

Treatment as prevention

Francois Venter

October 2018



University of the Witwatersrand

WITS RHI

Thanks DoH, WHO, PEPFAR, CHAI,
UCT, Joep Lange Institute, Celicia
Serenata, Steve Smith, David Allen



Optimising ART Consortia

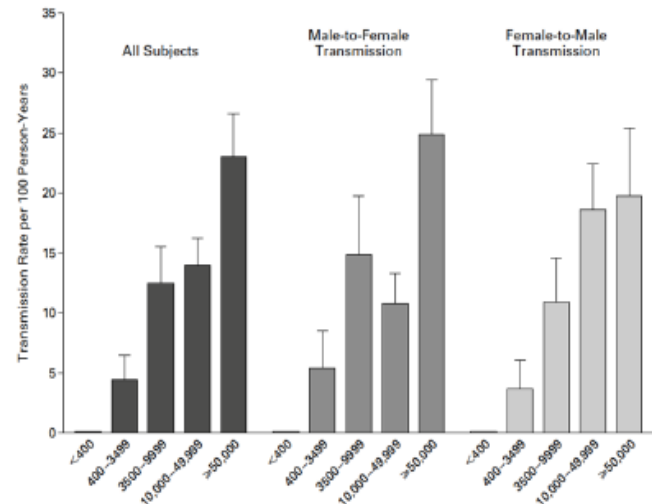
The USAID-funded OPTIMIZE consortium includes five leading private and public sector partners, and led by Wits RHI. OPTIMIZE leverages efforts by a wide range of donors and key stakeholders (e.g., Unitaid and its implementing partners, WHO and Global Fund).

OPTIMIZE operates under the assumption that aligning the collective power of scientists, regulators, drug companies, donors, programmers and advocates to achieve its singular goal -- accelerating access to simpler, safer and more affordable HIV treatment -- can rapidly advance ART optimization efforts.



HIV-1 levels & HIV-1 infectiousness

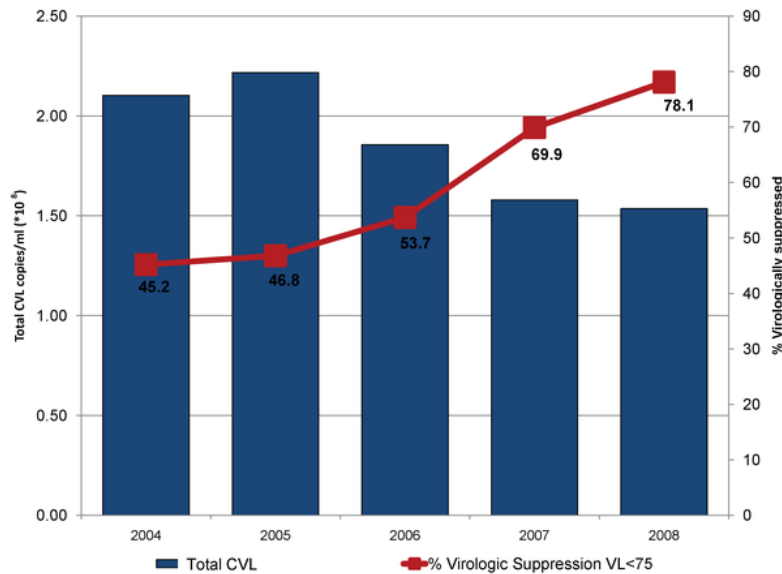
- High plasma HIV-1 RNA concentrations are associated with increased HIV-1 transmission risk
- Plasma and genital HIV-1 levels are correlated (coefficient ~0.5-0.6)
 - But, genital HIV-1 more variable than plasma and tight correlation not found in all individuals



