



# Connecting the dots from 90-90-90 to HIV Epidemic Control: Milestones for the climb up Mt. Everest

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Chair: UNAIDS Scientific Expert Panel

# Overview

- The HIV epidemic at a glance
- UNAIDS 2030 Goal: Ending AIDS as a public health threat – epidemic control
- Are we on the right path to epidemic control with 90-90-90 treatment targets?
- Connecting the dots to Epidemic Control...

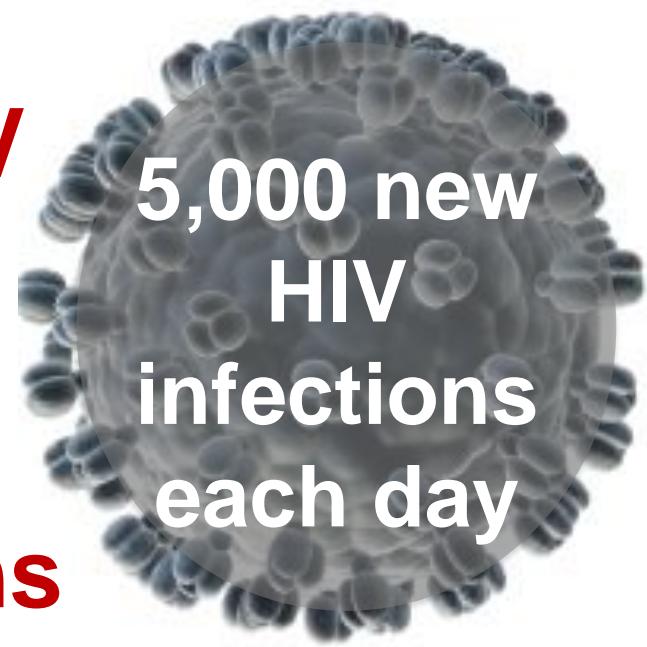
# Global HIV epidemic at a glance...

In 2016, worldwide there were:

