CONTROLLING THE HIV EPIDEMIC WITH ANTIRETROVIRALS

Having the Courage of Our Convictions

1 - 2 October 2015 • Paris

Where is the Demand? – Clearing Bottlenecks to Attaining the 90-90-90 Targets

Reuben Granich, MD, MPH
Vice President and Chief Technical Advisor (IAPAC)

Ding dong the CD4 witch is dead!

Test and start guidelines will have a major impact on our HIV response

Outline

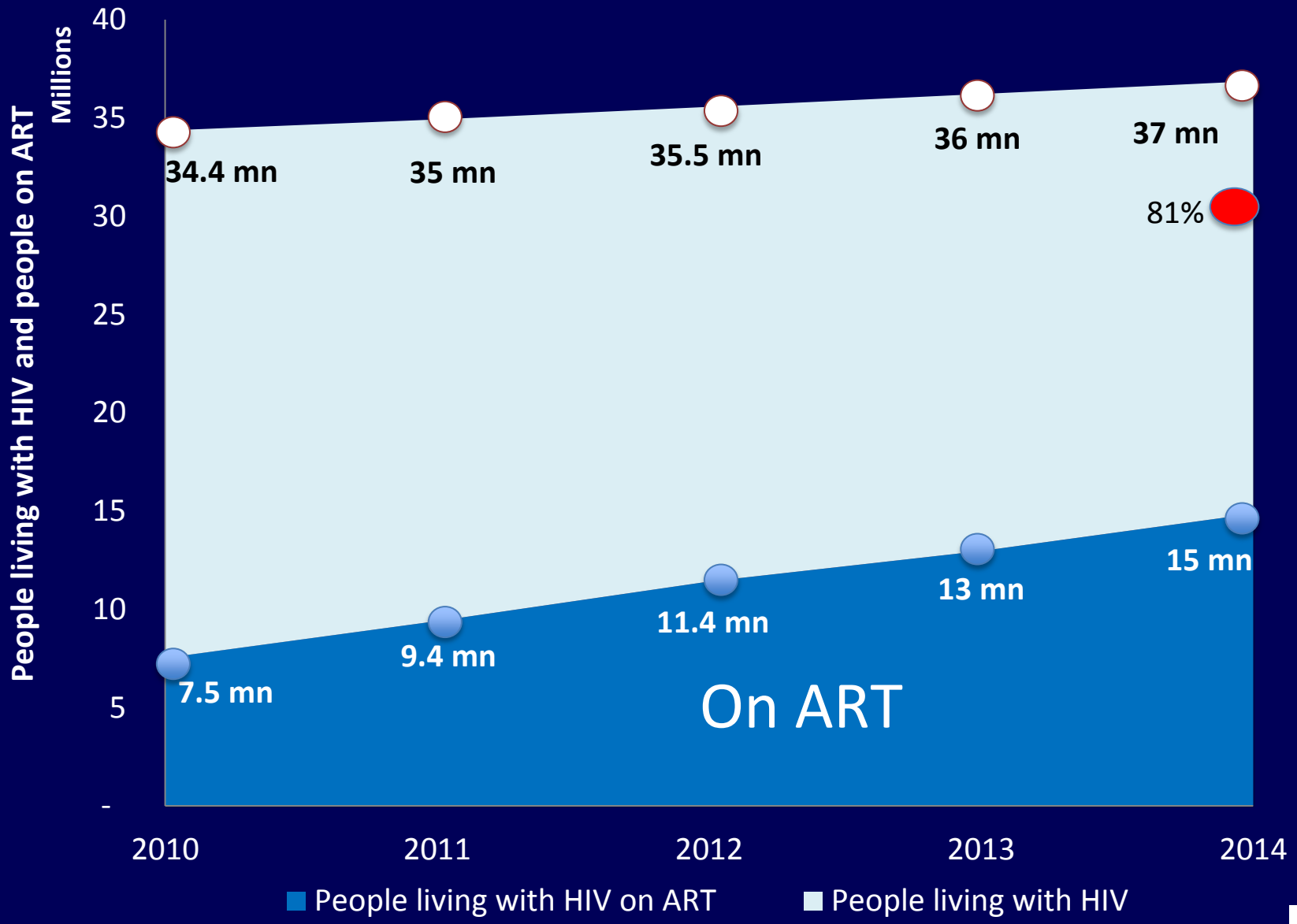
- Current situation
- Bottlenecks
  - Accountability and open data
  - M and E and cascade
  - Policy
  - Global financial situation
  - Leadership

Are we on track to end epidemic?

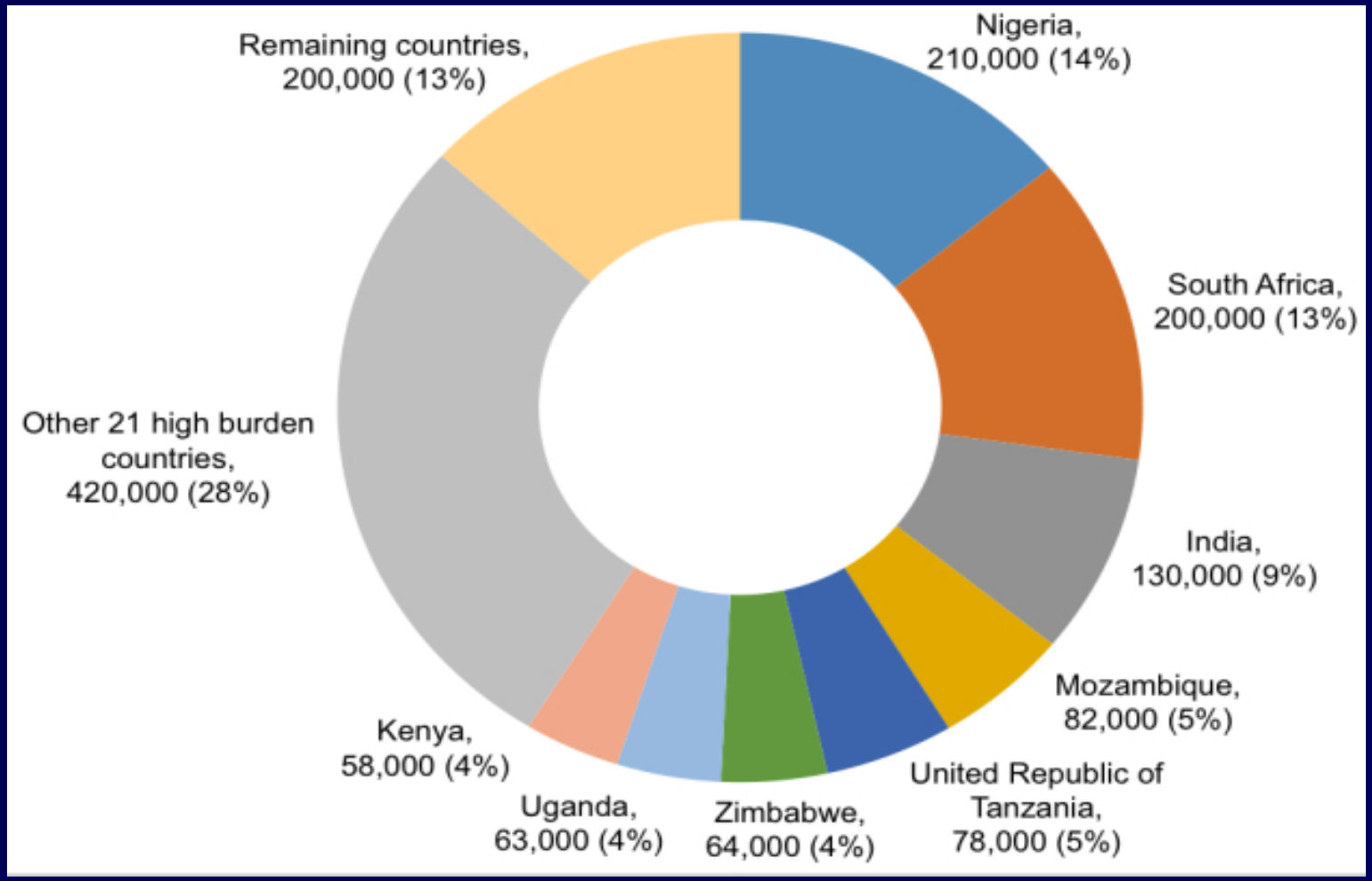
By end of 2014:

- ~50% of people living with HIV do not know their status
- ~22 million (59%) are not on treatment
- ~1.2 million deaths
- ~2 million new infections (5480 per day; 228 per hour)

Global access to HIV treatment, 2010-2014

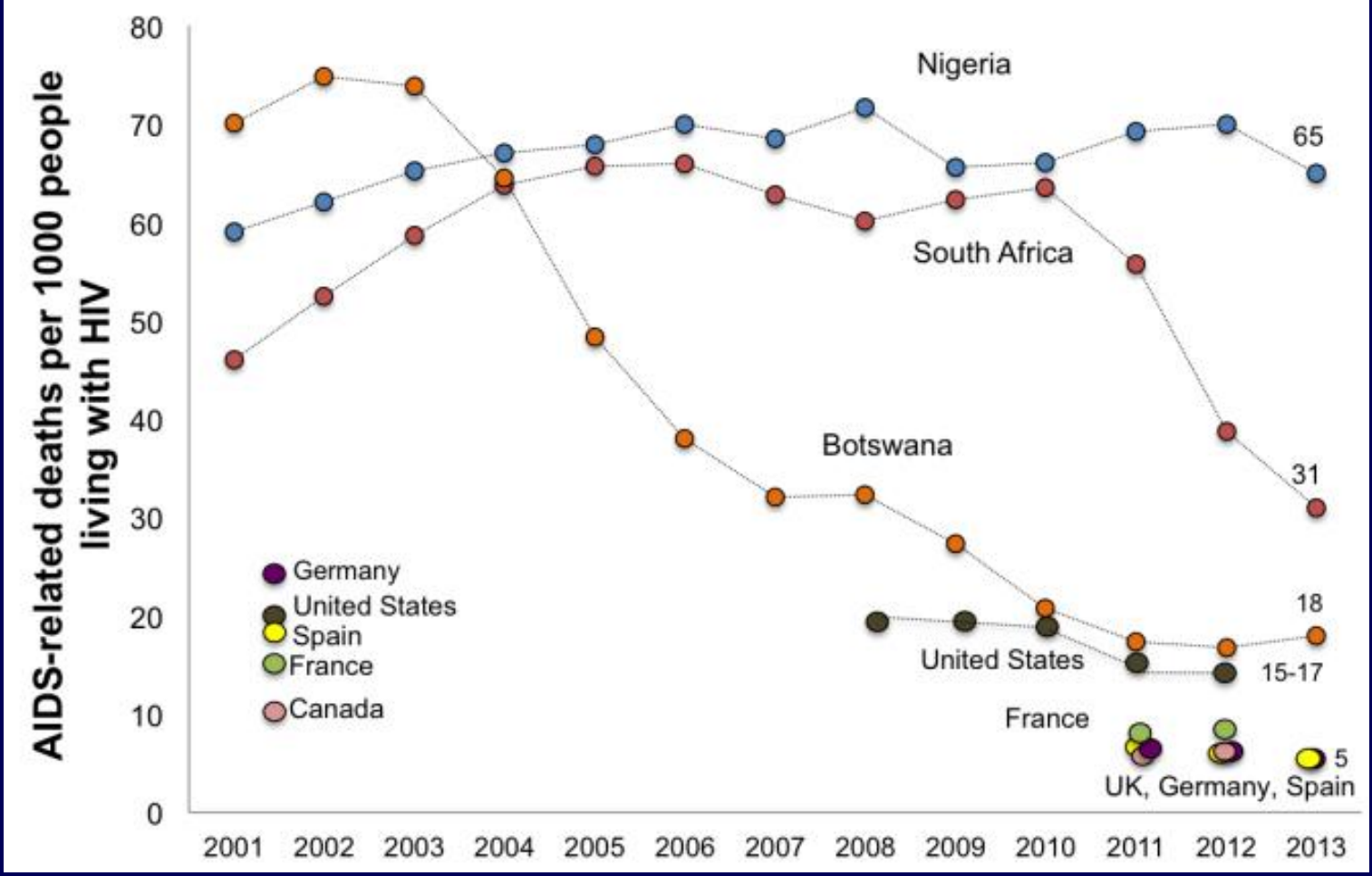


Eight countries account for 59% of Global AIDS Deaths, 2013



Granich R, Gupta S, Hersh B, Williams B, Montaner J, Young B, et al. PLoS ONE. 2015

Trends in estimated death rate per 1000 PLHIV, 2011-2013

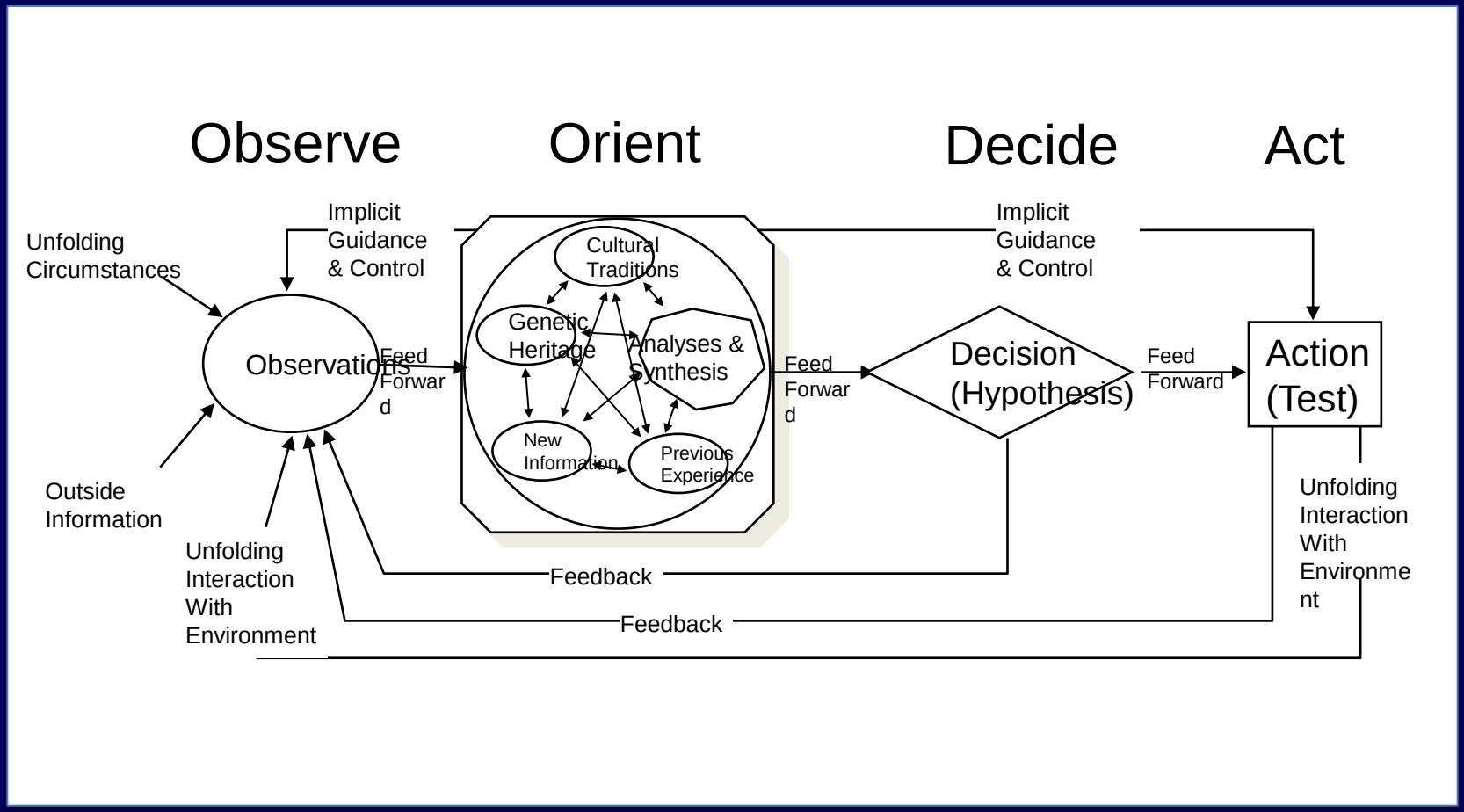


Trends in AIDS deaths, new infections and ART coverage in the top 30 countries with the highest AIDS mortality burden; 1990-2013. Granich et al. PlosOne, 2015

Outline

- Bottlenecks
  - Monitoring and evaluation
  - Policy
  - Cascade
  - Global finance
  - Research ethics
  - Leadership
  - Defining end game and metrics for success
  - PrEP vs Tx
  - Community engagement and activist voice

Information delay bottleneck



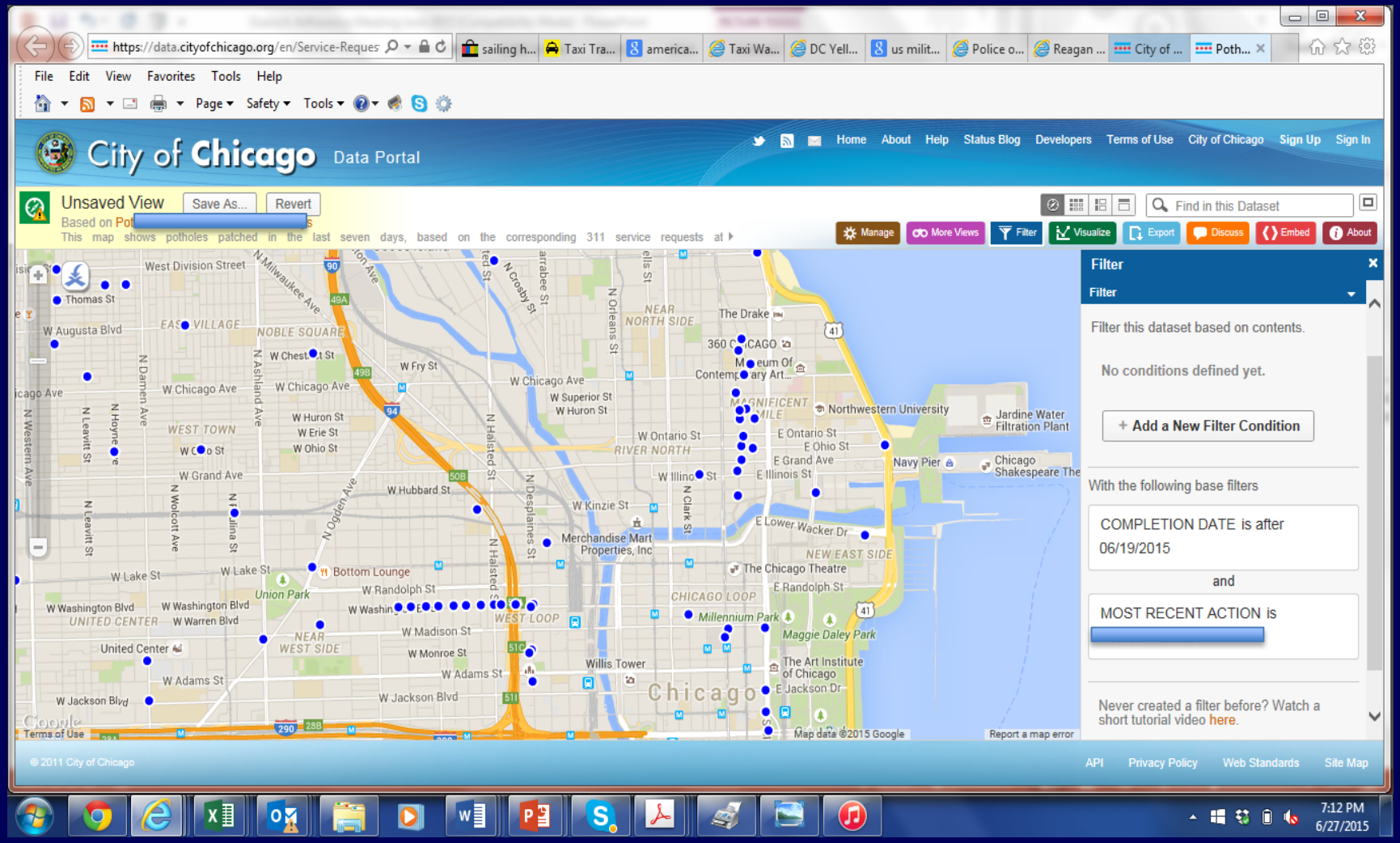
Shorten OODA loop

Data hoarding bottleneck

Open data principles (Sebastapol, California 2007)

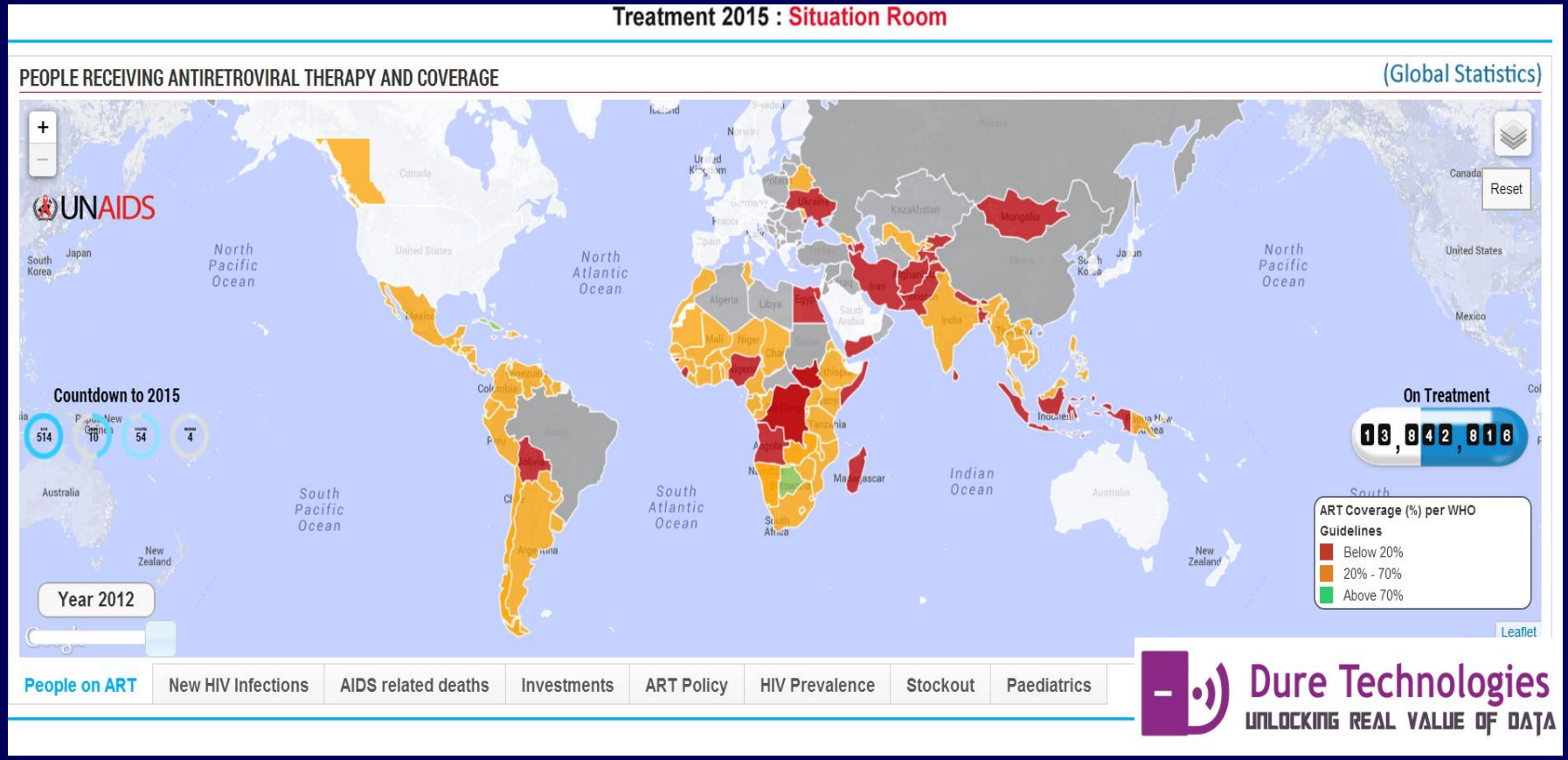
1) Complete
2) Primary
3) Timely
4) Accessible
5) Machine processable (not image)
6) Non-discriminatory (anyone, anon)
7) Non-proprietary
8) License-free

Example of near real time open data



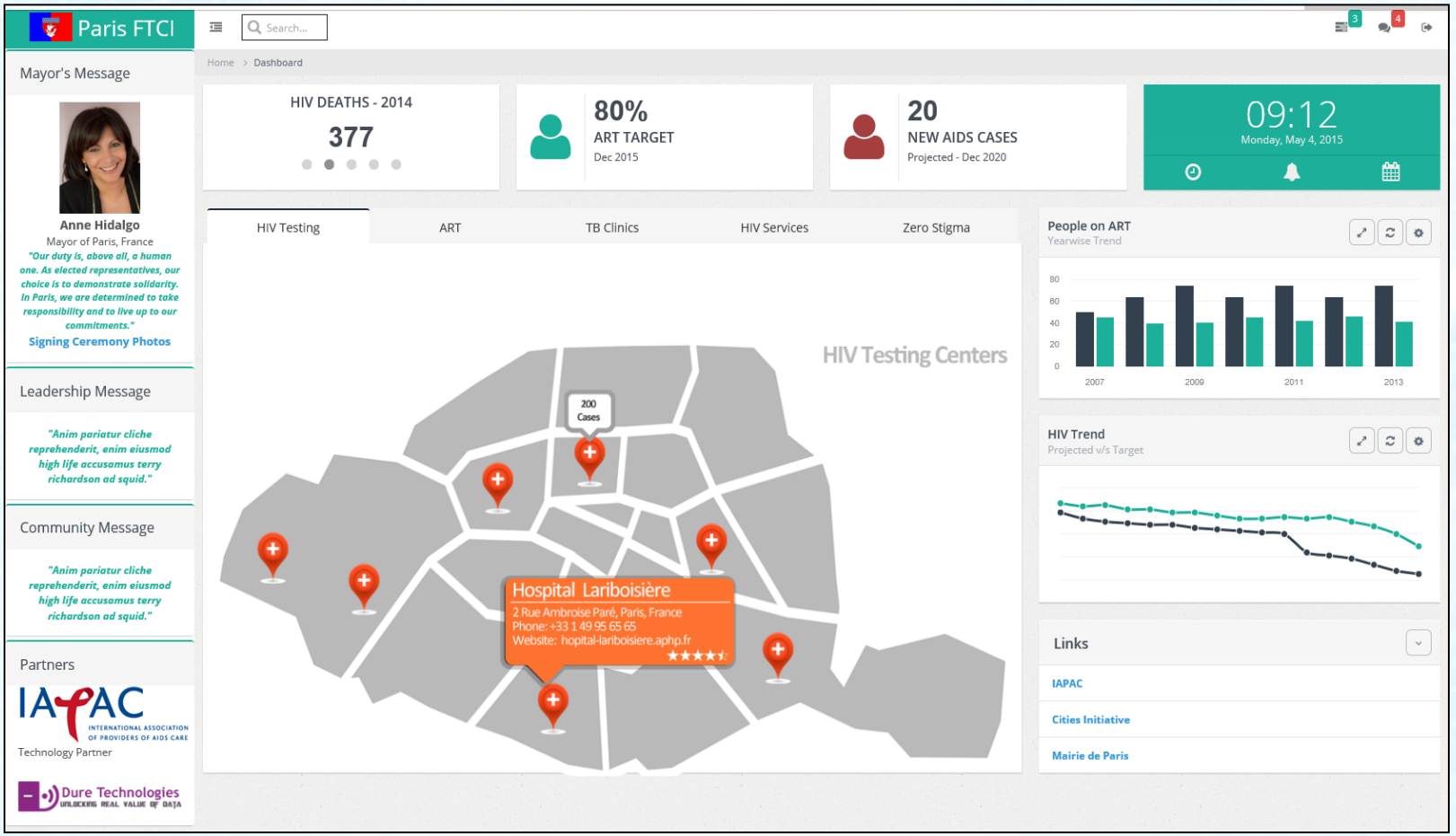
Bonus question beer or soft drink…

UNAIDS Situation Room Opening Page



- Note counter—time and number on ART
- Google map based—drill down possible
- Slider allows for backward look at previous years