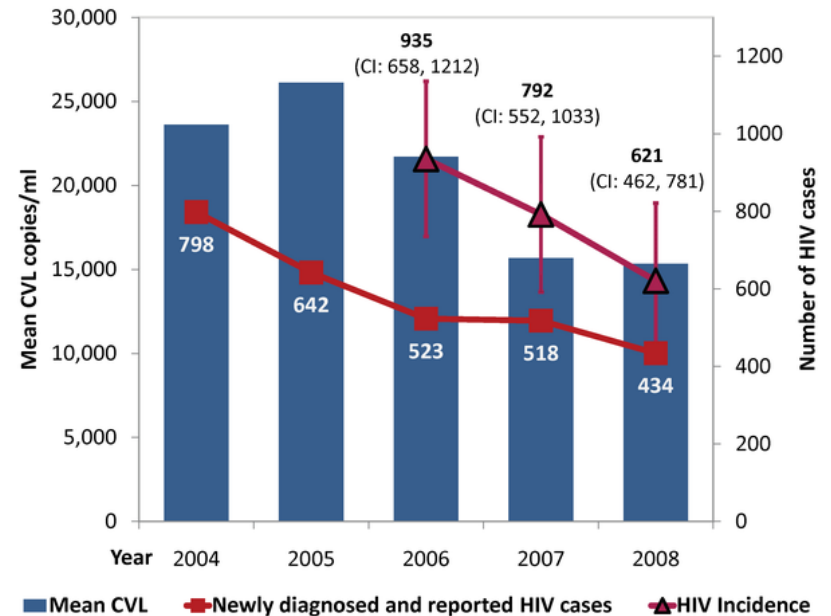
Quinn et al NEJM 2000

Thanks Connie Cellum

Viral Load and New HIV Cases in San Francisco

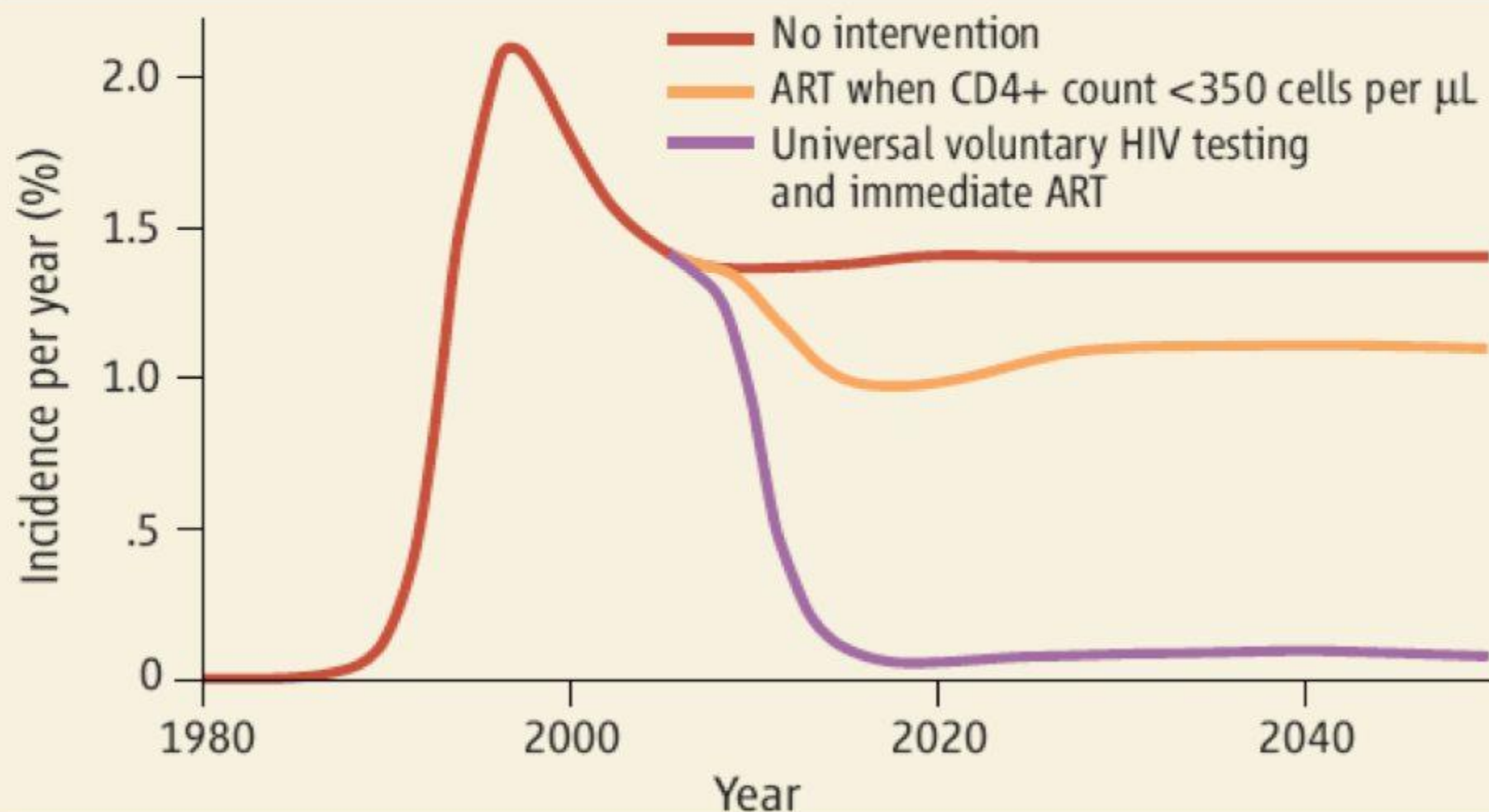


n=12,512 unduplicated HIV-positive individuals.



