk factors for HIV acquisition in female high school students

Risk factor	Adjusted OR	p-value
Age \leq 18 years	2.67 (1.67-4.27)	<0.001
HSV-2 seropositive	4.35 (2.61-7.24)	<0.001
Experience of pregnancy	1.66 (1.10-2.51)	0.016
Experience of >1 adult deaths in household	1.97 (1.13-3.44)	0.016

**SOCIAL as well as BIOLOGICAL
vulnerability to infection**

Abdool Karim Q, Kharsany ABM, Leask K, Ntombela F, Humphries H, Frohlich JA, Samsunder N, Grobler A, Dellar R, Abdool Karim SS. Sexually Transmitted Infections 2014;

HSV-2 infection increases HIV risk in CAPRISA 004 women

HSV-2 incident infections	HSV-2 positive n=58	HSV-2 Negative n=164
# HIV infections	11	13
HIV incidence / 100 person-yrs	12.3	5.3

HR for HIV risk in incident HSV-2: 2.4 (CI: 1.1-5.4), p = 0.03

Prevalent HPV infection increases HIV risk

Prevalent HPV	Women-years (n/N)	HIV Incidence rate (95% CI)
HPV-	330.5 (8/204)	2.4 (1.1 - 4.8)
HPV+	880.3 (59/575)	6.7 (5.1 - 8.6)

HR for prevalent HPV: 2.8 (CI: 1.3 – 5.9), p=0.007

**Multivariate model fitted to HIV incidence adjusting for Study arm, Self-reported condom use, Age, Baseline HSV-2 status, Self-reported sex acts in the last month, and Age at sexual debut.*



World Health Organization

New WHO policy on ARVs to prevent the spread of HIV by sex (Pre-exposure prophylaxis - PrEP):

