

# Global and Local Trends in the HIV Pandemic... Where are We Now?



**Aima Ahonkhai MD, MPH**

**Vanderbilt University Medical Center**

**Assistant Professor of Medicine**

**Division of Infectious Diseases**

**Institute for Global Health**

P30 AI110527, NIH/NIAID K23 AI106406, R21 TW-11327

# Outline

---

- Snapshot of HIV Today
- HIV in the 1980s, Fear
- HIV in the 1990s, Despair & Anger, and HAART
- HIV in the 2000s, International Urgency
- HIV in the 2010s, Reaching those Left Behind & Prevention Strategies
  - Key populations
  - Southern US
- HIV Today, Ending the Epidemic Strategies

# HIV is a Chronic Disease

## Normal Life Expectancy with 1 pill/day

- Highly Active Antiretroviral Therapy:
  - Decreases morbidity/mortality by 72%
  - Promotes a normal life expectancy
    - The expected age at death of a 20-year-old patient starting ART during 2008–10, who had a CD4 count of more than 350 cells/ $\mu$ L 1 year after starting ART, was **78.0 years** (77.7–78.3)
- Decrease transmission by 100%

Survival of HIV-positive patients starting antiretroviral therapy between 1996 and 2013: a collaborative analysis of cohort studies

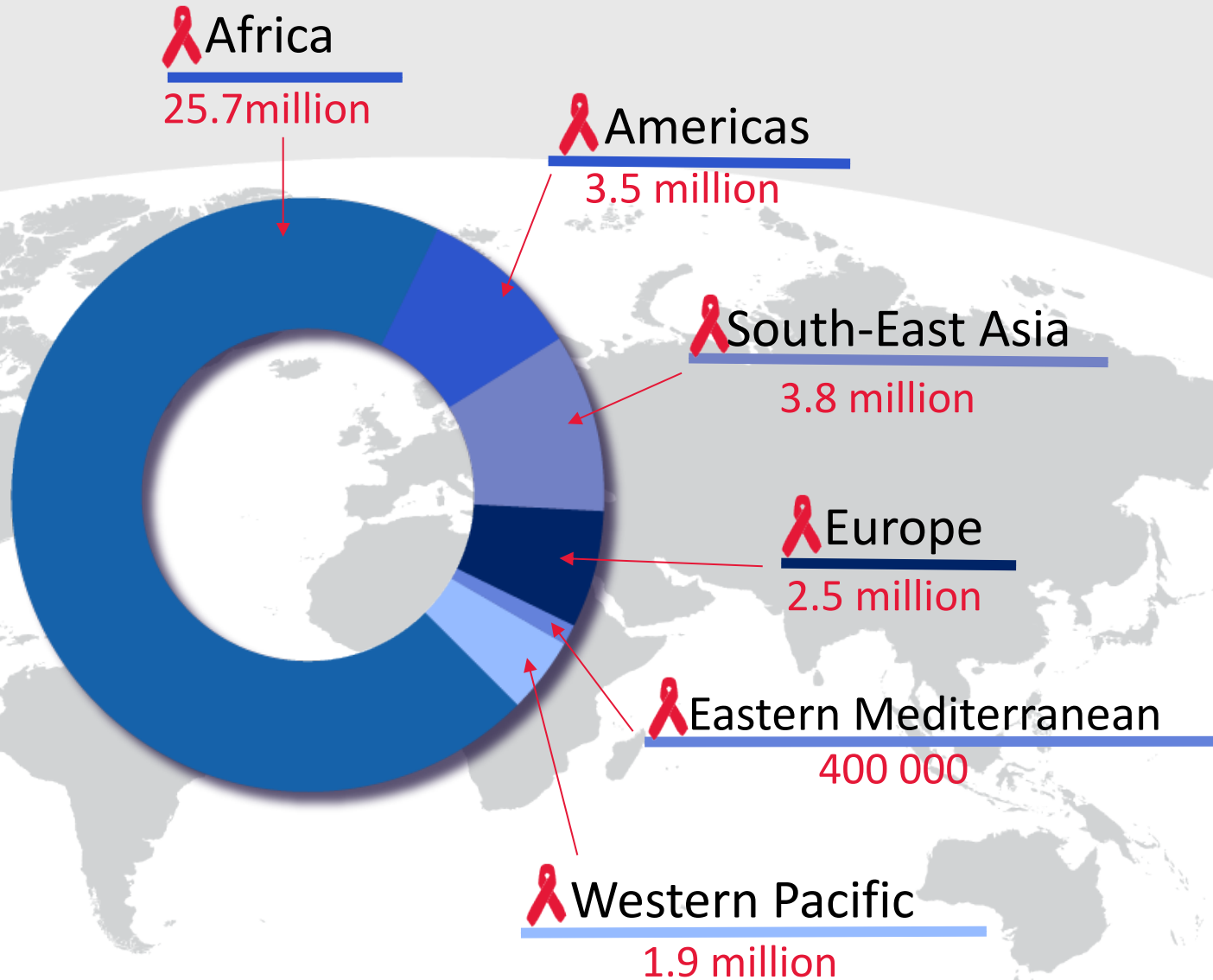
The Antiretroviral Therapy Cohort Collaboration <sup>†</sup> • [Show footnotes](#)

[Open Access](#) • Published: May 10, 2017 • DOI: [https://doi.org/10.1016/S2352-3018\(17\)30066-8](https://doi.org/10.1016/S2352-3018(17)30066-8) •

 Check for updates

# Number of people living with HIV by WHO Region

**37.9 million**  
people living  
with HIV globally





Epidemiologic Notes and Reports

## ***Pneumocystis Pneumonia* --- Los Angeles**

In the period October 1980-May 1981, 5 young men, all active homosexuals, were treated for biopsy-confirmed *Pneumocystis carinii* pneumonia at 3 different hospitals in Los Angeles, California. Two of the patients died. All 5 patients had laboratory-confirmed previous or current cytomegalovirus (CMV) infection and candidal mucosal infection. Case reports of these patients follow.

Patient 1: A previously healthy 33-year-old man developed *P. carinii* pneumonia and oral mucosal candidiasis in March 1981 after a 2-month history of fever associated with elevated liver enzymes, leukopenia, and CMV viruria. The serum complement-fixation CMV titer in October 1980 was 256; in May 1981 it was 32.\* The patient's condition deteriorated despite courses of treatment with trimethoprim-sulfamethoxazole (TMP/SMX), pentamidine, and acyclovir. He died May 3, and postmortem examination showed residual *P. carinii* and CMV pneumonia, but no evidence of neoplasia.

Patient 2: A previously healthy 30-year-old man developed *p. carinii* pneumonia in April 1981 after a 5-month history of fever each day and of elevated liver-function tests, CMV viruria, and documented seroconversion to CMV, i.e., an acute-phase titer of 16 and a convalescent-phase titer of 28\* in anticomplement immunofluorescence tests. Other features of his illness included leukopenia and mucosal candidiasis. His pneumonia responded to a course of intravenous TMP/.SMX, but, as of the latest reports, he continues to have a fever each day.

- June 5, 1981
- Dr. Michael Gottlieb, UCLA
- Dr. Wayne Shandera, CDC Epidemic Intelligence Service (EIS)

**First published report of illness later known as AIDS**

By end of 1981: 270 reported cases of severe immune deficiency among gay men, and 121 of those died.

# HIV/AIDS in the 1980s

---

- **FEAR**
- HIV first identified as the virus causing AIDS (1983), first commercial test available (1985)
- Characterization of routes of transmission: sex, injection drug use, blood transfusions, birth
- First single-drug antiretroviral therapy approved by FDA in 1987: zidovudine (AZT)
- First World AIDS Day (1988)
- Stigmatized populations and global spread
  - Disenfranchised populations → Slow political response

# AIDS in Africa

---

- Initial thought was that AIDS was limited to US white MSM
- “Slim” disease reported in Uganda (1982); DRC (1983); Uganda study finds 35% HIV prevalence among truck workers (1986)
- Widespread denialism and/or criminalization by sub-Saharan African governments → lost opportunity
- Initially thought only problematic in East and Central Africa

NEW

**Terrific Tube**  
More listings, more news  
TV starts on page 67



**Rose Ty's Cobb**  
Sports section

# DAILY NEWS

30c NEW YORK'S PICTURE NEWSPAPER® Monday, September 9, 1985

**QUEENS PARENTS PROTEST**

# AIDS BOYCOTT

They threaten to keep children home

Story on page 3

9 September 1985

1980s



# BROADWAY

Who has the clout Part 2 starts on Page 4

# DAILY NEWS

35c NEW YORK'S PICTURE NEWSPAPER® Monday, October 7, 1985

# STATE WEIGHS GAY BATH BAN

Story page 3

7 October 1985

1 October 1985

**NEW YORK POST**

Tuesday October 1 1985 35 CENTS

**METRO SPORTS FINAL**

TODAY: Partly cloudy, warm, upper 70s.  
TONIGHT: Cloudy, 55-60.  
TOMORROW: Cloudy, cooler, 60-65. Details: Page 2.  
TV listings: P. B3

# LOCK UP AIDS VICTIMS: JUDGE

PAGE 7

# HIV/AIDS in the 1990s

---

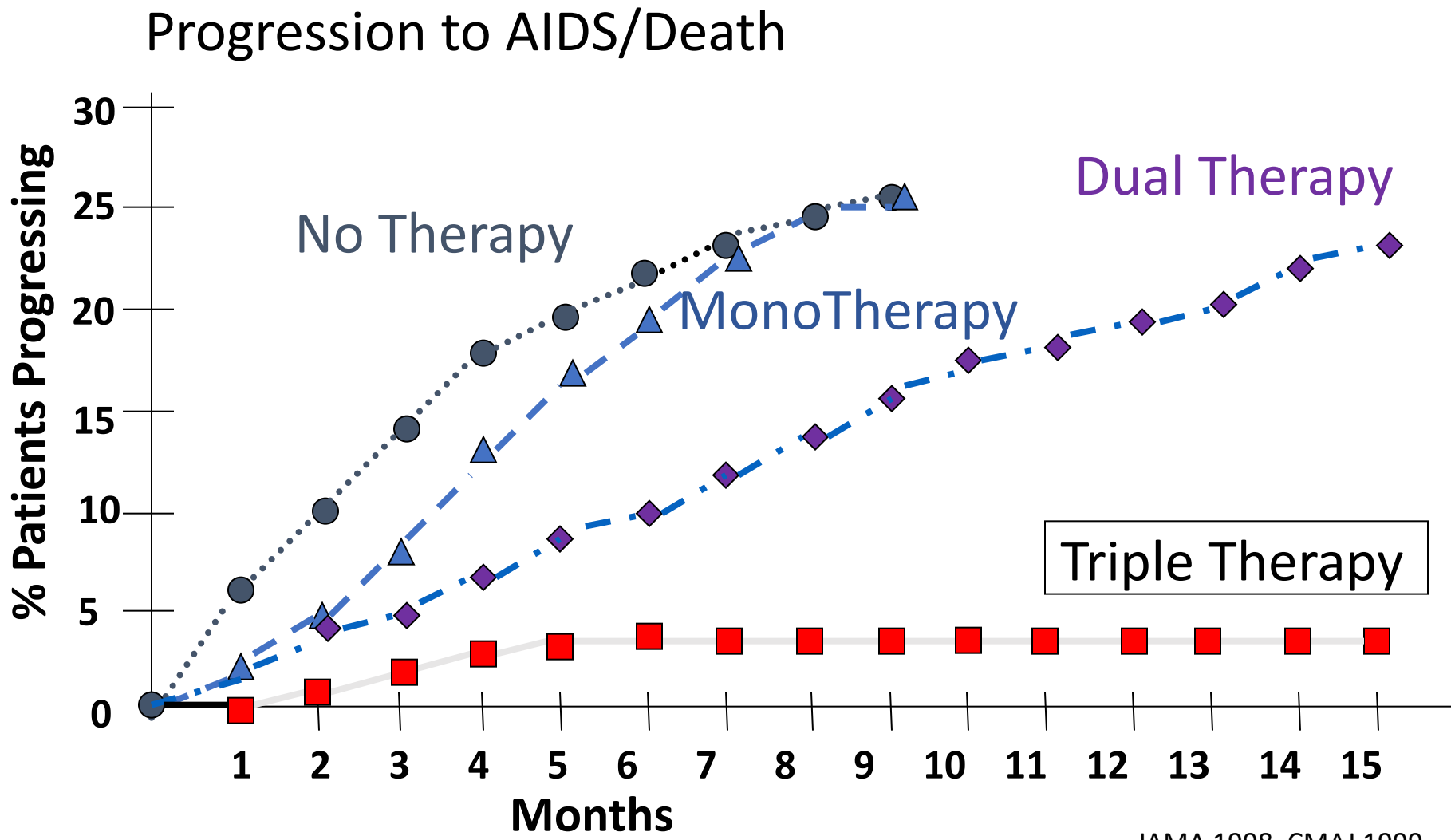
- **DESPAIR & ANGER**
- AIDS becomes the #1 cause of death for US men age 25-44 (1992); #1 cause of death for all Americans 25-44 (1993-1995)
- Awareness of global pandemic devastation
- Role of viral load and relationship to CD4+ T lymphocyte counts
- FDA approves first rapid (10 min.) HIV test (1992); oral test (1994); HIV viral load test becomes available (1996)
- AZT to prevent maternal-to-child transmission of HIV (1994)
- Triple-drug antiretroviral therapy (1995): major drug advancement but expensive (\$30K/yr)





- Hemophiliac child from Indiana
  - Infected with HIV from contaminated blood treatment in 1984 at age 13
- Community reacted in fear; denied attendance by school
- Shifted public awareness of HIV and impact of stigma
- Died at age 18; 5 years longer than predicted to live
- Ryan White HIV/AIDS Program established 1990, named in his honor: provides HIV care in the US for those lacking financial resources

# Better ART Regimens



JAMA 1998, CMAJ 1999

# Economic Impact

---

- “It is hard to imagine robust economic growth where so many adults are dying in their productive prime, leaving the very young and the very old to cope alone.” (The Economist, August 14, 1999)
- If you were a businessman or woman, would you invest in a country where 20% of your workforce would become seriously ill and die, unpredictably, in the near future?



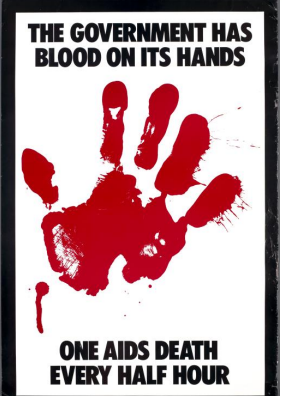
Images: ACT UP



KISSING DOESN'T KILL: GREED AND INDIFFERENCE DO.



CORPORATE GREED, GOVERNMENT INACTION, AND PUBLIC INDIFFERENCE MAKE AIDS A POLITICAL CRISIS.