Universal voluntary HIV testing with immediate antiretroviral therapy as a strategy for elimination of HIV transmission: a mathematical model

R Granich, C Gilks, C Dye, K De Cock, B Williams. The Lancet Nov 26th 2008

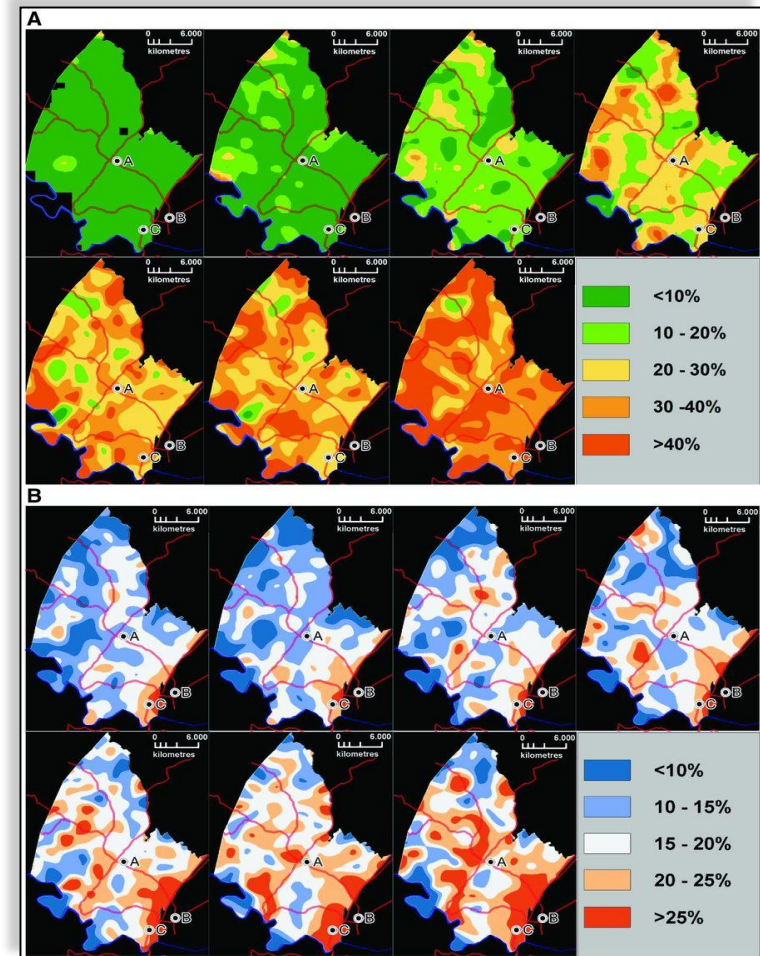


Simple!!