**37 million living with HIV**

**1 million HIV deaths**

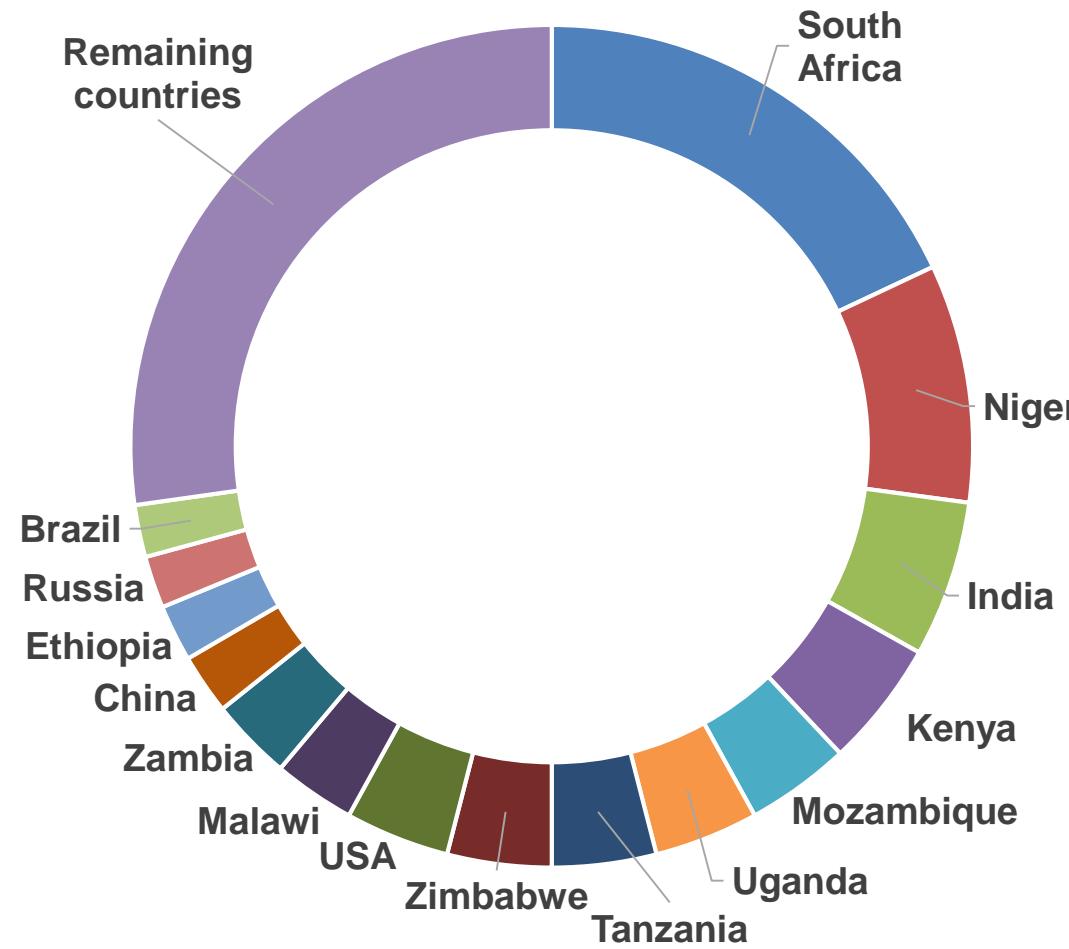
**1.8 million new infections**



5,000 new  
HIV  
infections  
each day

Source: UNAIDS Global Report 2017

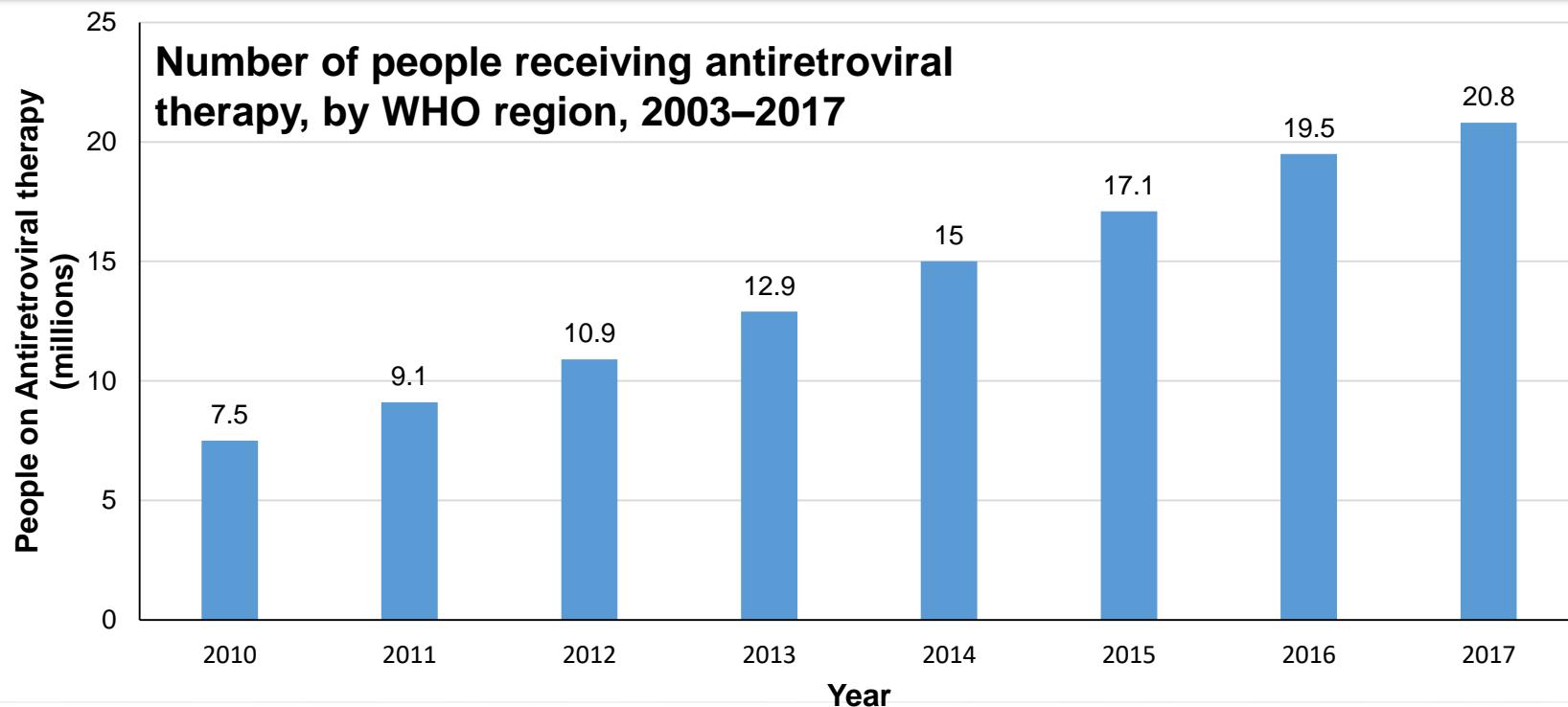
# Top 15 countries: People living with HIV



Rank	Country	% of people with HIV in the world
1	South Africa	18%
2	Nigeria	9%
3	India	6%
4	Kenya	5%
5	Mozambique	4%
6	Uganda	4%
7	Tanzania	4%
8	Zimbabwe	4%
9	USA	4%
10	Malawi	3%
11	Zambia	3%
12	China	2%
13	Ethiopia	2%
14	Russia	2%
15	Brazil	2%
	Remaining countries	27%

# Great progress on increasing ART coverage... but...

Number of people receiving ART globally rose from ~2 million in 2005 to ~21 million in 2017