# HIV/AIDS in the 2000s

---

- **INTERNATIONAL URGENCY**
- Expansion of diagnosis and therapy to developing nations
- HIV/AIDS becomes the leading killer of people in sub-Saharan Africa (2002)
- Major international investment for national treatment programs in developing nations
- Push towards microbicides and female-controlled prevention methods; control of sexually transmitted infections
- Clinton Foundation secures ART price reductions from generic manufacturers for developing countries (2003)

# Major push by international donors to contain the epidemic

**BILL & MELINDA**  
**GATES** *foundation*

2000



2002



2002

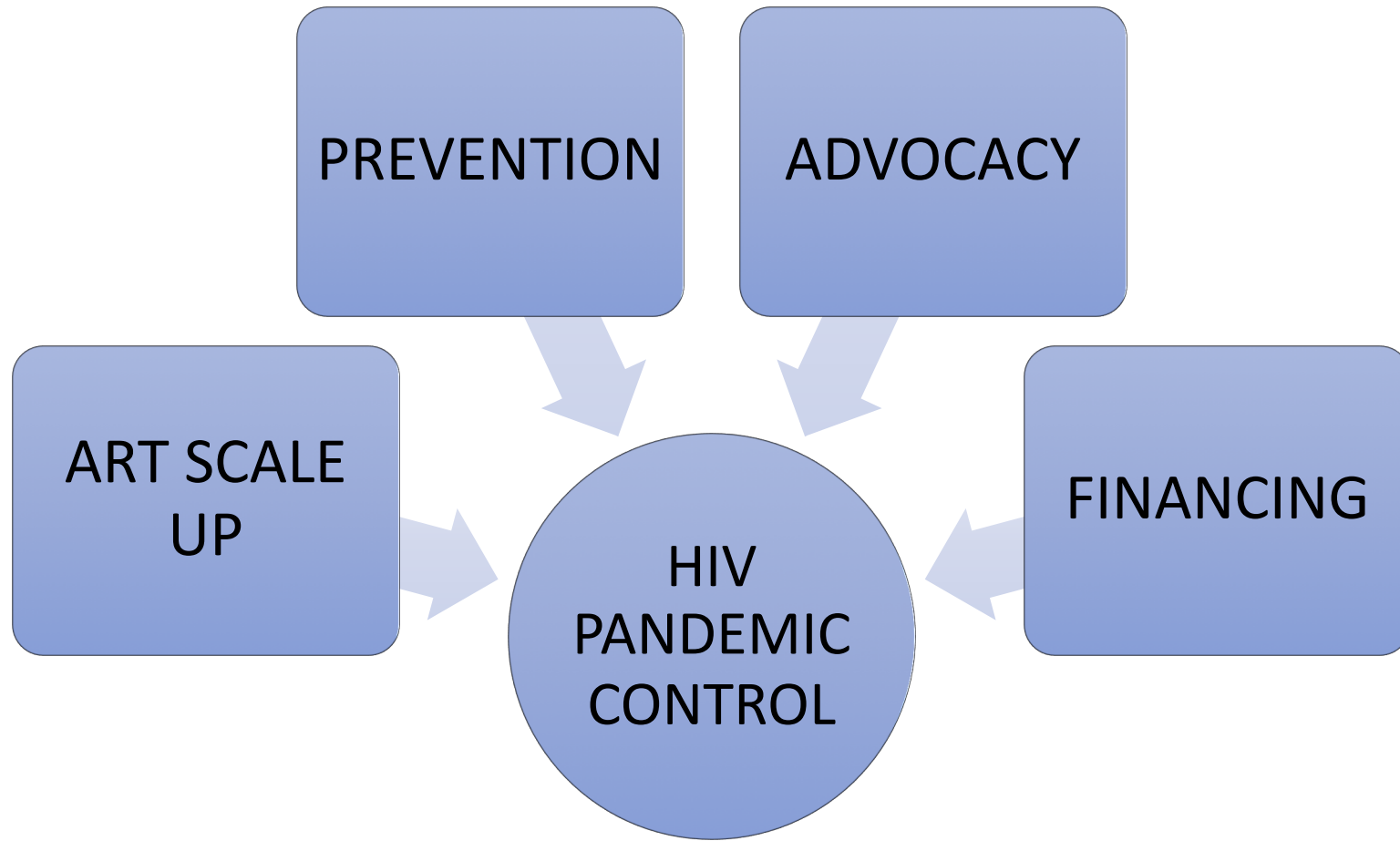


2003

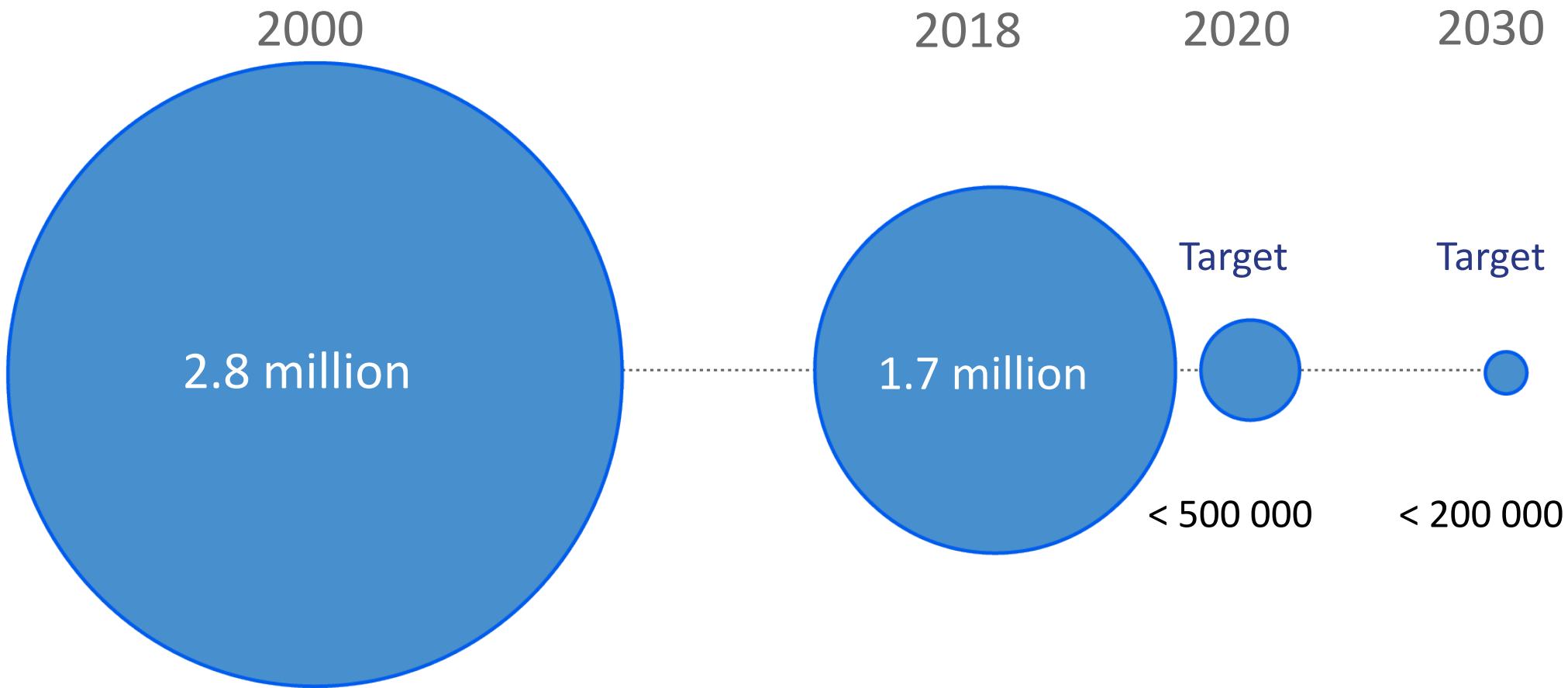
Billions of dollars invested to treat HIV infection

- Huge infrastructure investments
- Hoped-for integration with TB services, malaria, other diseases

# Global Success Story

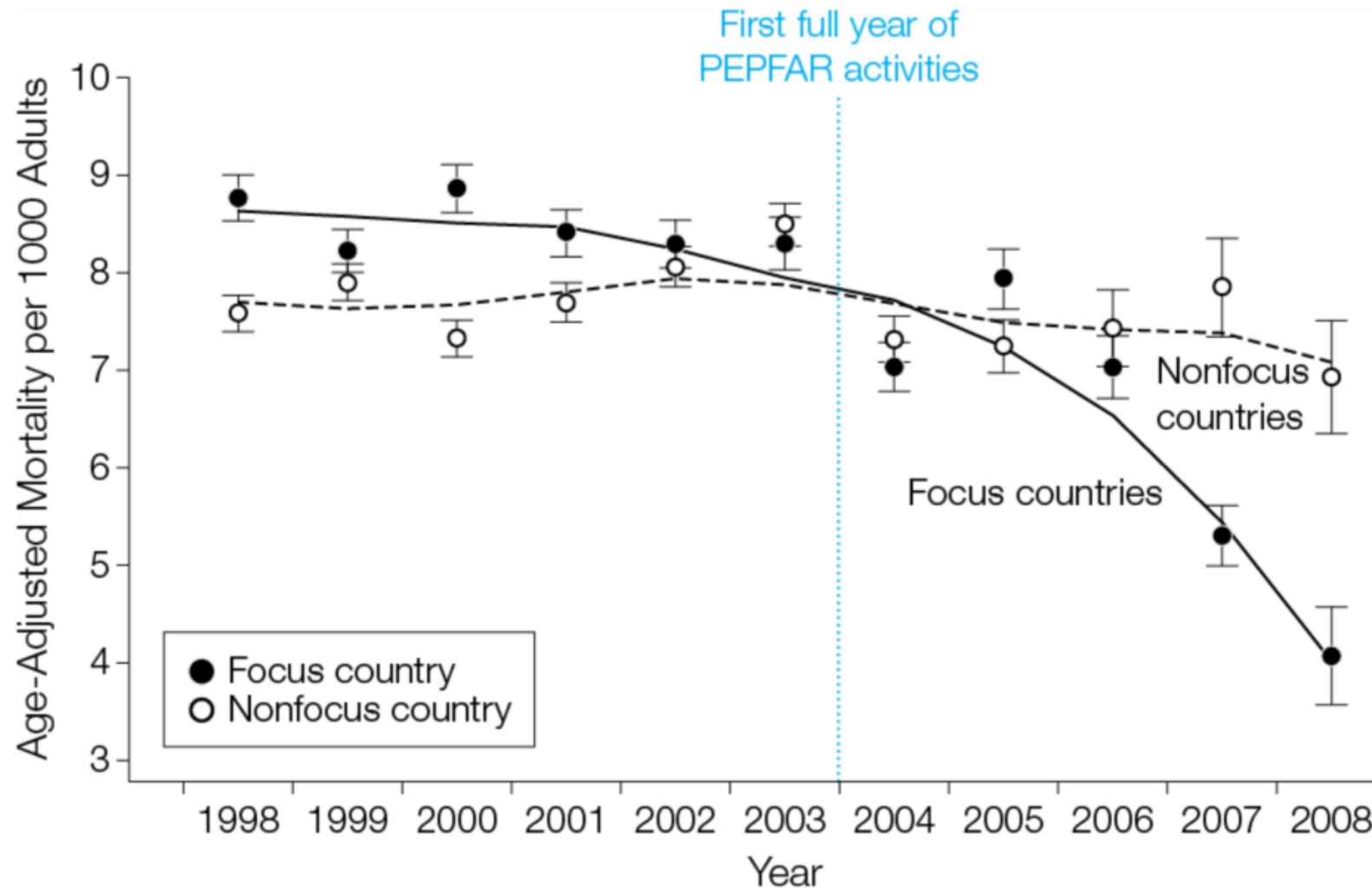


# New HIV Infections Declining Globally



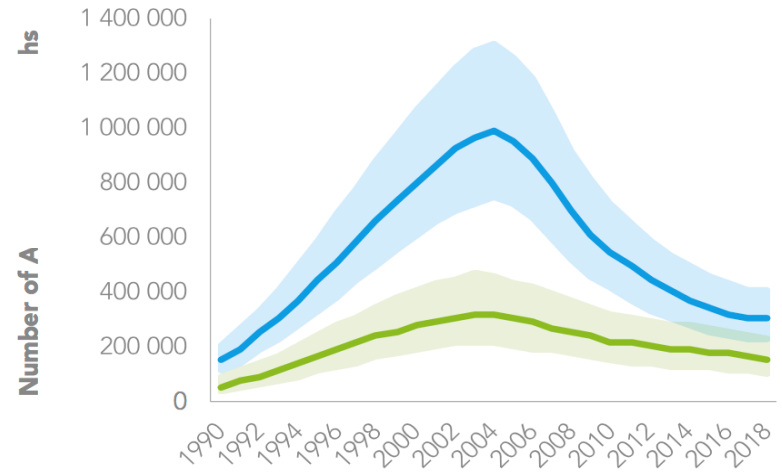
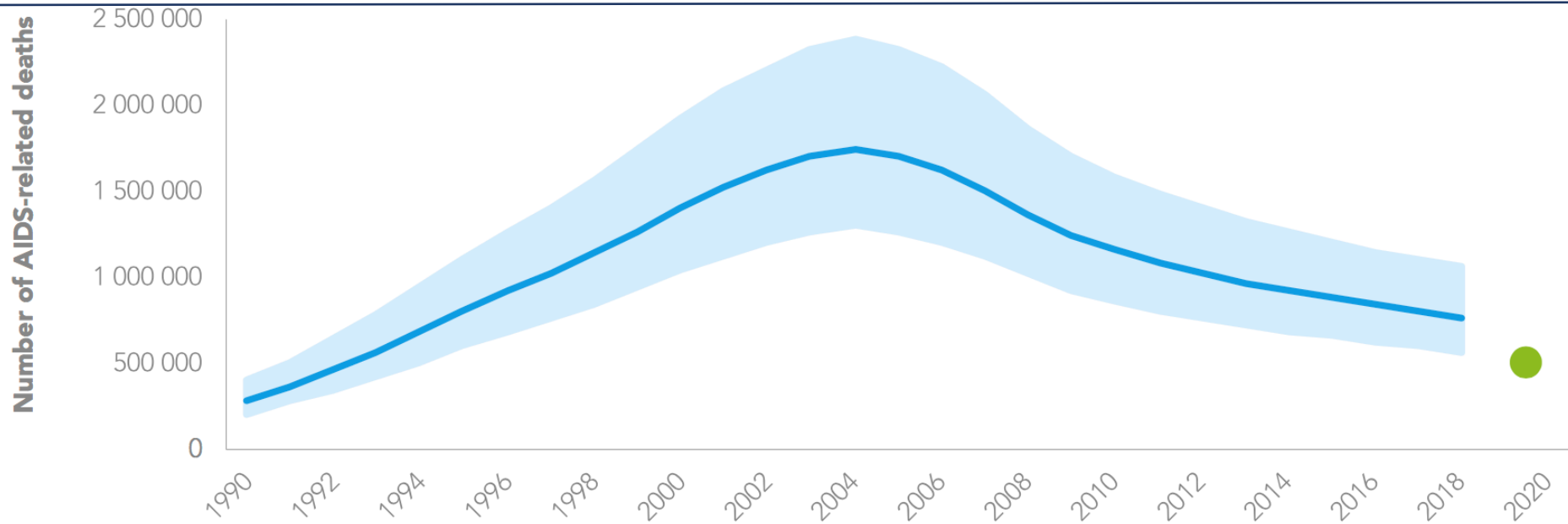
Source: UNAIDS/WHO estimates

# PEPFAR: largest health assistance initiative in global history



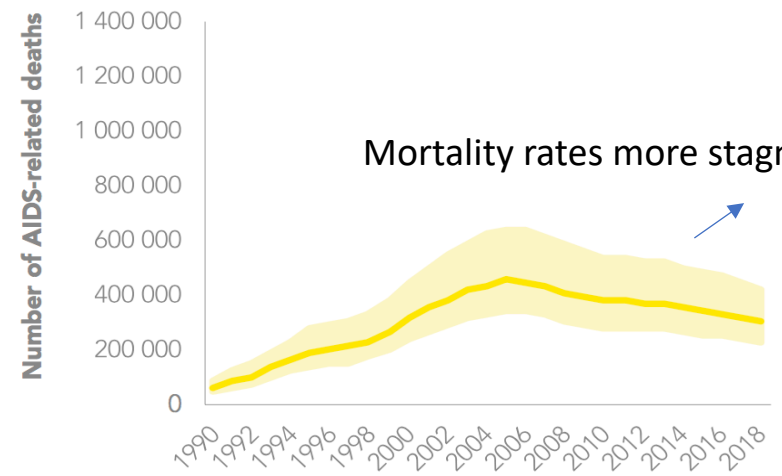


# Global AIDS-related deaths are declining



— Eastern and southern Africa  
 — Western and central Africa

Source: UNAIDS 2019 estimates.



— Regions outside sub-Saharan Africa

Source: UNAIDS 2019 estimates.