- Just treat everyone! Epidemic will disappear

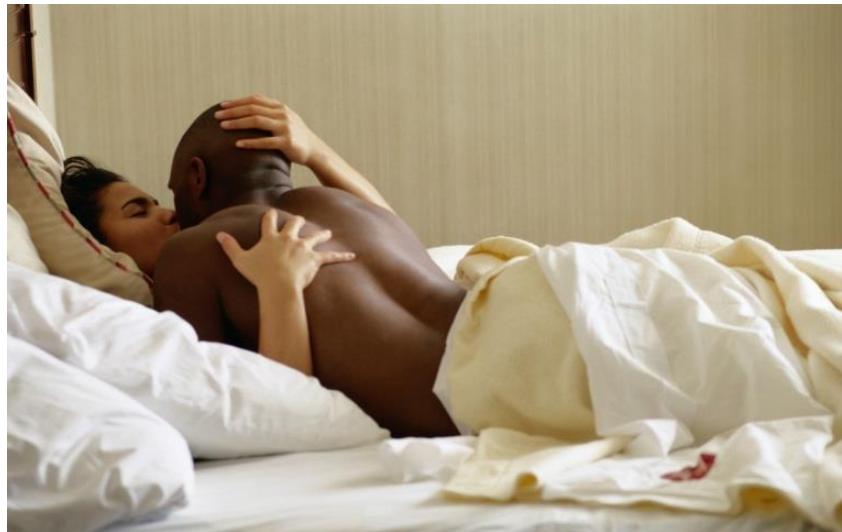
High Coverage of ART Associated with Decline in Risk of HIV Acquisition in Rural KwaZulu-Natal, South Africa

Frank Tanser,^{1*} Till Bärnighausen,^{1,2} Erofili Grapsa,¹ Jaffer Zaidi,¹ Marie-Louise Newell^{1,3}



Fact: Sex is now safe? (and childbirth and breastfeeding and ?sharing needles)

- 052, breastfeeding...



Several things happened in July 2017....

- 90-90-90 success stories (Botswana, Havlir, Sweden)
- But failure to link to care in some RCTs - Swaziland, KZN
- And no impact on new incidence (KZN)

The screenshot shows the The World Bank website. The header includes the logo, the text "THE WORLD BANK IBRD • IDA", and the tagline "Working for a World Free of Poverty". There are social media icons for Facebook, Twitter, YouTube, and LinkedIn. Below the header is a navigation bar with links: ABOUT, DATA, RESEARCH, LEARNING, NEWS, PROJECTS & OPERATIONS, and PUBLICATIONS. On the left side, there are tabs for "Latest news", "News by topic", "HIV update", "News feeds", and "Conference news". Below these tabs, there is a section titled "ACHIEVING THE 90-90-90 TARGET" with the headline "Sweden the first country to achieve UNAIDS/WHO 90-90-90 target". The author is Michael Carter, and it was published on 14 September 2016. On the right side of this section are links for "Print", "Email", and "Share". The main content area features a large banner with the text "INVESTING IN HEALTH" and "News and Views in Healthy Development". Below the banner is a search bar with "Bloggers", "Tags", and "Contact" filters. The featured article is titled "The end of the end of AIDS" and was submitted by David Wilson on Tuesday, 08/09/2016, with co-authors Marelize Gorgens. There is a "Share" button and a small profile picture of David Wilson. At the bottom, there is a snippet of another article titled "The recent Durban 2016 International AIDS Conference celebrates the success of AIDS treatment in reducing..."

Incidence still remains stubbornly high...

New HIV infections among people aged 15 years and over, by region, 2010–2015



Source: UNAIDS 2016 estimates.

And does not correlate well with ART...