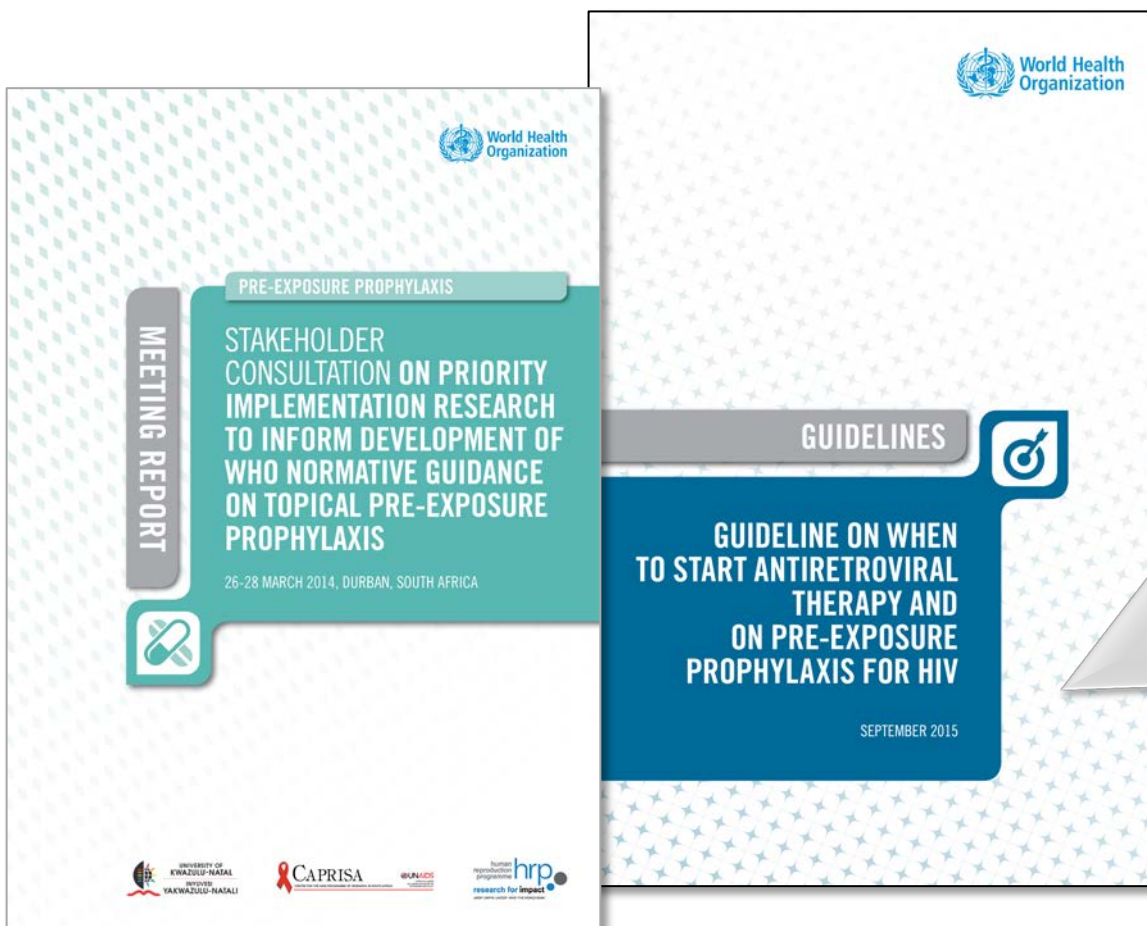


Daily Truvada

PrEP recommended as global standard for all at high risk

New WHO PrEP guidelines

“..the use of daily oral pre-exposure prophylaxis is recommended as an additional prevention choice for people at substantial risk of HIV infection as part of combination prevention approaches..”



Summary

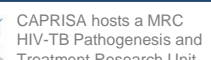
- **Diversity of epidemics**
- **Responses have to be shaped by knowledge of epidemic, drivers of epidemic & target populations**
- **Need to define optimal combinations of known interventions appropriate for target population and epidemic**
- **More than a health issue - social mobilization is effective**
- **Treatment scale up and PrEP are creating new opportunities for prevention – increase male engagement; 3 zeroes**
- **HIV prevention is complex challenge - no quick fix, no magic bullets, no one size fits all**
- **Major gap is HIV prevention technologies for young women – daily Truvada is a start.**
- **M&E and keep track of new knowledge**

Conclusion

- **Impressive progress in scientific research, political commitment & implementation globally:**
 - **created a favourable HIV trajectory**
 - **but, young women in SSA still have high HIV rates**
- **SSA is important and critical in impacting the global**
- **There are many challenges but it should not deter us!**
- **We won't stop HIV in young women tomorrow....**
.... but social and biomedical innovation has to be part of our long-term vision

Acknowledgements

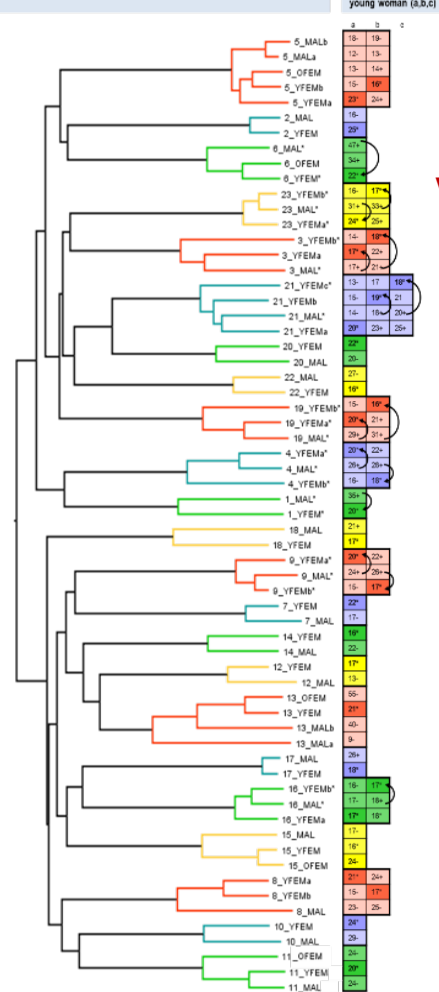
- **CAPRISA is funded by:**
 - DAIDS, NIAID, National Institutes of Health
 - US Agency for International Development (USAID)
 - President's Emergency fund for AIDS Relief (PEPFAR)
 - US Centers for Disease Control and Prevention (CDC)
 - South African Department of Science and Technology (DST)
 - National Research Foundation (NRF)
 - Fogarty International Center, NIH
 - Gilead Sciences (tenofovir API)
 - MACAIDS Fund (via Tides Foundation)
 - Medical Research Council (MRC)
 - CONRAD
- **CAPRISA hosts a DST-NRF Centre of Excellence in HIV Prevention (jointly with the University of KwaZulu-Natal)**



Who is infecting who?