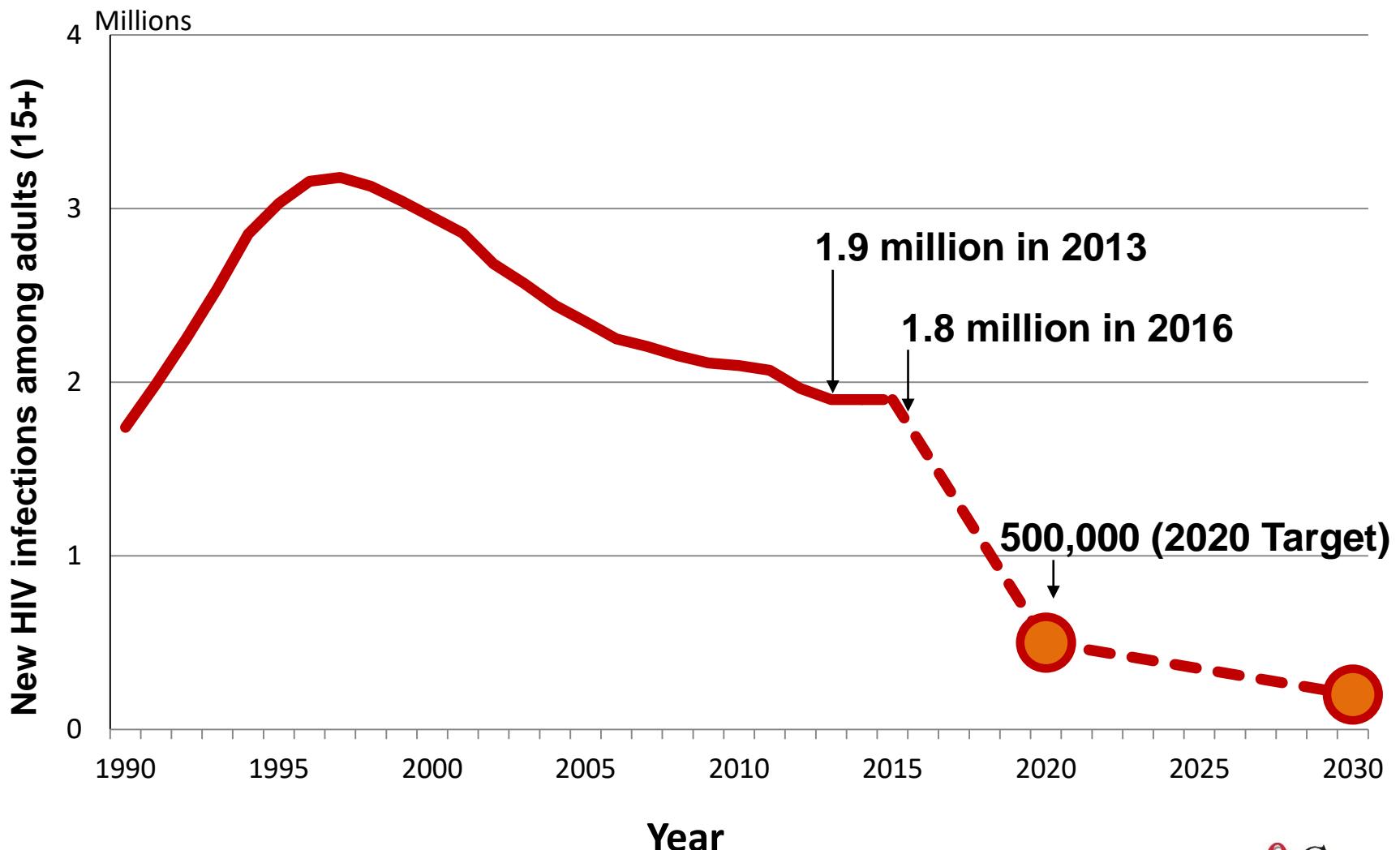


Even with 21 million on ART, much has been done – but even more still needs to be done!

Sources: Global AIDS Response Progress Report; UNAIDS update 2017

# But, globally HIV prevention is lagging...

5% reduction in new infections 2013 - 2016



Source: Adapted from UNAIDS Fast-track Report

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# Epidemic control - UNAIDS 2030 goal

- UNAIDS 2030 goal - “The End of AIDS as a Public Health Threat”
- Epidemic control: Reduction of disease incidence, prevalence, morbidity or mortality to a locally acceptable level as a result of deliberate intervention measures. Mathematically defined as the reproductive rate of infection ( $R_0$ ) below 1
- Some suggest - incidence rate of 1/10,000 pa indicates epi control
- UN Declaration 2030 - 90% decline in HIV incidence since 2010

**The world is embarking on a Fast-Track strategy to end AIDS epidemic by 2030.**

To reach this visionary goal...countries will need to use the powerful tools available, hold one another accountable for results and make sure that no one is left behind.



# Epidemic Control: the base-camp milestone on the route to the Mount Everest summit of Ending AIDS



# Our chosen path to epidemic control (base camp): 90-90-90



Why we chose a treatment target (90-90-90)?

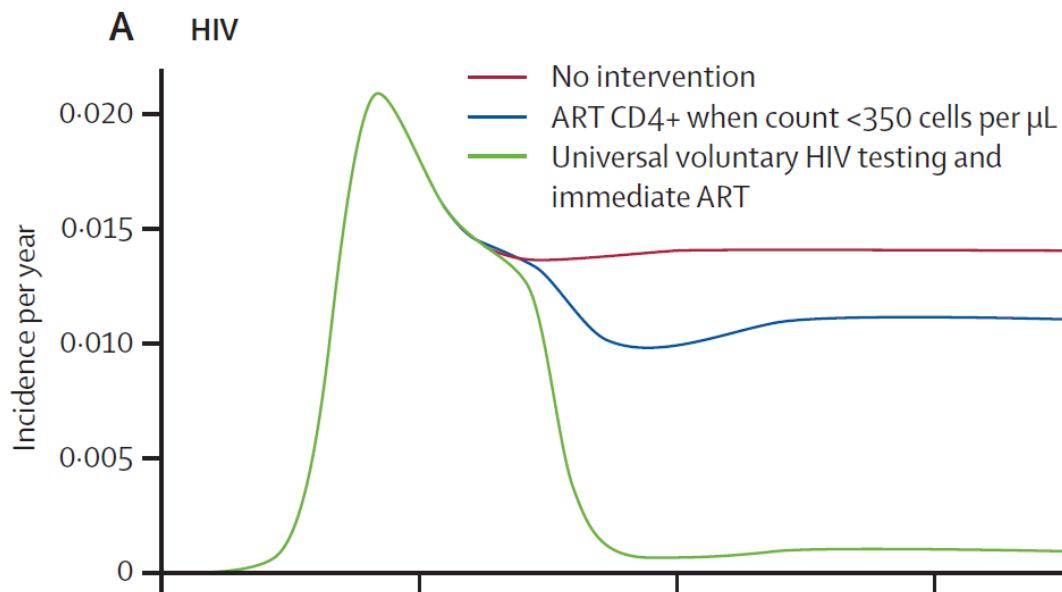
# Modelling evidence: Universal Test & Treat can eliminate HIV transmission (End AIDS)

**THE LANCET**

"Family planning is about a woman and her partners deciding what they should do to prevent unwanted pregnancy and then partners to decide healthy when and how many children they want to have."

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

Reuben M Granich, Charles F Gilks, Christopher Dye, Kevin M De Cock, Brian G Williams



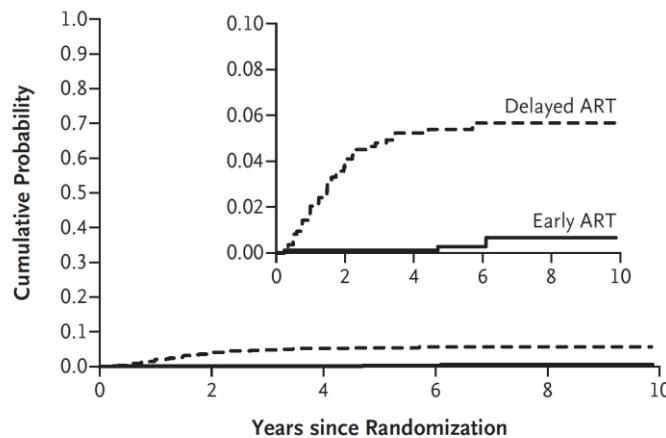
Using data from South Africa, mathematical models show how a test and treat strategy could have a major effect on severe generalised HIV/AIDS epidemics