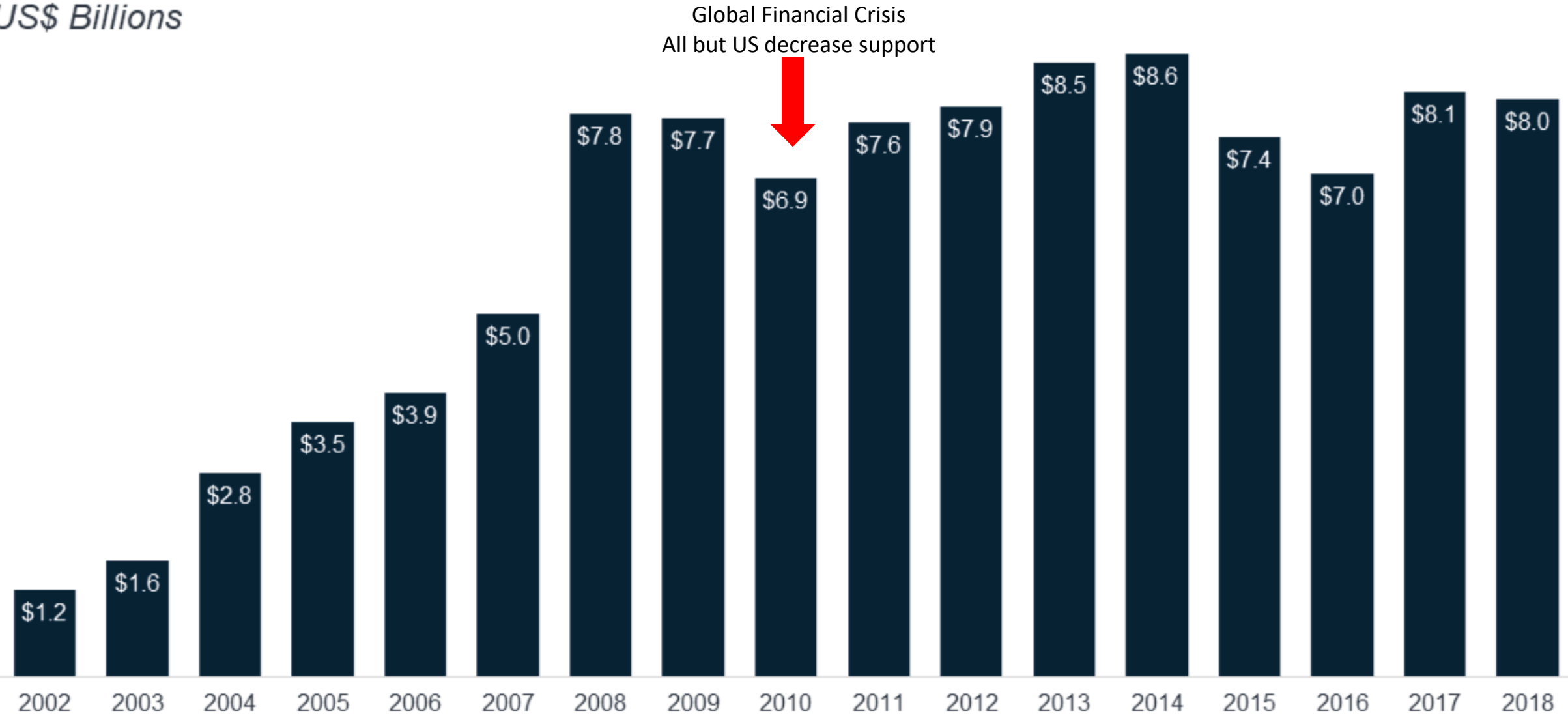


“I was a walking skeleton before I began therapy. I was afraid to go out of my house and no one would buy things from my shop. But now I am fine again... My wife has returned to me and now my children are not ashamed to be seen with me. I can work again.”

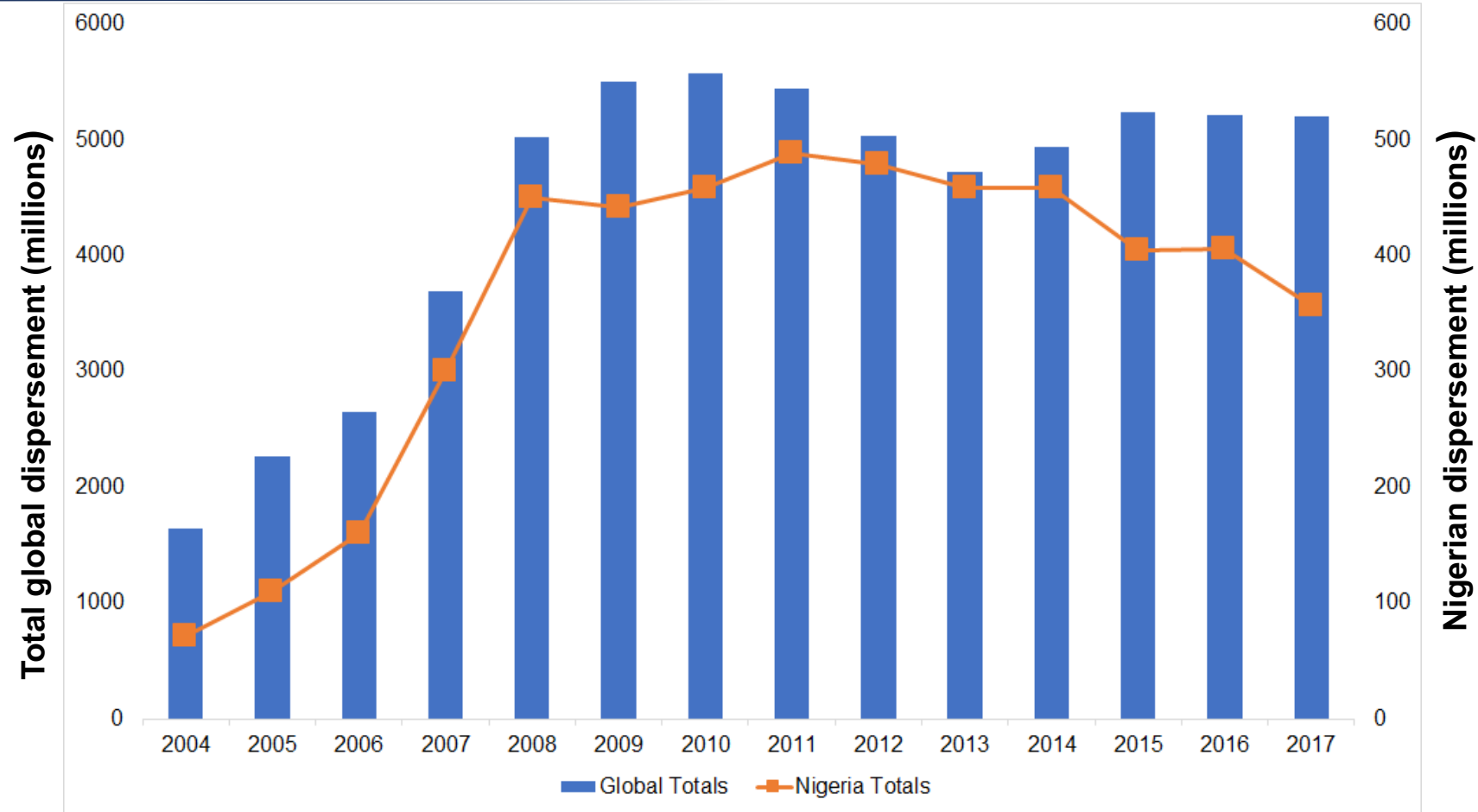


# HIV Funding from Donor Governments, 2002-2018

US\$ Billions



# Decreasing donor support in Nigeria



- PEPFAR funding to Nigeria peaked in 2011, and has decreased substantially since
- Expectation that the Government of Nigeria would increase financial commitment from 7 to 50%

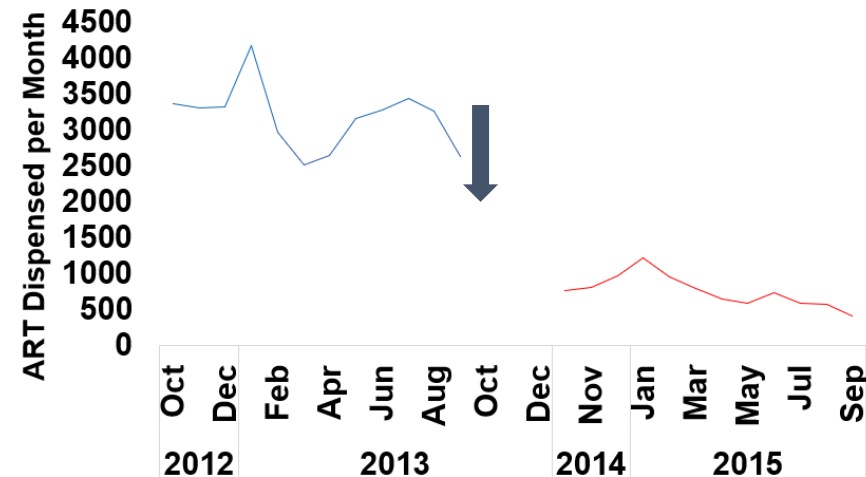
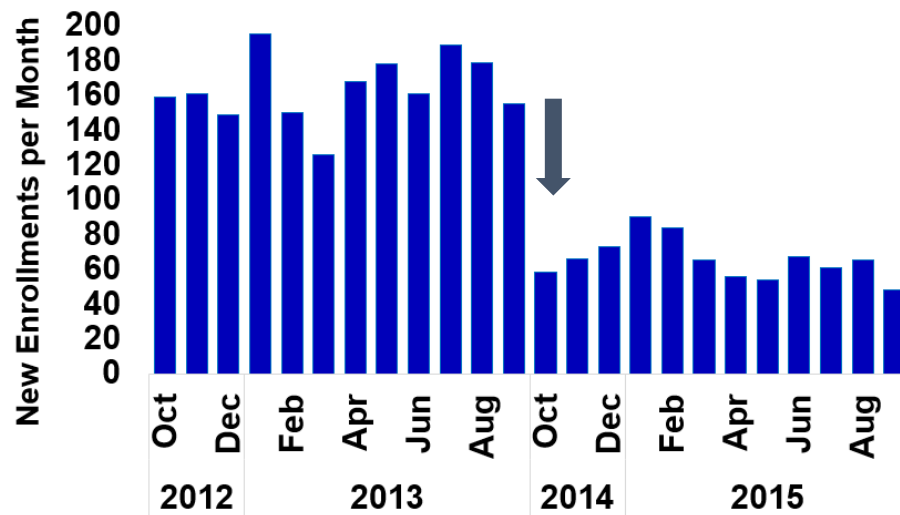
# Impact of User Fees on Enrollment and ART Dispensing

## Cohort Description

N=2757 (>14yrs)

NIMR

Enrolled before (2012-2013) and after (2014-2015)  
user fees instituted in 10/2014



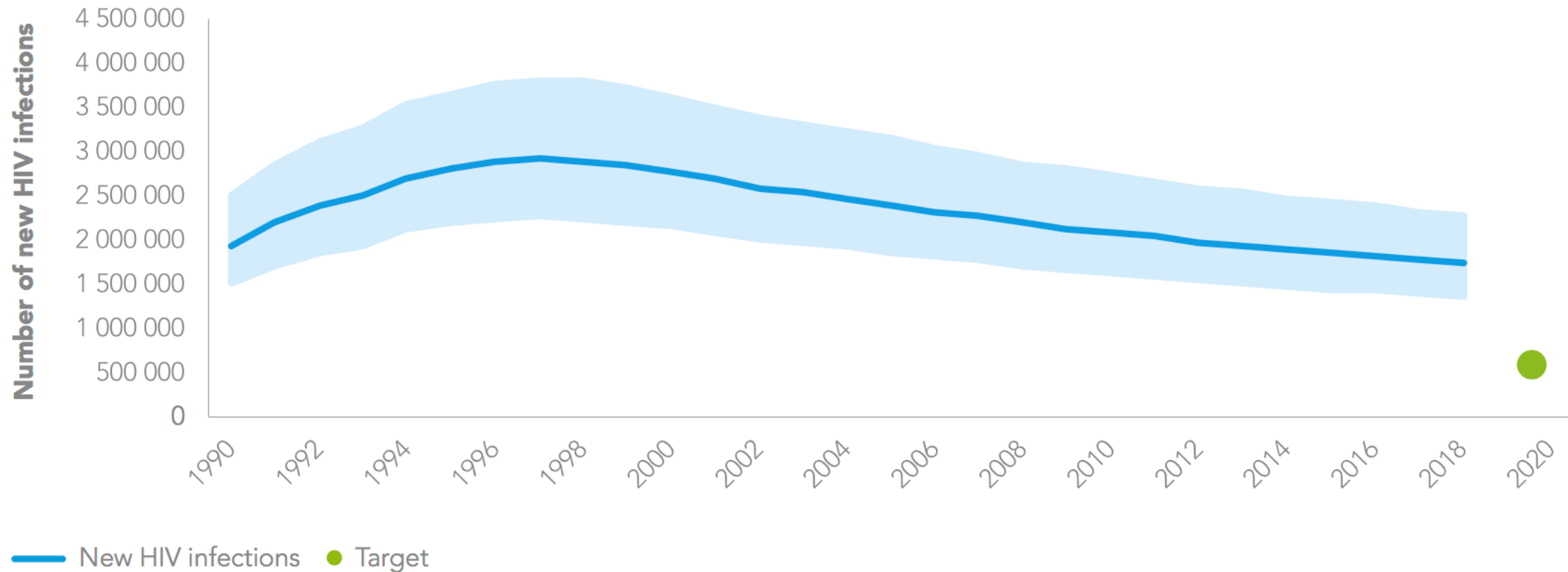
# HIV/AIDS in the 2010s

---

- **REACHING THOSE LEFT BEHIND**
- Increases in life expectancy; HIV as a chronic condition
- Affordable Care Act (2010) expands protections for people living with HIV
- Operational challenges: linkage to care, retention in care, 90-90-90
- Major expansion of ART programs (Option B+, test-and-treat)
- New drugs and prices
- Focus on key populations & delivery of effective interventions
- Role of technology to address key populations

# Gains Diminishing in Magnitude over Time

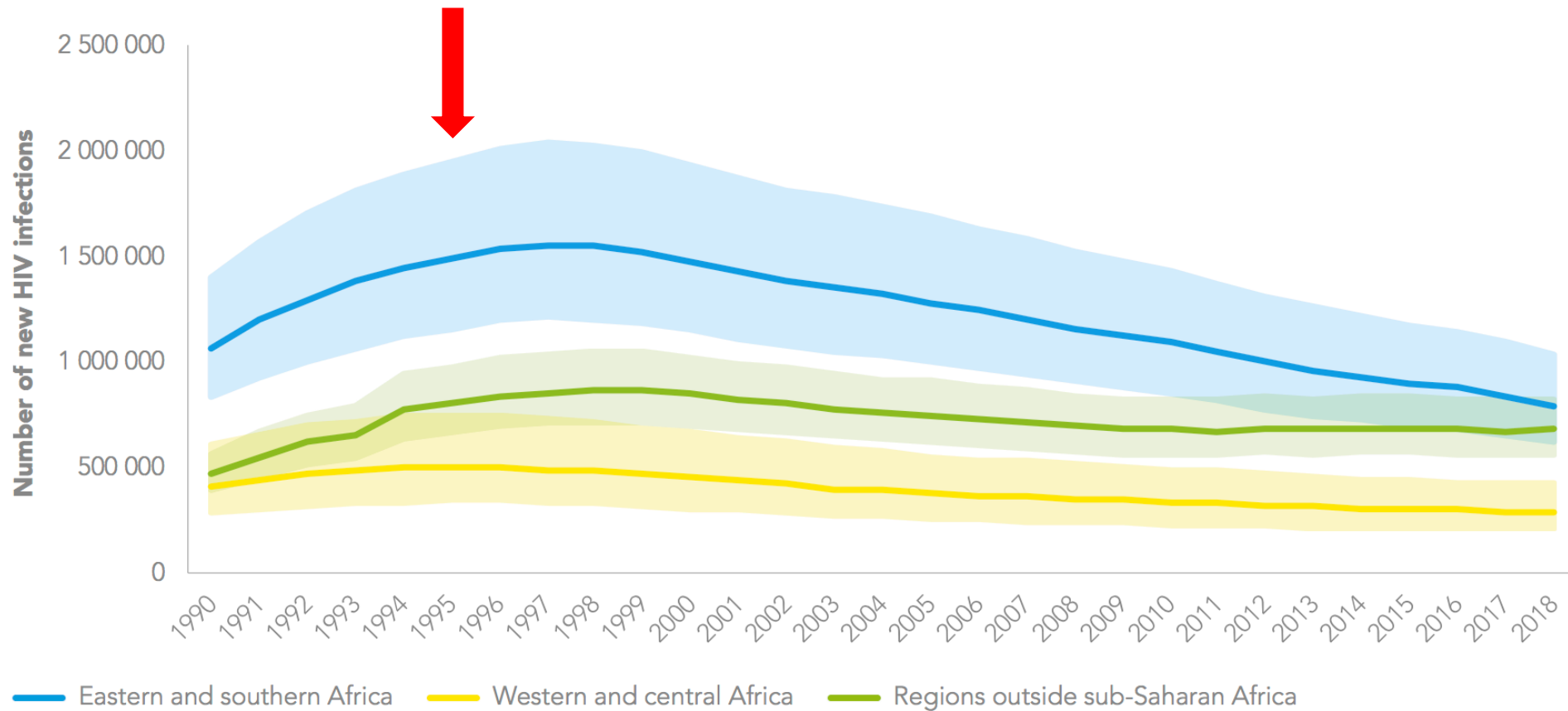
Number of New HIV Infections Globally 1990-2018, and 2020 Target



Source: UNAIDS 2019 estimates.