Africa Centre identified phylogenetically linked HIV transmission networks in Hlabisa

Tip-dated Bayesian phylogenetic tree highlighting clusters containing at least one young woman and one man



High HIV incidence men
mean age 27 years (range 23-35 years)



Very young women acquire HIV from men, on average, 8 years older



Men and women > 24 years usually acquire HIV from similarly aged partners

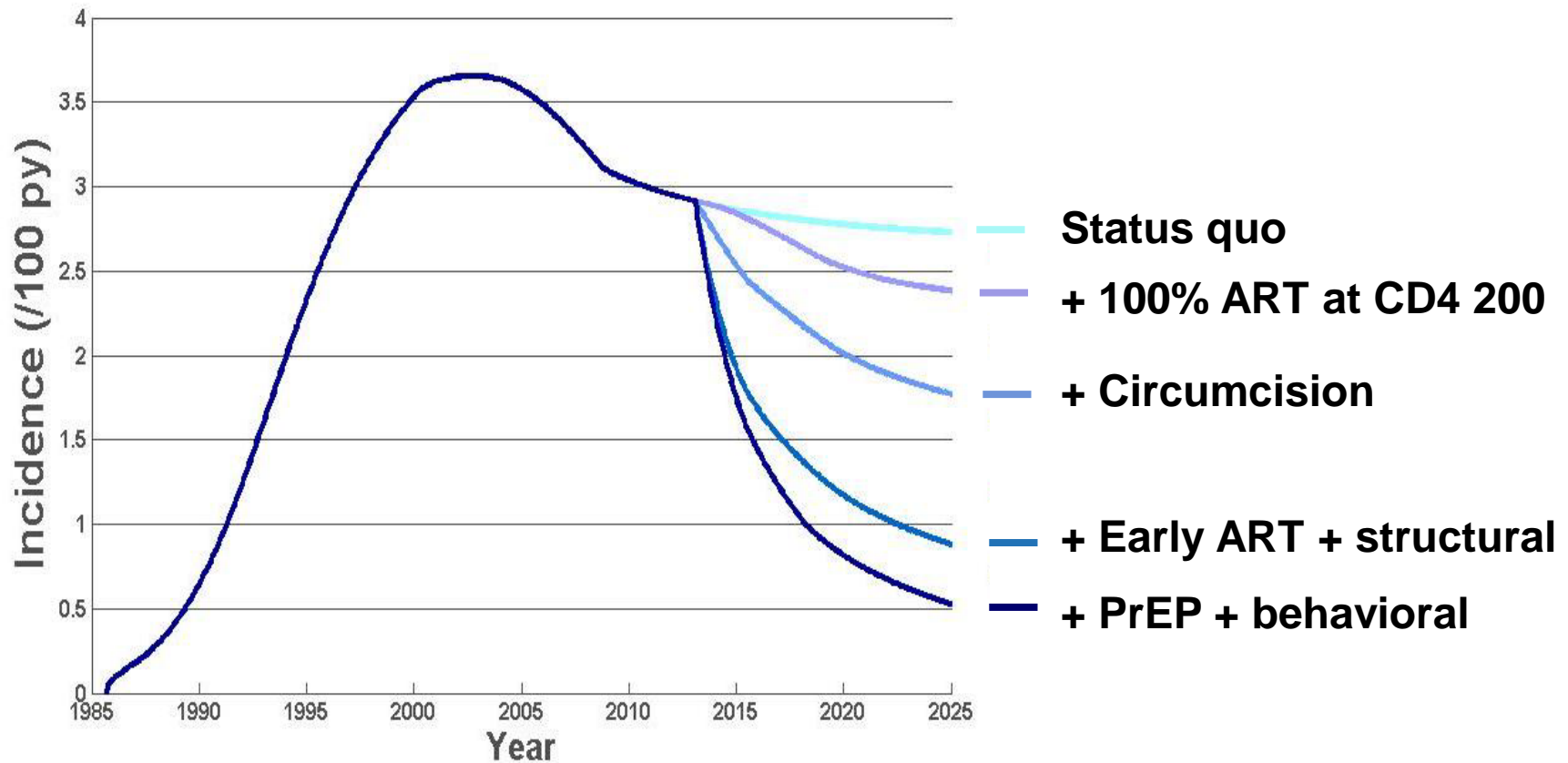


High HIV risk women
Mean age 18 years (range 16-23 years)