# Clinical Trial evidence: ART prevents HIV transmission in discordant couples



## Antiretroviral Therapy for the Prevention of HIV-1 Transmission

M.S. Cohen, Y.Q. Chen, M. McCauley, T. Gamble, M.C. Hosseinpour, N. Kumarasamy, J.G. Hakim, J. Kumwenda, B. Grinsztejn, J.H.S. Pilotto, S.V. Godbole, S. Chariyalertsak, B.R. Santos, K.H. Mayer, I.F. Hoffman, S.H. Eshleman, E. Piwowar-Manning, L. Cottle, X.C. Zhang, J. Makhema, L.A. Mills, R. Panchia, S. Faesen, J. Eron, J. Gallant, D. Havlir, S. Swindells, V. Elharrar, D. Burns, T.E. Taha, K. Nielsen-Saines, D.D. Celentano, M. Essex, S.E. Hudelson, A.D. Redd, and T.R. Fleming, for the HPTN 052 Study Team\*



No. at Risk	Early ART	Delayed ART
903	808	746
Delayed ART	890	792

**HPTN 052:  
1763 discordant couples**

**Effect on ART (HIV +ve) on HIV:  
93% reduction in transmission**

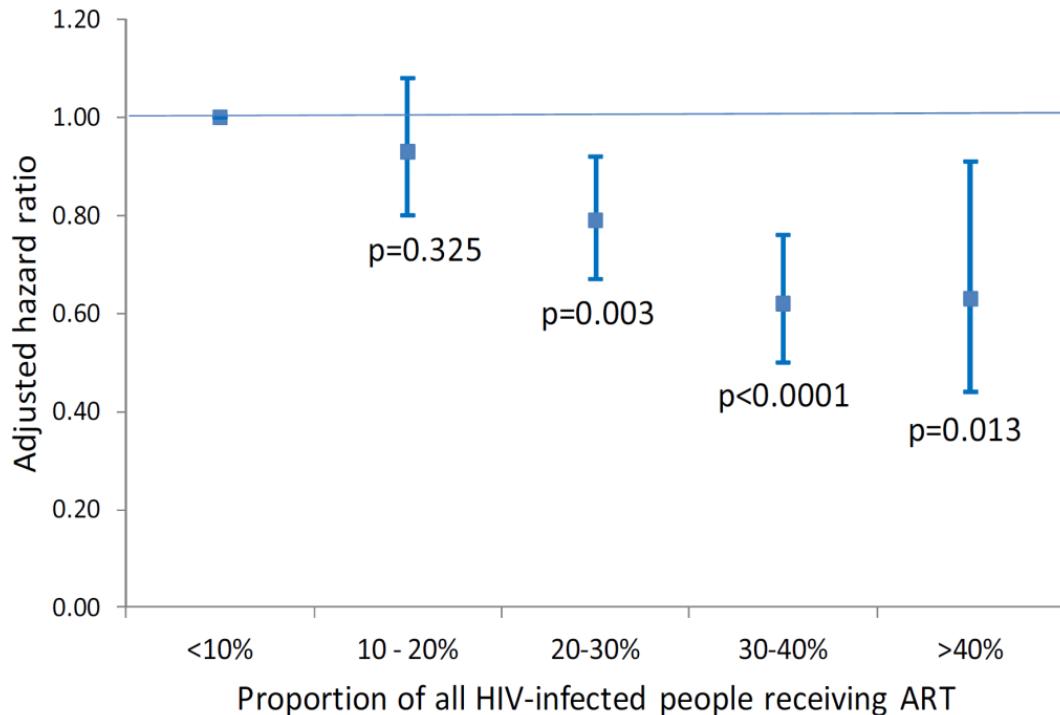
**Effect is durable over 7 years**

**Source:** Cohen M, et al, (2016). Antiretroviral Therapy for the Prevention of HIV-1 Transmission. *N Engl J Med*, 375(9): 830-839.

# Implementation evidence: High ART coverage ↓ HIV risk and ↑ life expectancy

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

Frank Tanser,<sup>1,\*</sup> Till Bärnighausen,<sup>1,2</sup> Erofili Grapsa,<sup>1</sup> Jaffer Zaidi,<sup>1</sup> Marie-Louise Newell<sup>1,3</sup>



## Increases in Adult Life Expectancy in Rural South Africa: Valuing the Scale-Up of HIV Treatment

Jacob Bor,<sup>1,2,\*</sup> Abraham J. Herbst,<sup>1</sup> Marie-Louise Newell,<sup>1,3</sup> Till Bärnighausen<sup>1,2</sup>

**Adult life expectancy increased from 49.2 years in 2003 to 60.5 years in 2011**

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# Questioning whether the 90-90-90 UNAIDS target achieves epidemic control



## Is the UNAIDS target sufficient for HIV control in Botswana?

Salim Abdoool Karim

Centre of AIDS Programme of Research in South Africa, Durban,

## 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, Mompati 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, Tafireyi Marukutira, Rui Wang, Eric J Tchetgen Tchetgen, Victor DeGruttola, M Essex, Shahin Lockman, and the Botswana Combination Prevention Project study team

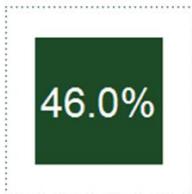
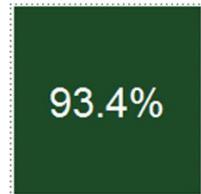
# 2016: Impact of Test & Treat on HIV incidence in a KZN – ANRS 12249 TasP



Antiretroviral Treatment as Prevention • ANRS 12249  
Ukuphila kwazi, ukuphila kwethu (my health for our health)



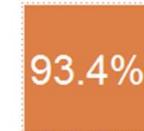
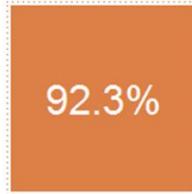
Control