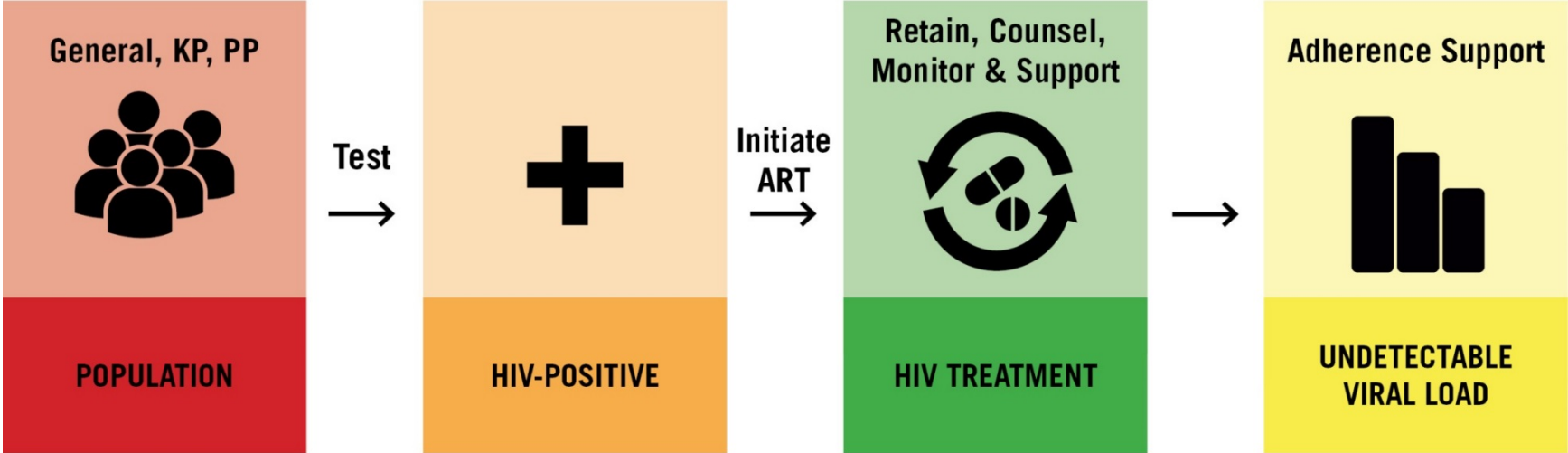
# Trends in Eastern, Southern Africa Driving Improvement in Global Trends

Number of New HIV Infections In and Outside of Sub-Saharan Africa 1990-2018

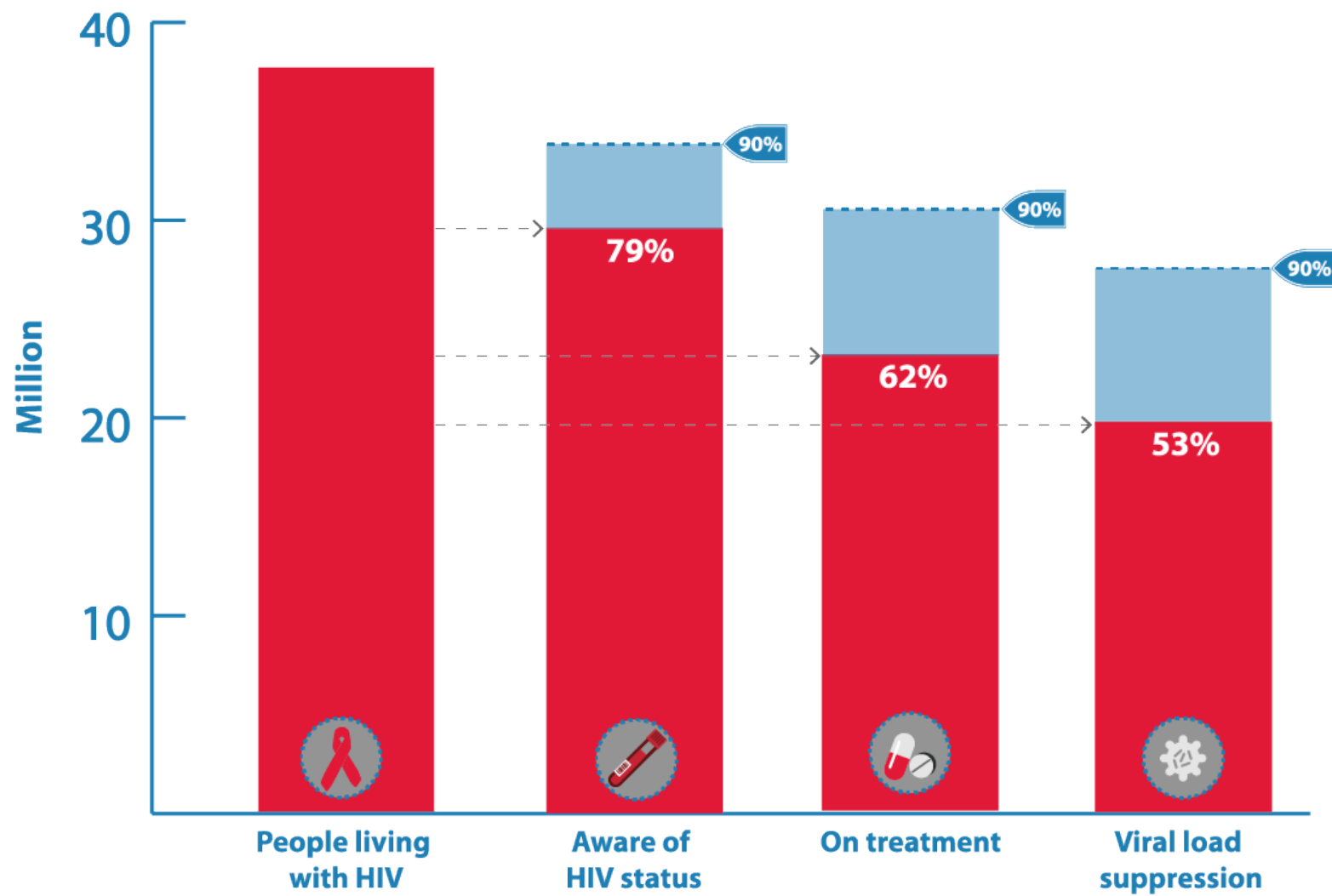


Source: UNAIDS 2019 estimates.

# HIV care continuum



# UNAIDS 90-90-90 targets established 2013



Source: UNAIDS/WHO estimates



# Increased risk of acquiring HIV among key populations

Among men who have sex with men



(22 times)

Among people who inject drugs



(22 times)

For sex workers



(21 times)

For transgender people

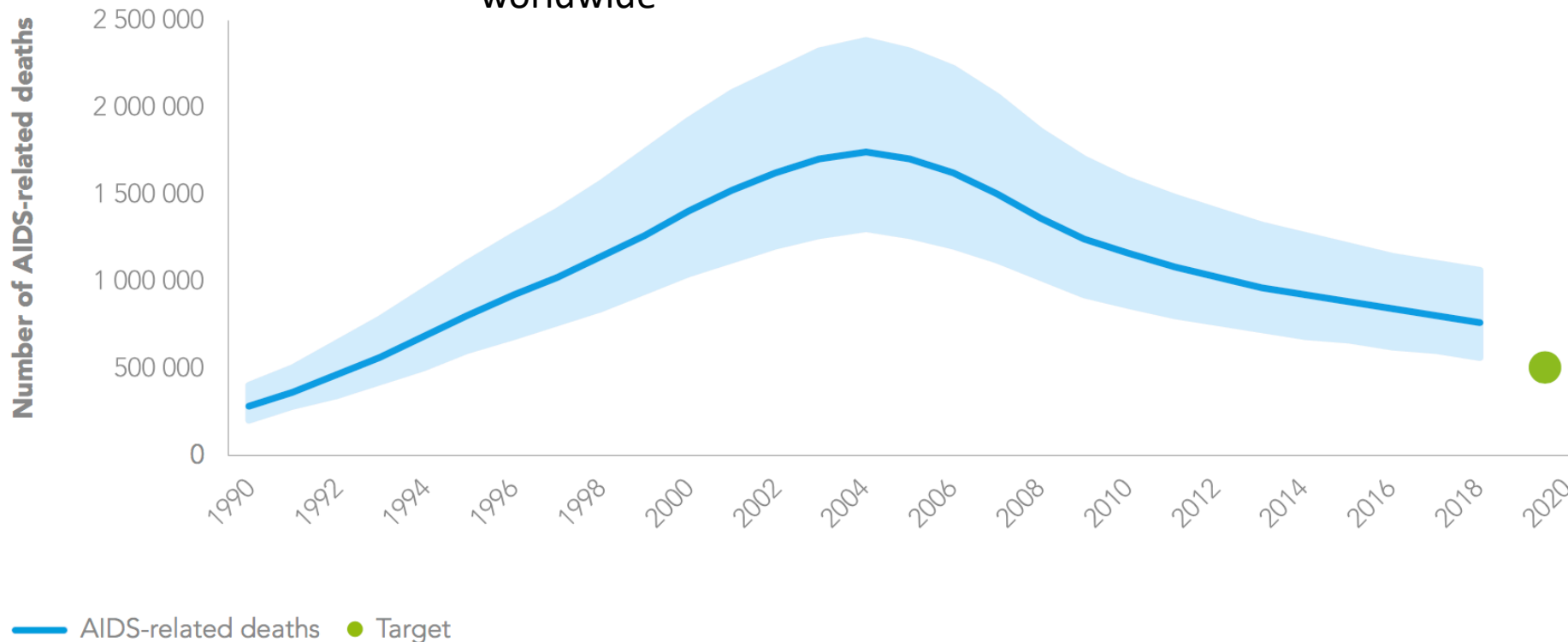


(12 times)

# Opposing mortality trends among youth

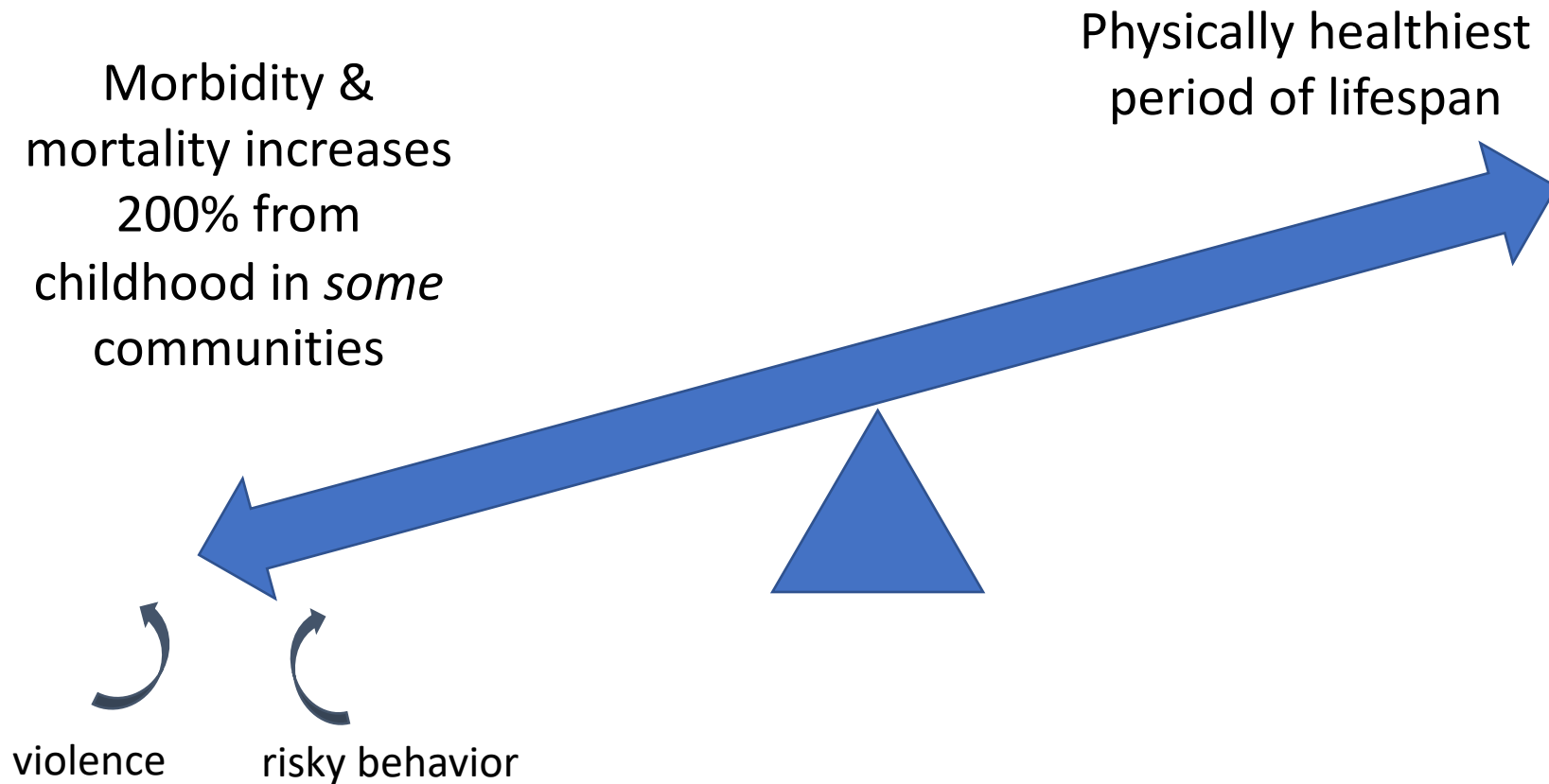


- 50% increase in deaths among adolescents (10-19yrs)
- leading cause of death African adolescents
- 2<sup>nd</sup> leading cause of death among adolescents worldwide