FAST-TRACK CITY DASH BOARD



Dure Technologies
UNLOCKING REAL VALUE OF DATA

IAPAC
INTERNATIONAL ASSOCIATION OF PROVIDERS OF AIDS CARE

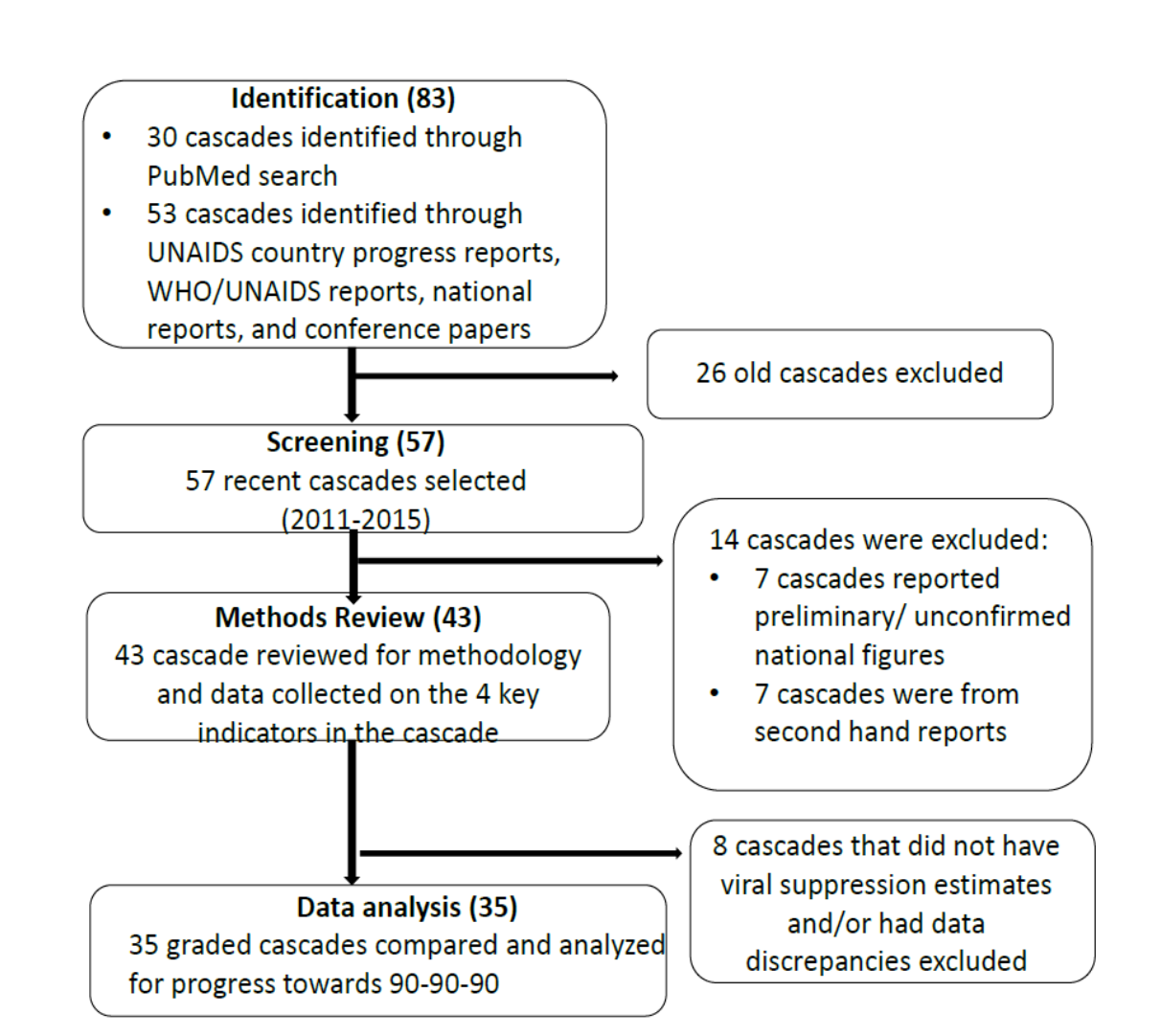
UNAIDS targets: harnessing treatment as prevention

Know status | On treatment | Virally suppressed

Cascade:

90% | 81% | 73%

Public Domain Cascade Search

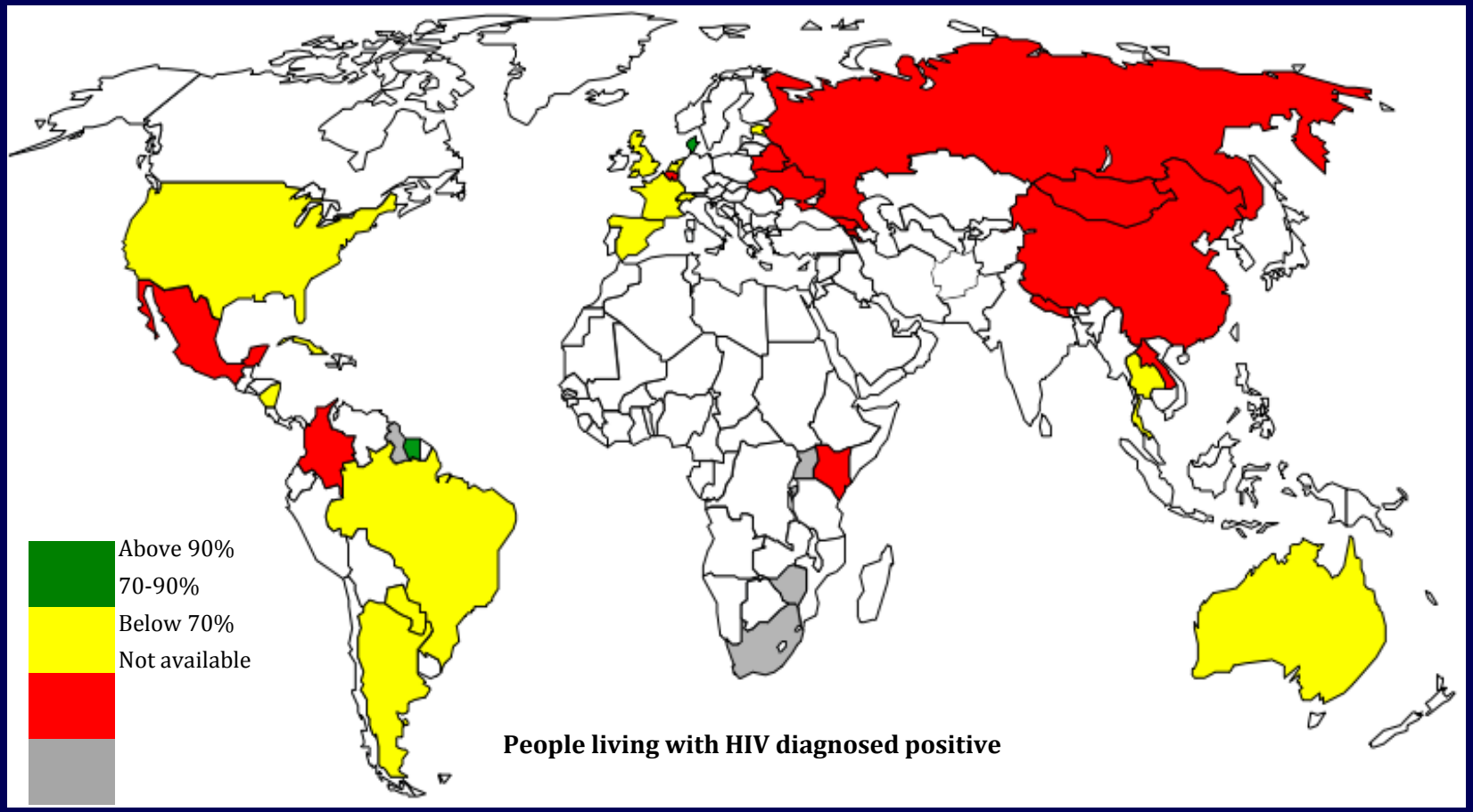


Methods review: high, medium, low quality methods

Appendix: Table 1

Country	Source	Estimated PLHIV	Diagnosed	On ART	Viral suppression	Quality
Antigua and Barbuda	Newspaper article	Data not available	National programme data	National programme data	Data not available	Incomplete
Argentina	National programme report	UNAIDS estimate	Not available	Not available	VL <50 copies/mL Not available	Source?
Armenia	UNAIDS meeting report	UNAIDS estimate	Not available	Not available	VL <250 copies/mL Not available	Source?
Australia	National surveillance report	Diagnosed + Undiagnosed (based on cross-sectional prevalence surveys and on reported HIV and AIDS cases)	National HIV Registry and estimation of deaths	ART coverage is estimated as average of 4 approaches: ARV prescription count (Australian HIV Observational Database or AHOD); self-reported ART use in large national survey; pharmacy dispensing data from New South Wales; study in Victoria analyzing data on ARVs and non-identified individuals receiving ART in Melbourne	VL <400 copies/mL Calculated as proportion of people with viral suppression recorded in AHOD (cohort size of 3,972)	Medium
Belarus	National programme review by WHO	Numbers based on estimate & personal communications with the Infectious Disease Hospital in Minsk	Numbers based on estimate & personal communications with the Infectious Disease Hospital in Minsk	Numbers based on estimate and personal communications with the Infectious Disease Hospital in Minsk	Numbers based on estimate and personal communications with the Infectious Disease Hospital in Minsk	
Belgium	National cohort data	UNAIDS estimate	National registration of new diagnosis	National cohort data	VL <500 copies/mL National cohort data	High
Bhutan	UNAIDS country progress report	UNAIDS estimate	National programme PLHIV database	National programme PLHIV database	Data not available	Incomplete
Brazil	National programme report	Sistema de Informacao de Agravos de Notificacao or System for notifiable diseases information (SINAN) and Sistema de Informacao de Mortalidade System on Information on Mortality (SIM)	SINAN and SIM	Sistema de Controle Logistico de Medicamentos or Logistics Control System of Medicines (SICLOM)	VL <1,000 copies/mL Sistema de Controle de Exames Laboratoriais or System for Laboratory Tests Control (SISCEL)	Medium
China	WHO-UNAIDS meeting presentation	UNAIDS estimate	National Center for AIDS/STD Control and Prevention (NCAIDS) programme data	NCAIDS programme data	VL <1,000 copies/mL NCAIDS programme data (viral load suppression measured from a sub-sample of those on ART)	Medium
Colombia	UNAIDS report	UNAIDS estimate	Ministry of Health and Social protection data	UNAIDS Global AIDS response progress reporting	VL <1,000 copies/mL National programme data	Medium
Cuba	WHO report	Ministry of Public Health, HIV Registry. Estimated as the difference between	HIV Registry (Calculated as everyone diagnosed between 1986 and 2012 minus deaths)	HIV Registry	Undetectable viral load HIV Registry	Medium

Proportion of people living with HIV diagnosed

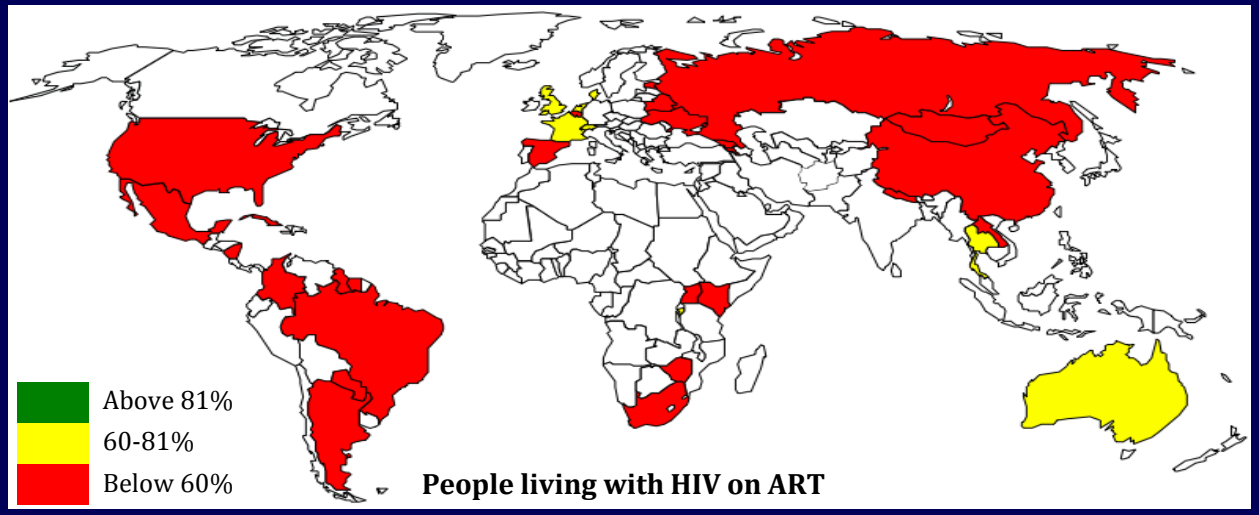


(35 countries)

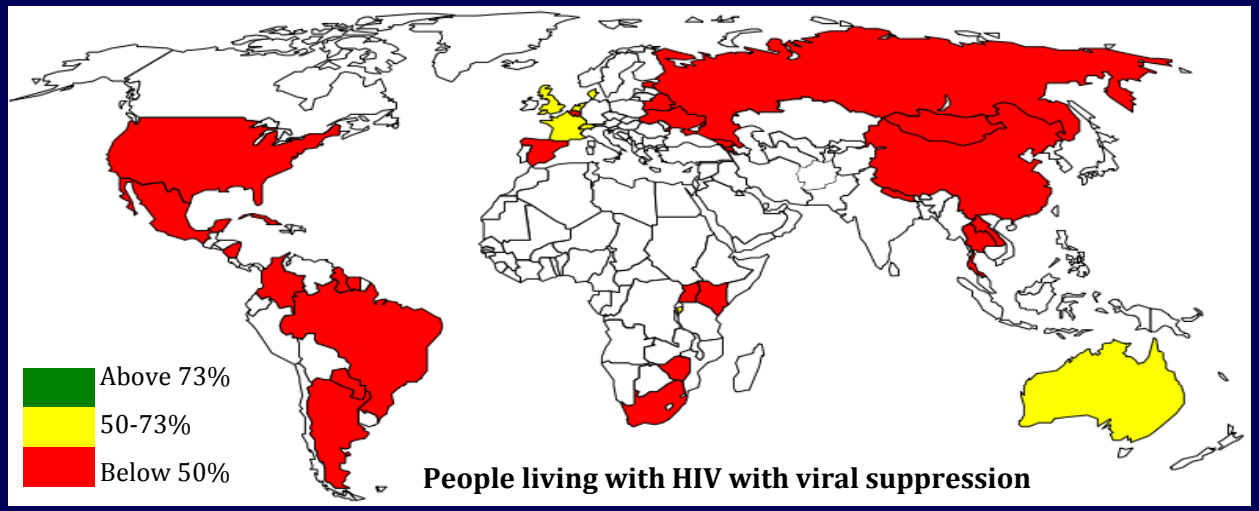
Source: Granich *et al* (2015), Global HIV Care Continuum: evaluation of cascade methodology and 90-90-90 targets for 35 Countries (in preparation)

Proportion of people living with HIV on ART and virally suppressed (35 countries)

On ART

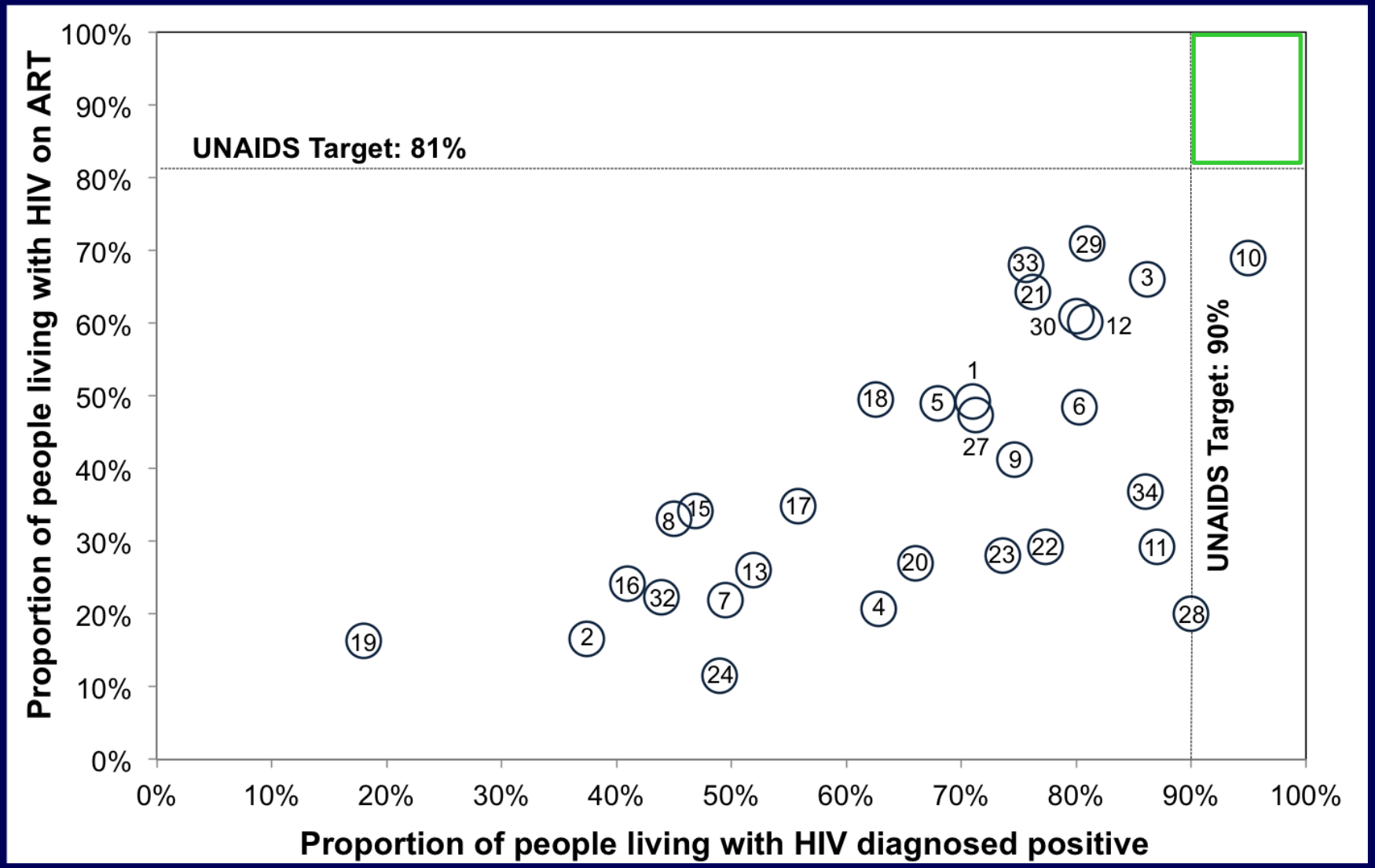


Suppressed



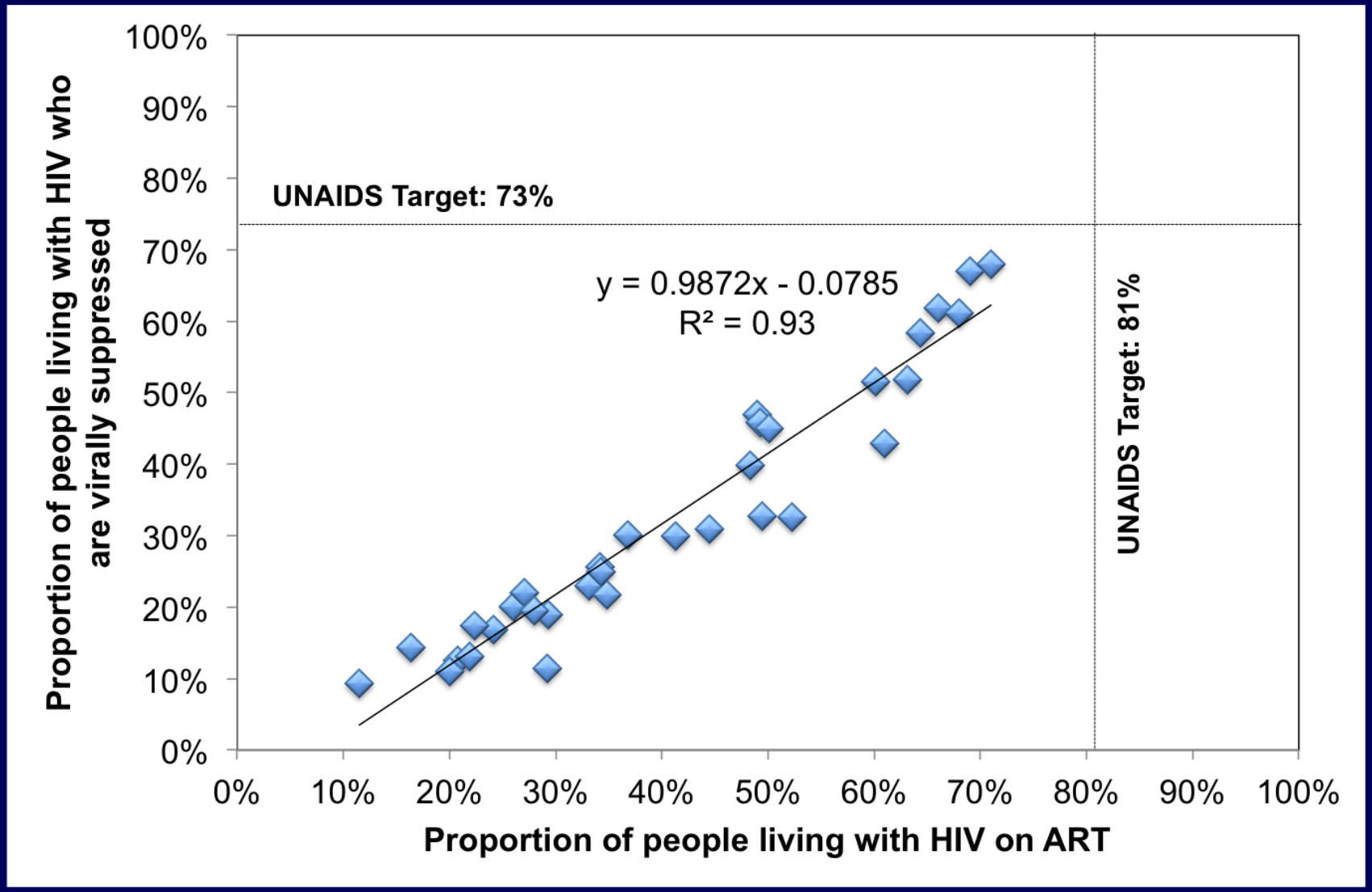
Source: Granich *et al* (2015), Global HIV Care Continuum: evaluation of cascade methodology and 90-90-90 targets for 35 Countries (in preparation)

Proportion of people living with HIV diagnosed positive versus those on ART (35 countries)



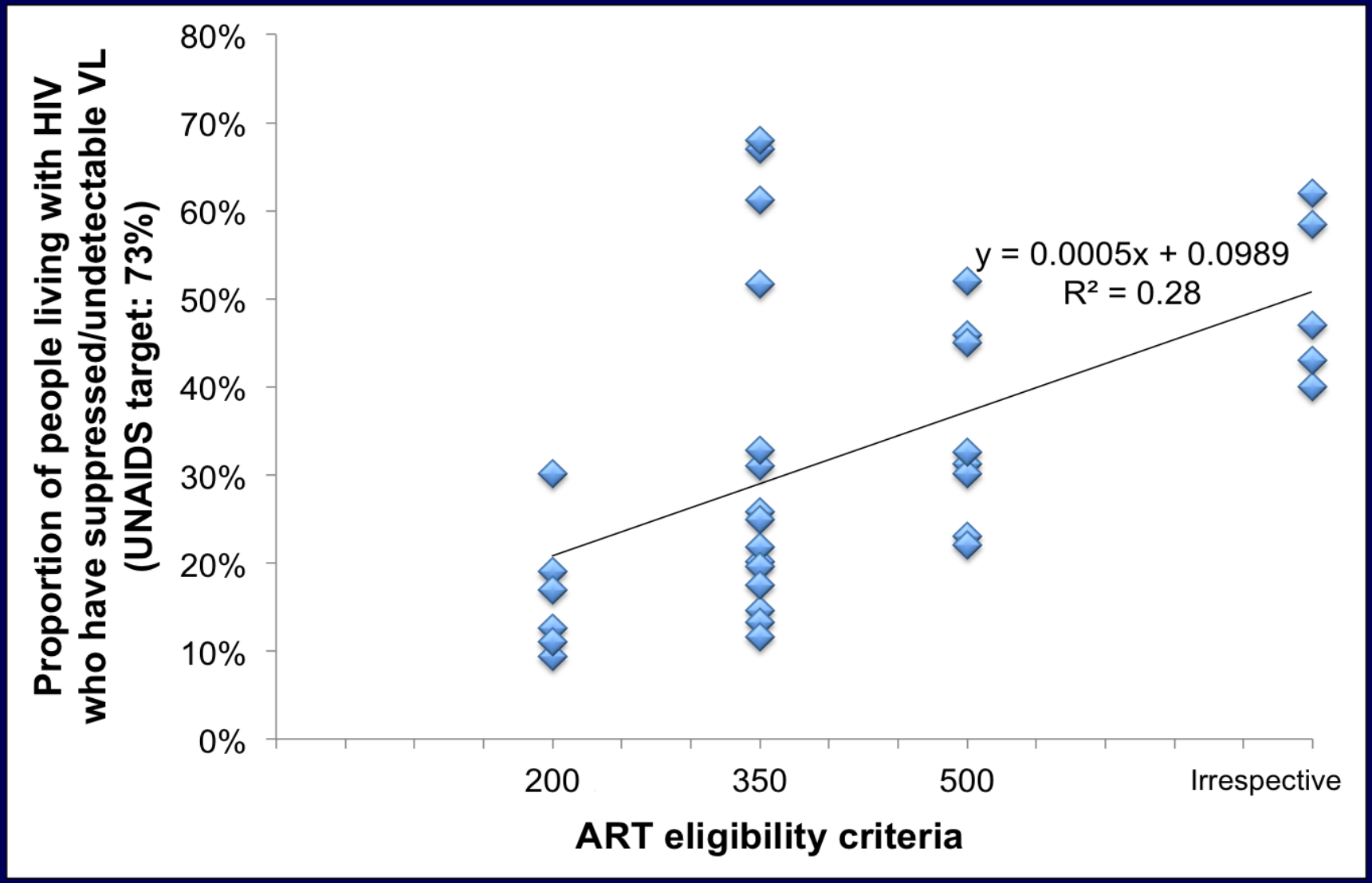
Source: Granich *et al* (2015), Global HIV Care Continuum: evaluation of cascade methodology and 90-90-90 targets for 35 Countries (in preparation)