= 40.2%

**Treatment by CD4 (N = 14 916)**  
HIV incidence: 2.27%

Intervention



= 42.4%

**Test & Treat (N = 13 239)**  
HIV incidence: 2.13%

**No reduction in HIV incidence from 6 monthly HIV testing & treatment (adjusted relative risk: 0.96 [CI: 0.83 to 1.10])**

**Source:** Dabis F et al. The impact of universal test and treat on HIV incidence in a rural South African population: ANRS 12249 TasP trial, 2012-2016 [FRAC0105LB]. AIDS 2016, 19-22 July, Durban 2016

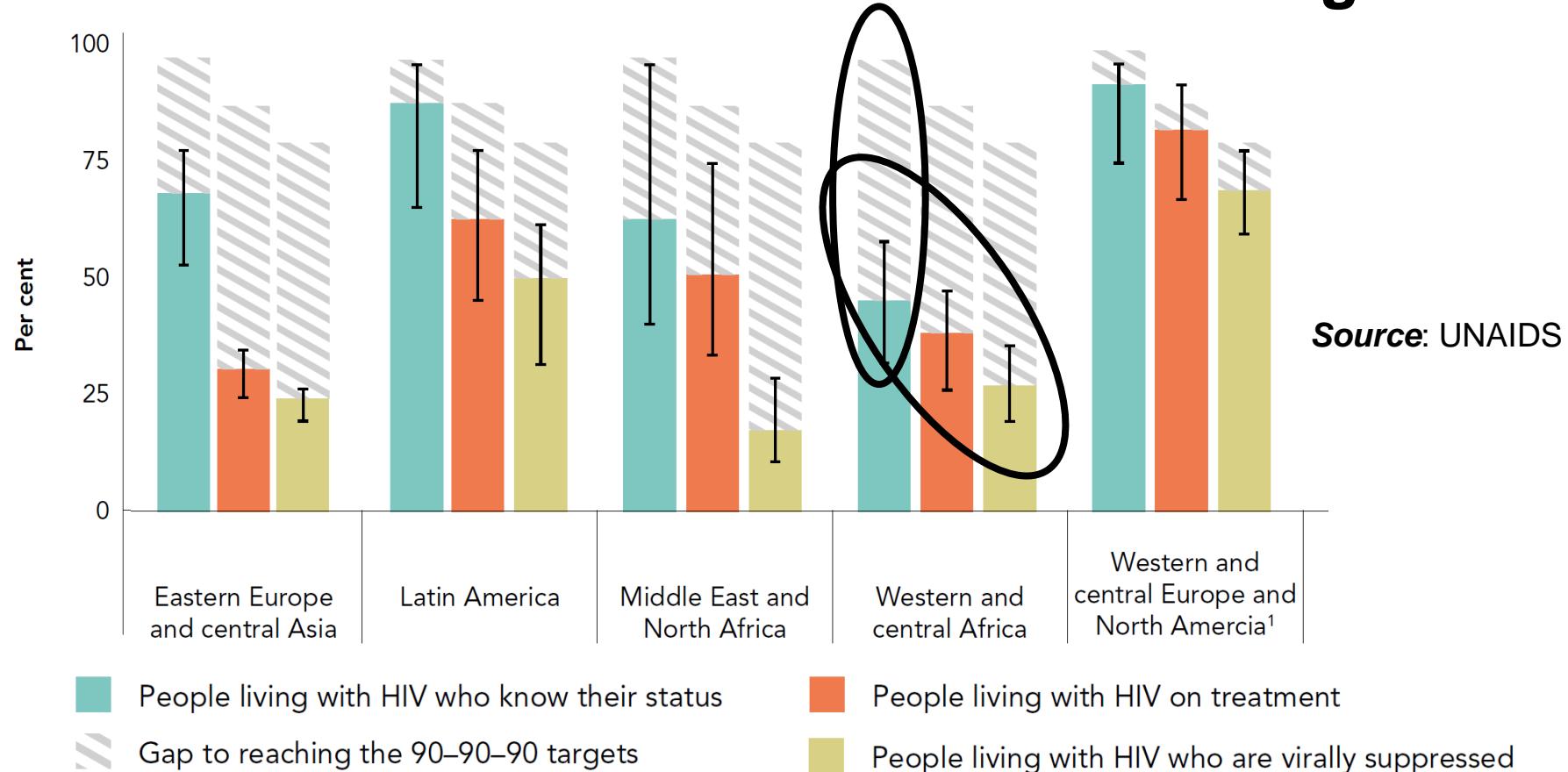
# **Whither UTT\* with a 90-90-90 target?**

- **The scientific rationale is sound**
- **Practical implementation challenging**
  - In Botswana, migrants excluded from the study
  - In KwaZulu-Natal, poor linkage to care
- **Can we reduce HIV incidence to reach epidemic control with treatment scale-up?**
  - Awaiting SEARCH results at IAS Amsterdam
  - Awaiting PopArt trial results at CROI 2019
- **For now, how much do we know about the obstacles to 90-90-90 and beyond?**