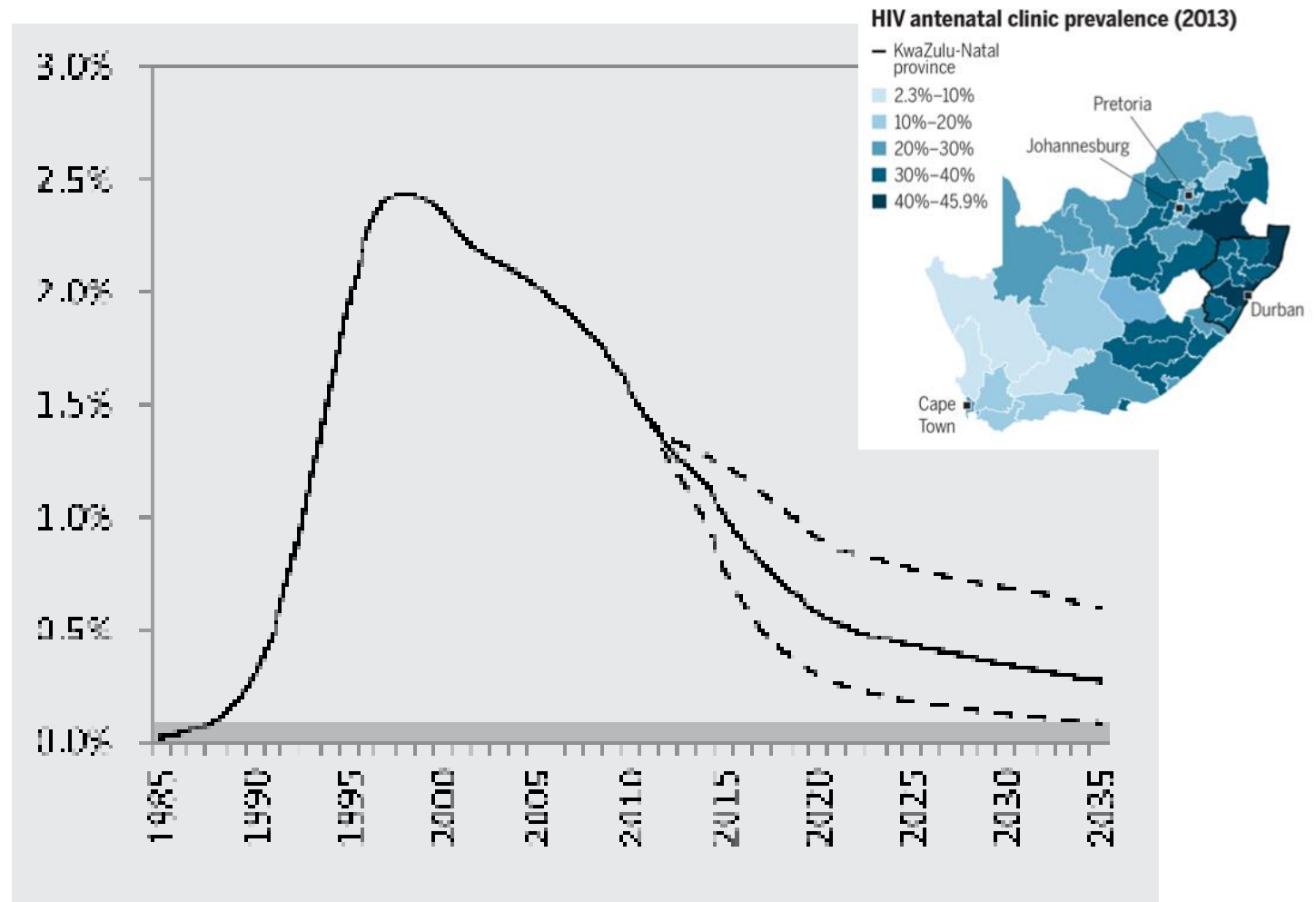


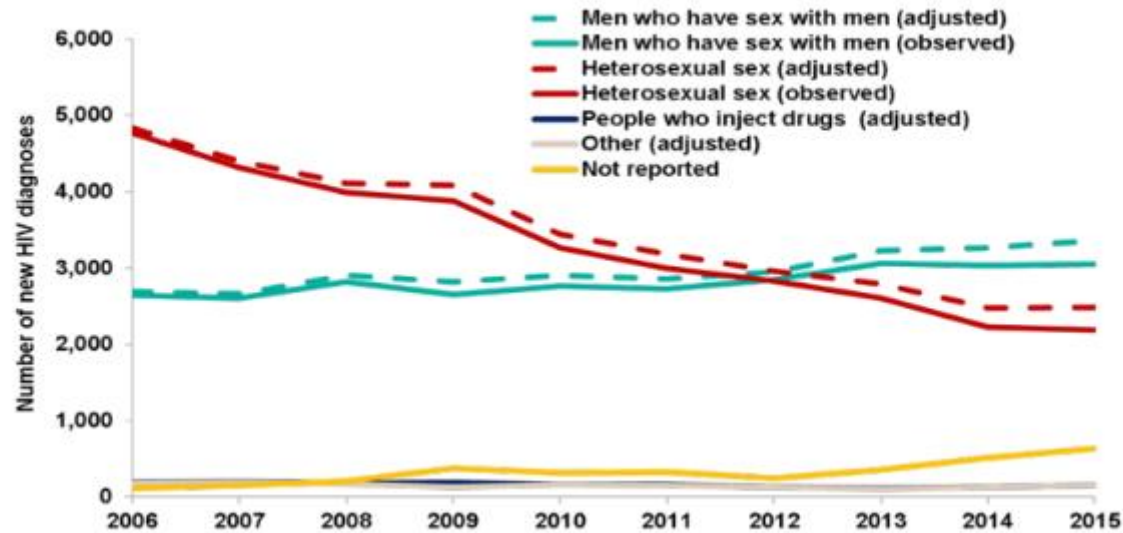
Figure 1: HIV Incidence trends in South African adults aged 15-49

Source: Leigh Johnson, Spotlight, 2016

Troubling....

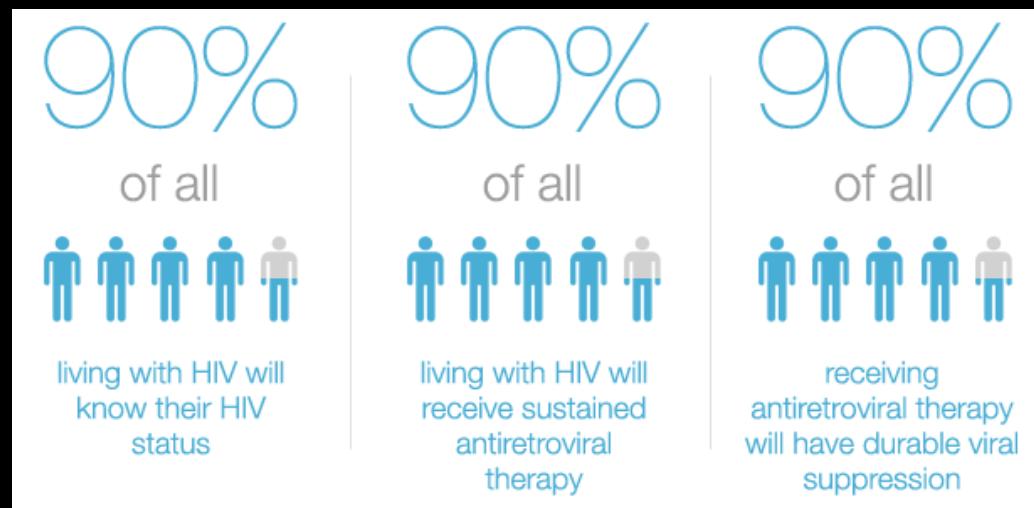
- Julio Montagner in Vancouver: MSM vs intravenous drug users

Figure 1: New HIV diagnoses² reported by exposure group, UK: 2006-2015



Some ideas why: missing men?

- Second 90: probably there for women; not men – and that's a huge problem



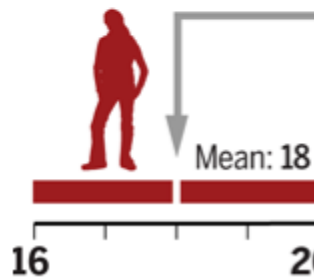
Fact: Transmission is not well understood

- And the 'solutions' are often based on common sense mixed with morality and poor science

Or is it something else?