Proportion of people living with HIV on ART versus those with viral suppression



Source: Granich *et al* (2015), Global HIV Care Continuum: evaluation of cascade methodology and 90-90-90 targets for 35 Countries (in preparation)

ART eligibility criteria versus proportion of people living with HIV with viral suppression



Source: Granich *et al* (2015), Global HIV Care Continuum: evaluation of cascade methodology and 90-90-90 targets for 35 Countries (in preparation)

Clearing bottleneck to measure 90-90-90

- Standardize cascade methods
- Make cascades available in public domain
- Improve viral load measurements to be more representative of people on ART
- Move quickly toward cohort and ability to follow patients from diagnosis to viral suppression
- Implement periodic population based surveillance of HIV diagnosis and VL suppression

The translating science to service delivery bottleneck

Scientific discovery

New WHO Guidelines

Country adaptation

Finance

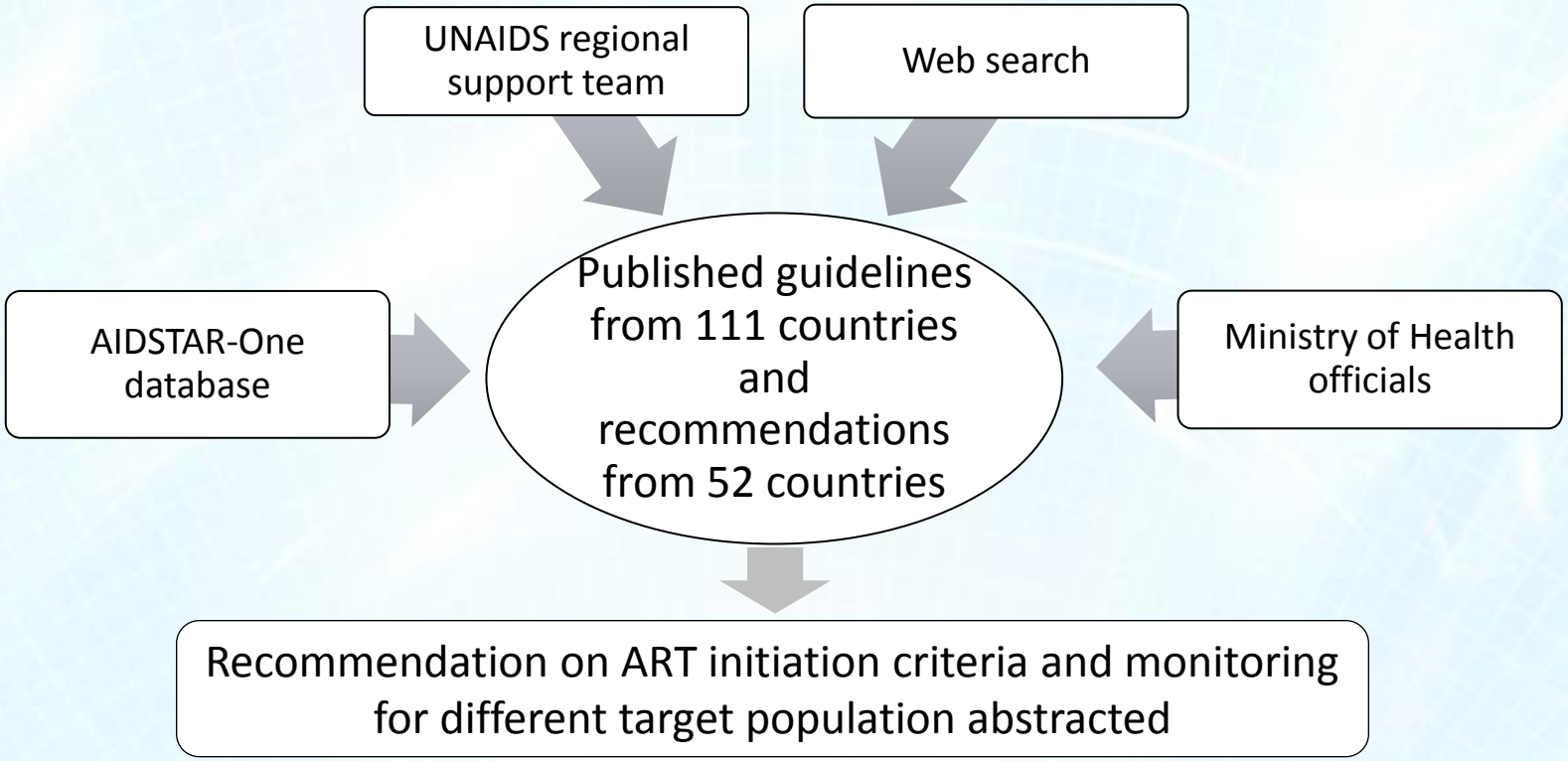
Service delivery

How can we accelerate translation?

Objectives and methodology: "wiki strategy"

Objective:

Compare national ART guidelines for 149 countries with WHO 2013 guidelines



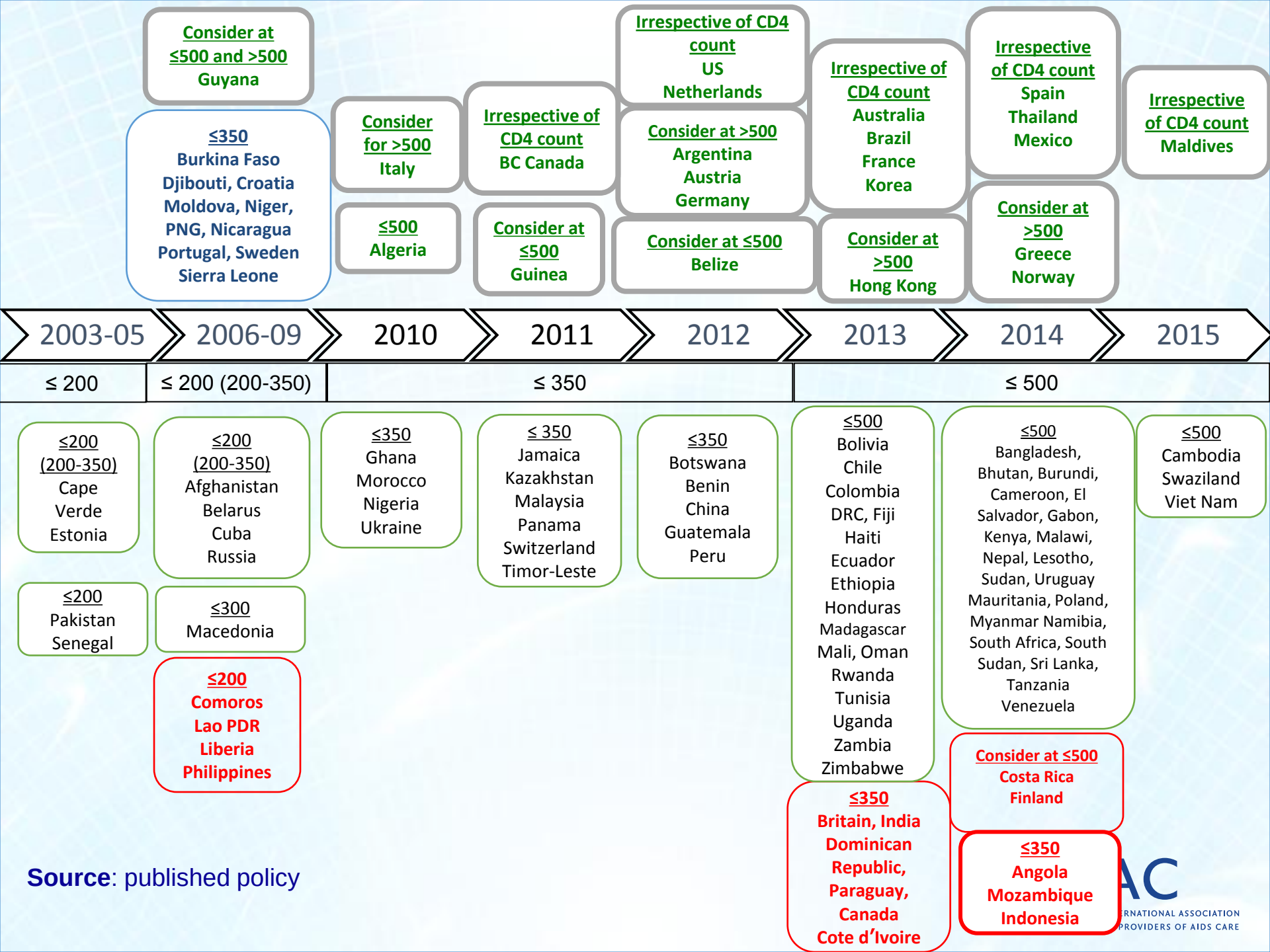
Search end date: September 2015

IAPAC
INTERNATIONAL ASSOCIATION OF PROVIDERS OF AIDS CARE

ART initiation for asymptomatic people

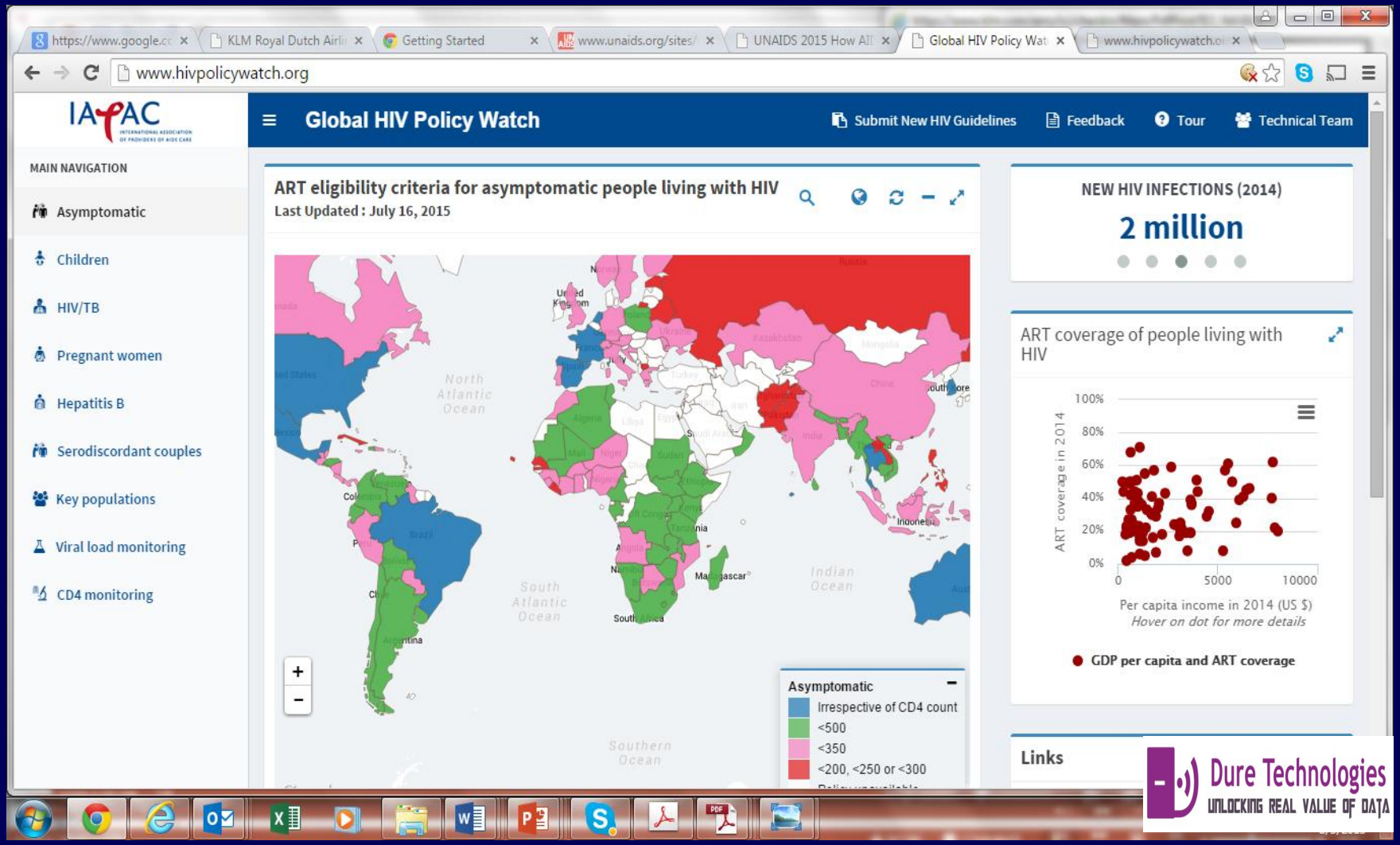
ART initiation criteria	No. of Countries	People with HIV (2014)	Countries
Irrespective of CD4 count	**10**	2,925,000 (8%)	Australia, Brazil, British Columbia (Canada), France, Korea, Maldives, Mexico, the Netherlands, Papua (Indonesia), Spain, Thailand, US
Consider for >500	**8**	142,000 (1%)	Argentina, Austria, Germany, Greece, Guyana, Hong Kong, Italy, Norway
≤500 WHO recommendation	**42**	19,485,000 (53%)	Algeria, Bangladesh, Bhutan, Bolivia, Burundi, Cambodia, Cameroon, Chile, Colombia, Democratic Republic of Congo, Ecuador, El Salvador, Fiji, Ethiopia, Gabon, Haiti, Honduras, Kenya, Lesotho, Mali, Madagascar, Malawi, Mauritania, Myanmar, Namibia, Nepal, Oman, Poland, Rwanda, South Africa, South Sudan, Sri Lanka, Sudan, Swaziland, Tanzania, Tunisia, Uganda, Uruguay, Venezuela, Viet Nam, Zambia, Zimbabwe
≤350 (consider for CD4 ≤ 500)	**4**	129,000 (<1%)	Belize, Costa Rica, Finland, Guinea
≤350	**34**	11,044,000 (30%)	Angola, Benin, Botswana, Britain, Burkina Faso, Canada, China, Cote d'Ivoire, Croatia, Djibouti, Dominican Republic, Ghana, Guatemala, India, Indonesia, Jamaica, Kazakhstan, Malaysia, Moldova, Morocco, Mozambique, Nicaragua, Niger, Nigeria, Panama, Papua New Guinea, Paraguay, Peru, Portugal, Sierra Leone, Sweden, Switzerland, Timor-Leste, Ukraine
≤300	**1**	200 (<1%)	Macedonia
≤200 (consider for CD4 ≤ 350)	**6**	1,456,000 (4%)	Afghanistan, Belarus, Cape Verde, Cuba, Estonia, Russia
≤200	**6**	218,000 (1%)	Comoros, Lao PDR, Liberia, Pakistan, Philippines, Senegal

Source: published policy



Source: published policy

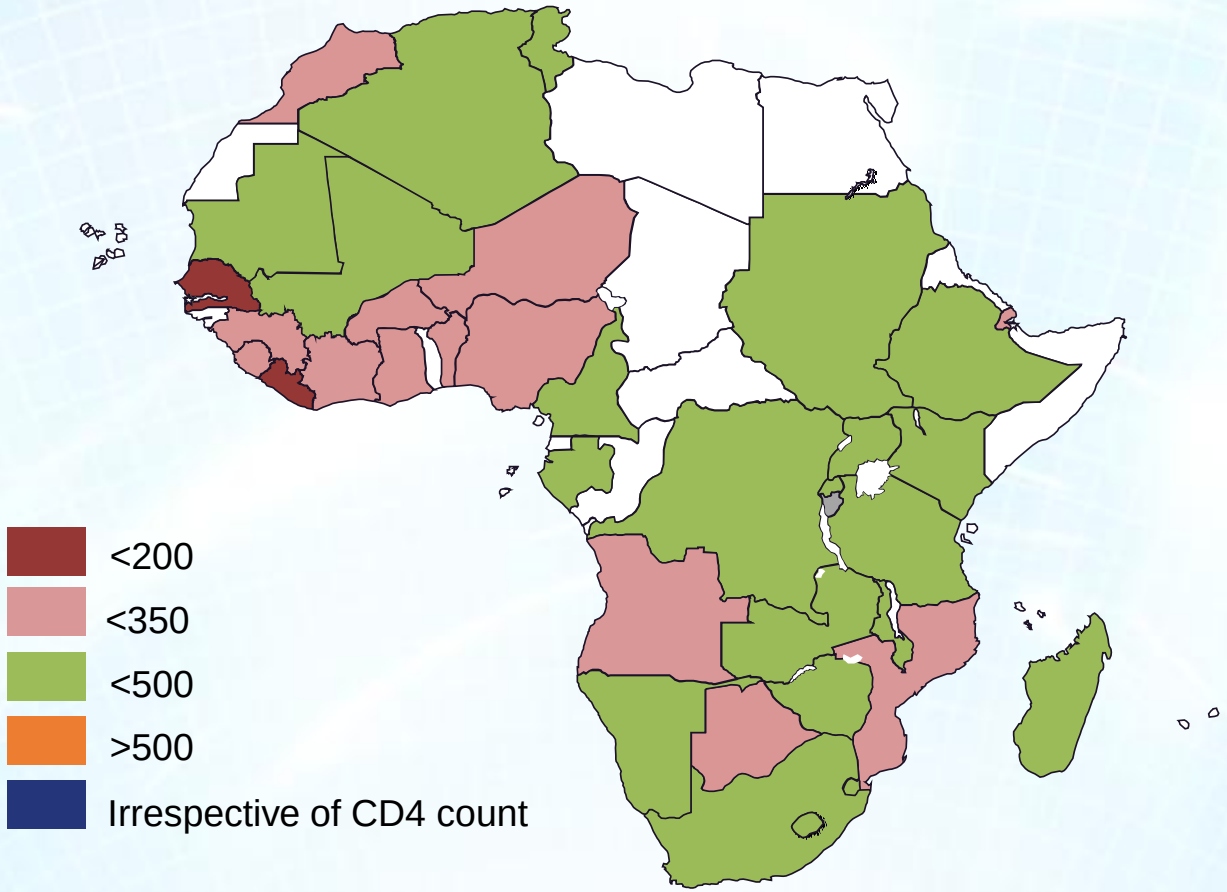
HIV policy is moving to test and treat



www.HIVpolicywatch.org

ART initiation criteria in Africa

2013 WHO Recommendation : CD4 count ≤ 500 cells/mm^3



Source: published policy

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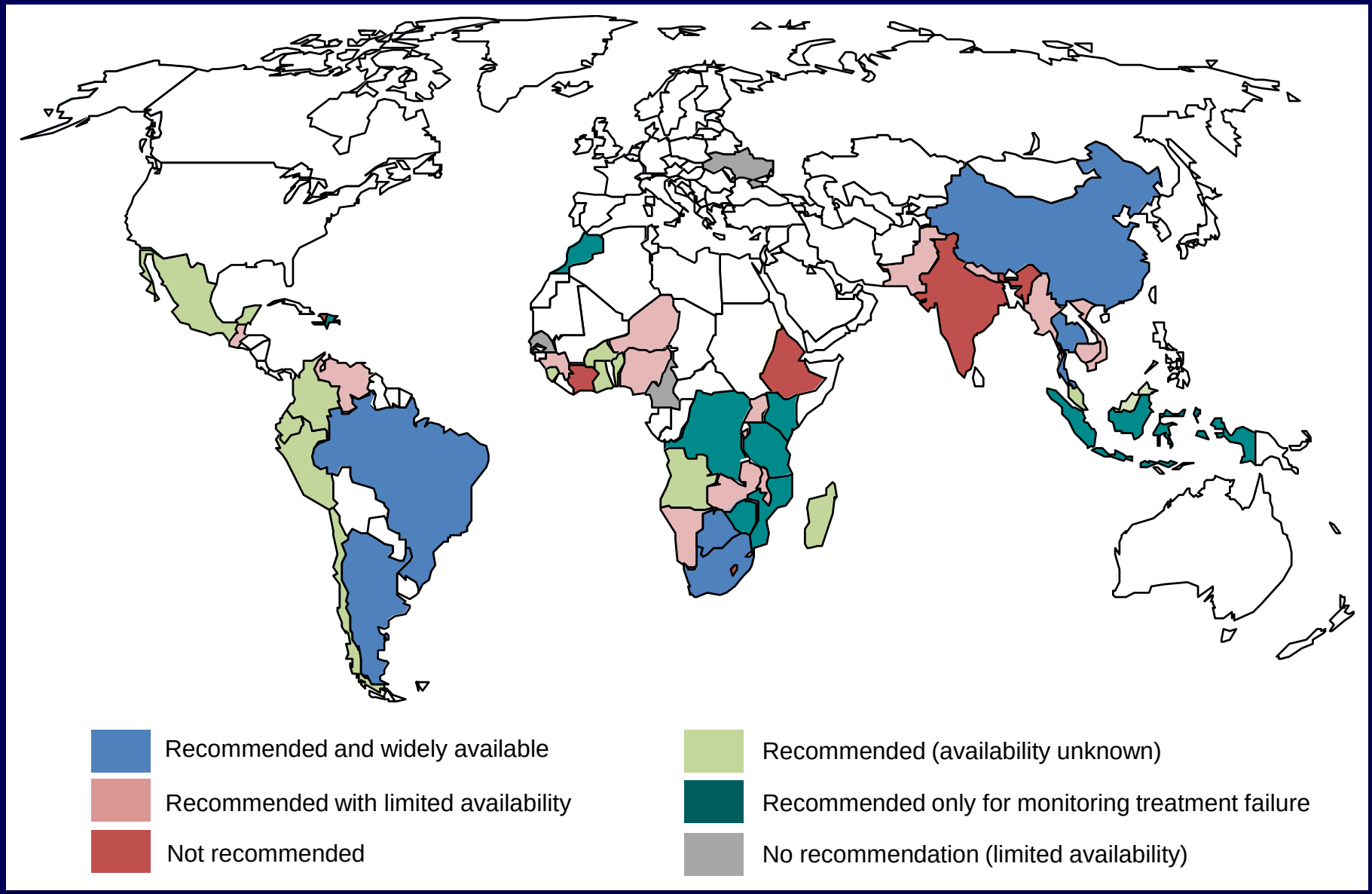
Viral Load for ART monitoring (51 countries)



Source: MSF Issue Brief: Getting to Undetectable

Policy Lag - Methodology

Identified 202 national ART guidelines from 111 countries (96% global burden)

Sources: IAPAC database, AIDSTAR-One database, Internet search, and WHO, UNAIDS, CDC and MoH staff

Reviewed all guidelines for

a. Month and year of publication
b. ART eligibility criteria for asymptomatic PLHIV

No. of months taken to adopt WHO guidelines calculated for

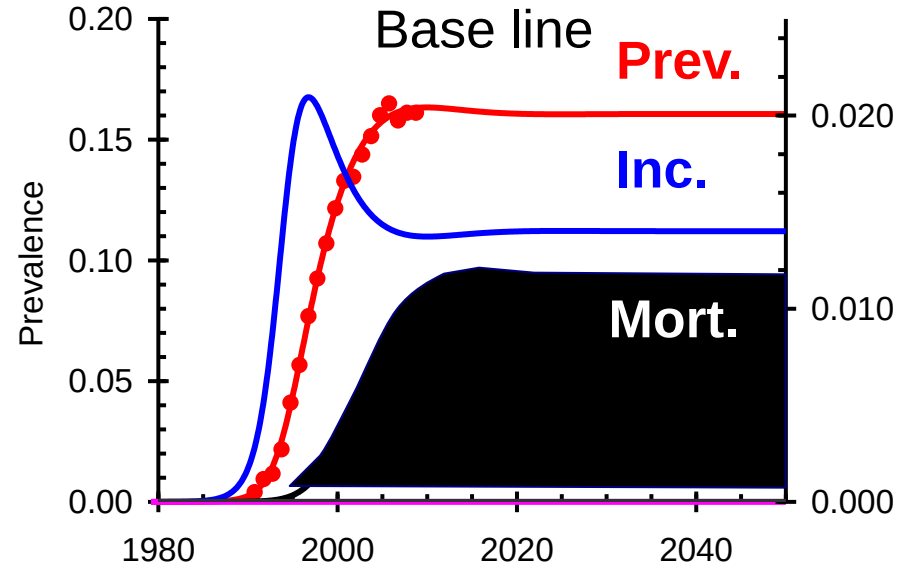
a. 52 countries that changed to <350 after WHO 2009 guidelines
b. 41 countries that changed to <500 after WHO 2013 guidelines

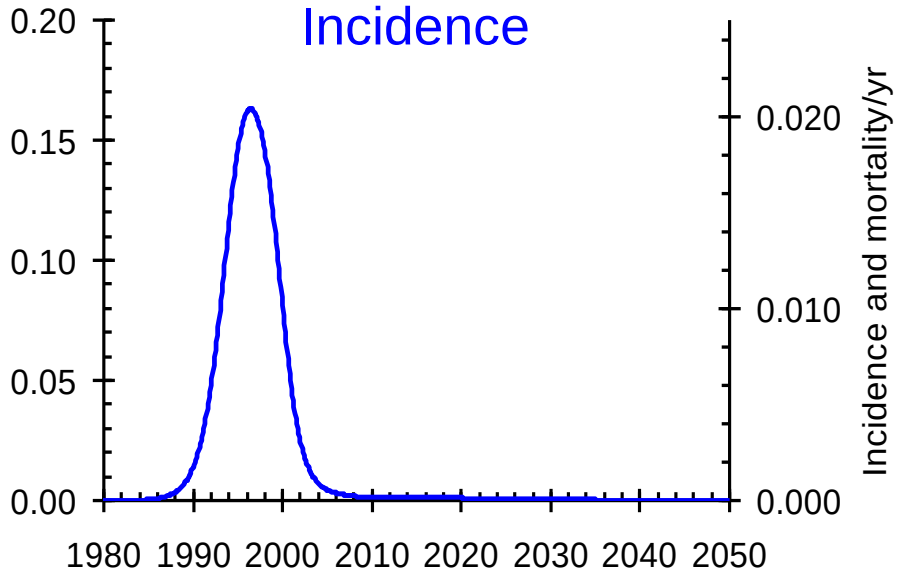
$$\text{Average time to adopt WHO guidelines} = \frac{\text{Total months taken to adopt WHO guidelines}}{\text{Total no. of guidelines}}$$