\*UTT = Universal HIV test & treat

# Knowledge of HIV status, treatment coverage & viral load suppression, 2016

## Central Africa: low HIV testing rates



Challenge reaching men & ART adherence in adolescents

# Knowledge of HIV status, treatment coverage & viral load suppression, 2016

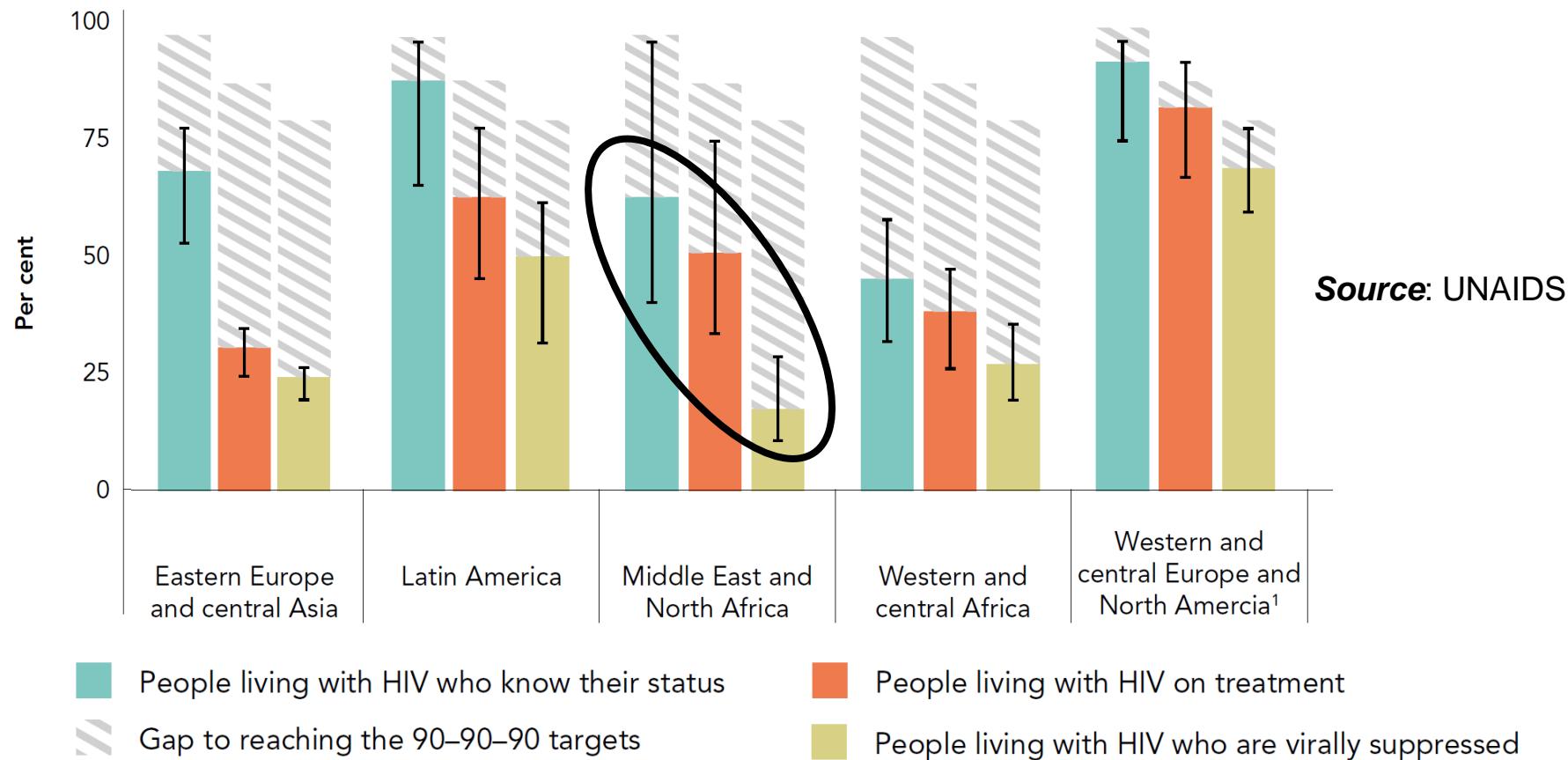
## Eastern Europe/central Asia: poor linkage to care



Challenge reaching men & ART adherence in adolescents

# Knowledge of HIV status, treatment coverage & viral load suppression, 2016

N Africa/M East: poor adherence & viral suppression



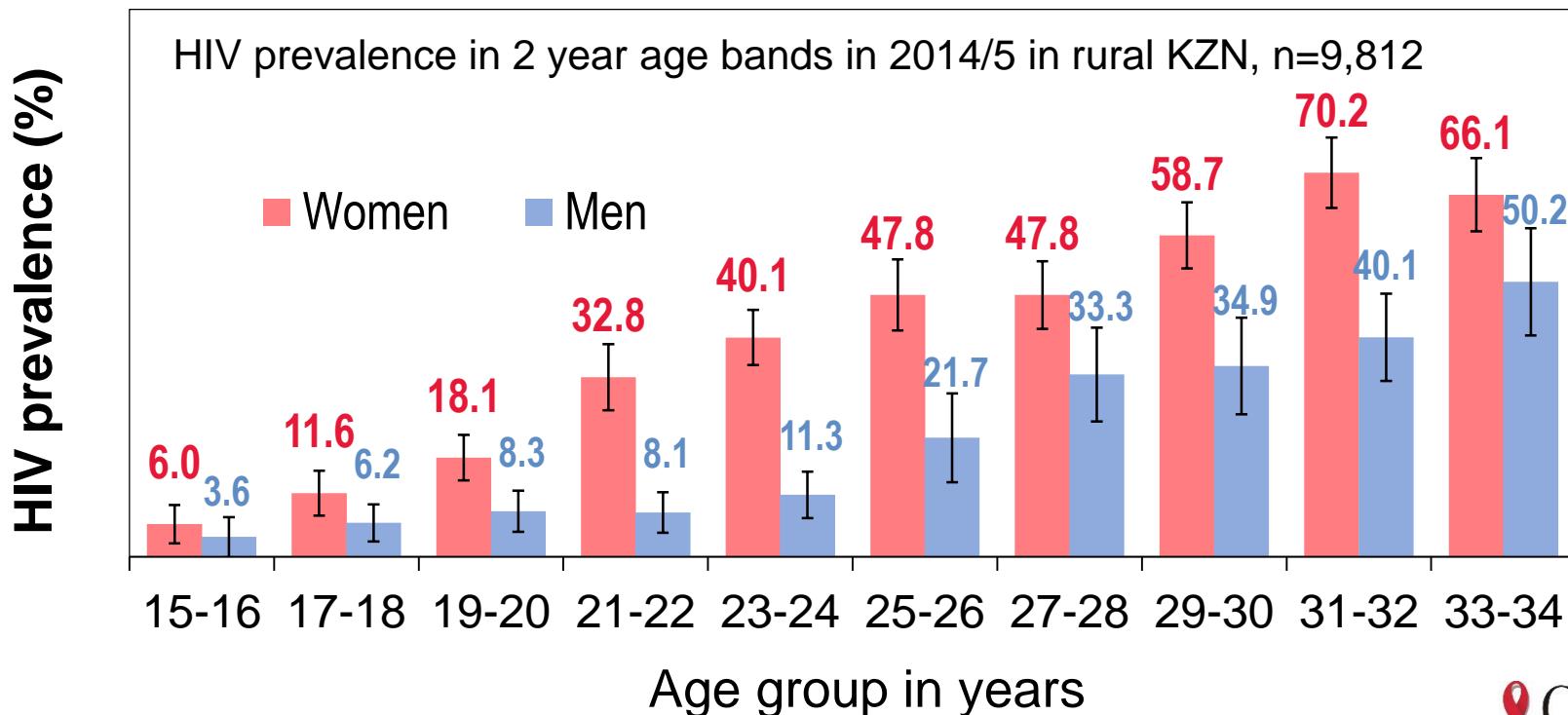
Challenge reaching men & ART adherence in adolescents