The cycle of infection in South Africa

**Young women
between 16 and 23**
acquire HIV from
older men.



Men between 23 and 35
have a high incidence of HIV.

Mean: 27

Women in their mid-20s
infect and are infected by
similarly aged men.

Mean: 26

Age

16

20

25

30

35

Fact: Sex is now safe



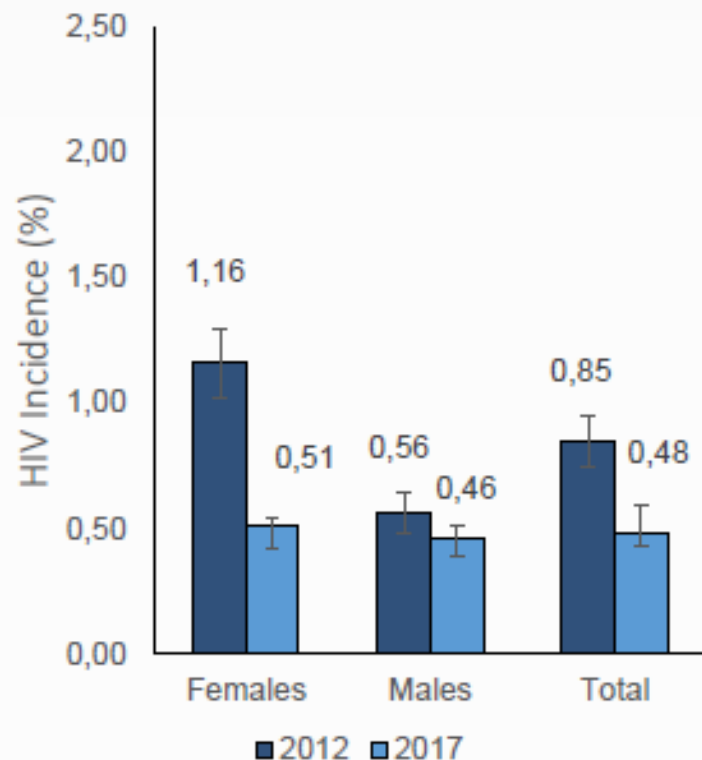
IAS 2018: Sex is now safe



- PrEP/PEP: almost total protection
- As treatment: undetectable=untransmissible
- Partners study (Lancet Aug 2018)
 - Sub-study of gay men
 - Almost 77 000 unprotected anal sex acts – no transmission
- Intermittent PrEP for gay men
 - “on-demand” – 2 tabs 2-24 hours before sex, 1 tab at 24, then 48 hours
 - 1500 (mainly gay men) – no transmissions



- NB. The 2012 results were re-calculated using the 2017 test parameters
- The overall HIV incidence has significantly dropped by 44%.
- The largest decline (56%) in incidence was among females.
- Among males the incidence declined by 18%



Variable	Estimated number of people on ART (n)	Proportion of people living with HIV on ART (%) 95% CI
National	4,401,872	62.3 (59.2-65.2)
Female	2,998,170	65.5 (62.4-68.4)
Male	1,403,702	56.3 (51.0-61.5)

Similar drops in:

- Rich countries – esp with PrEP
- Botswana
- Swaziland
- Zimbabwe

1 Per Sex-Act Risk of HIV Transmission Under Antiretroviral Treatment:

2 A Data-Driven Approach

3 Running head: Per-act risk of HIV transmission on cART

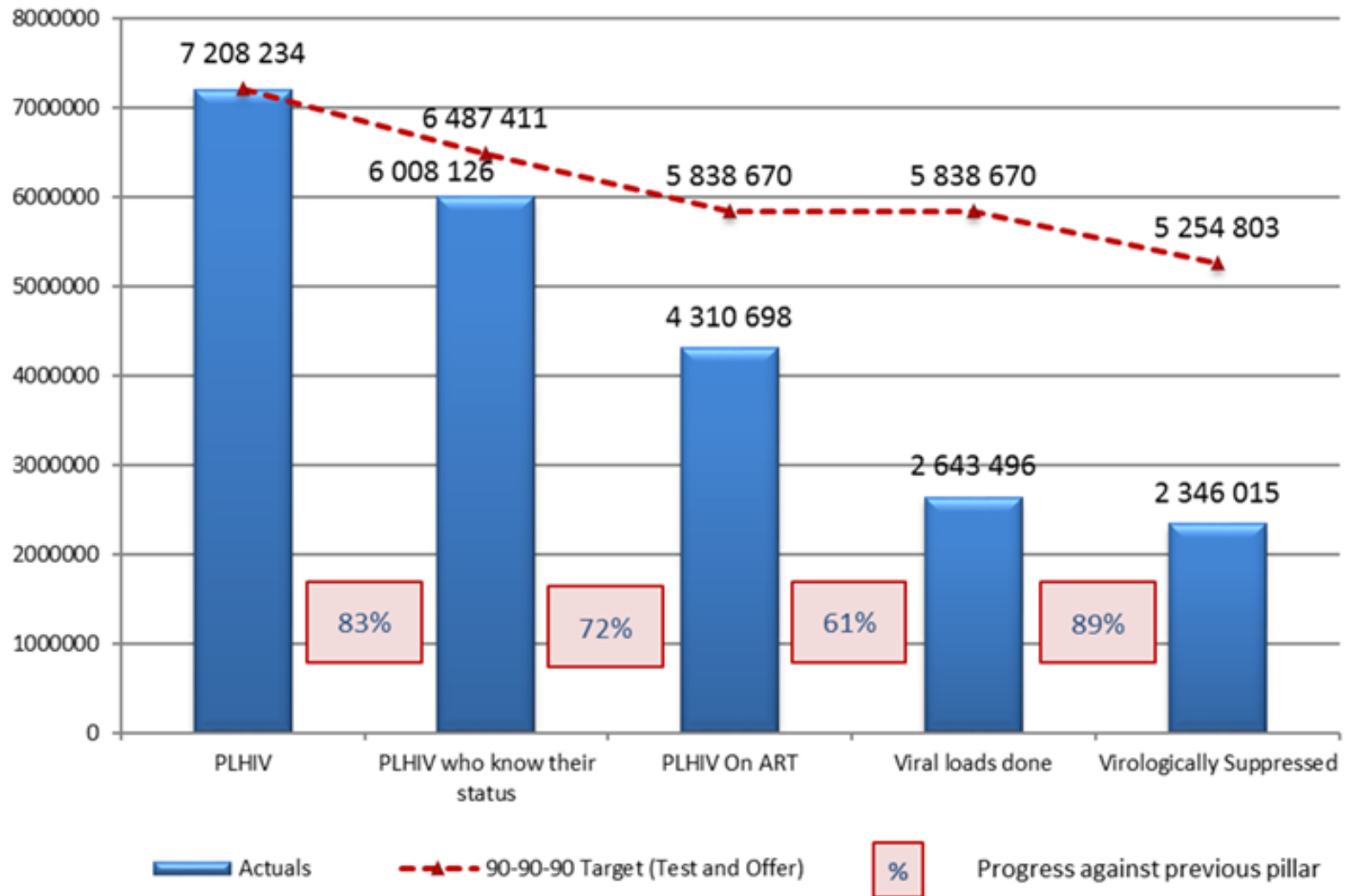
4

5 Virginie Supervie¹, PhD, and Romulus Breban², PhD

41 **Conclusion.** Data has accumulated to render obsolete estimates of the risk of HIV transmission
42 on cART obtained by extrapolation. Direct estimates are significantly lower and should be used
43 in practice.

90-90-90 Cascade - Total Population

(Jun 2018 - South Africa)



Conclusions

- The decrease in HIV incidence pre-dates ART introduction at scale
- But treatment seems to have had a huge additional impact
- Critical to get to the youth and men

Thank you