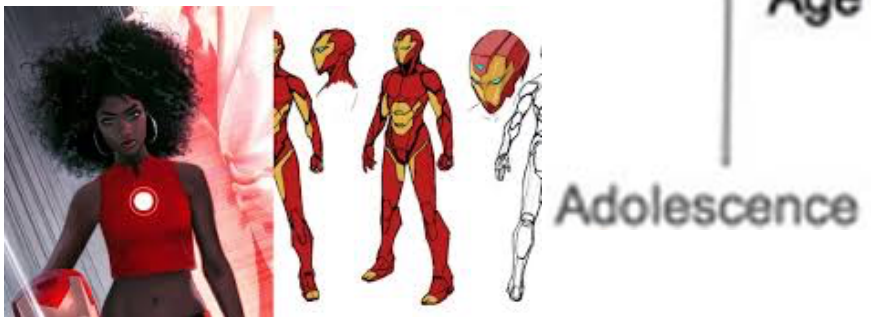
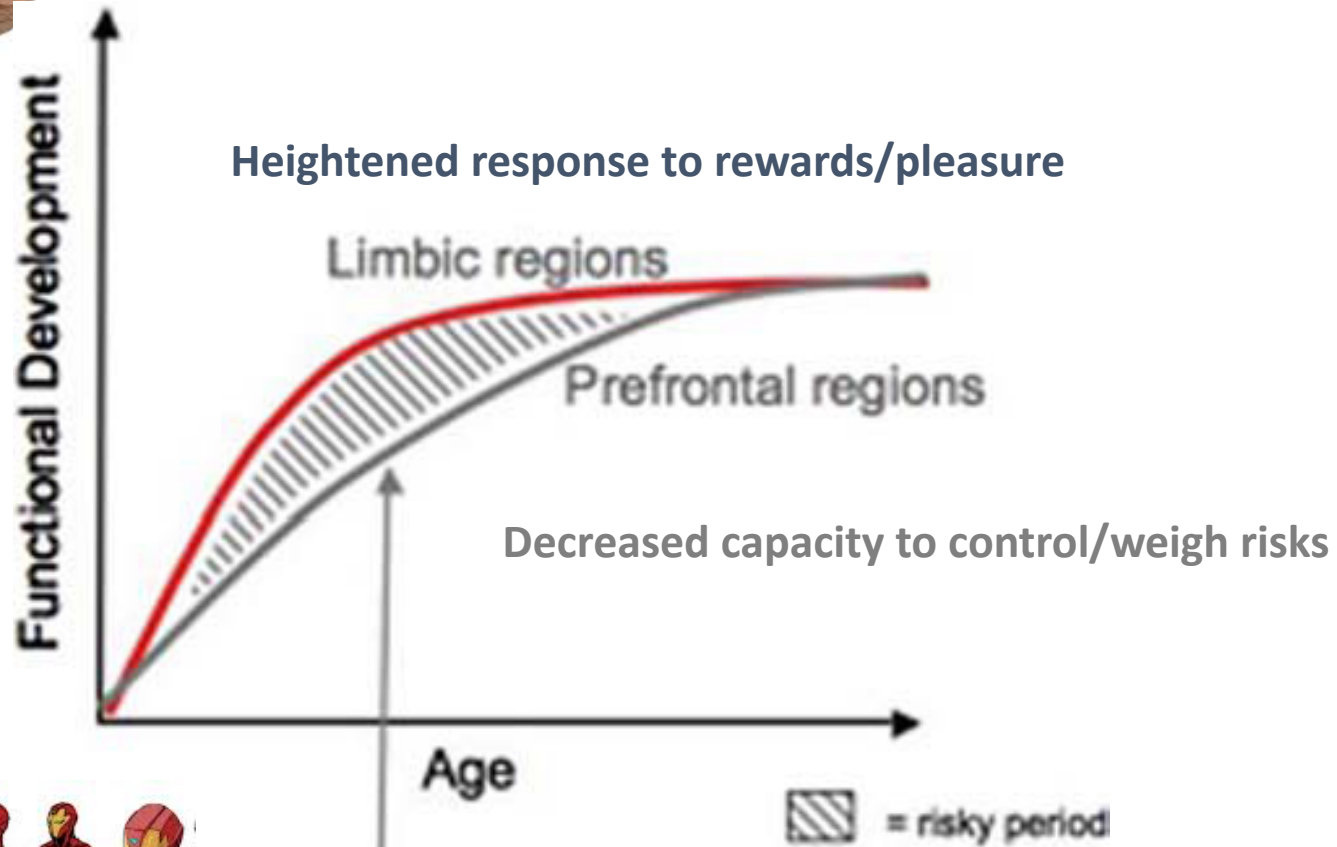
Source: UNAIDS 2019 estimates.

# Adolescent health paradox



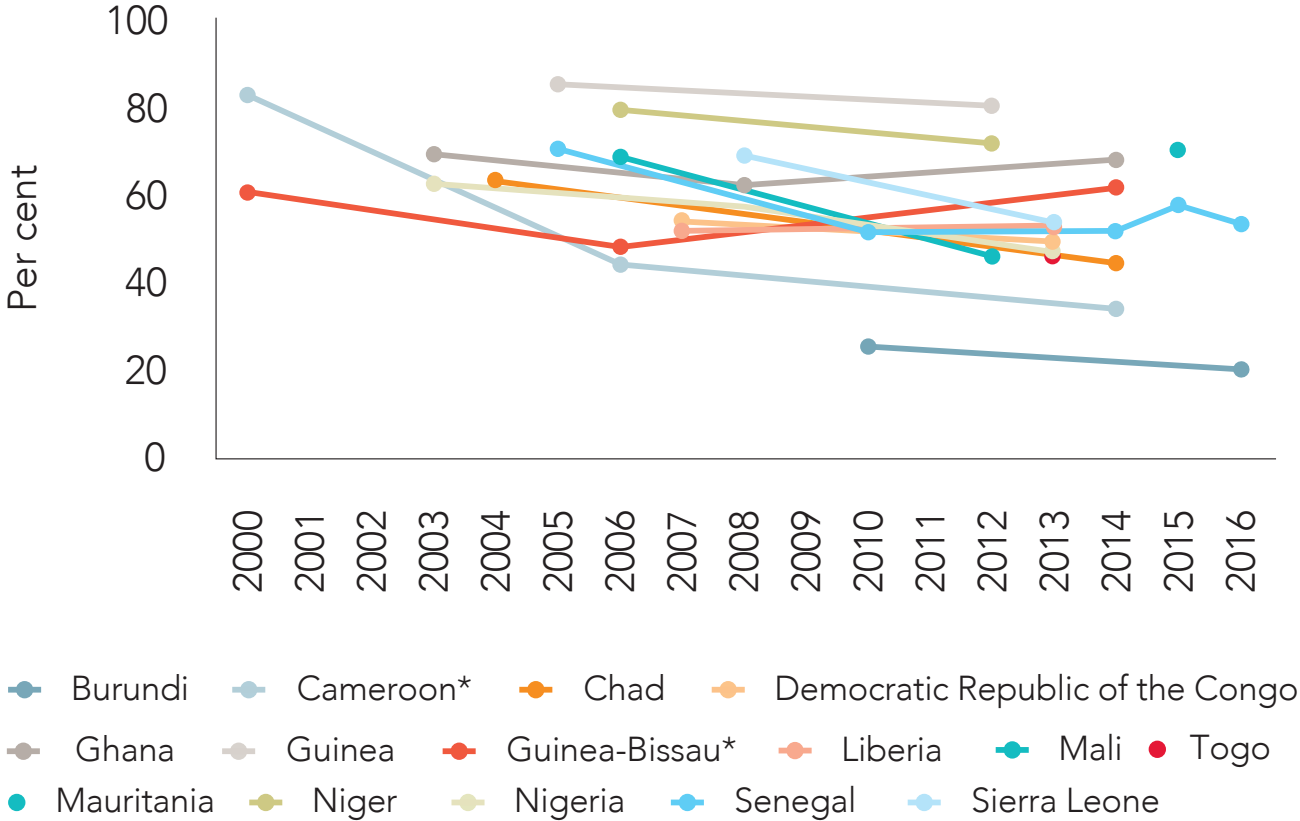


# Developmental Mismatch



# Stigma decreasing, but remains prevalent


Percentage of men and women aged 15–49 who would not buy vegetables from a shopkeeper living with HIV, western and central Africa, 2000–2016



\*Female respondents

# Increasing Psychological Distress in First Year on ART in Nigeria

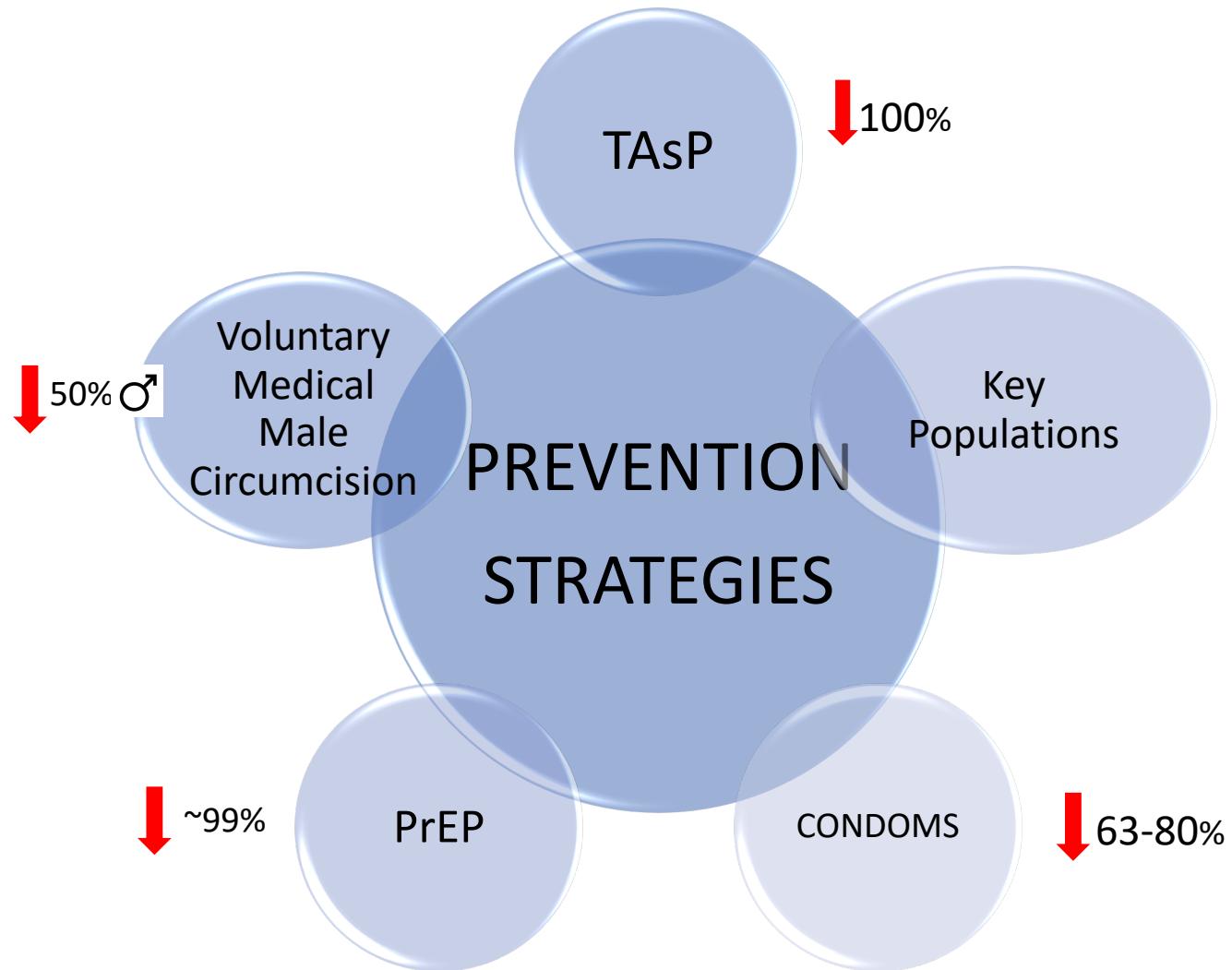
Distress Score	Enrollment (n=78)	4 Month (n=77)	12 Month (n=74)
0	21%	23%	16%
1	26%	27%	14%
2	27%	16%	1%
3	10%	6%	12%
4	13%	16%	26%
5	4%	8%	20%
6	0%	4%	11%
7	0%	0%	0%
8	0%	0%	0%
9	0%	0%	0%



moderate, or  
 severe psychological distress

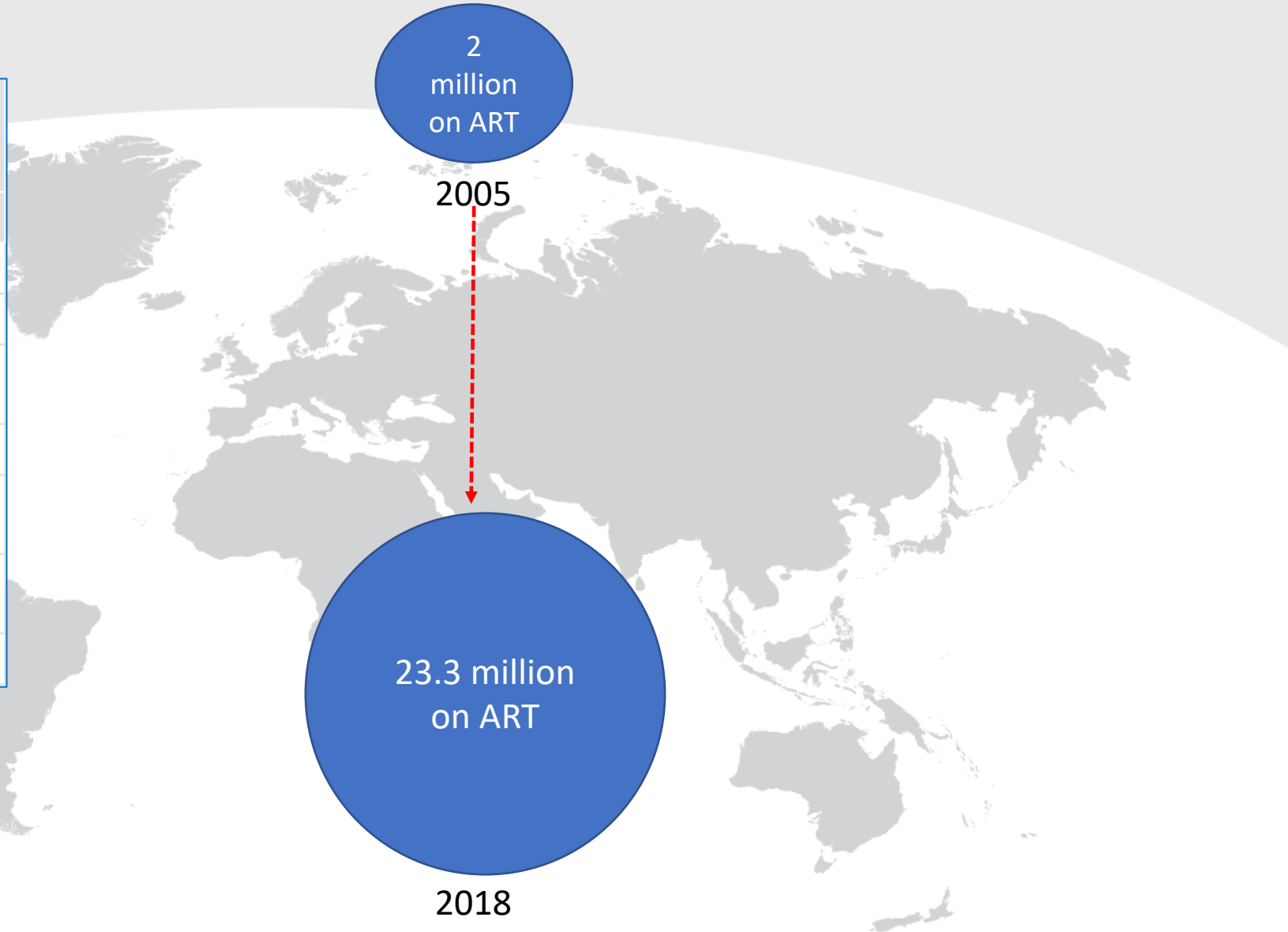
**17%**                      **28%**                      **57%**