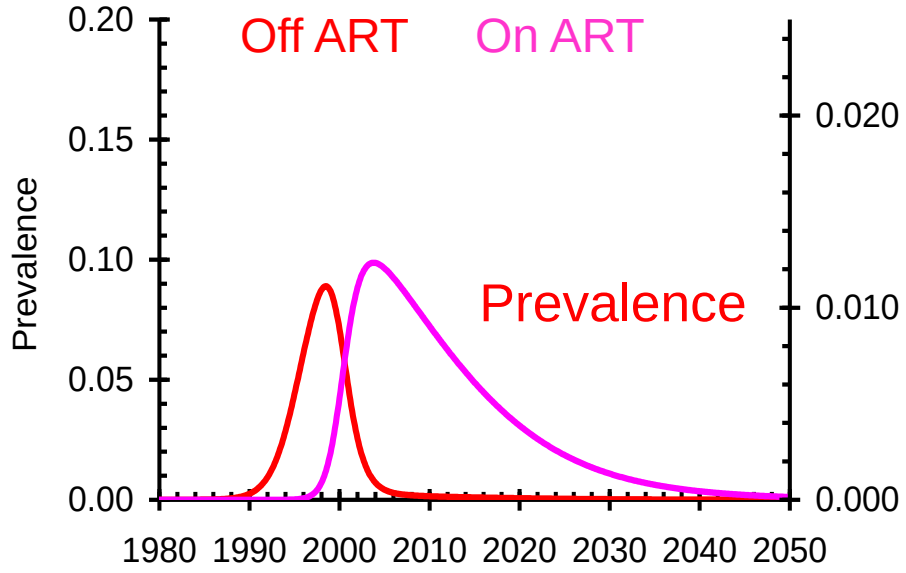
Policy Lag

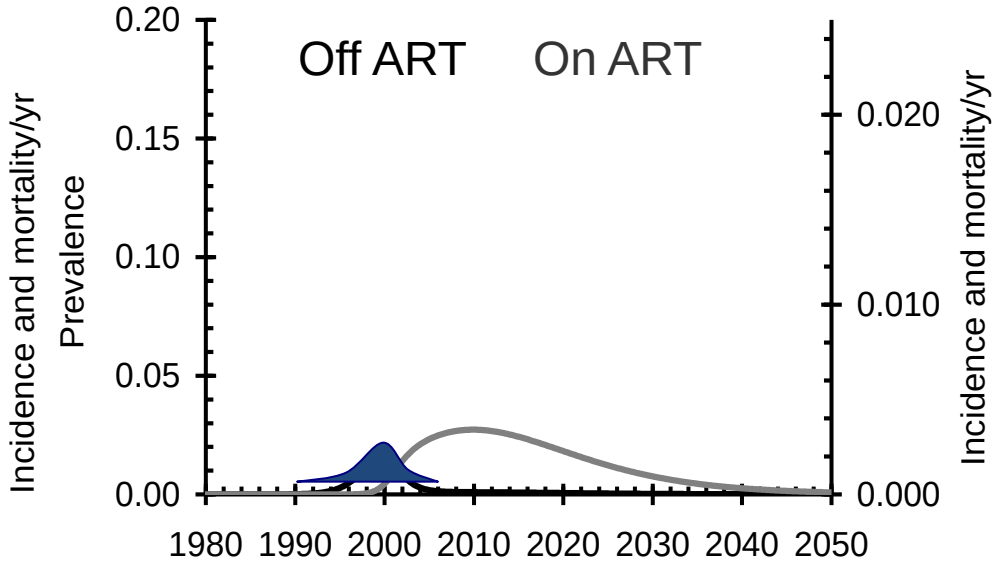
	WHO 2009 guidelines	WHO 2013 guidelines
Date of publication	October, 2009	June, 2013
ART eligibility criteria recommended	<350 cells/mm^3	<500 cells/mm^3
No. of countries that adopted the recommendation	52 (78% burden)	41 (53% burden)
Average time to adopt the WHO guidelines (Range)	**1 year 7 months** (1 month – 3 years 9 months)	**9 months** (1 month – 2 years)
Countries yet to adopt the recommendation	**13** (5% burden)	**47** (35% burden)

Accountability and the retrospectoscope





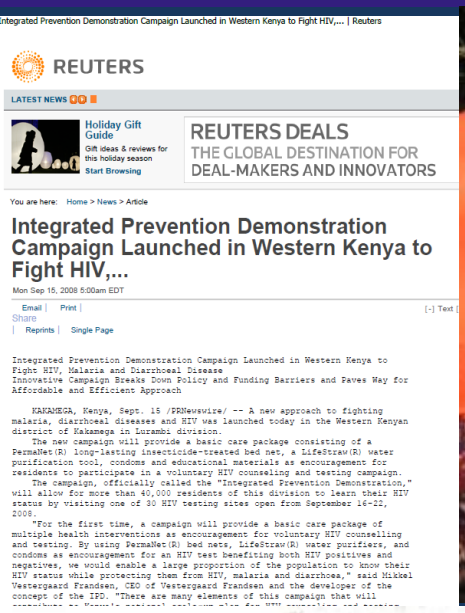




HIV in South Africa: test and treat starting in 1995

Williams 2010

Counseling and testing is feasible and works in a wide variety of settings—need to go to scale


Integrated Prevention Demonstration Campaign Launched in Western Kenya to Fight HIV,... | Reuters

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Integrated Prevention Demonstration Campaign Launched in Western Kenya to Fight HIV,...

Mon Sep 15, 2008 5:00am EDT

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Integrated Prevention Demonstration Campaign Launched in Western Kenya to Fight HIV, Malaria and Diarrhoeal Disease
Innovative Campaign Breaks Down Policy and Funding Barriers and Paves Way for Affordable and Efficient Approach

KAKAMEGA, Kenya, Sept. 15 /PRNewswire/ -- A new approach to fighting malaria, diarrhoeal diseases and HIV was launched today in the Western Kenyan district of Kakamega in Lurambi division.

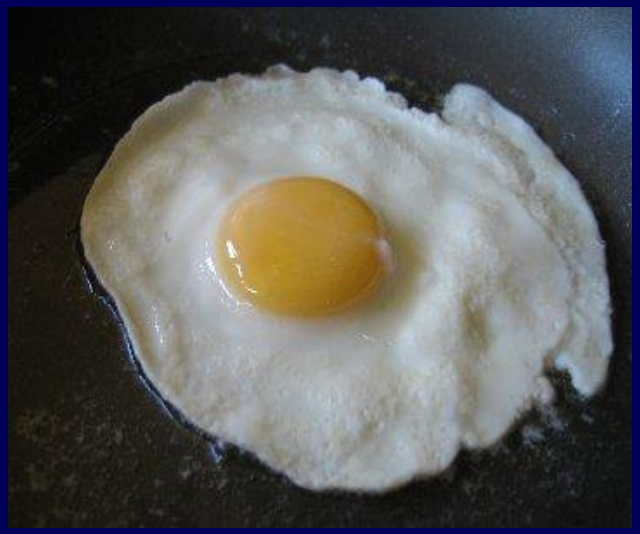
The new campaign will provide a basic care package consisting of a PermaNet(R) long-lasting insecticide-treated bed net, a LifeStraw(R) water purification tool, condoms and educational materials as encouragement for residents to participate in a voluntary HIV counseling and testing campaign.

The campaign, officially called the "Integrated Prevention Demonstration," will allow for more than 40,000 residents of this division to learn their HIV status by visiting one of 30 HIV testing sites open from September 16-22, 2008.

"For the first time, a campaign will provide a basic care package of multiple health interventions as encouragement for voluntary HIV counselling and testing. By using PermaNet(R) bed nets, LifeStraw(R) water purifiers, and condoms as encouragement for an HIV test benefiting both HIV positives and negatives, we would enable a large proportion of the population to know their HIV status while protecting them from HIV, malaria and diarrhoea," said Mikkel Vestergaard Frandsen, CEO of Vestergaard Frandsen and the developer of the concept of the IPD. "There are many elements of this campaign that will

Photos courtesy of Bunnell R, Marum E, and Vestergaard

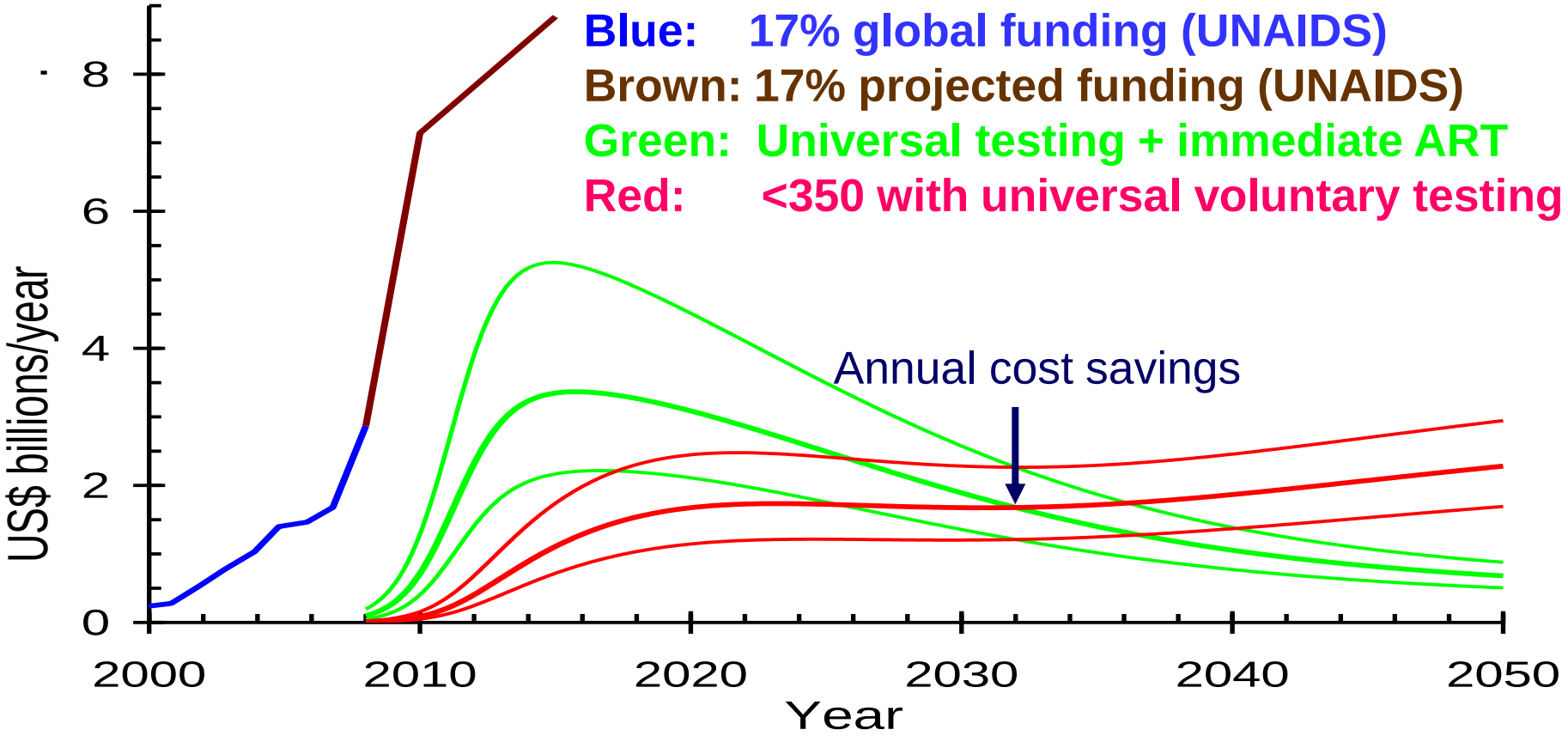
ART policy vs. funding confusion bottleneck



Can we afford to shift policy to meet 90-90-90 targets?

Can we afford not to?

Estimated and projected funding and costs: We appear to be in the right ball park….



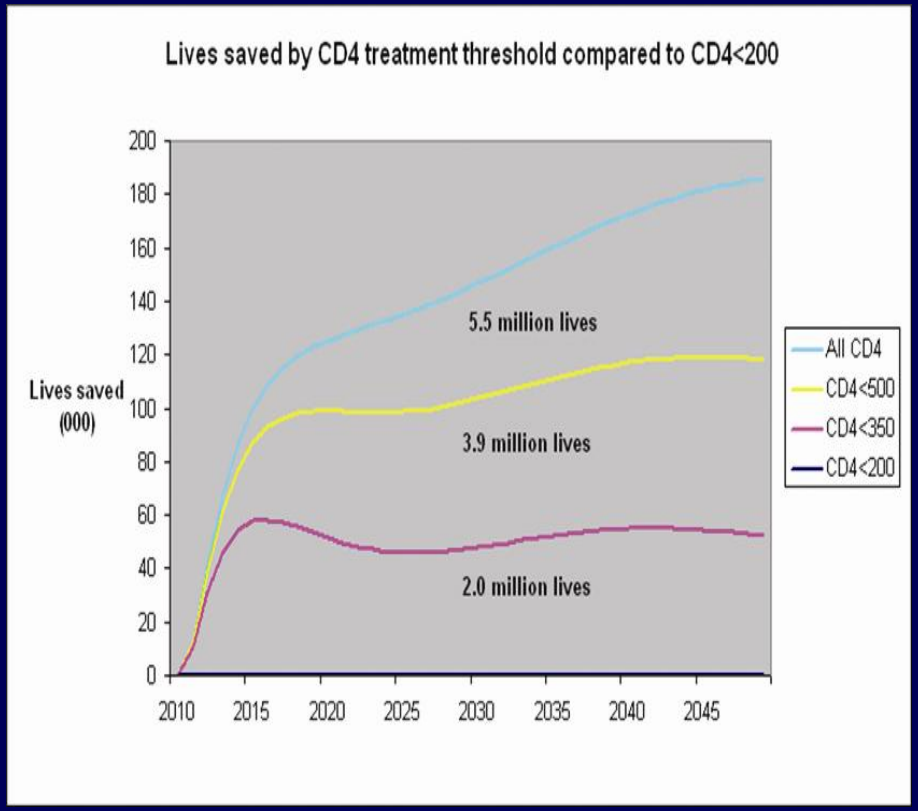
Cohen J. HIV/AIDS. The great funding surge. Science **2008** Jul 25;321(5888):512-9.

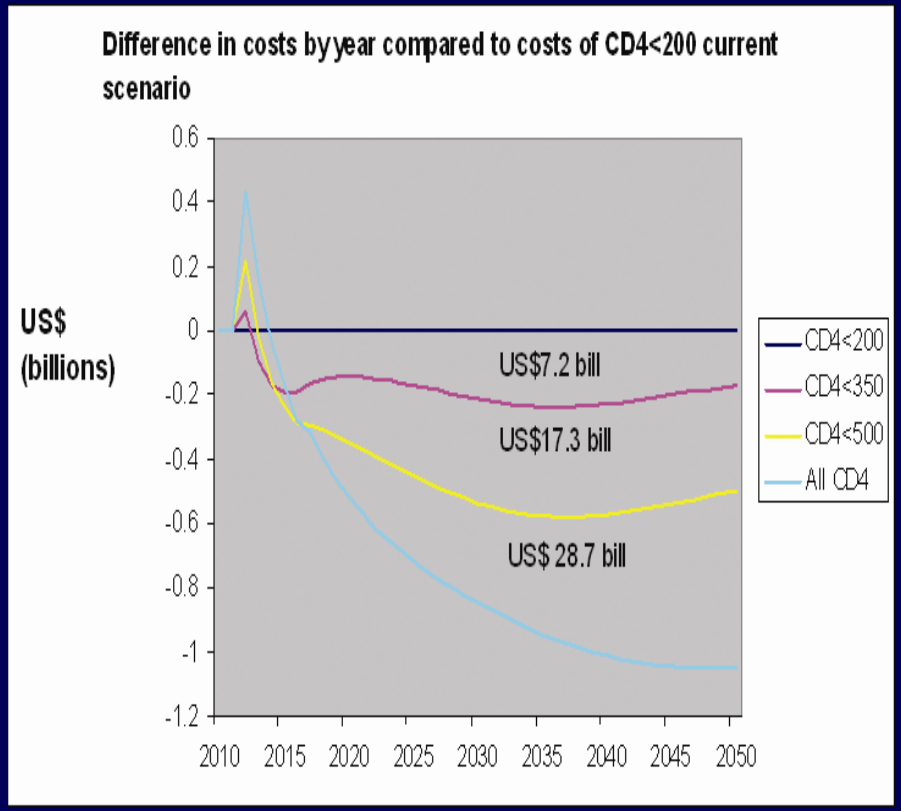
UNAIDS. Financial resources required to achieve universal access to HIV prevention, treatment, care and support.

UNAIDS Report (2007). http://data.unaids.org/pub/Report/2007/20070925_advocacy_grne2_en.pdf.

Granich *Lancet* 2008

Expanding treatment can save millions of lives and billions of dollars

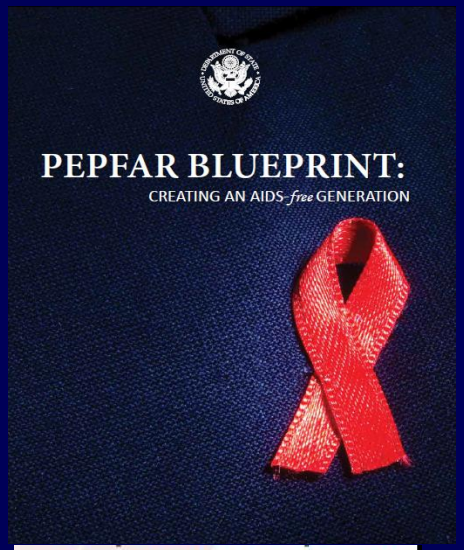


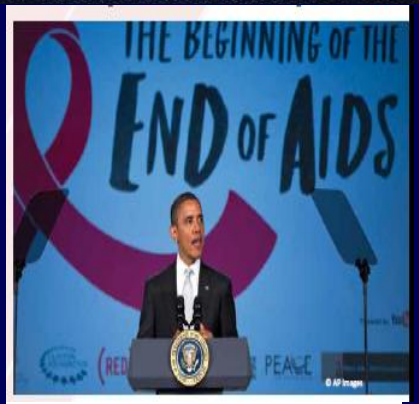


Potential lives and cost saved by expanding ART in South Africa

Granich et al. Expanding ART for Treatment and Prevention of HIV in South Africa: Estimated Cost and Cost-Effectiveness 2011-2050. Plos Med

PEPFAR 2012 Blueprint: modelling end of AIDS





November 29, 2012

As a nation, we are firmly committed to turning the tide on the 30-year-old fight against AIDS. That's why I proudly announced last year that creating an AIDS-free generation is a new policy imperative for the United States.

To be clear, we still face enormous challenges. Far too many people are dying from this disease. We need to reach more people with both prevention and treatment services. But today, thanks to remarkable scientific discoveries and the work of countless individuals, organizations and governments, an AIDS-free generation is not just a rallying cry—it is a goal that is within our reach.

At the International AIDS Conference this past July, I asked our Global AIDS Coordinator, Ambassador Eric Goosby, to prepare this blueprint outlining our path to helping create an AIDS-free generation. I want the next Congress, the next Secretary of State, and all of our partners here at home and around the world to understand everything we've learned and to have a road map for how the United States will contribute to an AIDS-free generation.

This blueprint should make one thing clear: the United States is and will continue doing our part. But creating an AIDS-free generation is too big a task for one government or one country. It requires the world to share in the responsibility. We call on partner countries, other donor nations, civil society, faith-based organizations, the private sector, foundations, multilateral institutions and people living with HIV to join us as we each do our part.

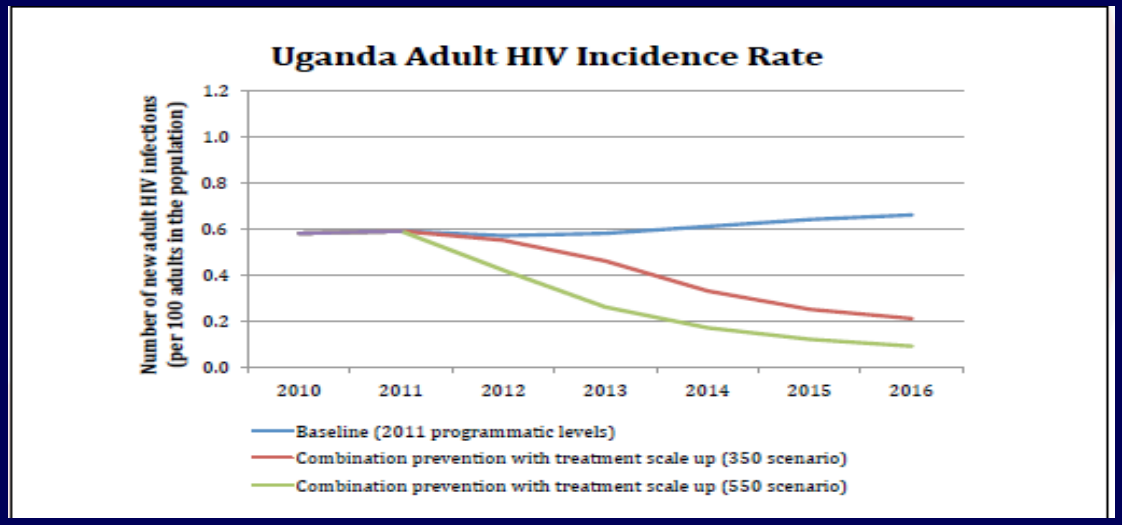
Together, we can deliver a better future to millions across the globe. A future where children are not born with HIV… where teenagers and adults are at far lower risk of contracting the virus… where those who do have the virus get lifesaving treatment. A future where every child has the chance to live up to his or her God-given potential.

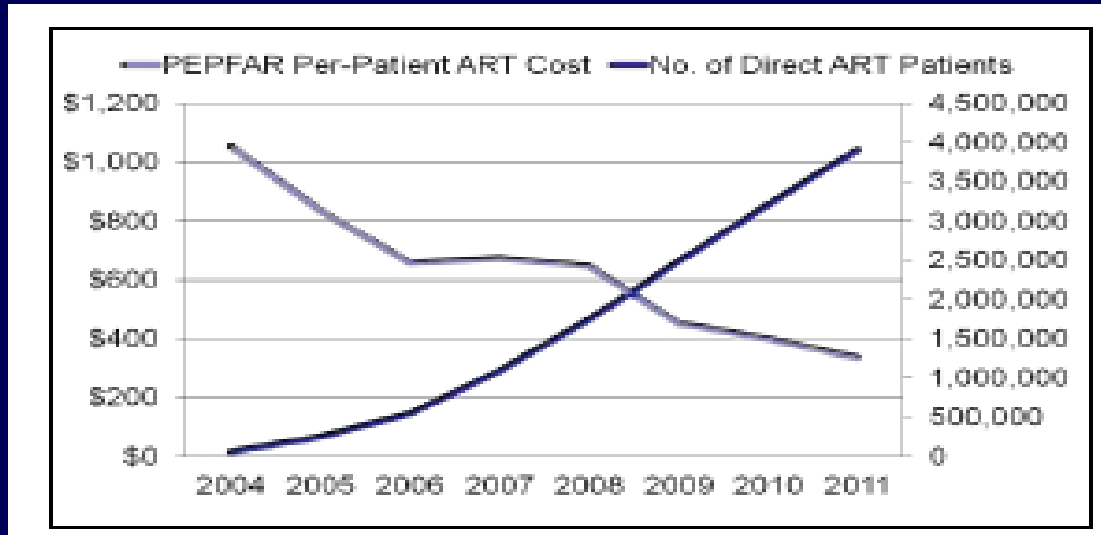
That's a future worth fighting for, together.