# In generalised epidemics: Young women: biggest global challenge to prevention

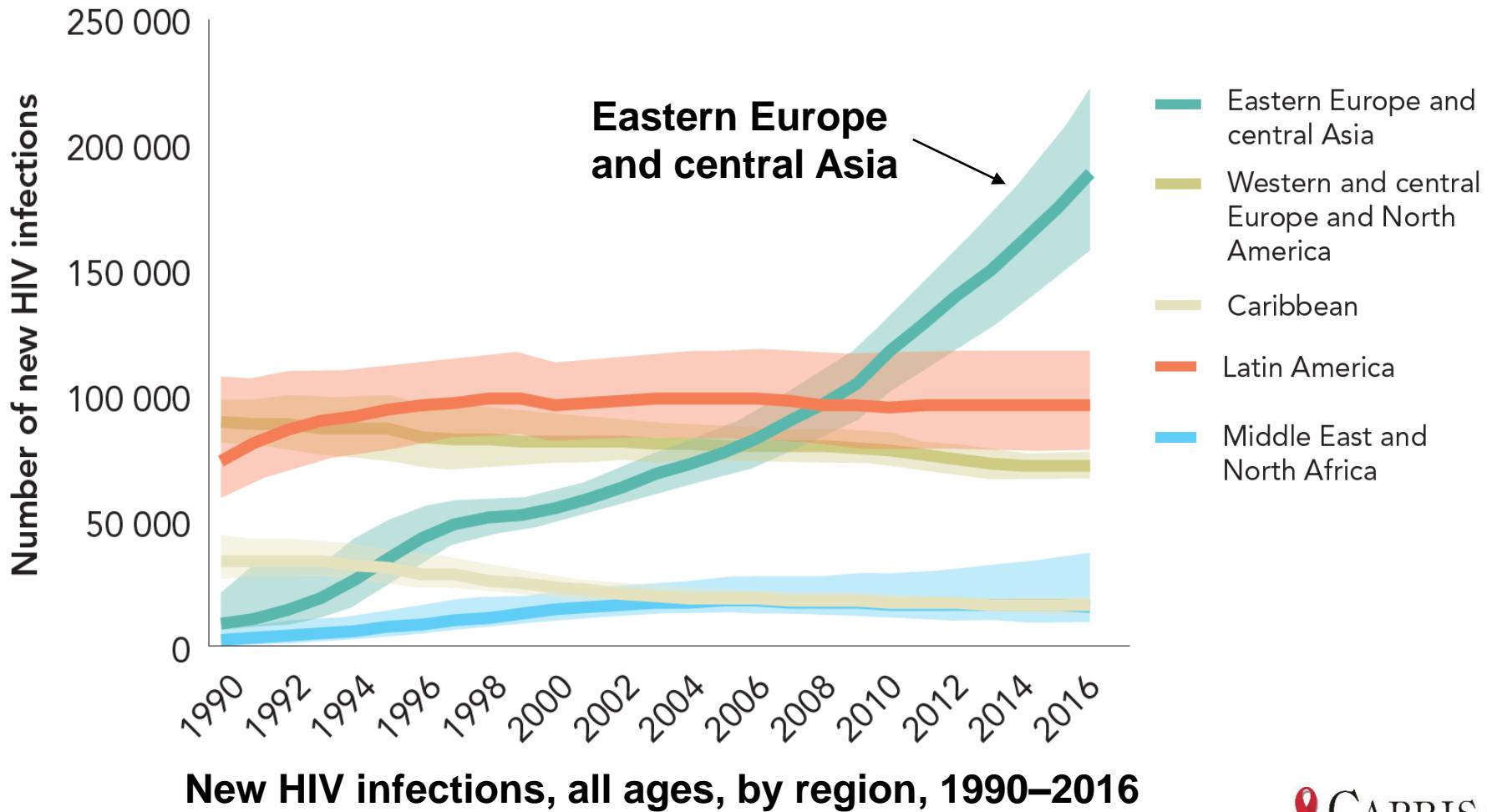


## Transmission networks and risk of HIV infection in KwaZulu-Natal, South Africa: a community-wide phylogenetic study

Tulio de Oliveira\*, Ayesha B M Kharsany\*, Tiago Gräf, Cherie Cawood, David Khanyile, Anneke Grobler, Adrian Puren, Savathree Madurai, Cheryl Baxter, Quarraisha Abdool Karim, Salim S Abdool Karim



# In concentrated epidemics: Concerning rise in new HIV infections among key populations eg. PWID in Russia



Source: UNAIDS

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# How do we know whether we are on the right path to epidemic control?