# Prevention Strategies



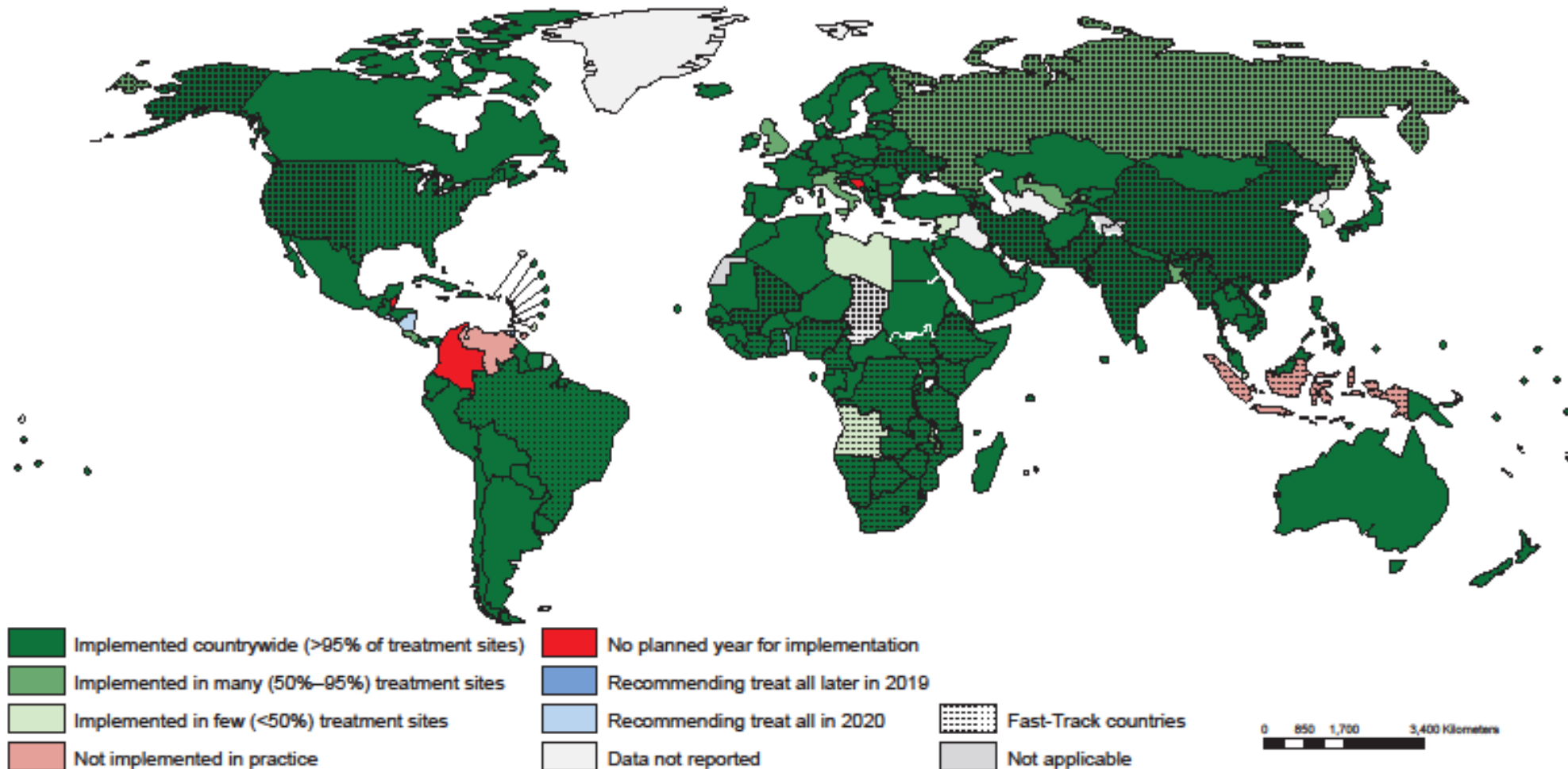
# Treatment as Prevention: ART Scale Up Globally

WHO region	2018
Africa	64 [48 - 76]
Americas	67 [49 - 82]
South-East Asia	53 [39 - 71]
Europe	55 [43 - 64]
Eastern Mediterranean	21 [13 - 31]
Western Pacific	59 [47 - 69]
(WHO) Global	62 [47 - 74]





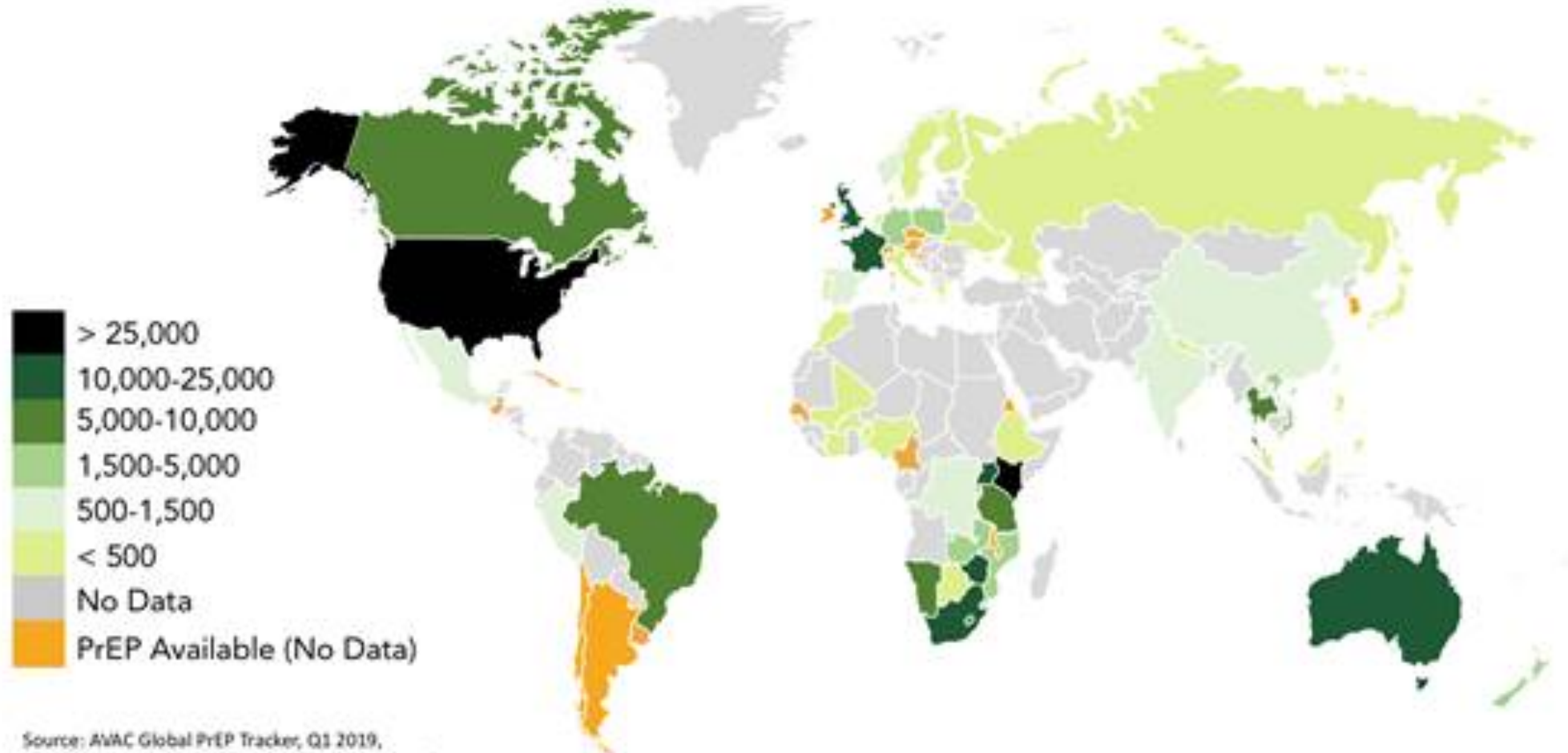
# Treatment as Treatment as Prevention: ART Scale Up Globally



Source: Global AIDS Monitoring (UNAIDS/WHO/UNICEF) and WHO HIV Country Intelligence Tool, 2019

# PrEP Scale Up Globally

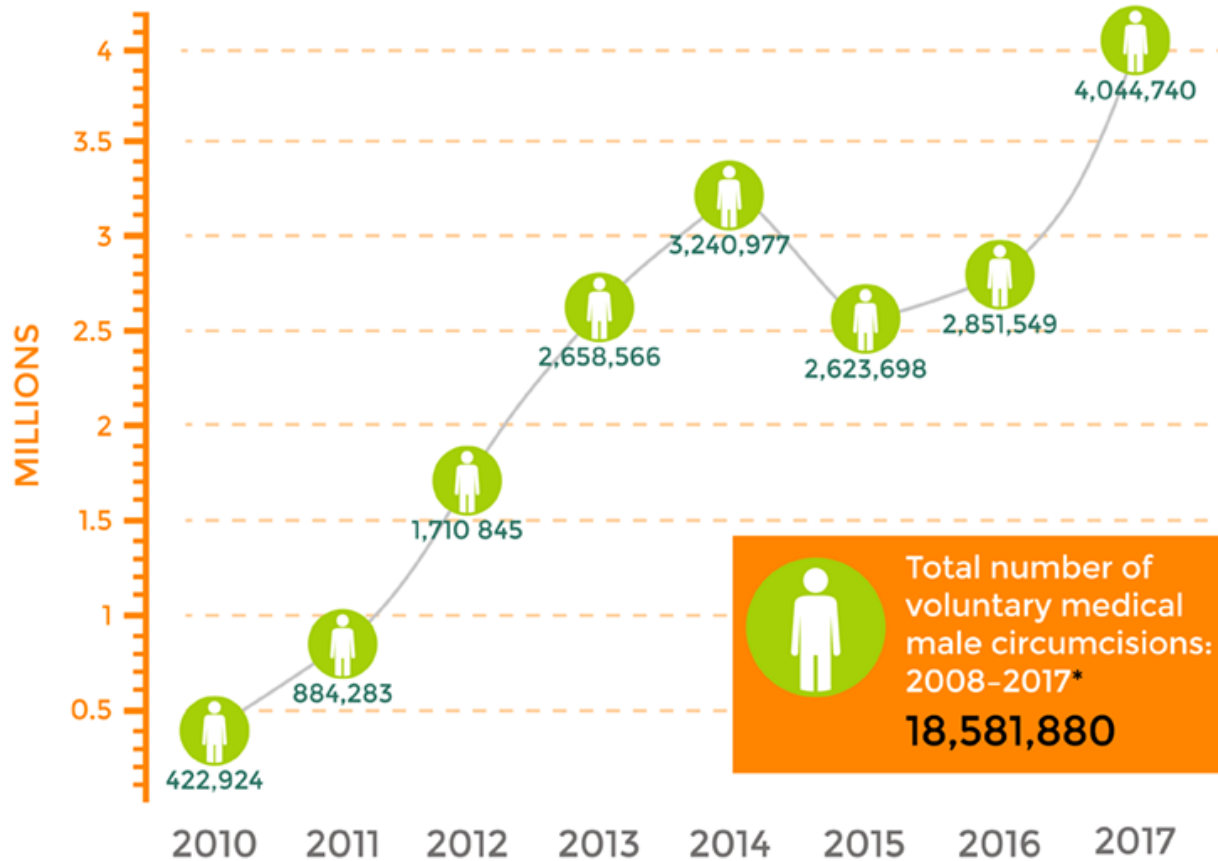
## PrEP Initiations by Country, April 2019



Source: AVAC Global PrEP Tracker, Q1 2019,  
<https://www.prepwatch.org/country-updates/>

# Scale up of Voluntary Medical Male Circumcision

Voluntary medical male circumcision (VMMC) for HIV prevention in the 14 UNAIDS and WHO priority countries\*\*



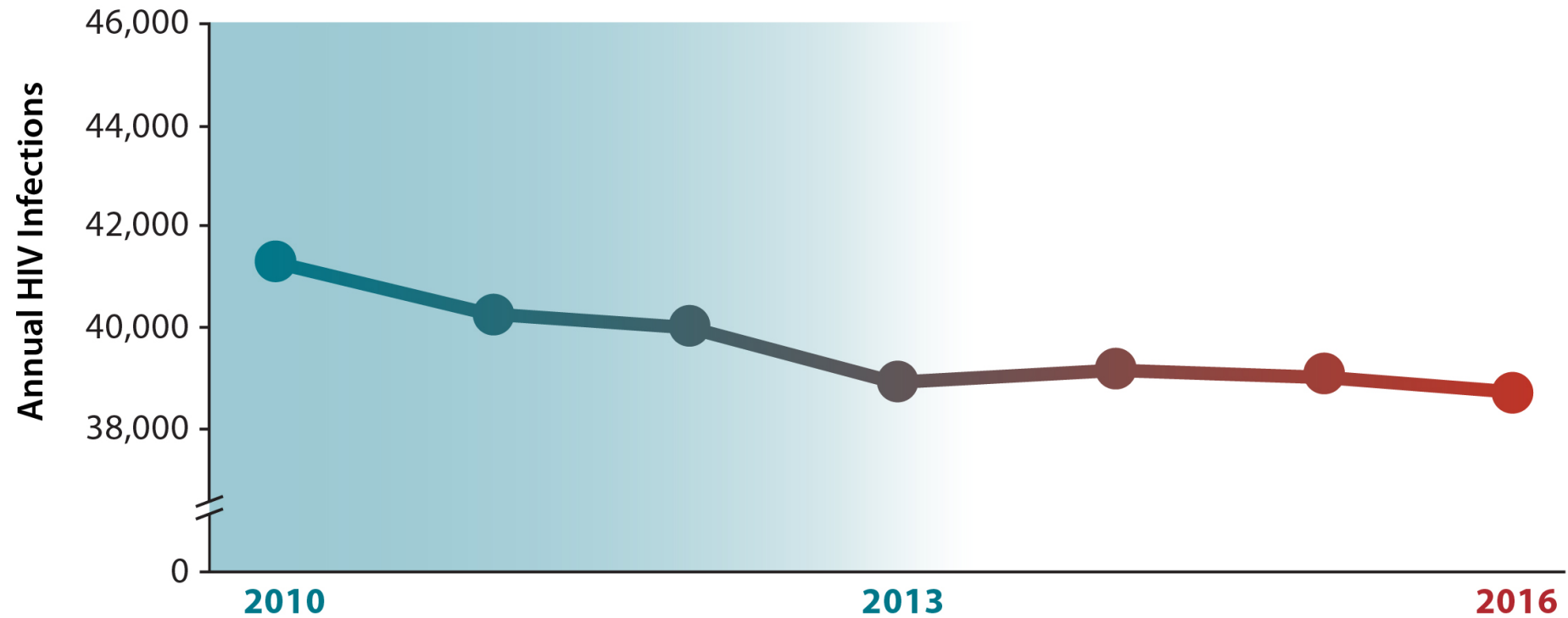
- Global target 90% of 10-29yo males in priority countries by 2021

\*Calendar years 2008 and 2009 are included in total numbers.

\*\*UNAIDS and WHO 14 priority countries: Botswana, Eswatini, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Tanzania, Uganda, Zambia, Zimbabwe

Source: Global AIDS Monitoring, national programmes, UNAIDS/UNICEF/WHO.