Sincerely,

Hillary Rodham Clinton

Hillary Rodham Clinton
Secretary of State

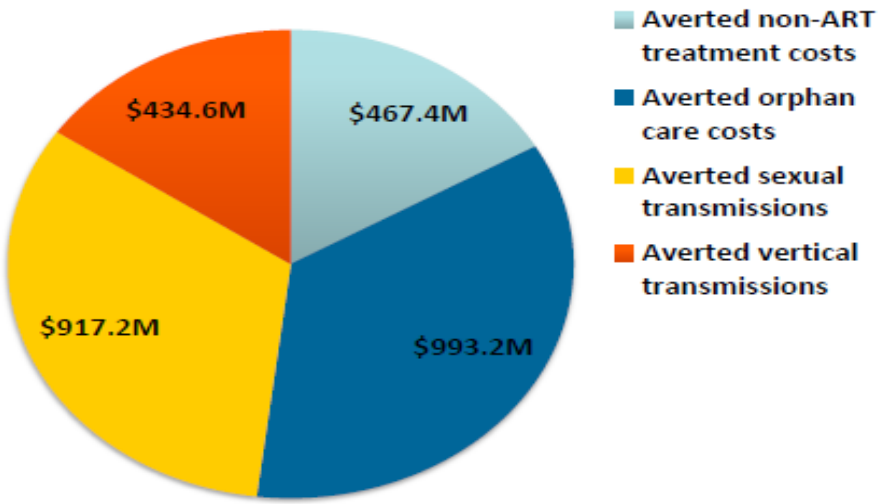




Broad societal benefits of ART (2013)

Broad Societal Benefits of ART

FY2013 Societal Cost Savings Attributable to PEPFAR Investment in ART: *$2.8B*



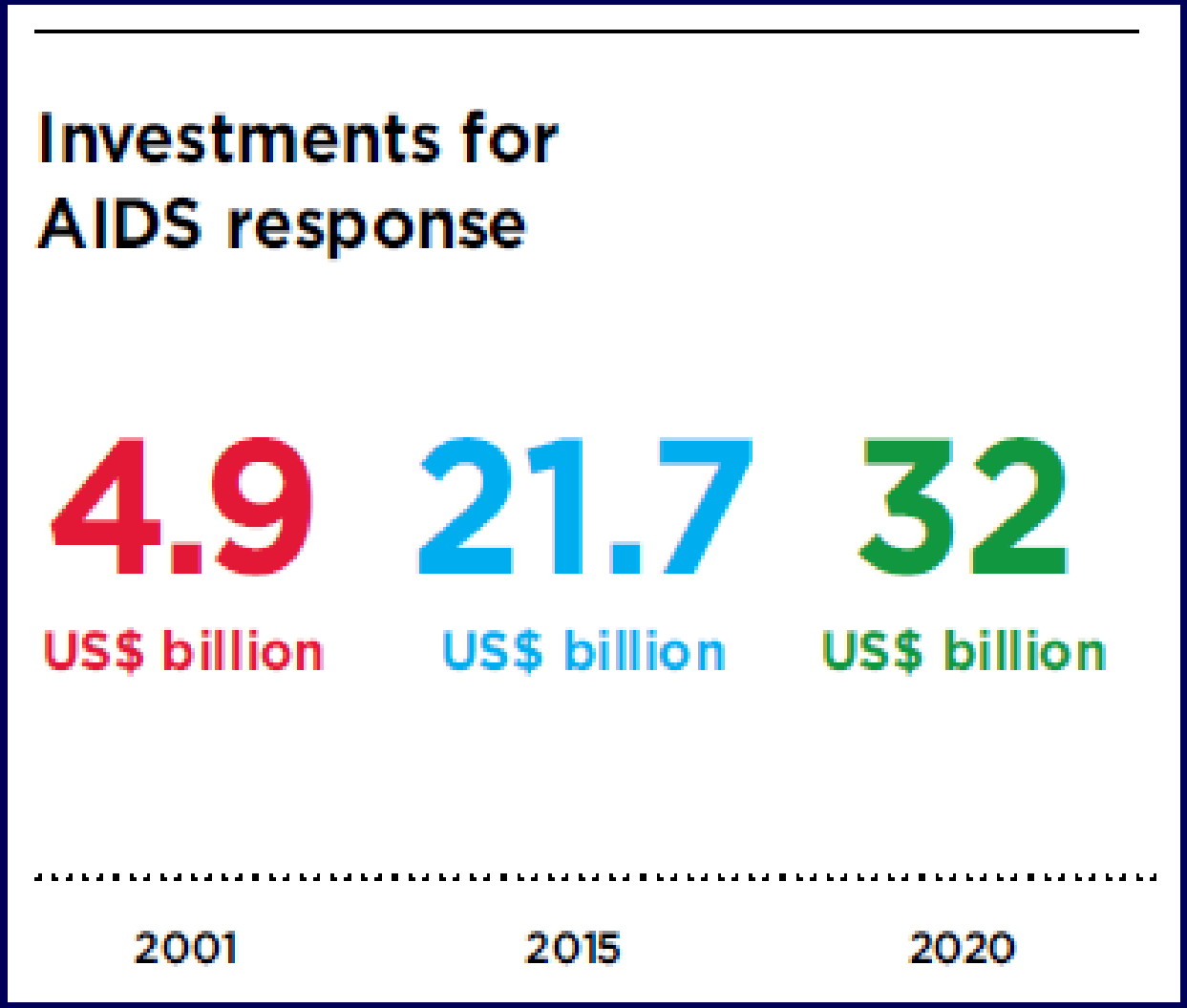
For every 1000 patient-years of treatment:

- 226 patient deaths averted
- 432 children not orphaned
- 60 sexual transmissions of HIV averted
- 39 vertical (mother-to-child) infections averted
- 9 TB cases averted among HIV patients
- 2,419 life-years gained

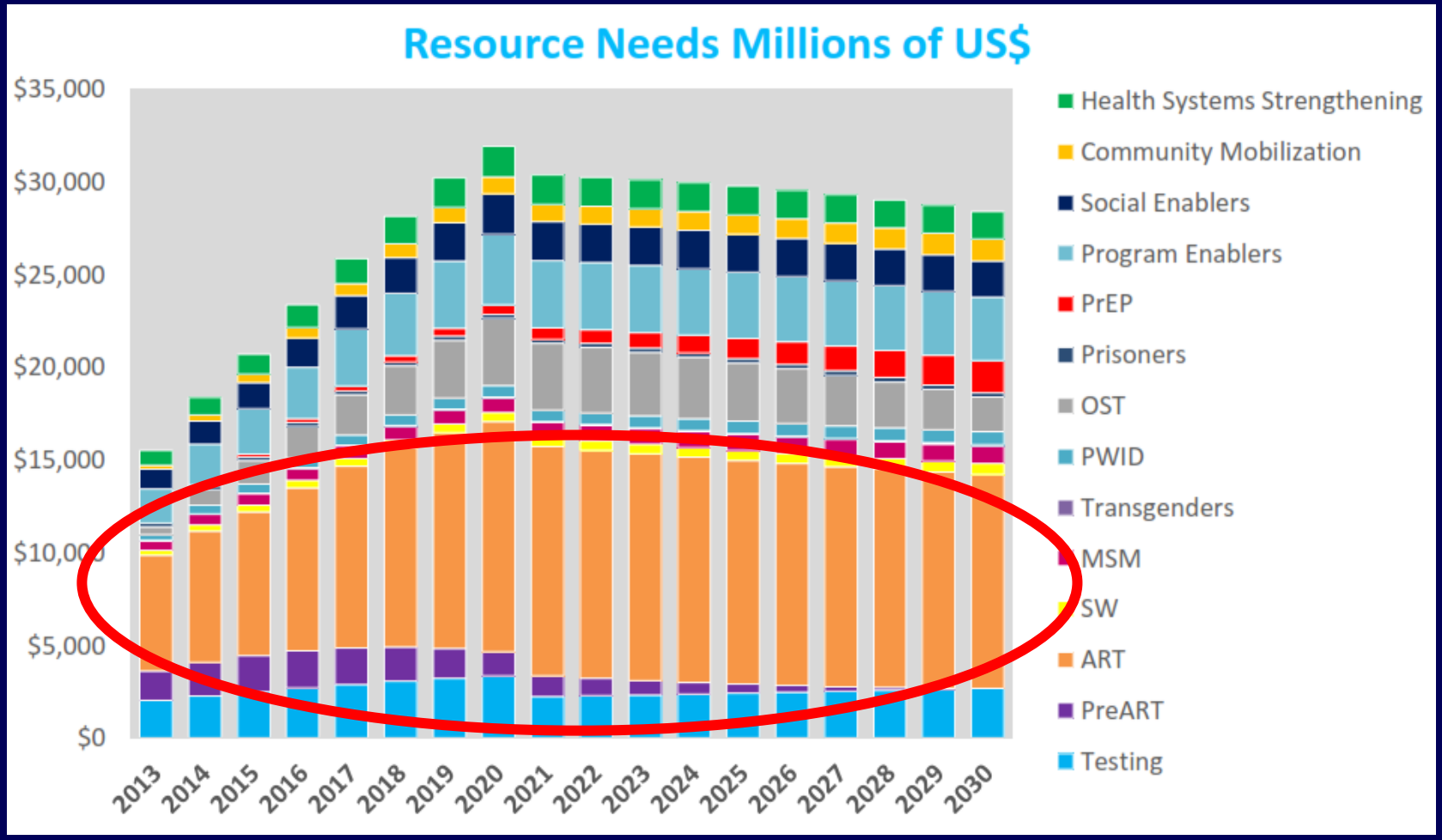
Source: CDC estimates from the PEPFAR ART Cost Model (PACM) for the Office of the U.S. Global AIDS Coordinator, based on PEPFAR FY2013 APR results

PEPFAR
U.S. President's Emergency Plan for AIDS Relief

UNAIDS needs estimates



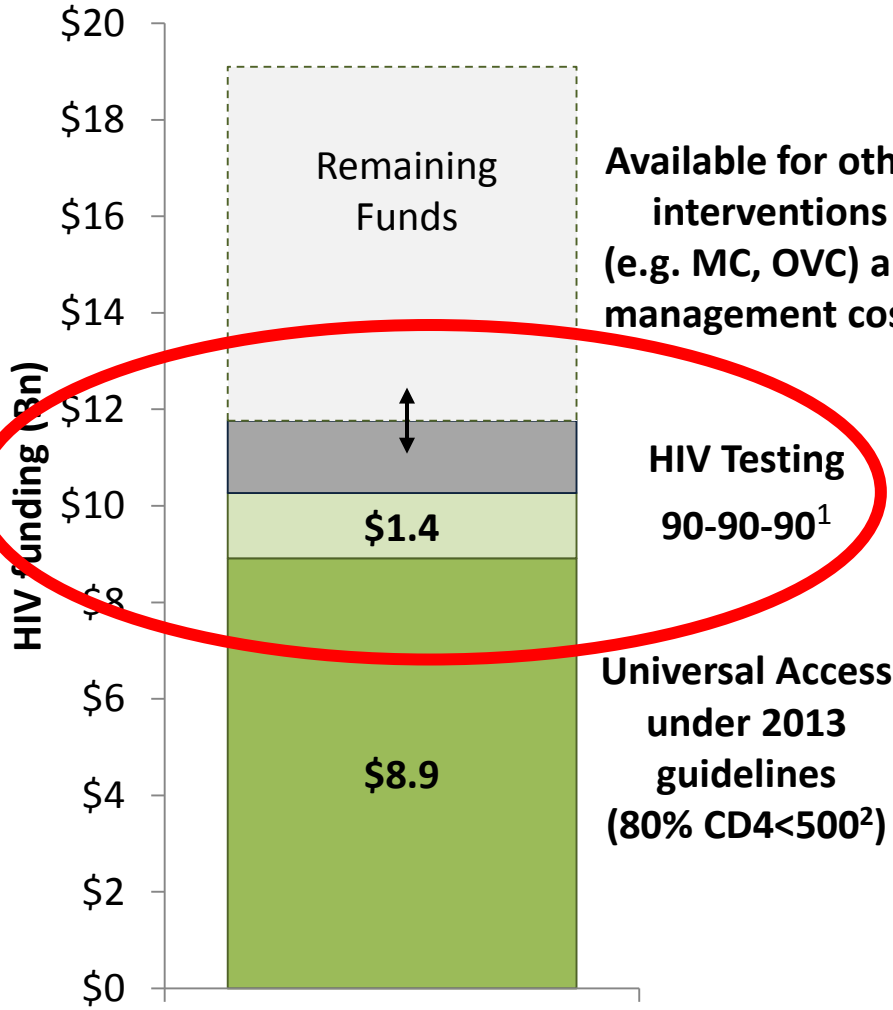
Full Package of UNAIDS Fast Track Interventions includes broad traditional response



Source: Jose Antonio Izazola-Licea, What would it take to make 90% of all people living with HIV aware of their own status? Presentation at the *Democratizing HIV Testing Conference, Geneva, 18-19 March 2015*

A high-level estimate suggests that universal access is affordable, with facility-level ART costs requiring 45-55% of available HIV funding (Ripin, CHAI)

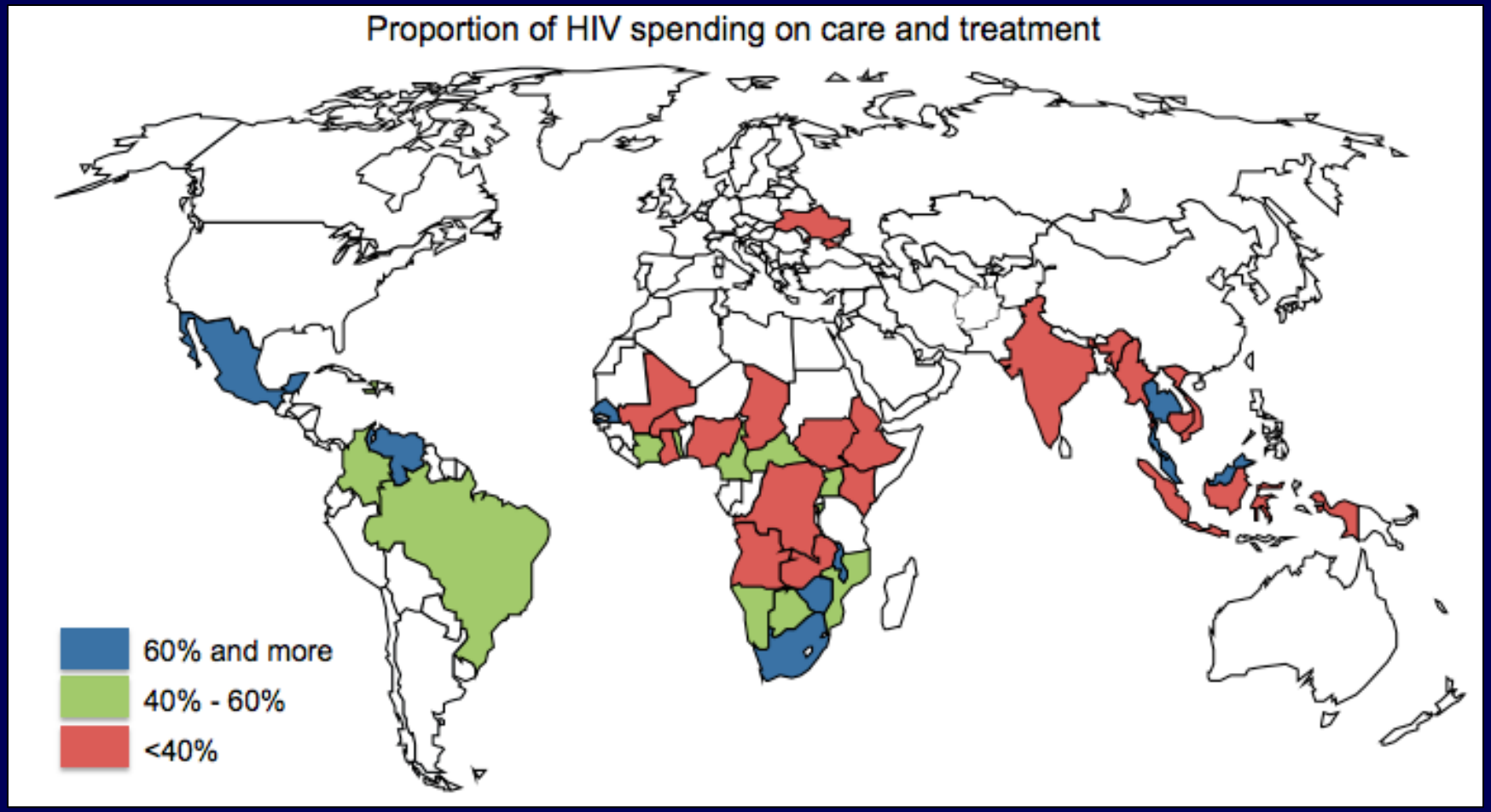
Estimated facility-level ART costs relative to available HIV funding (billion USD)



- The funding required to maintain people on treatment does not appear prohibitive: universal access under 2013 guidelines would require ~46% of available HIV funding
- Moving to the more aggressive goal of 90-90-90 only adds 1.4B more, reaching ~53% of HIV funding
- Annual testing costs will vary significantly depending on level of targeting and timeline to reach targets

1. Defined as 81% PLHIV
2. Also includes implementation of Option B+ and treatment for serodiscordant couples.

Global proportion of HIV spending on care and treatment in 39 low- and middle-income countries, 2009-2013



UNAIDS, *AIDSinfo*

Global leadership opportunity or bottleneck?

- 90-90-90 is complex objective—requires leadership
- Leadership: GF, PEPFAR, Gates, UNITAID, UNAIDS, UNICEF, WHO, UNDP, MoH, IAS, CROI, NIH, etc.
  - Set the goal: 90-90-90 (accepted?)
  - How to cause change to occur (execution?)
  - How best to involve followers (execution?)
- Establish accountability mechanism



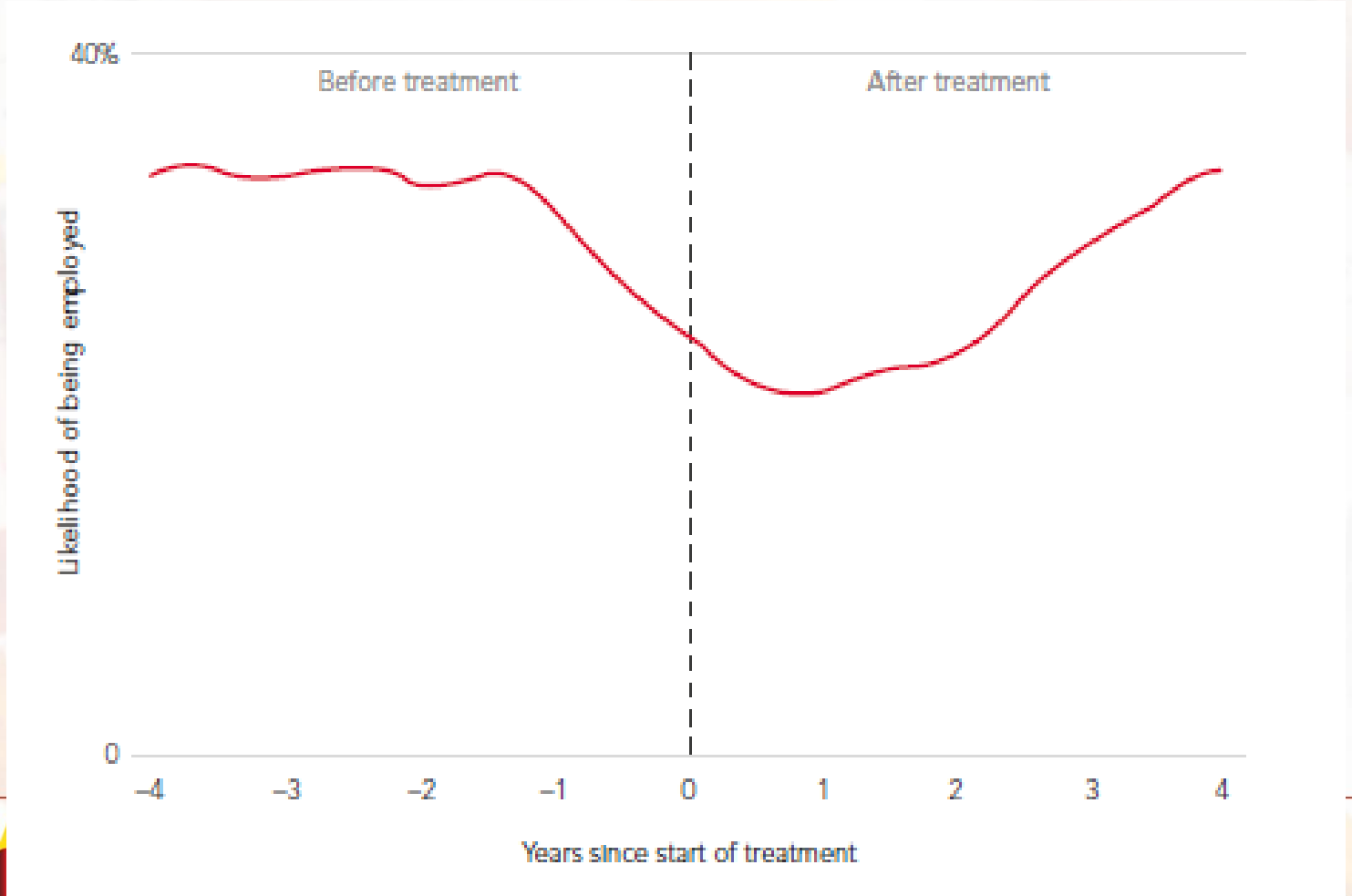
Apollo 13 Strategy:
Houston we have a problem

- Set clear and shared goals
- Identify bottlenecks
- Change business as usual
- Establish accountability and use open data
- Use cascade to measure progress to 90-90-90 target
- Determine costs and benefits of achieving 90-90-90
- Accelerate pace of translating science to service delivery
- Improve leadership, clarity regarding goals, execution and accountability

Thank you

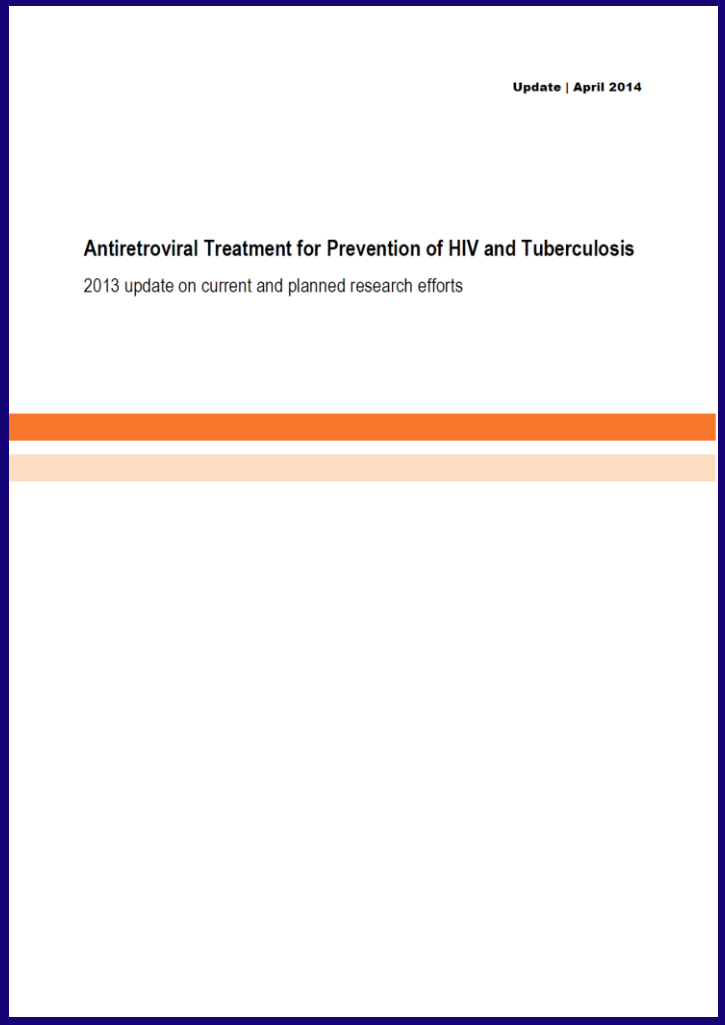
- Somya Gupta
- Jonathan Mermin
- Mike Ruffner
- Brian Williams
- Julio Montaner
- Brad Hersh
- Jose Zuniga

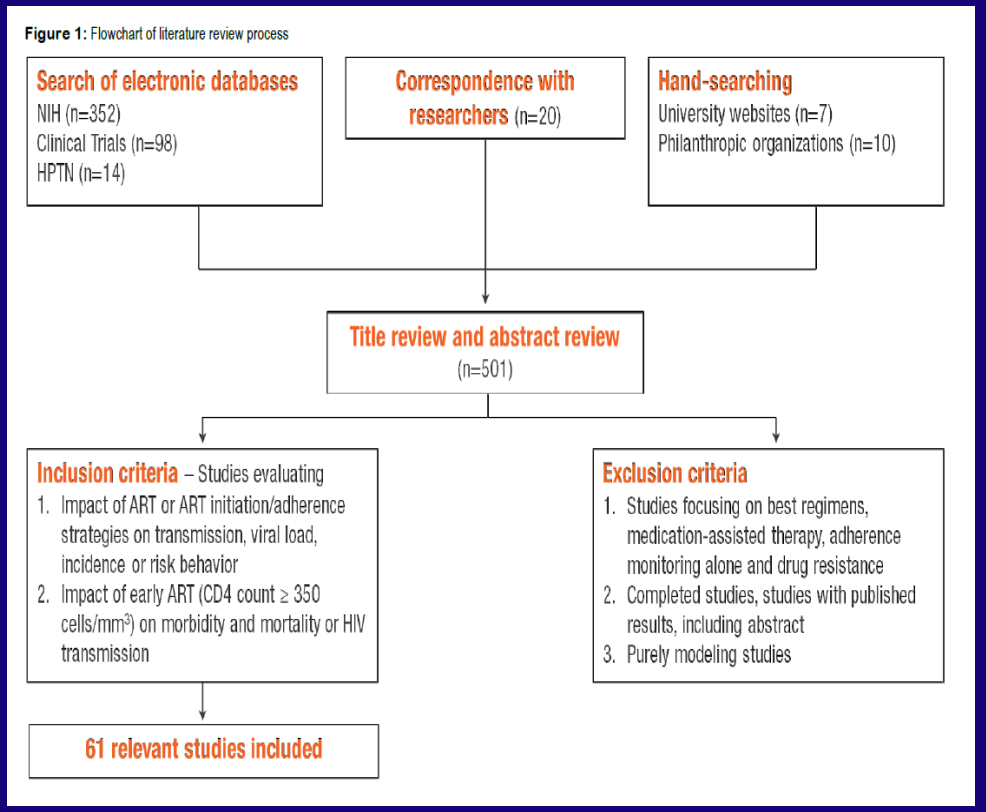
Treatment has a positive economic impact: healthy people go back to work



Source: Bärnighausen T et al. The economic benefits of ART: evidence from a complete population cohort in rural South Africa. *2nd International HIV Workshop on Treatment as Prevention, Vancouver, Canada, 22–25 April 2012.*

TasP Research Update, 2014

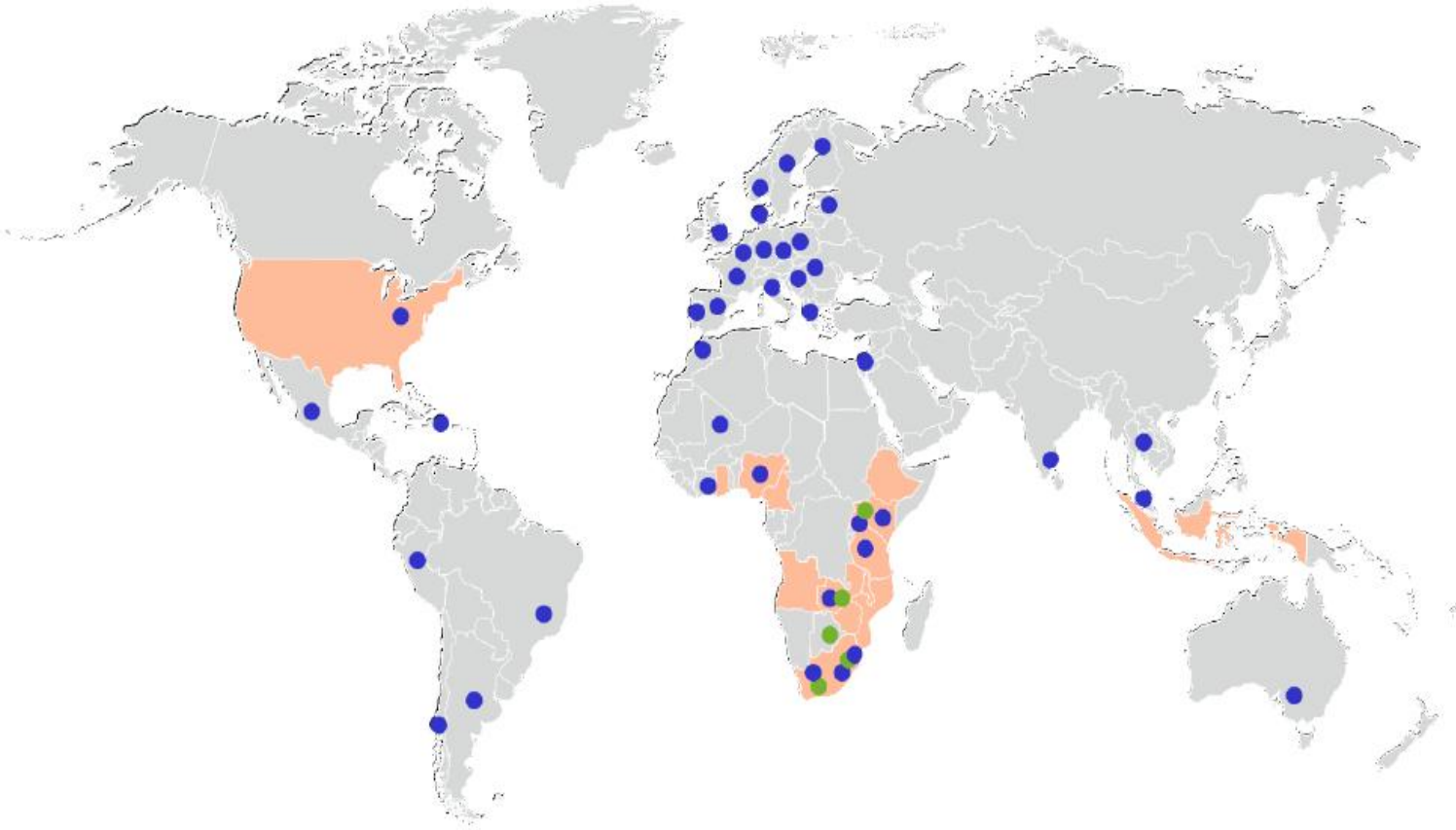




http://www.avac.org/sites/default/files/resource-files/ART%20for%20prevention%20study%20update%20report%20March%202014.pdf

Global TasP Research Study Sites

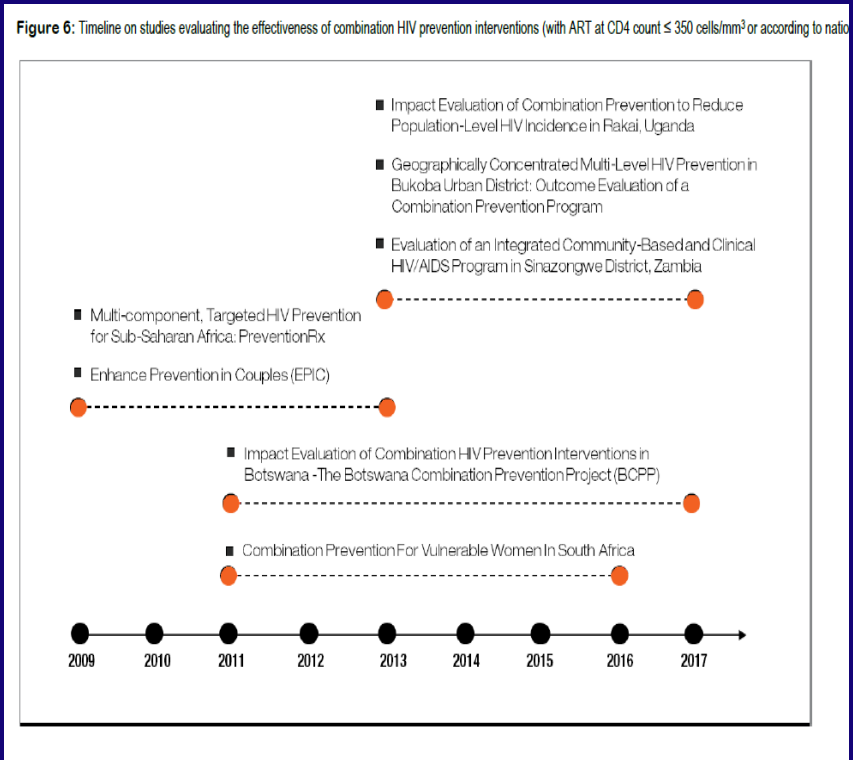
Figure 2: Map representing countries with studies on early ART for general population and combination HIV prevention programmes



Note: Orange represents countries with more than 10,000 new HIV infections (age 15+) in 2011; the blue dots represent countries conducting research on early ART for general population and the green dots represent countries with combination HIV prevention strategies.