High HIV prevalence women
Mean age 26 years (range 24-29 years)

When teen women reach mid-20s they continue the cycle

Is HIV epidemic control achievable?



Yes, HIV epidemic control is achievable!

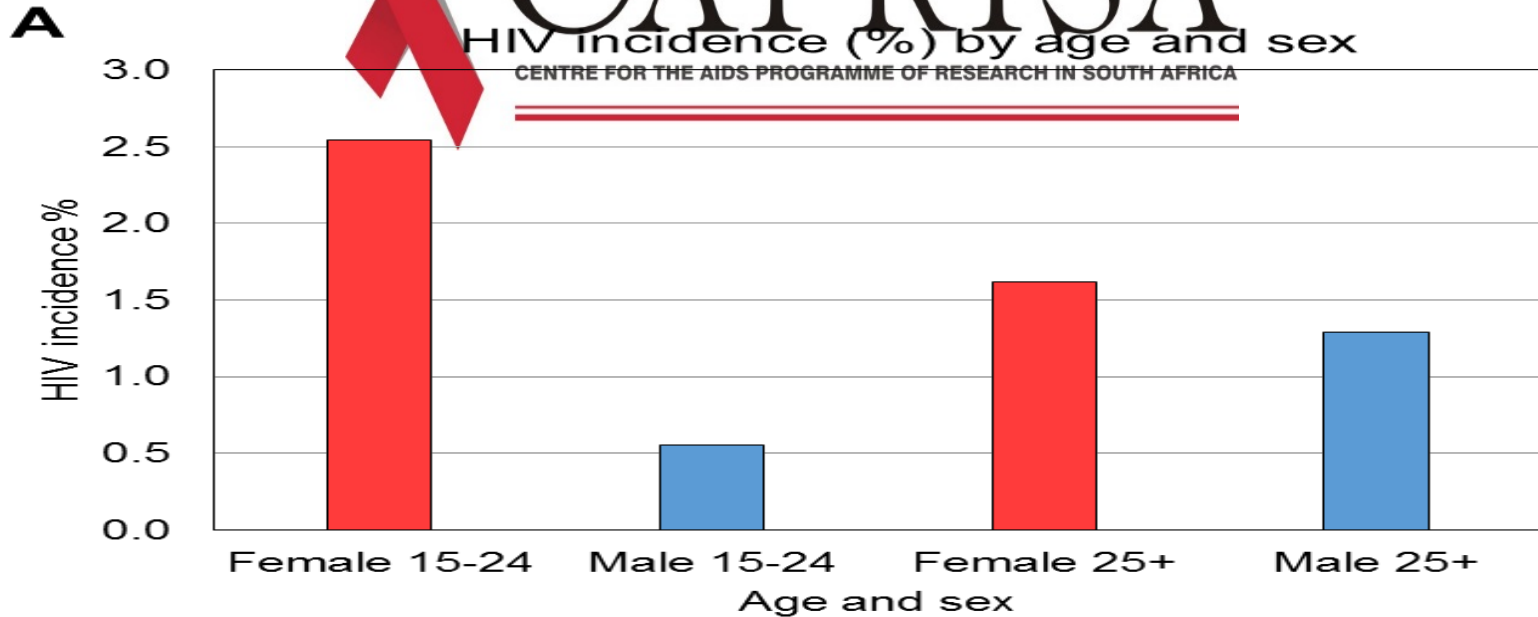
Source: Cremin I. et al. AIDS 2013

HSRC 2012 Survey: HIV Incidence rates



CAPRISA

HIV incidence (%) by age and sex
CENTRE FOR THE AIDS PROGRAMME OF RESEARCH IN SOUTH AFRICA



B Proportion of new HIV infections by age and sex