# HIV Infections Started to Stabilize in 2013



For more information, visit [cdc.gov/nchhstp/newsroom](http://cdc.gov/nchhstp/newsroom)



U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention

# HIV in the Southern US

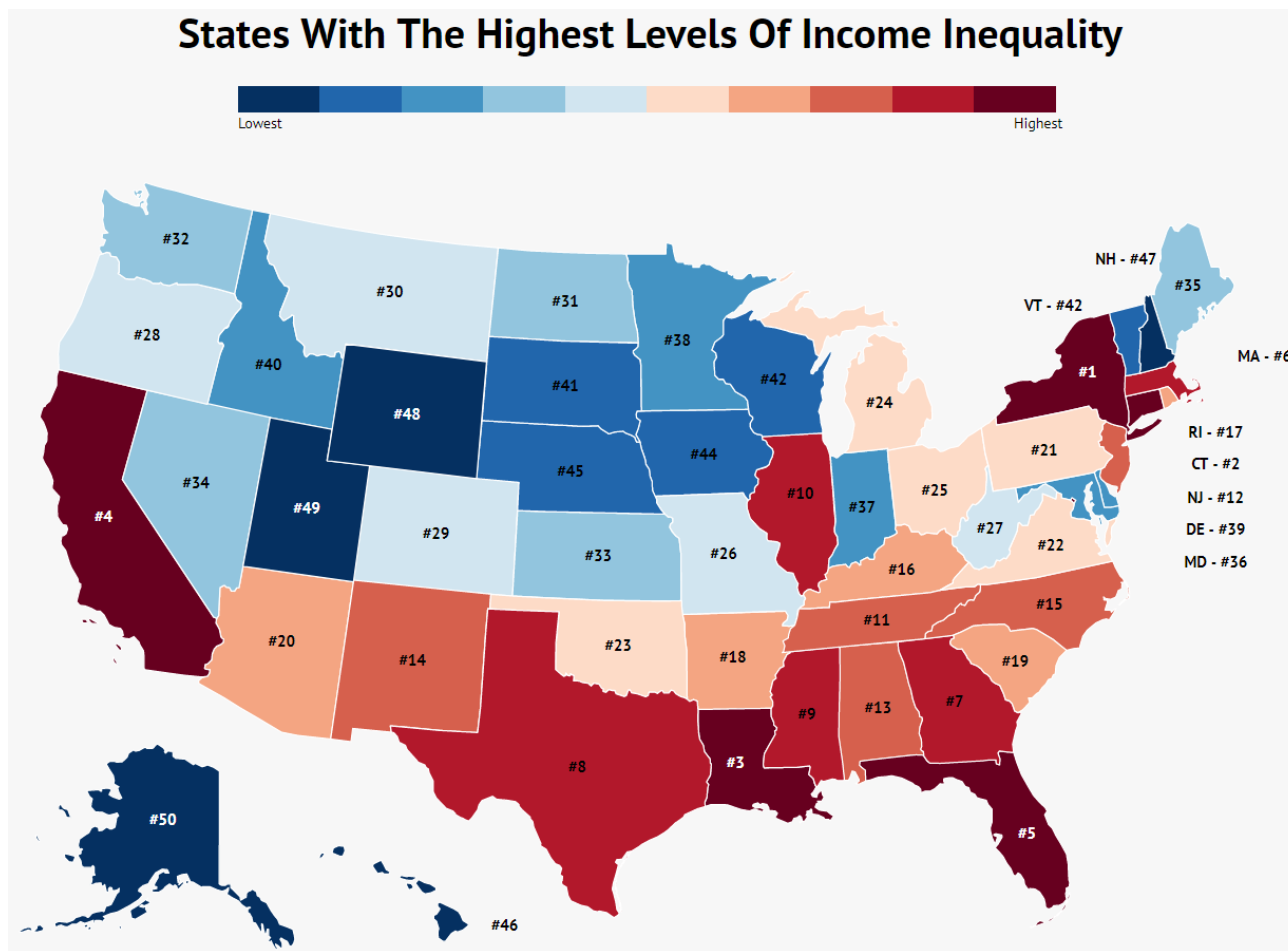
Of the 38,739 new HIV diagnoses in the US\* in 2017,  
**19,968 (52%) were in the South.**

**From 2012 to 2016, HIV diagnoses remained stable in the US.\*\***



- HIV diagnoses fell 27% in the US dependent areas.
- HIV diagnoses fell 17% in the Northeast.
- HIV diagnoses fell 6% in the Midwest.
- HIV diagnoses remained stable in the South.
- HIV diagnoses remained stable in the West.

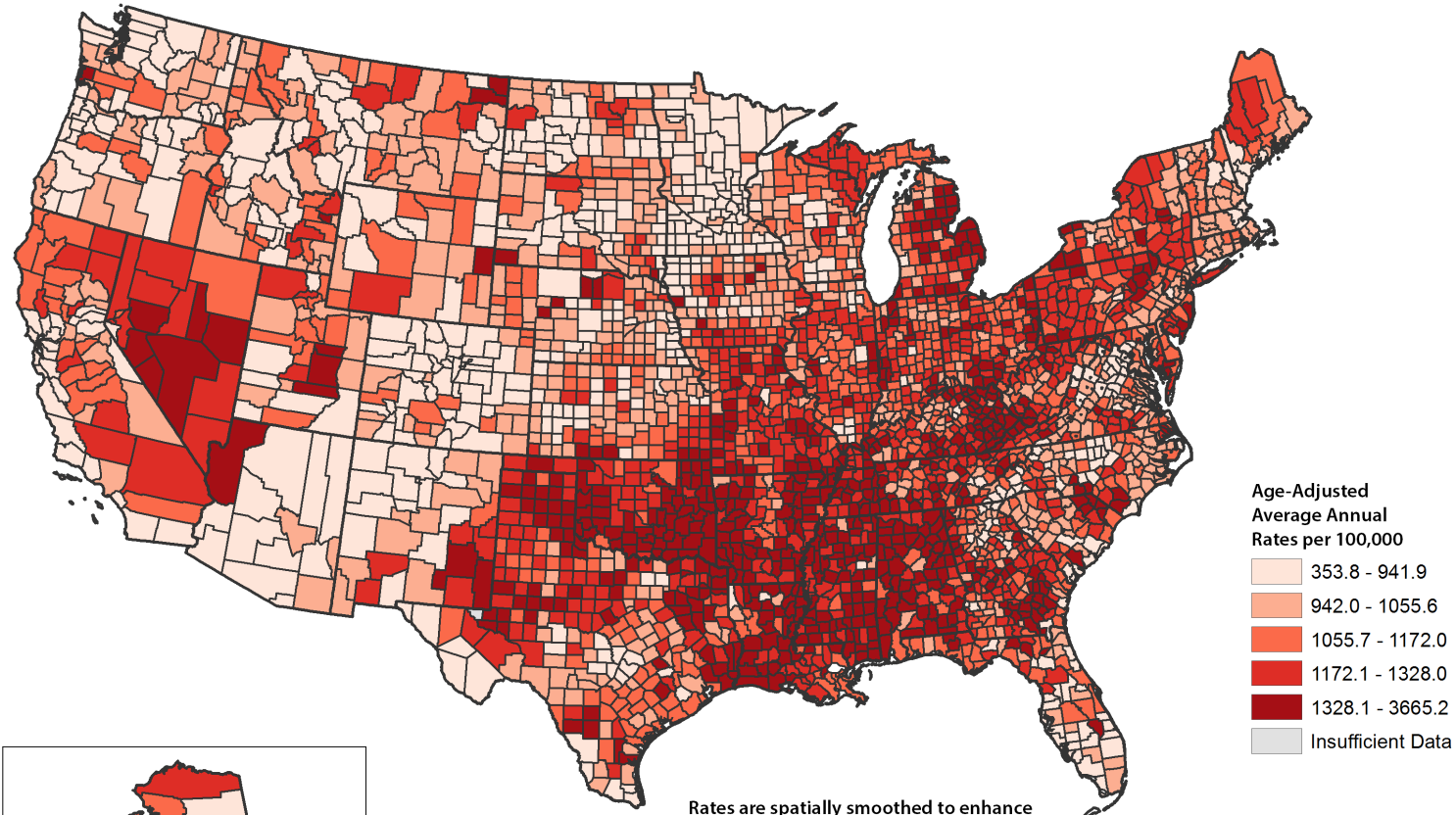
# Drivers of HIV Disparities in the Southern US



- Income inequality
- Uninsured/underinsured
- Phobia of "others"
- Racism
- Intersecting Stigmas

# Regional disparities In health: heart disease

**Heart Disease Death Rates, 2014-2016  
Adults, Ages 65 +, by County**



Age-Adjusted  
Average Annual  
Rates per 100,000

- 353.8 - 941.9
- 942.0 - 1055.6
- 1055.7 - 1172.0
- 1172.1 - 1328.0
- 1328.1 - 3665.2
- Insufficient Data

Rates are spatially smoothed to enhance the stability of rates in counties with small populations.

Data Source:  
National Vital Statistics System  
National Center for Health Statistics  
[www.cdc.gov/dhdsp/maps](http://www.cdc.gov/dhdsp/maps)





# HIV in TN

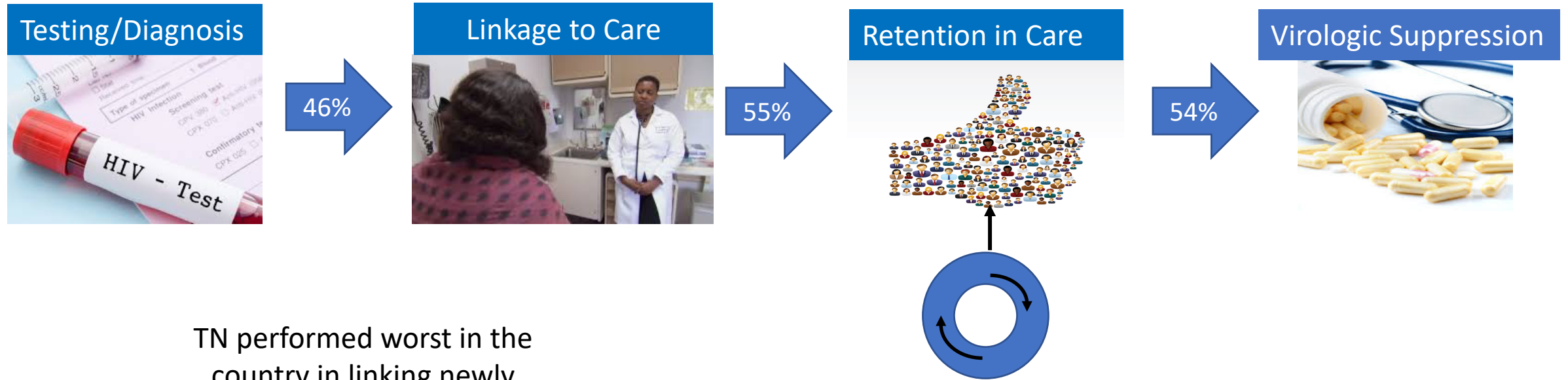


- 16,190 people living with HIV
- 71% of new infections are in 4 of 95 counties
  - Shelby (39%), Davidson (21%), Hamilton(6%), and Knox (5%)
- Black individuals disproportionately affected
  - Black female 14X greater than White
  - Black male 6X greater than White

New Infections 2012-2016	
<b>Sex</b>	
Male	79%
Female	21%
<b>Race/Ethnicity</b>	
White (non-Hispanic)	32%
<b>Black (non-Hispanic)</b>	<b>59%</b>
Hispanic (all Races)	5%
Other/Unknown	3%
<b>Age at diagnosis, Median [IQR]</b>	31 [24, 44]
<b>Transmission Risk Factor</b>	
Heterosexual	22%
<b>MSM</b>	<b>55%</b>
IDU	3%
MSM/IDU	2%
Other/Unknown	18%