AVAC UNAIDS Report, 2014
http://www.avac.org/resource/antiretroviral-treatment-prevention-hiv-and-tuberculosis

Timeline for studies



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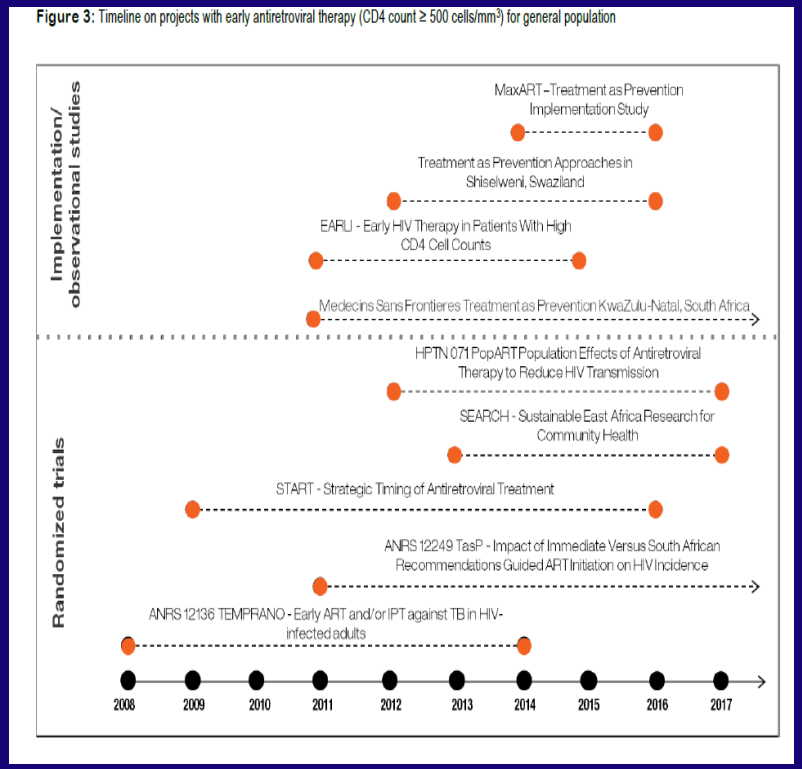

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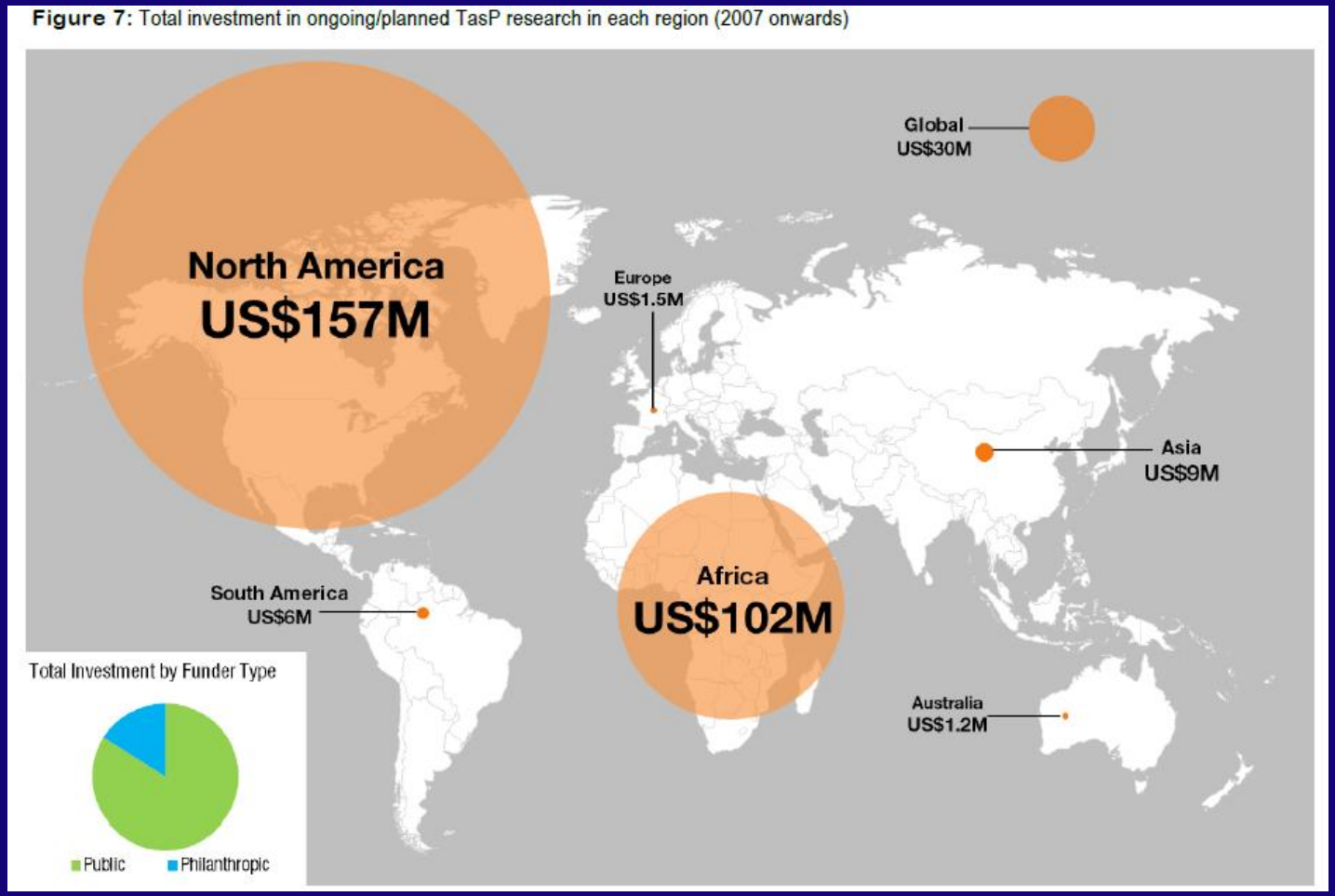
AVAC UNAIDS Report, 2014
http://www.avac.org/resource/antiretroviral-treatment-prevention-hiv-and-tuberculosis

Estimated financial investment in TasP

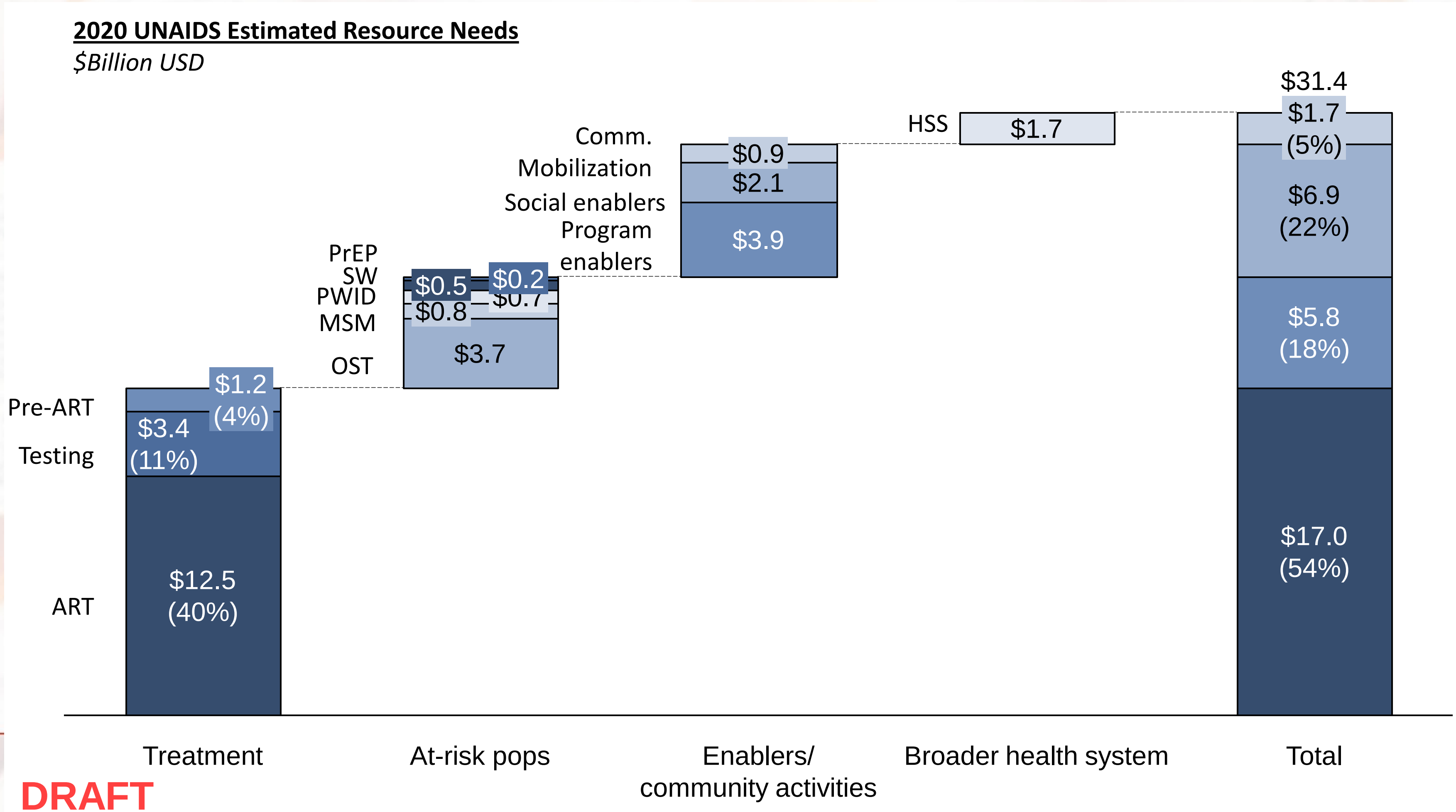


AVAC UNAIDS Report, 2014
http://www.avac.org/resource/antiretroviral-treatment-prevention-hiv-and-tuberculosis

Are these trials ethical given new standard of care?

- Which ones should be stopped and converted to programme implementation?
- How do we ethically conduct PrEP trials in areas with sub-standard care?
- How do we best use these resources to learn how to implement test and treat and other interventions?

At the peak, only about half of UNAIDS's estimated need would be for treatment



DRAFT

CONTROLLING THE HIV EPIDEMIC WITH ANTIRETROVIRALS
Having the Courage of Our Convictions

Source: Jose Antonio Izazola-Licea [illegible] aware of their own status? Presentation at the *Democratizing HIV Testing Conference, Geneva, 18-19 March 2015*

What is wrong with this picture?

..and it is not that no one is taking PrEP

HIV treatment reduces viral load and heterosexual transmission (2003)

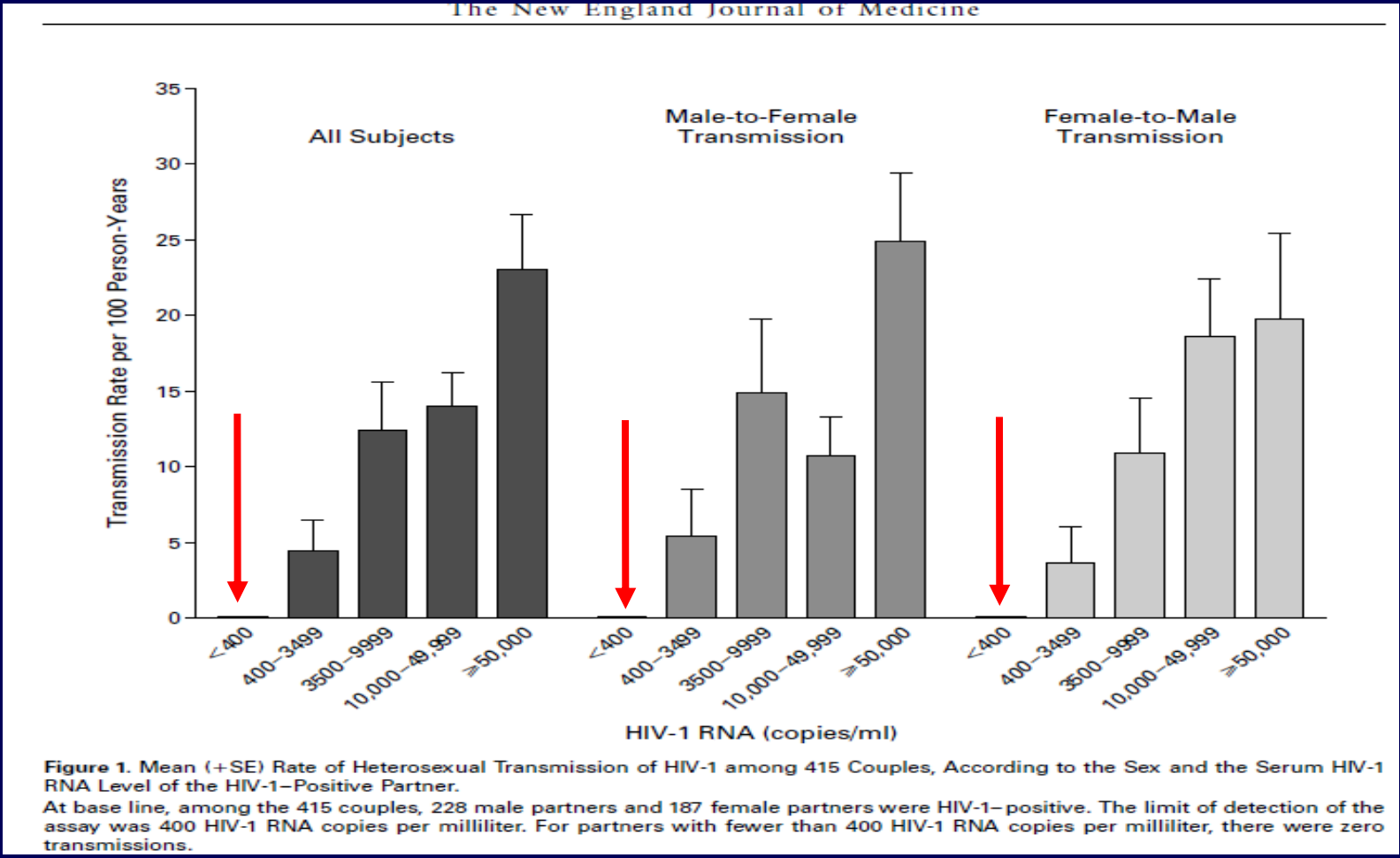
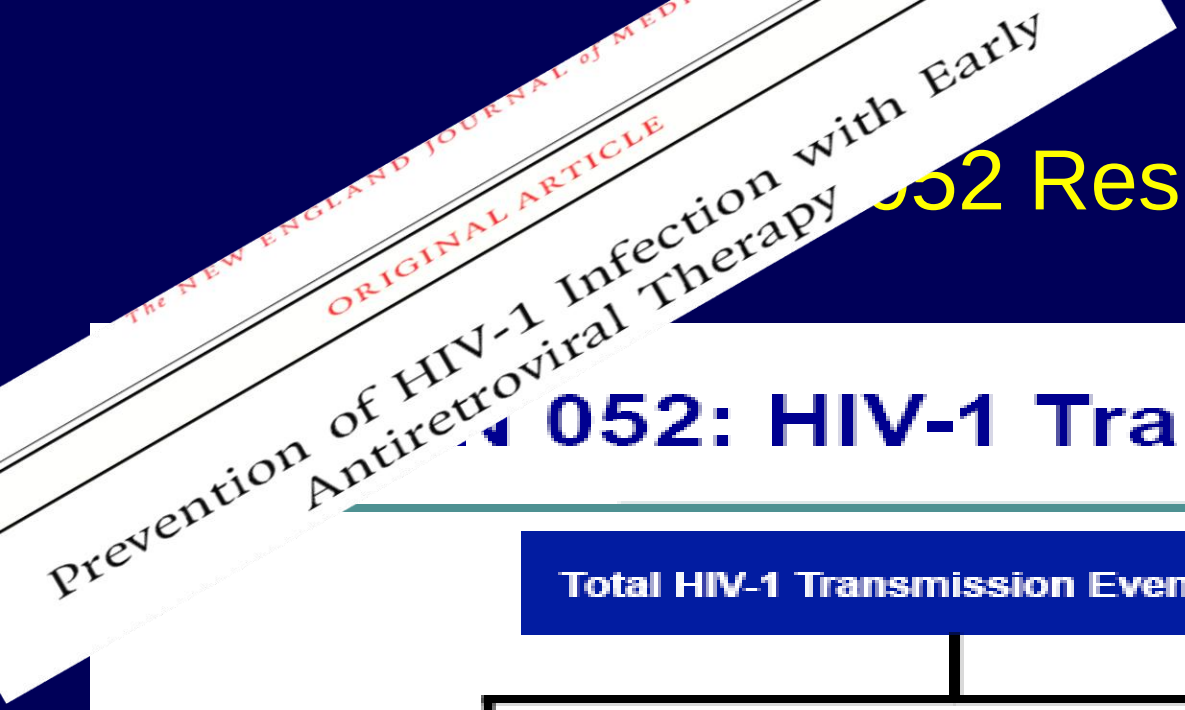


Figure 1. Mean (+SE) Rate of Heterosexual Transmission of HIV-1 among 415 Couples, According to the Sex and the Serum HIV-1 RNA Level of the HIV-1–Positive Partner.
At base line, among the 415 couples, 228 male partners and 187 female partners were HIV-1–positive. The limit of detection of the assay was 400 HIV-1 RNA copies per milliliter. For partners with fewer than 400 HIV-1 RNA copies per milliliter, there were zero transmissions.

Quinn et al. NEJM. 2003;342(13):921-929.



052 Results

052: HIV-1 Transmission

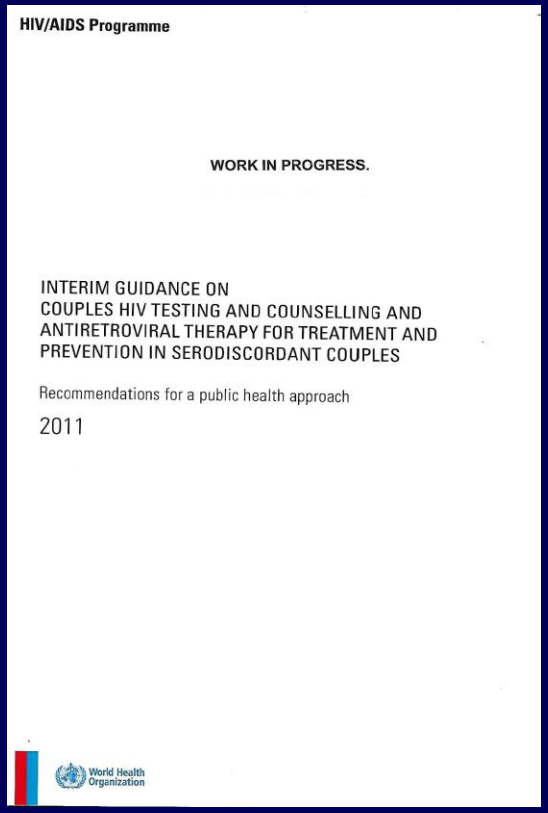
Total HIV-1 Transmission Events: 39

- **Linked Transmissions: 28**
  - **Immediate Arm: 1**
  - **Delayed Arm: 27**
  - $p < 0.001$
- **Unlinked or TBD Transmissions: 11**

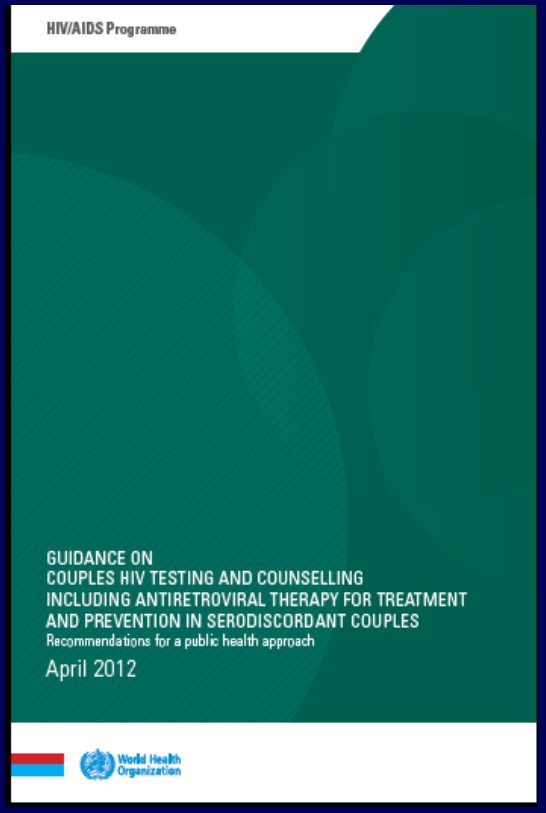
- 18/28 (64%) transmissions from infected participants with CD4 >350 cells/mm^3 and VL >50,000 copies/ml at transmission
- 23/28 (82%) transmissions in sub-Saharan Africa
- 18/28 (64%) transmissions from female to male partners