## UNAIDS consultation in Glion, Switzerland

MAKING THE END OF AIDS REAL:  
CONSENSUS BUILDING AROUND  
WHAT WE MEAN BY  
"EPIDEMIC CONTROL"

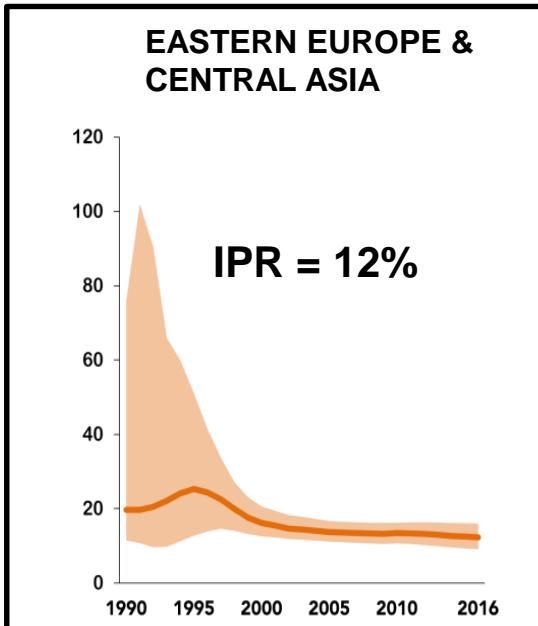
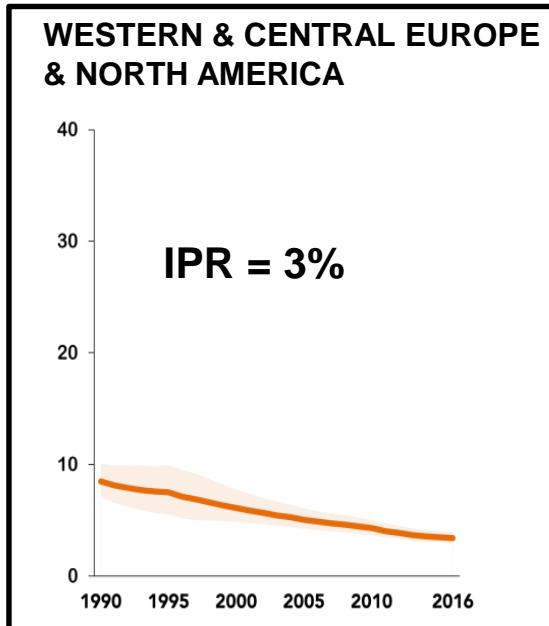
CONCEPT NOTE  
MEETING CONVENED BY  
UNAIDS SCIENCE TEAM



4–6 OCTOBER, 2017  
GLION, SWITZERLAND

# Glion - What indicators can we use to determine if we are on the right path & know when we have reached epidemic control?

1. 90% reduction in new infections (baseline: 2010)
2. Incidence rate of <1 per 1,000 / 10,000 / 100,000
3. New cases / all-cause deaths in people with HIV
4. Incidence / Prevalence ratio (New cases / PLHIV)  
IPR: is most compelling epidemiologically



*Note: These 4 are not mutually exclusive*

*Shortcoming: All need accurate measure of new cases (incidence)*

# Why bother with milestones & targets?

- Need a shared view of what we are trying to achieve and how much progress has been made
- Avoid public perception that we reached the summit when we have not even made it to base camp

“...The AIDS response has now become a victim of its successes .... impression that the epidemic is no longer important or urgent. Commitment to HIV is slowly dissipating as the world’s attention shifts elsewhere. Complacency is setting in.

However, nearly 5,000 new cases occur each day, defying any claim of a conquered epidemic.

...no room for complacency when so much more remains to be done”



[www.sciencemag.org](http://www.sciencemag.org) SCIENCE VOL 360 July 2018

## EDITORIAL

### HIV -- no time for complacency

Today, the global HIV epidemic is widely viewed as triumph over tragedy. This stands in stark contrast to the first two decades of the epidemic, when AIDS was synonymous with suffering and death. But have we turned the tide on HIV sufficiently to warrant directing its attention and investments elsewhere?

Highly effective treatment, through an array of about 30 new antiretroviral drugs, have given people living with HIV an almost normal lifespan and instilled hope in high burden communities. Activism played a key role in ensuring global access to treatment. Simplified, low-cost, one-pill-a-day, 3-drug combination regimens with minimal side effects are now widely available. The Global Fund against AIDS, Tuberculosis and Malaria and the U.S. President's Emergency Plan for AIDS Relief support global access to life-saving treatment in poor countries and helped increase treatment coverage from about 2 million people in 2005 to about 21 million in 2017. HIV transmission from mothers to their babies has been reduced to such low levels that plans for its global elimination are well underway.

The AIDS response has now become a victim of these successes - as it eases the pain and suffering from AIDS, it creates the impression that the epidemic is no longer important or urgent. Commitment to HIV is slowly dissipating as the world’s attention shifts elsewhere. Complacency is setting in.

However, nearly 5,000 new cases of HIV infection occur each day, defying any claim of a conquered epidemic. The estimated 36.7 million people living with HIV, 1 million AIDS-related deaths, and 1.8 million new infections in 2016 remind us that HIV remains a serious global health challenge. Millions need support for life-long treatment and millions more still need to start antiretroviral treatment, many of whom do not even know their HIV status. People living with HIV have more than a virus to contend with-they must cope with the stigma and discrimination that adversely impacts their quality of life and undermines their human rights.



Quarraisha Abdool Karim is the associate scientific director of the Centre for the AIDS Program of Research in South Africa (CAPRISA)



Salim S. Abdool Karim is the director of the Centre for the AIDS Program of Research

# Conclusion

**Connecting 90-90-90 → Epidemic control → “The End of AIDS”**



- “**The End of AIDS**” is an aspirational vision (**Summit**) similar to the epidemiological concepts of **elimination & eradication** - not applicable to AIDS now as millions living with HIV & no cure available
- Epidemic control is the current milestone to reach
- 90-90-90 is chosen path for now until better ones...
- Incidence rates & IPR used to indicate whether the chosen path is correct & going to epidemic control
- Clear messaging on progress achieved and tasks remaining - to overcome & prevent complacency