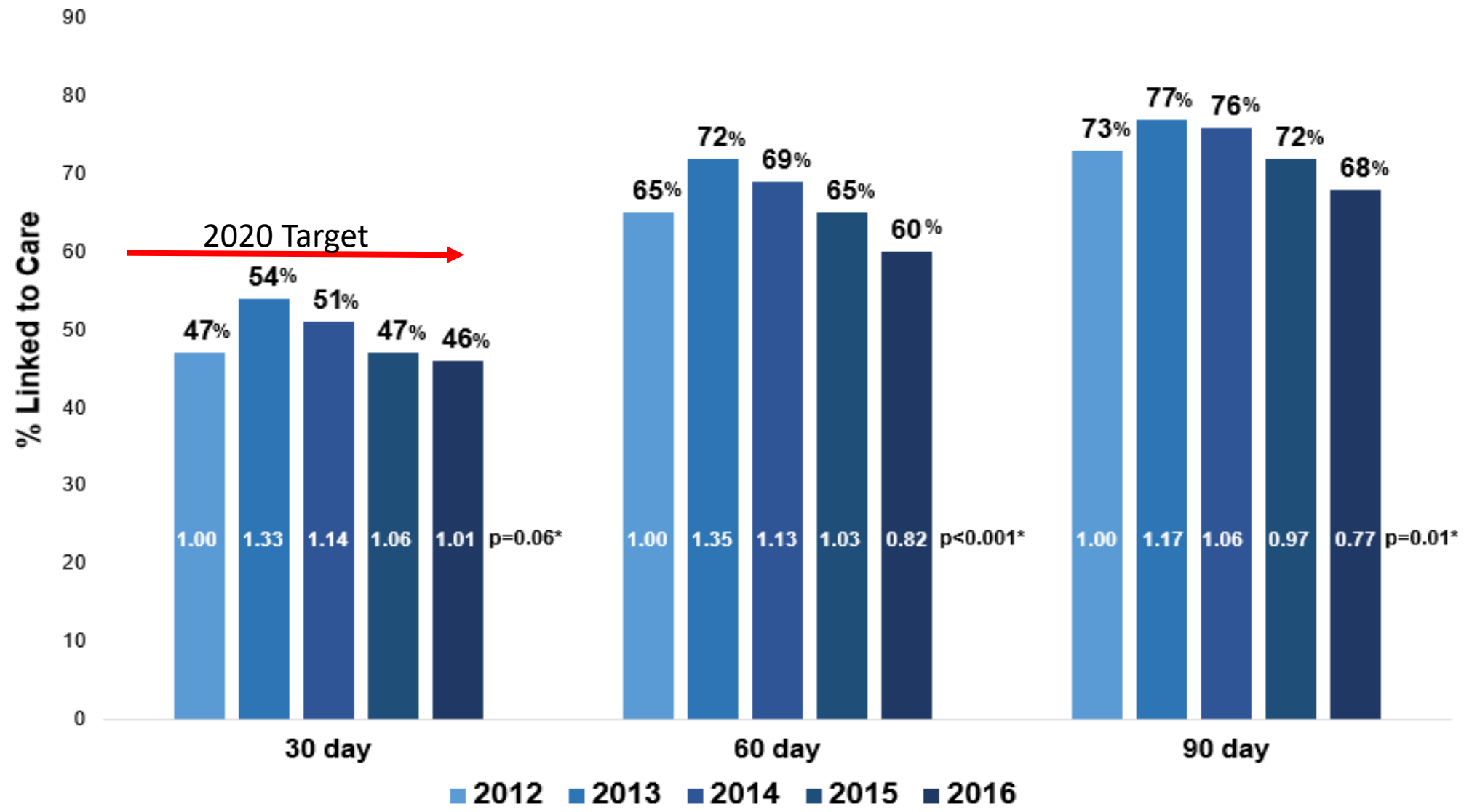


# Continuum of HIV Care in TN

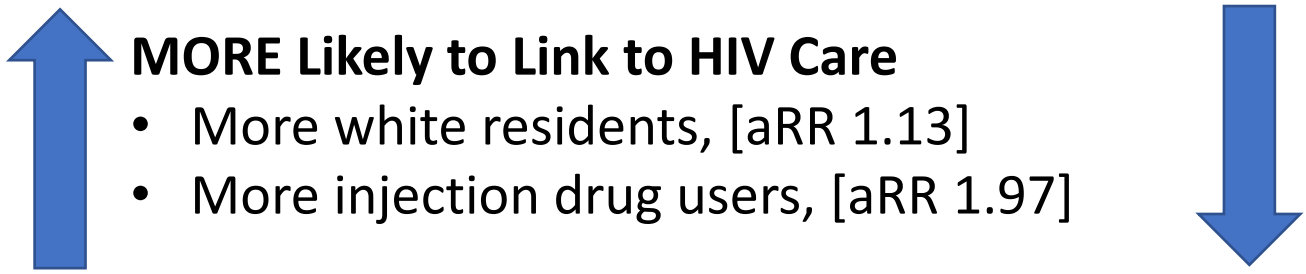


TN performed worst in the country in linking newly diagnosed patients to care

# No improvement in linkage to HIV care over time

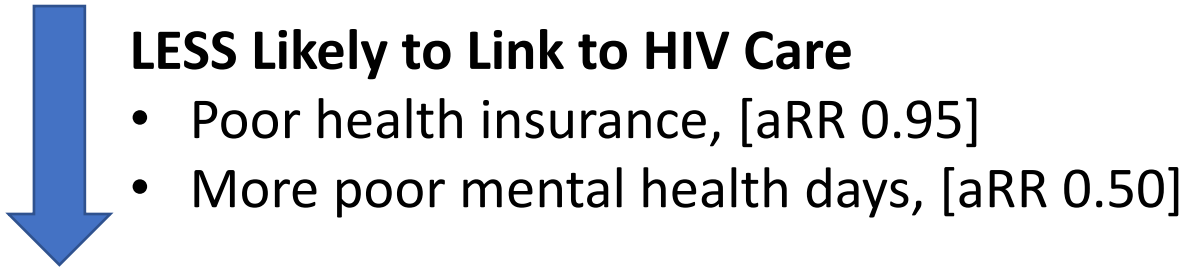


# County level predictors of linkage to HIV care at 30 days in TN



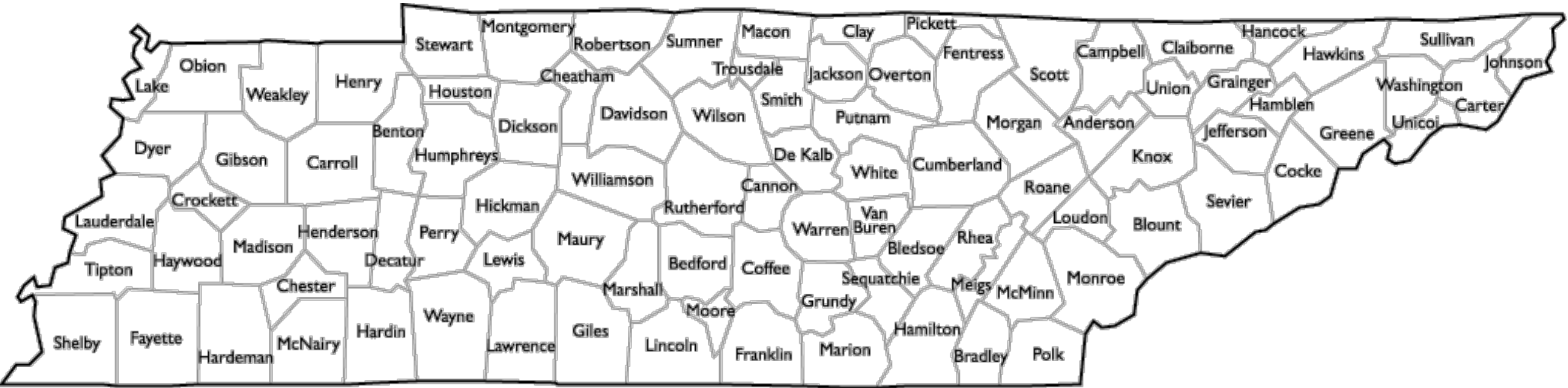
**MORE Likely to Link to HIV Care**

- More white residents, [aRR 1.13]
- More injection drug users, [aRR 1.97]



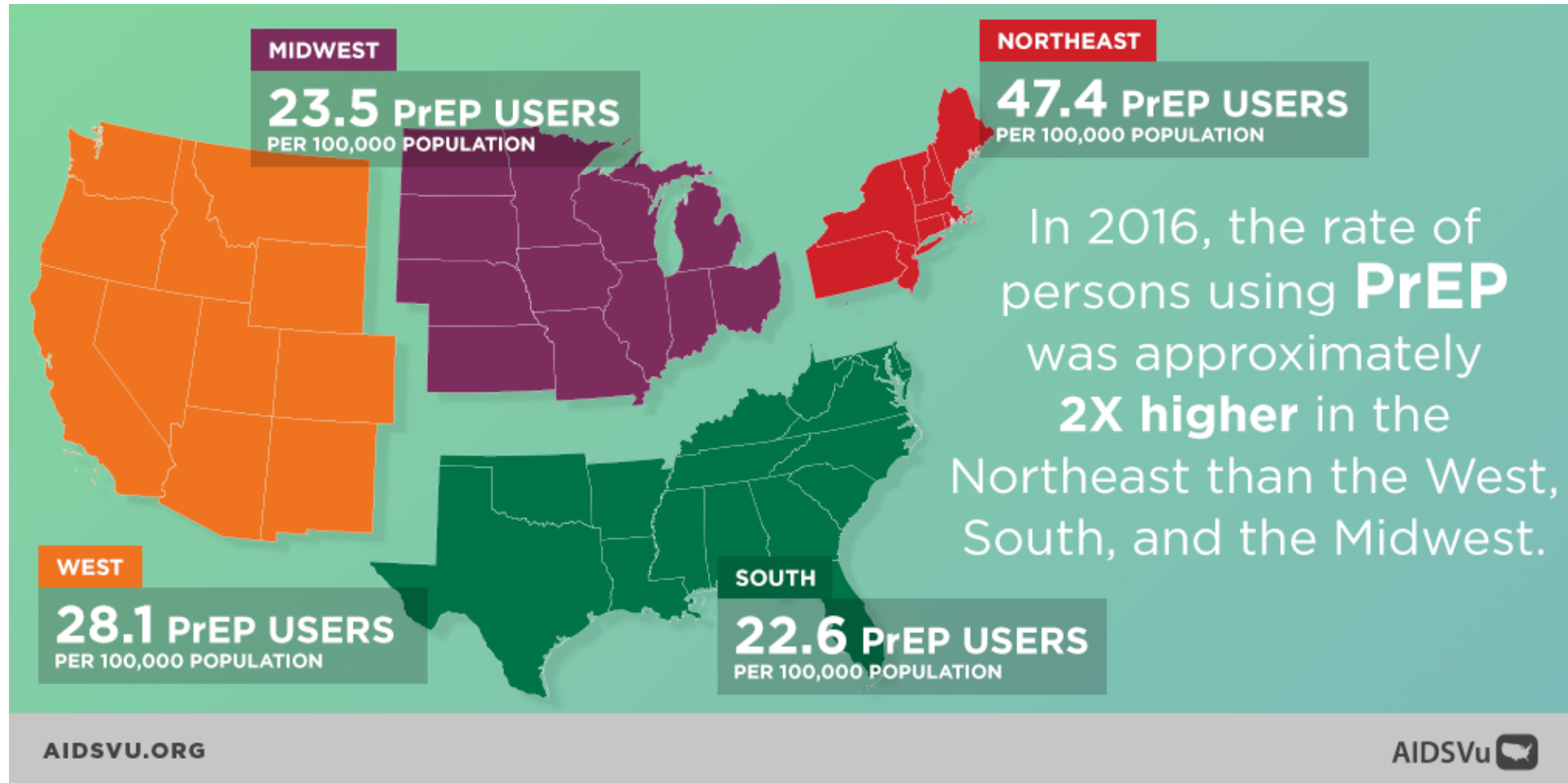
**LESS Likely to Link to HIV Care**

- Poor health insurance, [aRR 0.95]
- More poor mental health days, [aRR 0.50]



Adjusted for age, sex, race/ethnicity, transmission risk factor,

# Poor uptake of PrEP in the Southern US



# HIV in the 2020s: End the Epidemic Framework

## GOAL:

**75%** reduction in new HIV infections in 5 years and at least **90%** reduction in 10 years.



ENDING THE HIV EPIDEMIC: A PLAN FOR AMERICA			
<b>Diagnose</b> HIV as early as possible	<b>Treat</b> HIV quickly and effectively	<b>Protect</b> people at risk	<b>Respond</b> quickly to clusters of new cases

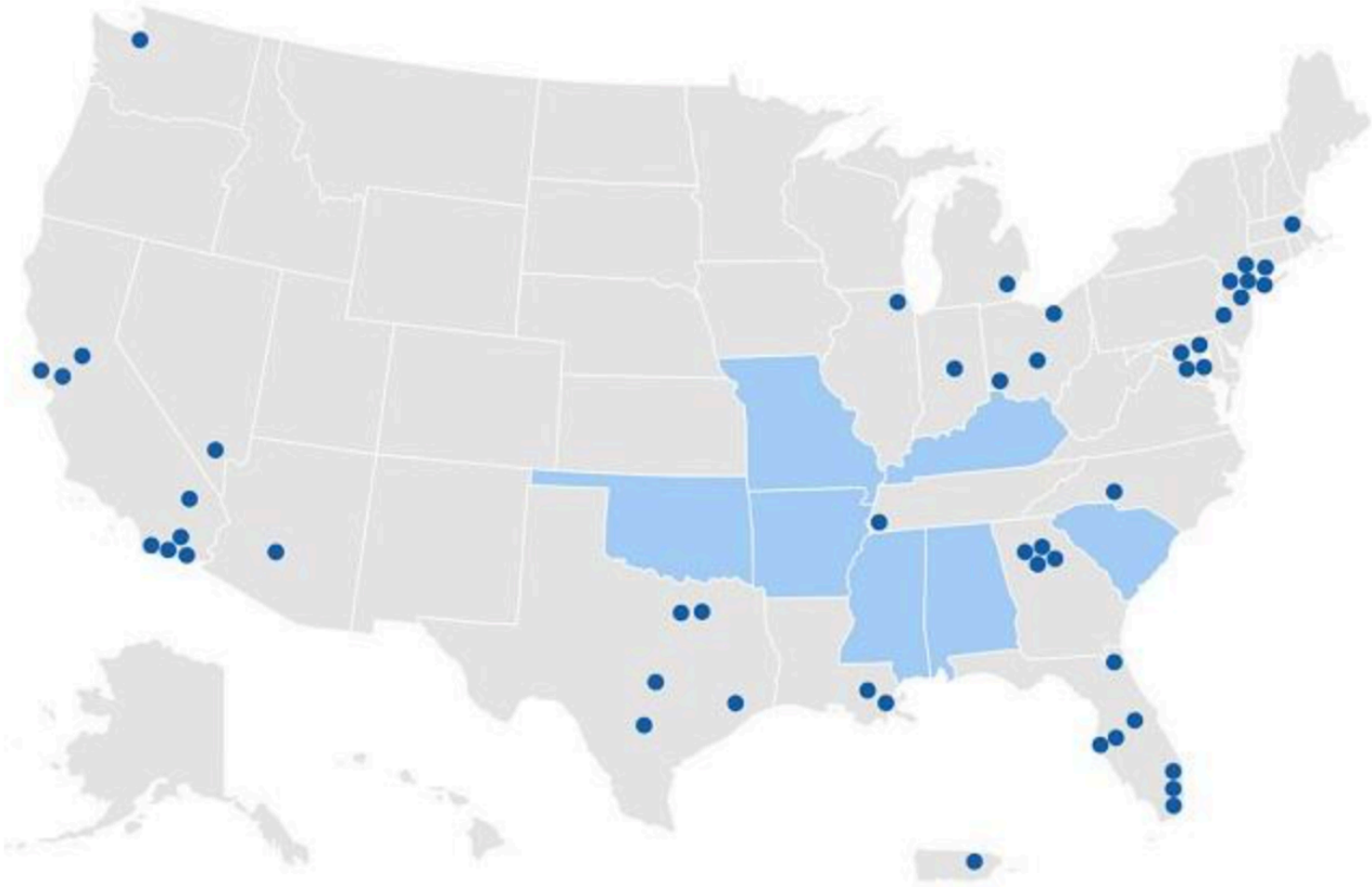
“Theoretically, if we accessed and put on antiretroviral therapy everyone who has HIV and provide PrEP for all at high risk of HIV, we could rapidly end the epidemic.”



- Dr. Anthony Fauci (NIAID), 2019

# Renewed Focus

48 counties, San Juan, DC, with >50% of HIV Diagnoses 2016-2017





# End the Epidemic Local Efforts



By 2024, Nashville will:

- Ensure that 90% of residents living with HIV know their status
- Decrease new infections by 2/3rds
- Link 90% of people diagnosed with HIV to care
- Engage 90% of those linked to care
- Eliminate disparities in outcomes

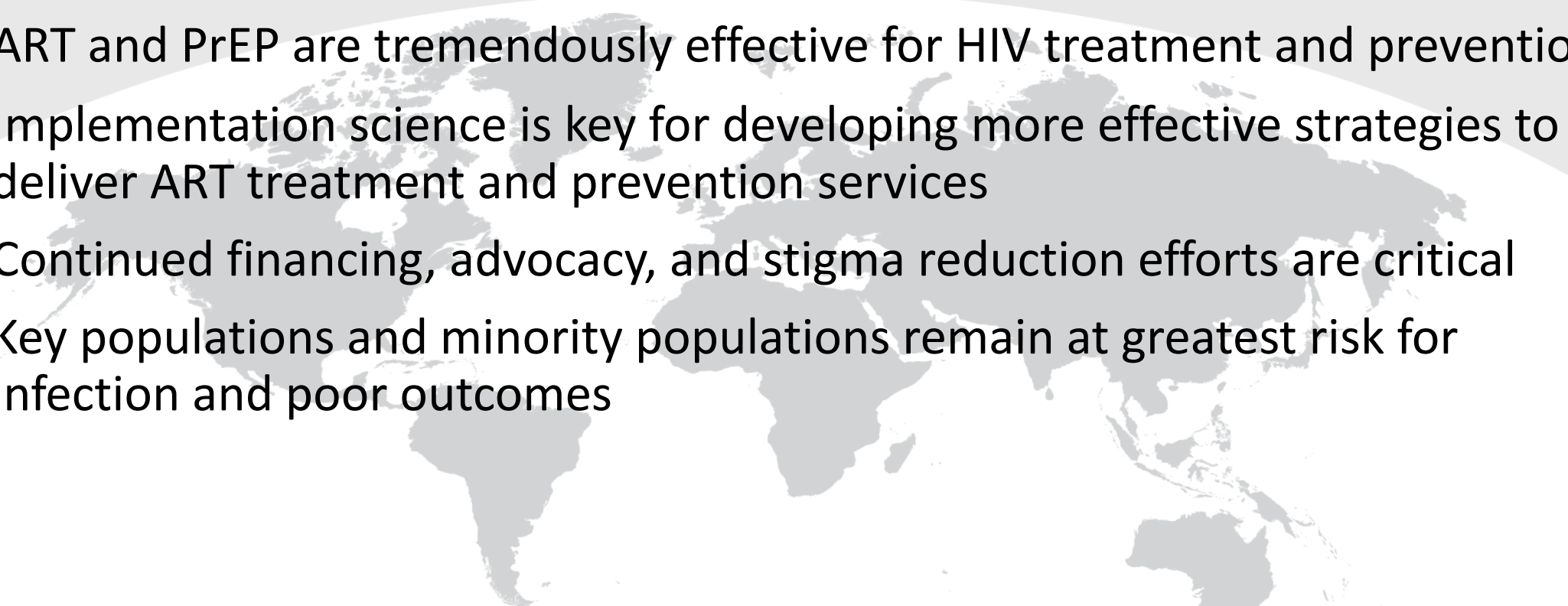
## Ending the Epidemic Nashville

*A 5-Year Plan to End the HIV Epidemic in Davidson County, Tennessee*



# Final Thoughts

---

- Tremendous progress has been made
  - Gains diminishing in magnitude over time
  - Sustained efforts needed to “end the epidemic”
  - ART and PrEP are tremendously effective for HIV treatment and prevention
  - Implementation science is key for developing more effective strategies to deliver ART treatment and prevention services
  - Continued financing, advocacy, and stigma reduction efforts are critical
  - Key populations and minority populations remain at greatest risk for infection and poor outcomes
- 

# Acknowledgements

## Slides and references

- Sten Vermund, Yale University School of Public Health
- Kate Clouse, Vanderbilt University School of Nursing

## My work

- Vanderbilt Institute for Global Health
- Vanderbilt Division of Infectious Diseases, Dept. of Medicine
- APIN Public Health Initiatives, Nigeria
- Nigerian Institute for Medical Research