Cohen NEJM 2011

Serodiscordant couples guidelines, 2011 and 2012

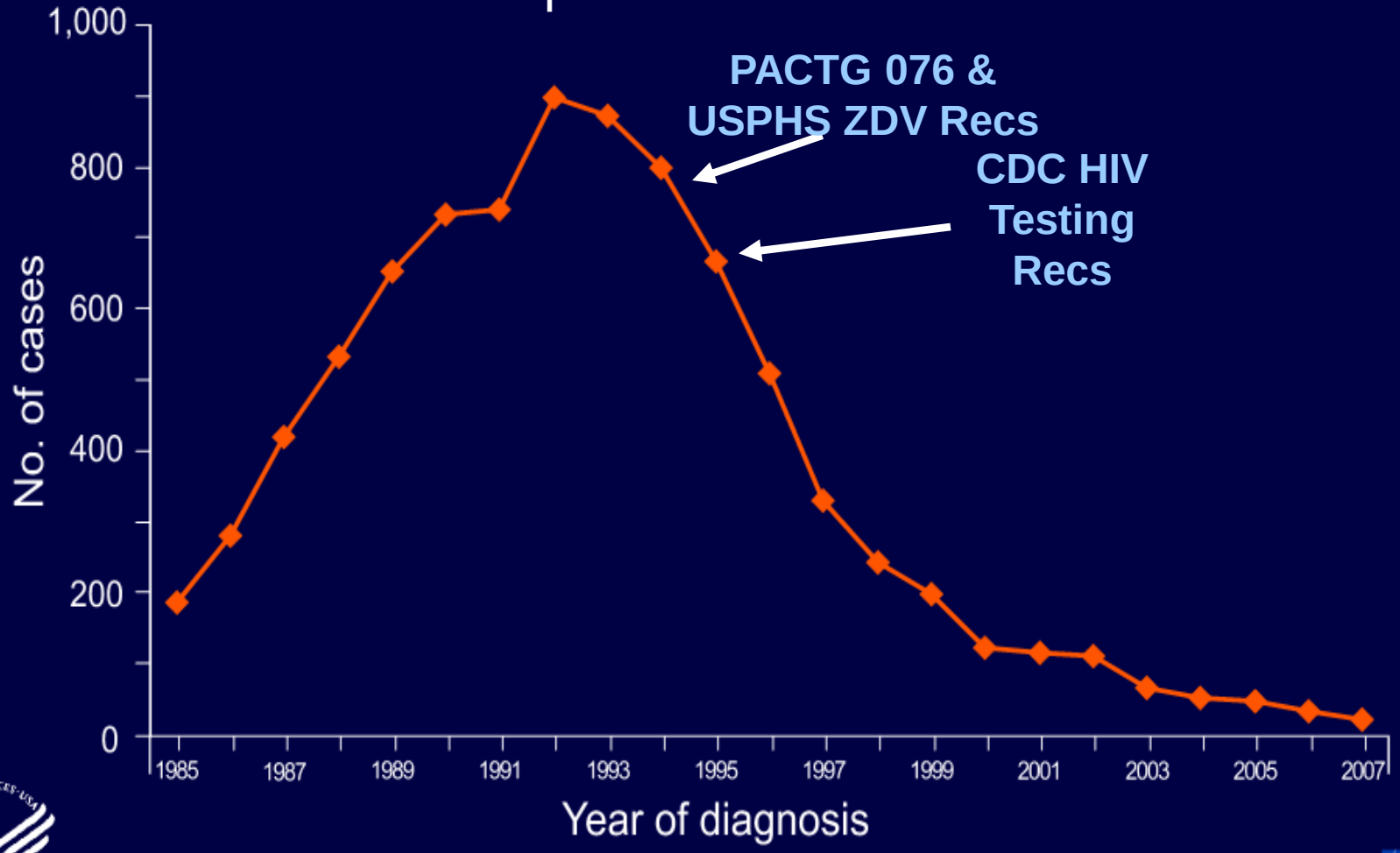


2011



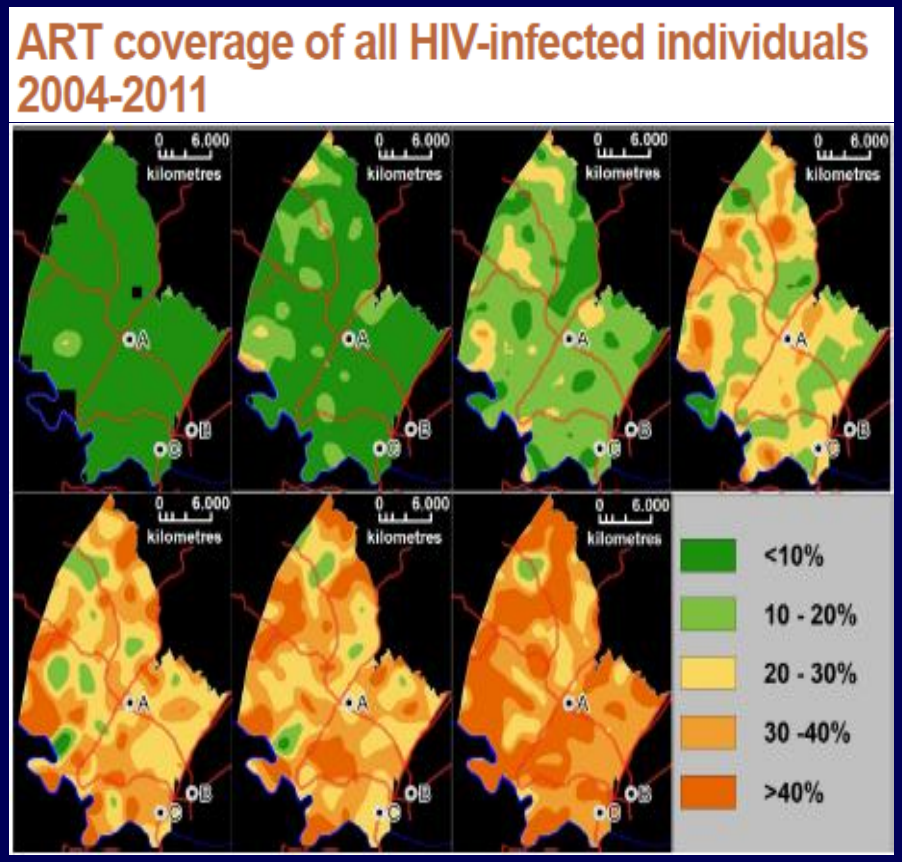
2012

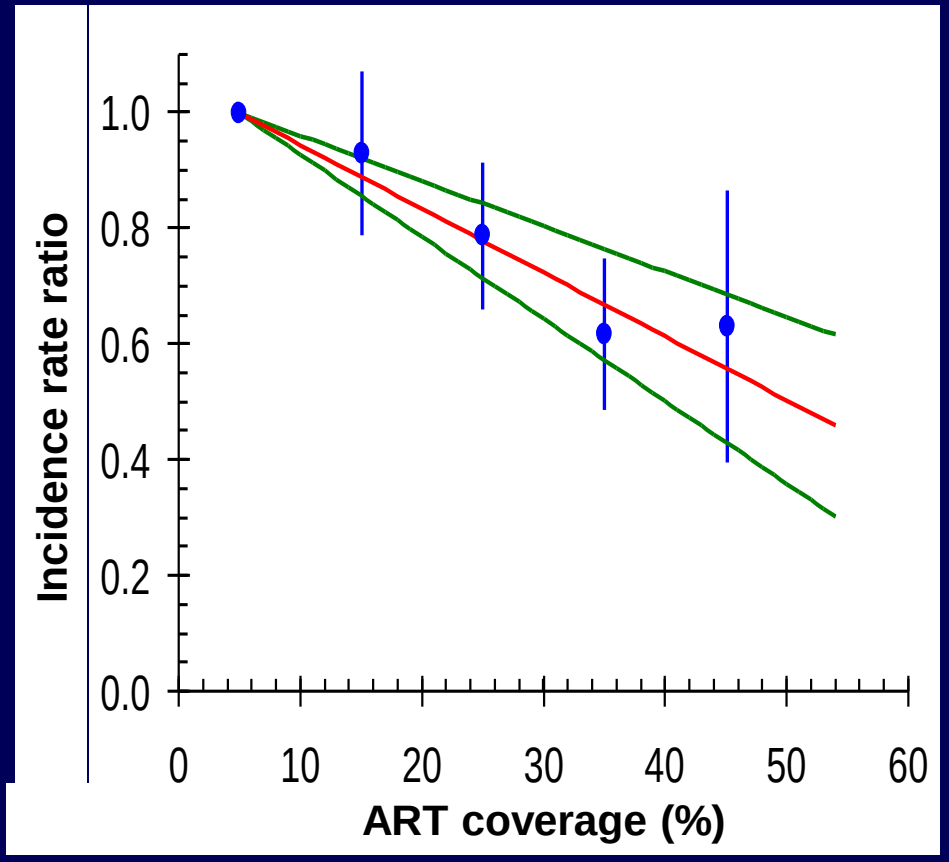
Estimated Numbers of Perinatally Acquired AIDS Cases by Year of Diagnosis, 1985–2007—United States and Dependent Areas



Note. Data have been adjusted for reporting delays and missing risk-factor information.

Community scaling of ART coverage reduces individual risk of transmission: KZN South Africa

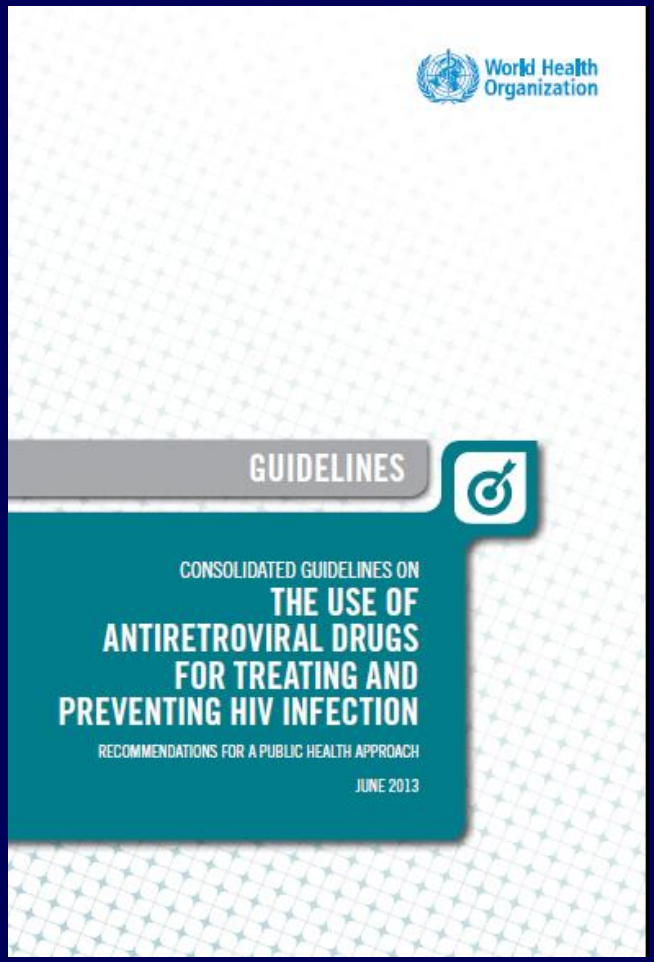




Incidence falls by 1.1% (0.8%-1.4%) for each 1% increase in coverage

Tanser Science 2013; Williams 2013

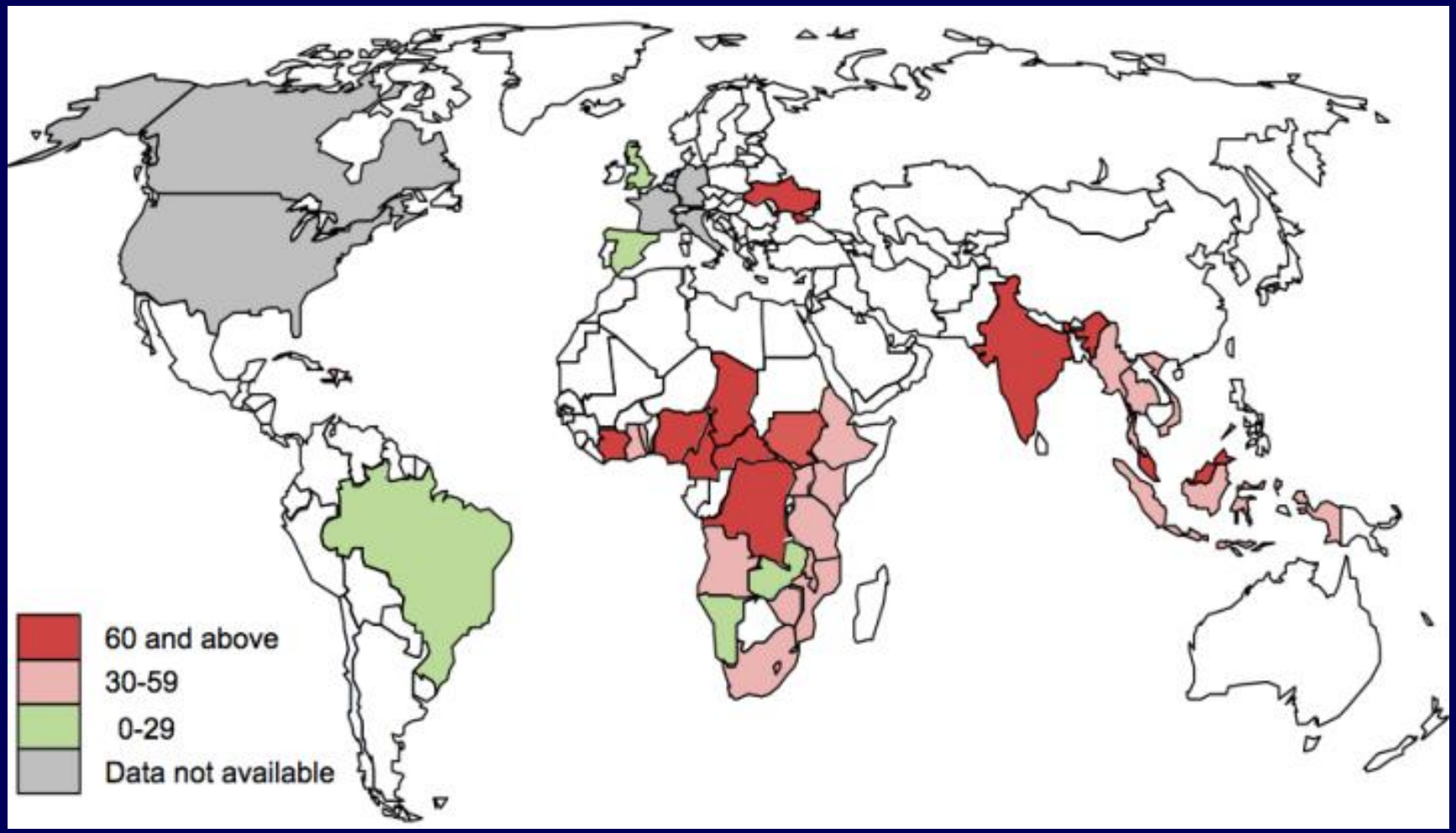
WHO Option B+ recommendations, 2013



Biomedical interventions for the prevention of HIV transmission

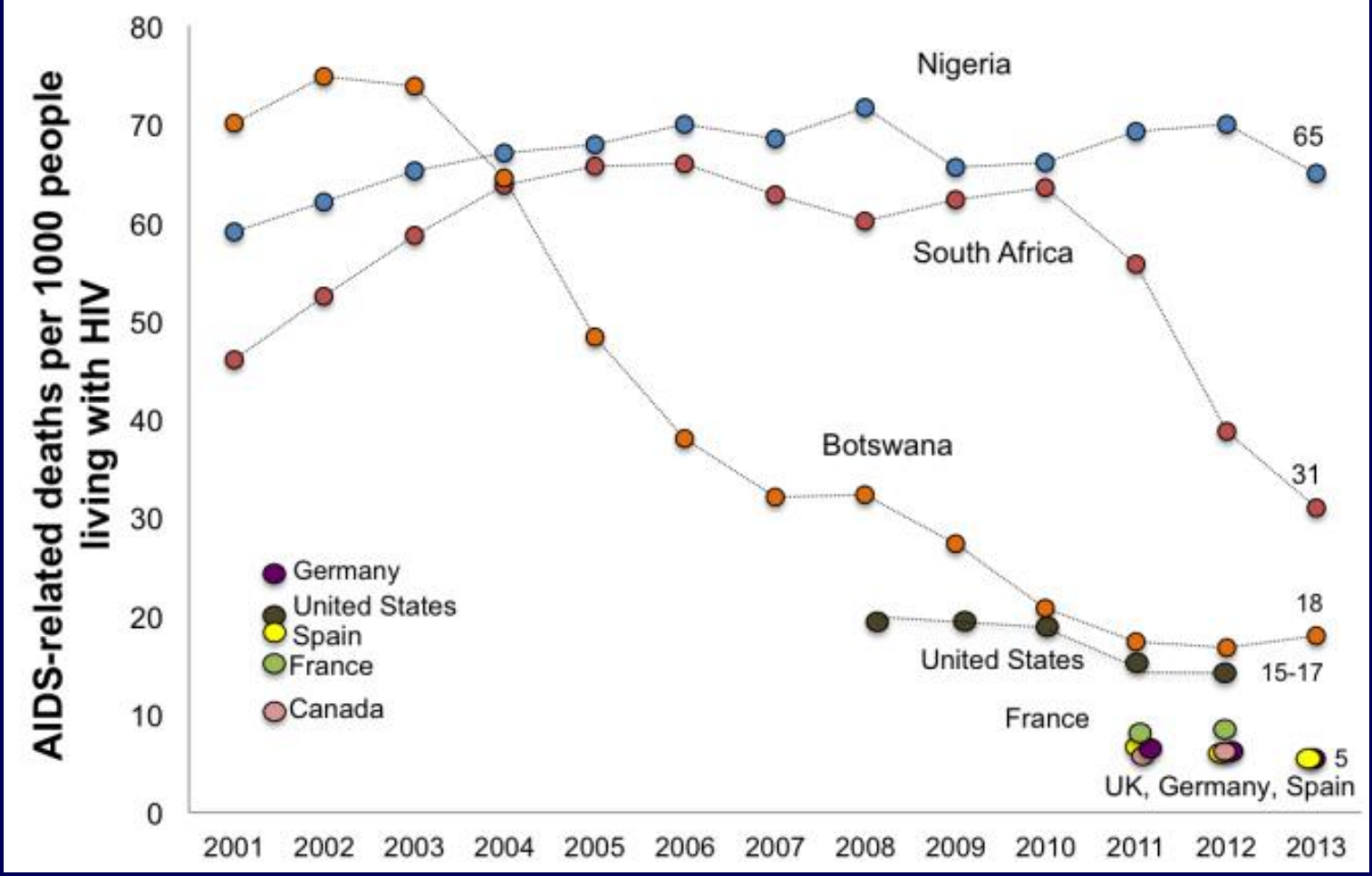
Slide courtesy of Julio Montaner

Global AIDS-related death rate per 1000 PLHIV, 2013



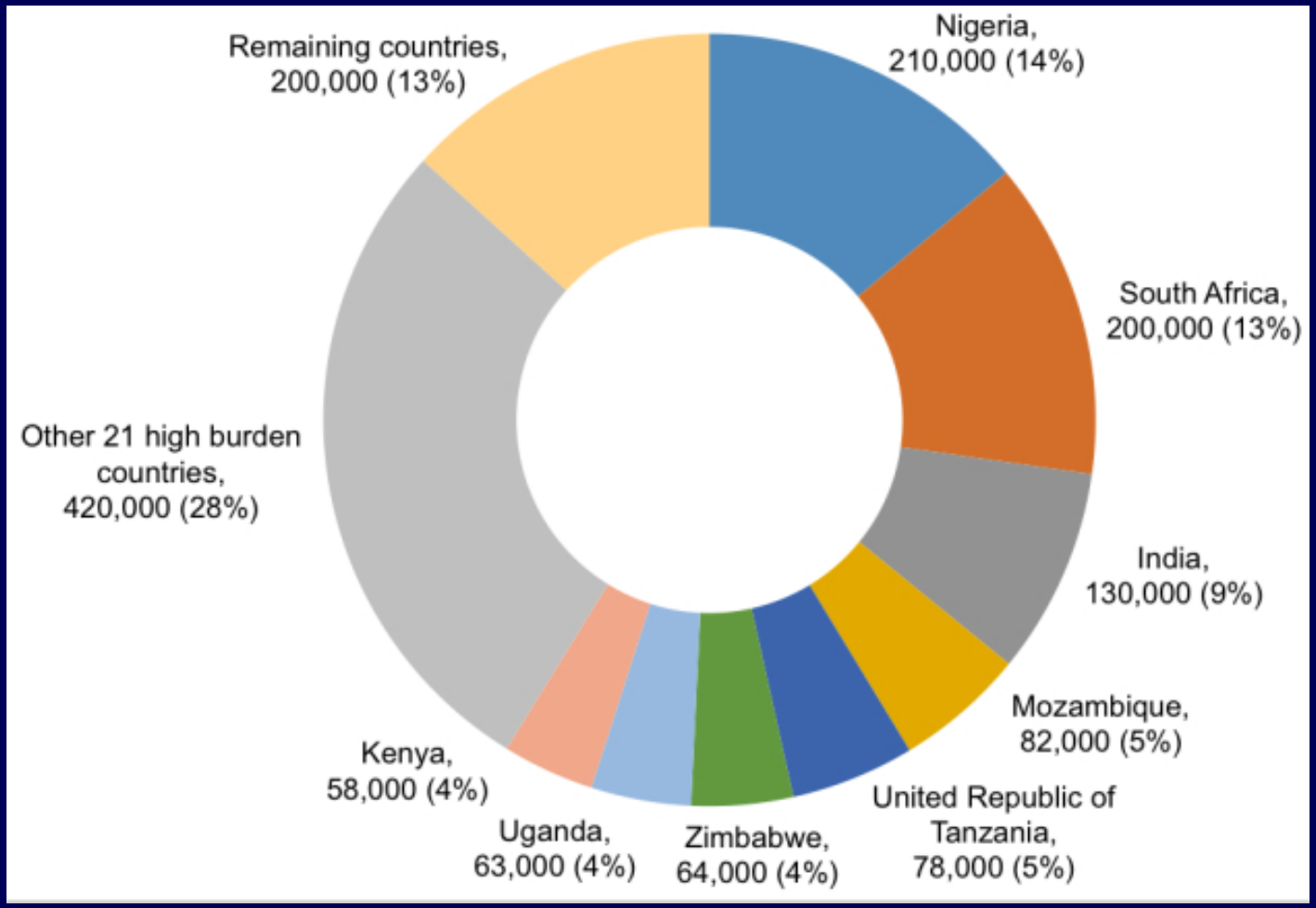
Trends in AIDS deaths, new infections and ART coverage
in the top 30 countries with the highest AIDS mortality burden; 1990-2013. Granich et al. PlosOne, 2015

Trends in estimated death rate per 1000 PLHIV, 2011-2013



Trends in AIDS deaths, new infections and ART coverage in the top 30 countries with the highest AIDS mortality burden; 1990-2013. Granich et al. PlosOne, 2015

Estimated annual AIDS-related deaths by country, 2013



Trends in AIDS deaths, new infections and ART coverage in the top 30 countries with the highest AIDS mortality burden; 1990-2013. Granich et al. PlosOne, 2015

Fast Track Cities Initiative

MAIRIE DE PARIS

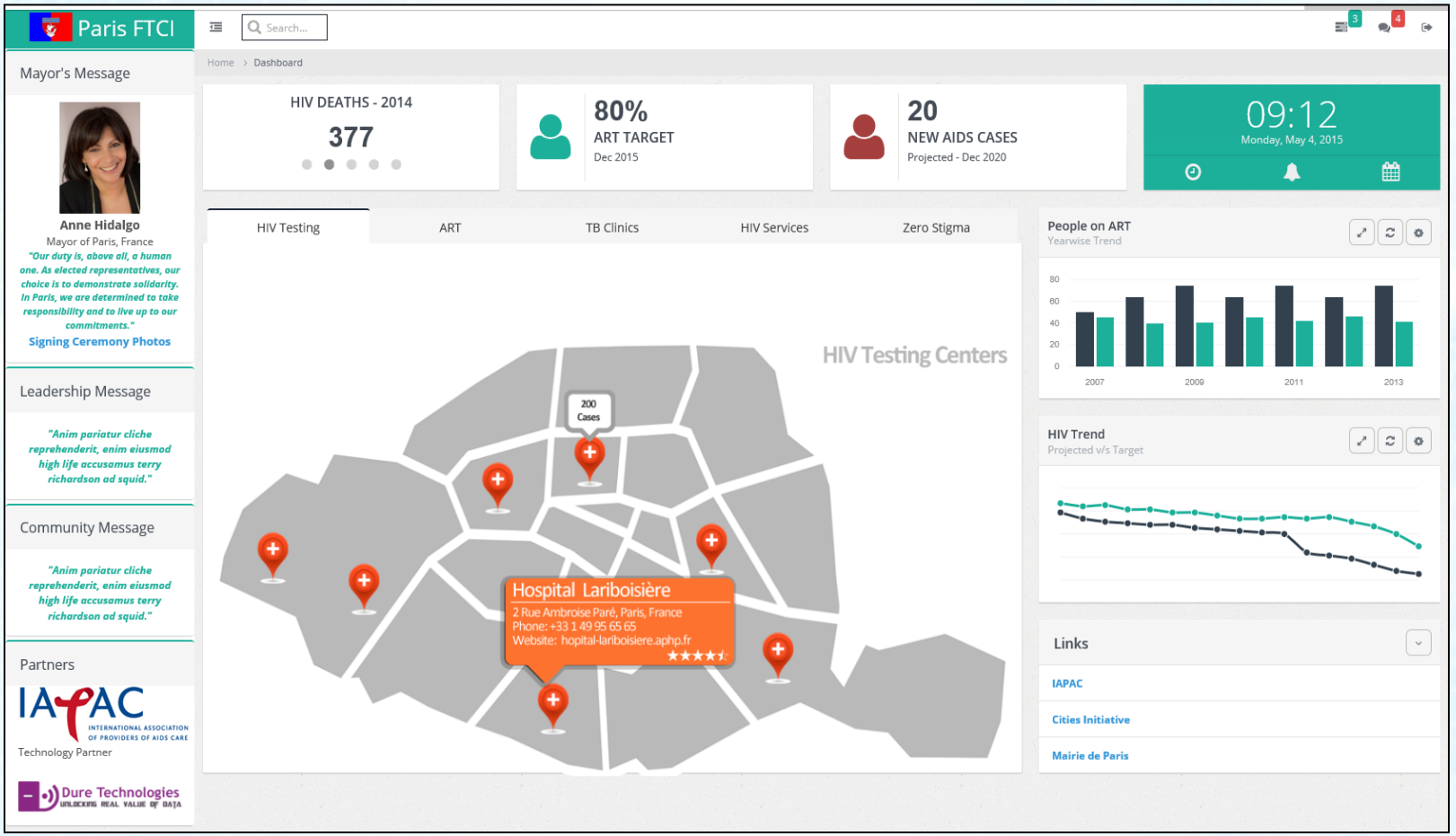
IAPAC
INTERNATIONAL ASSOCIATION OF PROVIDERS OF AIDS CARE

UNAIDS
JOINT UNITED NATIONS PROGRAMME ON HIV/AIDS

UN HABITAT
FOR A BETTER URBAN FUTURE

IAPAC
INTERNATIONAL ASSOCIATION OF PROVIDERS OF AIDS CARE

FAST-TRACK CITY DASH BOARD



Dure Technologies
UNLOCKING REAL VALUE OF DATA

IAPAC
INTERNATIONAL ASSOCIATION OF PROVIDERS OF AIDS CARE

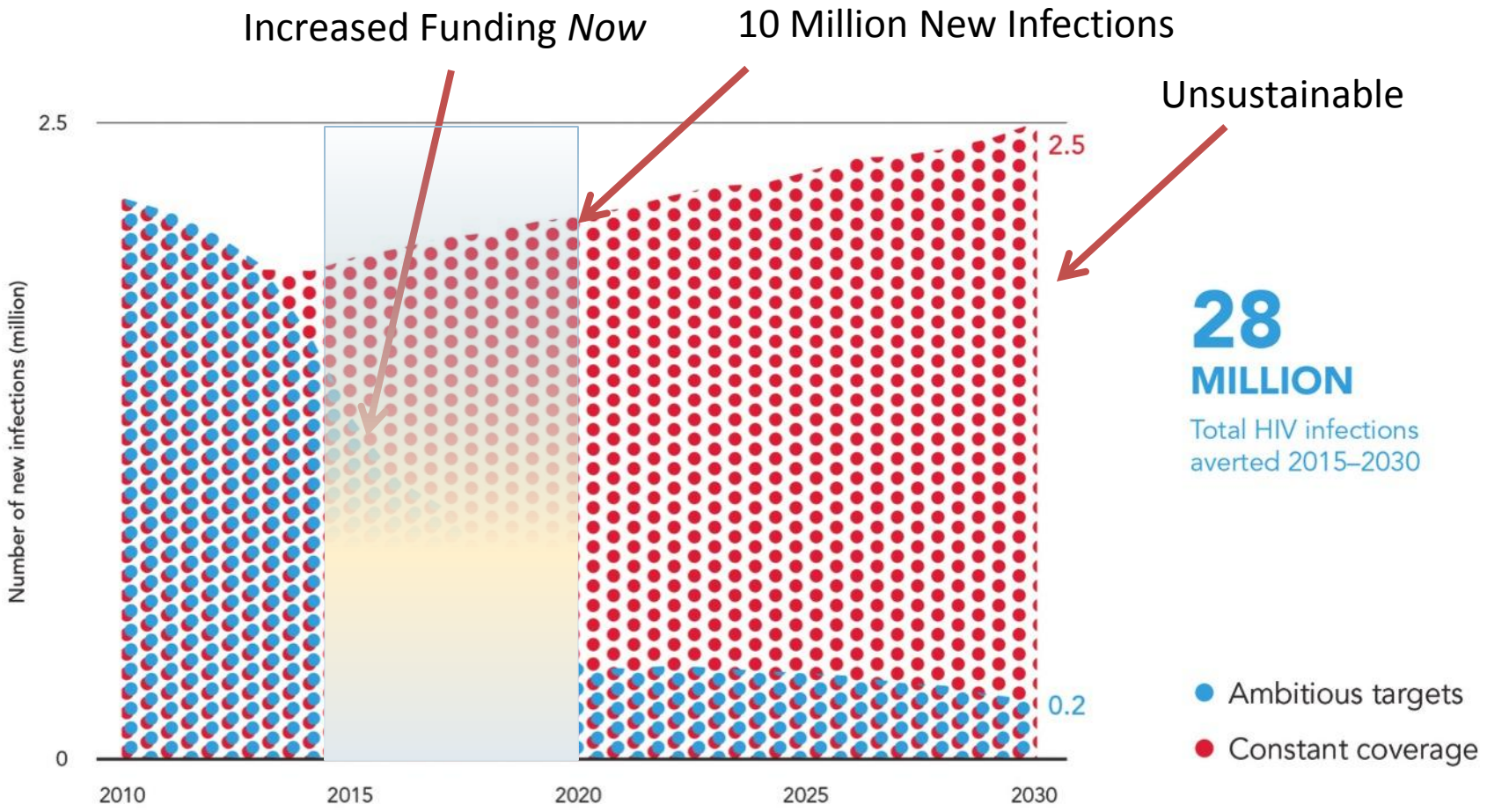
COMMUNITY INFORMATION SYSTEM

Dure Technologies
UNLOCKING REAL VALUE OF DATA

IATAC
INTERNATIONAL ASSOCIATION OF PROVIDERS OF AIDS CARE

Re-think how we spend the money

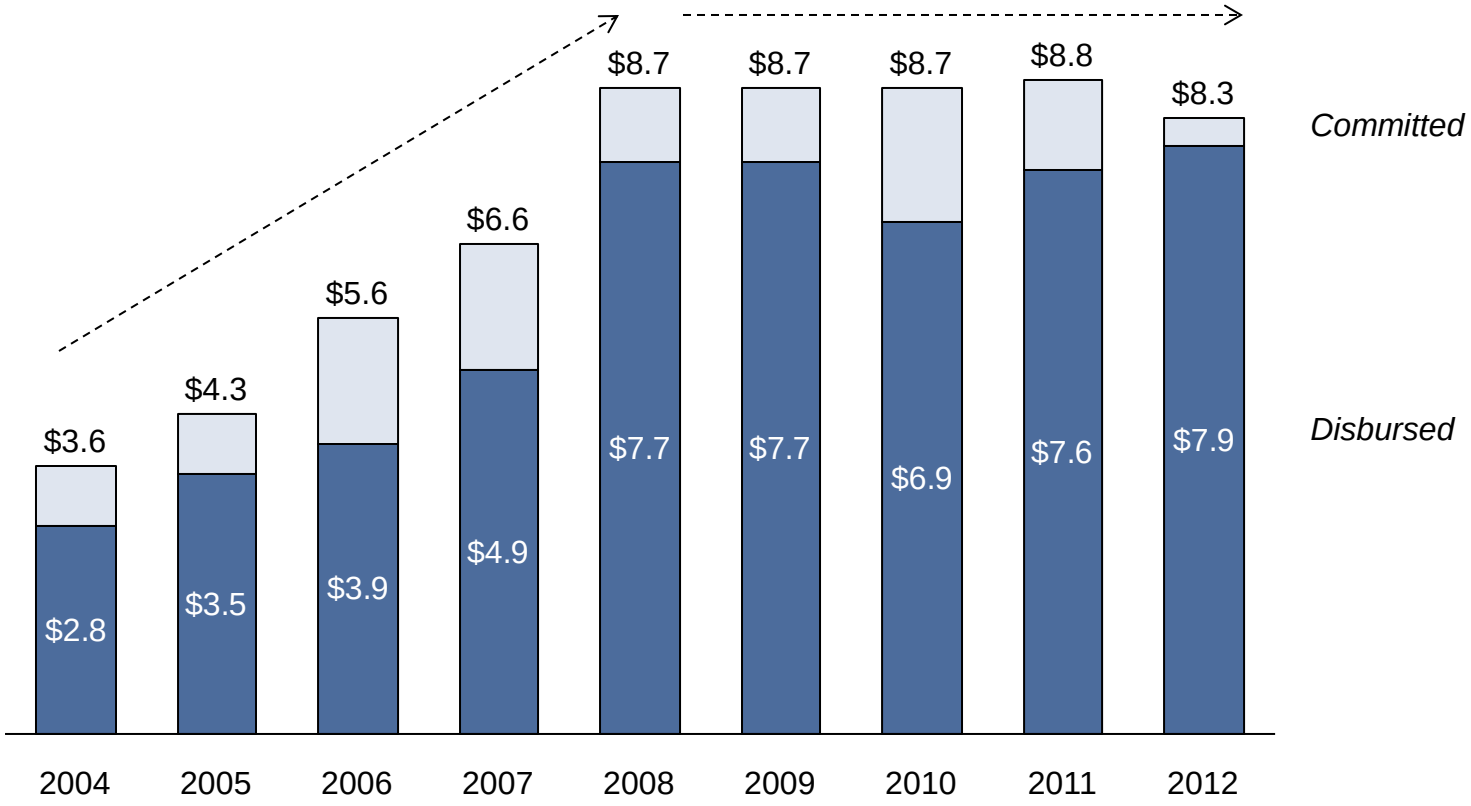
A Five Year Window



Going Forwards, International Donor HIV Assistance has Plateaued

International HIV Assistance from Donor Governments

$USD Billions

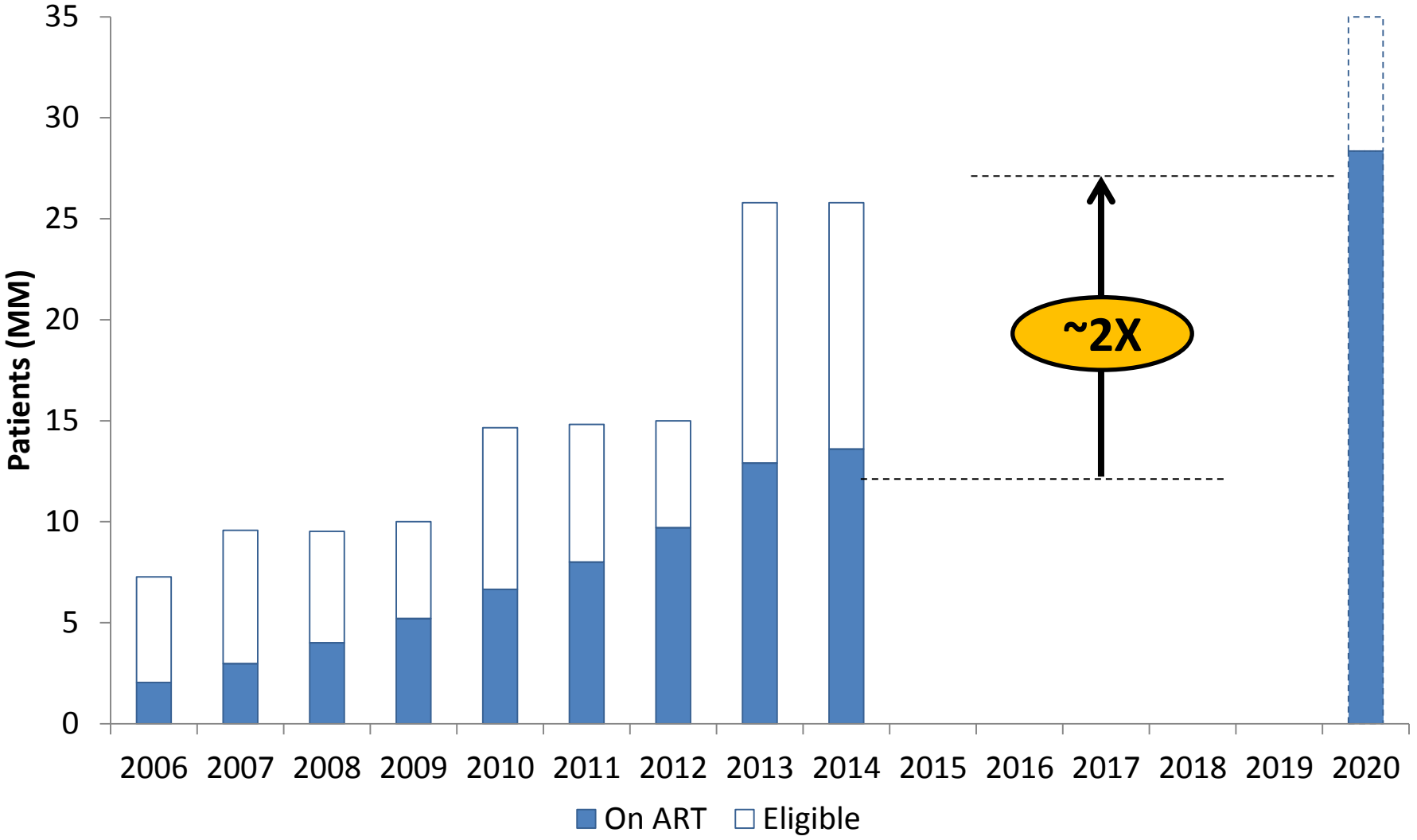


DRAFT

Source: UNAIDS, "Financing the Response to HIV in Low- and Middle-Income Countries", 2013

To get benefits, we would need to scale up ART significantly. At first glance, this appears to be prohibitively costly (Ripin, IAS 2015, CHAI)

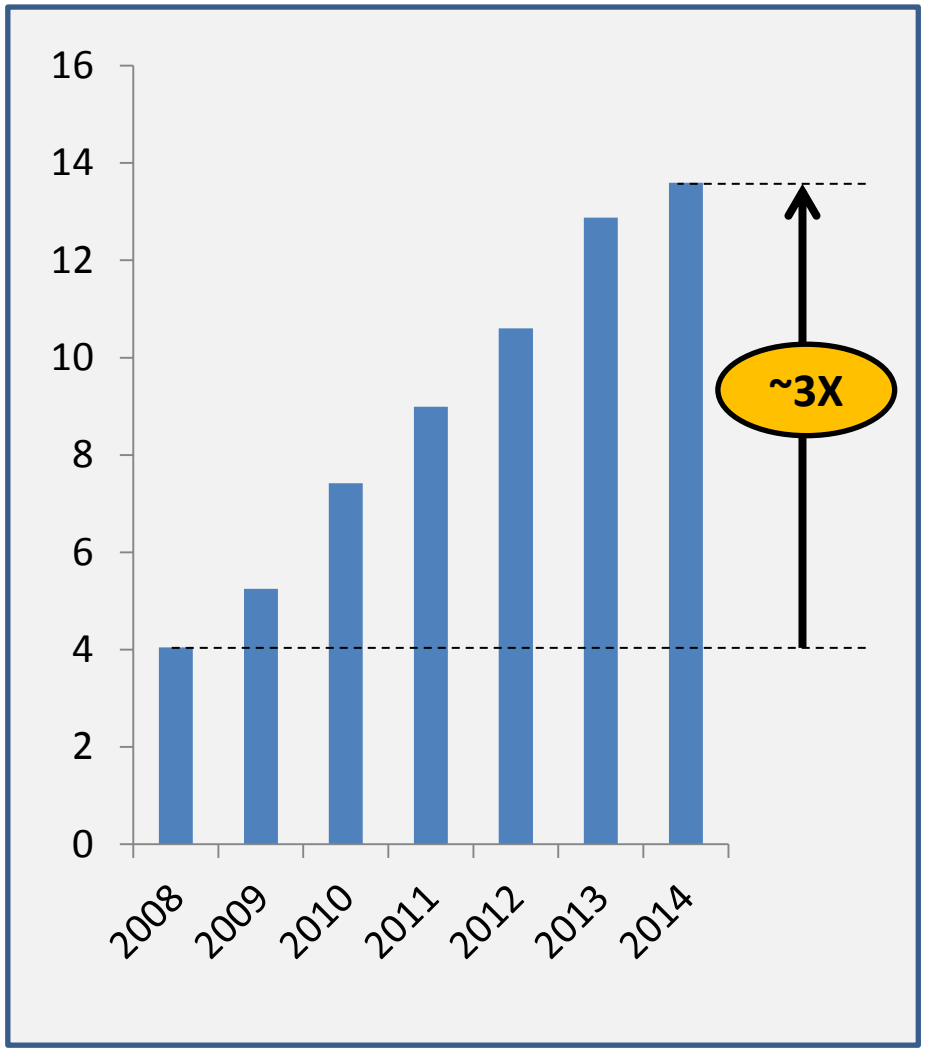
People eligible to, and on, ART



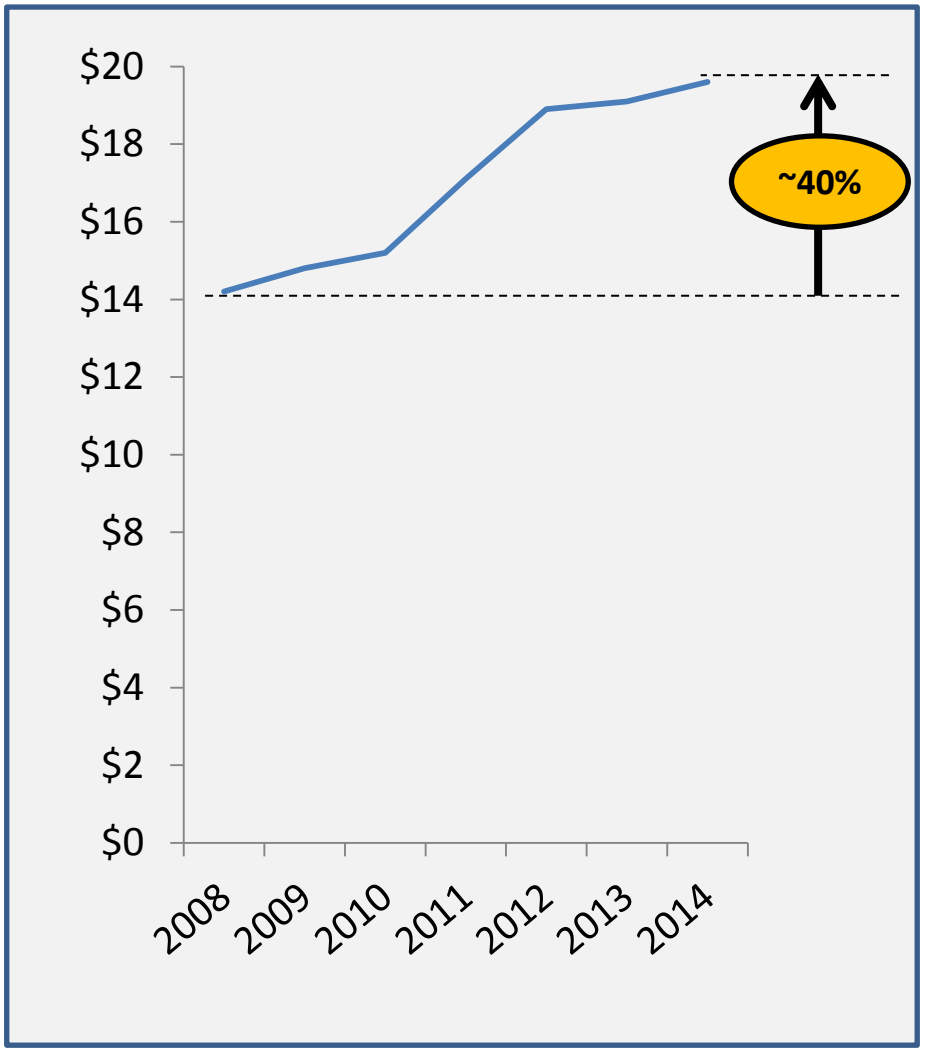
Source: UNAIDS, Global AIDS Report 2006-2013.; WHO UNICEF and UNAIDS, Global Update on HIV Treatment 2013.

Over the past 6 years, however, we have tripled the number of patients on ART while funding levels increased by only 40% (Ripin, IAS 2015 CHAI)

Patients on ART, millions



HIV funding levels*, $ billions



* Resources available for HIV programs in low and middle income countries. UNAIDS, Global AIDS Gap Reports, 2012 & 2013.

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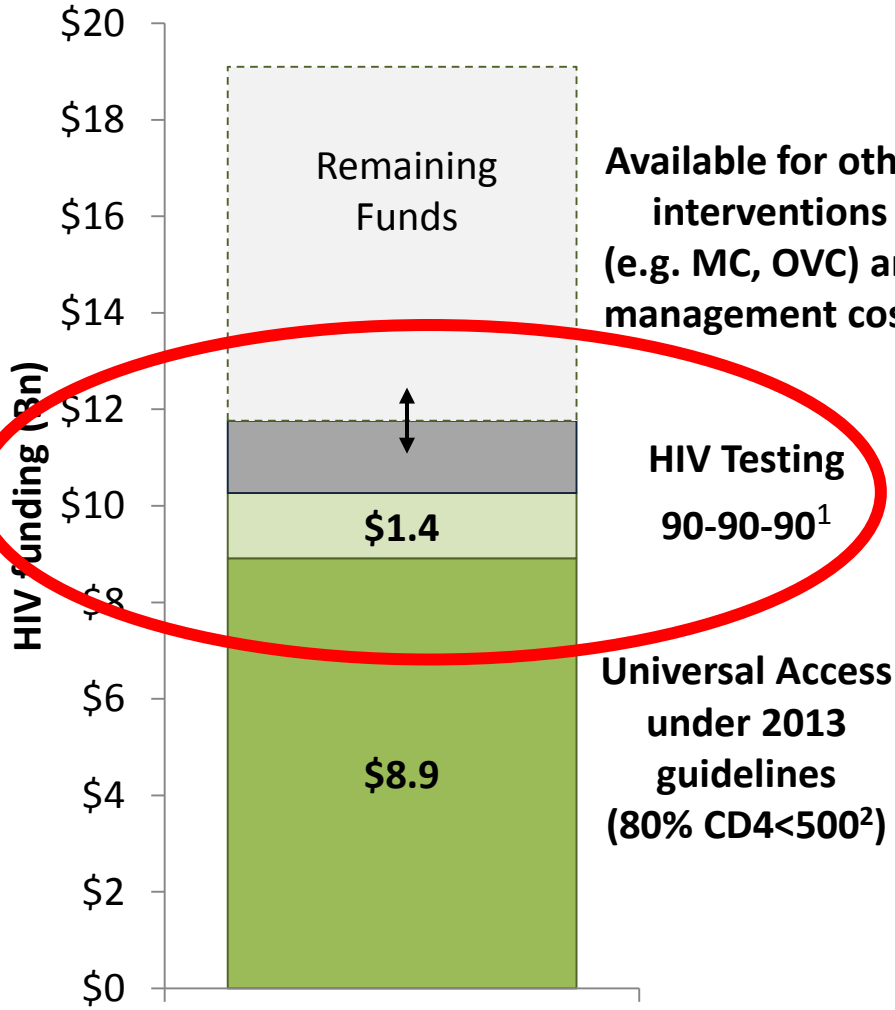
Estimated facility-level ART costs relative to available HIV funding (billion USD)



- The funding required to maintain people on treatment does not appear prohibitive: universal access under 2013 guidelines would require ~46% of available HIV funding
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- Annual testing costs will vary significantly depending on level of targeting and timeline to reach targets

1. Defined as 81% PLHIV
2. Also includes implementation of Option B+ and treatment for serodiscordant couples.

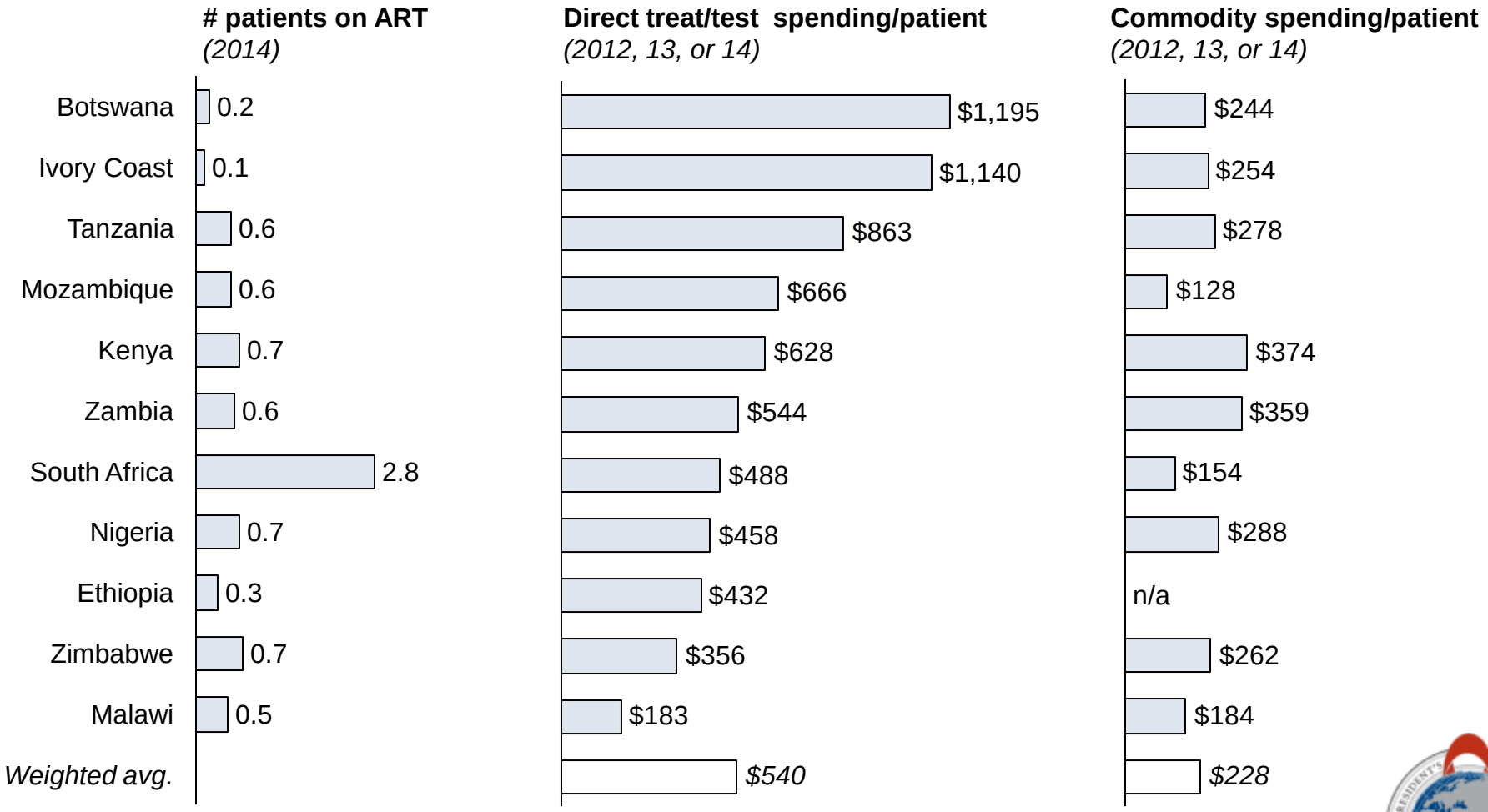
PEPFAR:
We see three categories of efficiencies

System efficiencies
Designing the best overall architecture

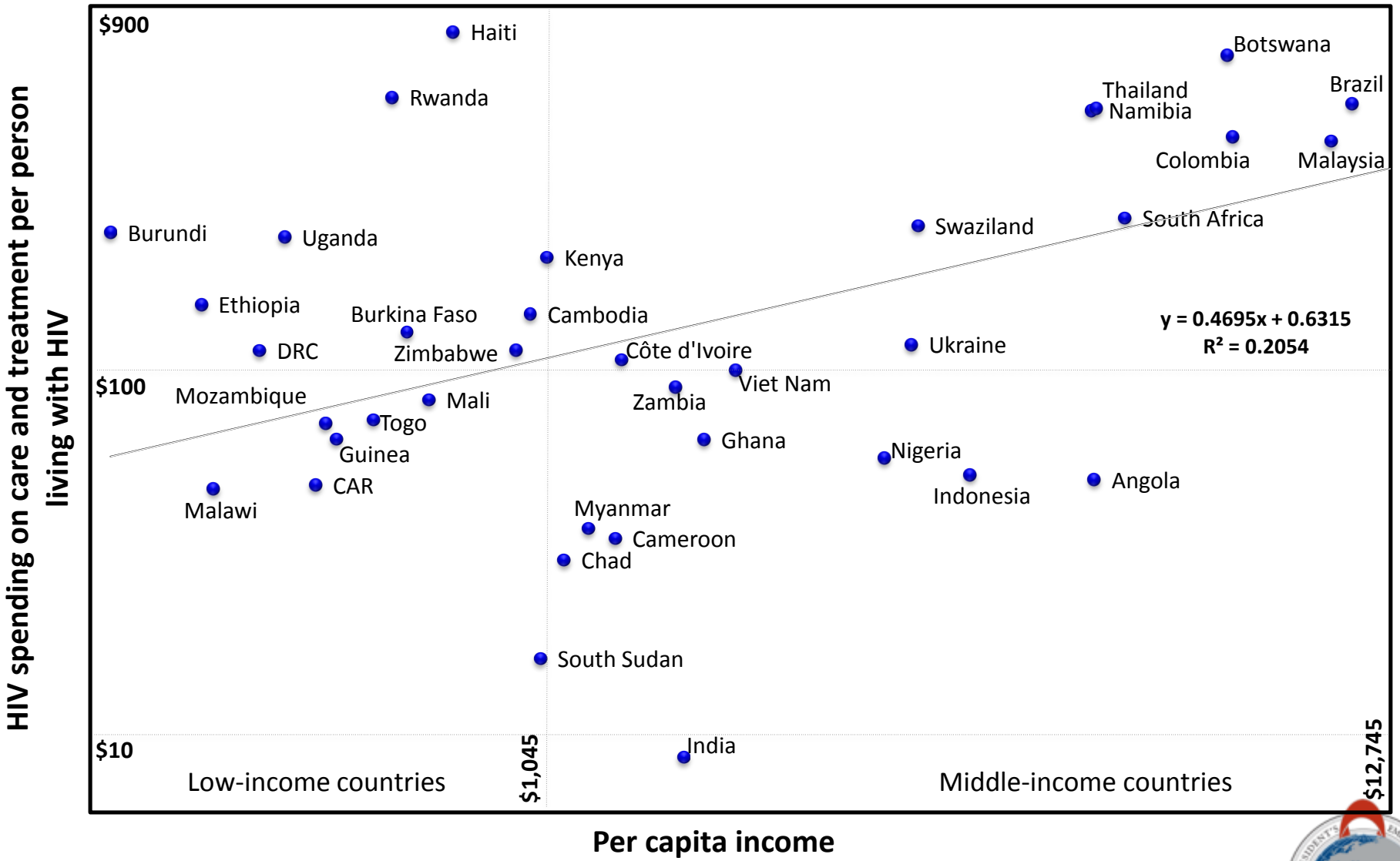
Allocative efficiencies
Choosing the right interventions

Operational efficiencies
Working in the right places, in the right way

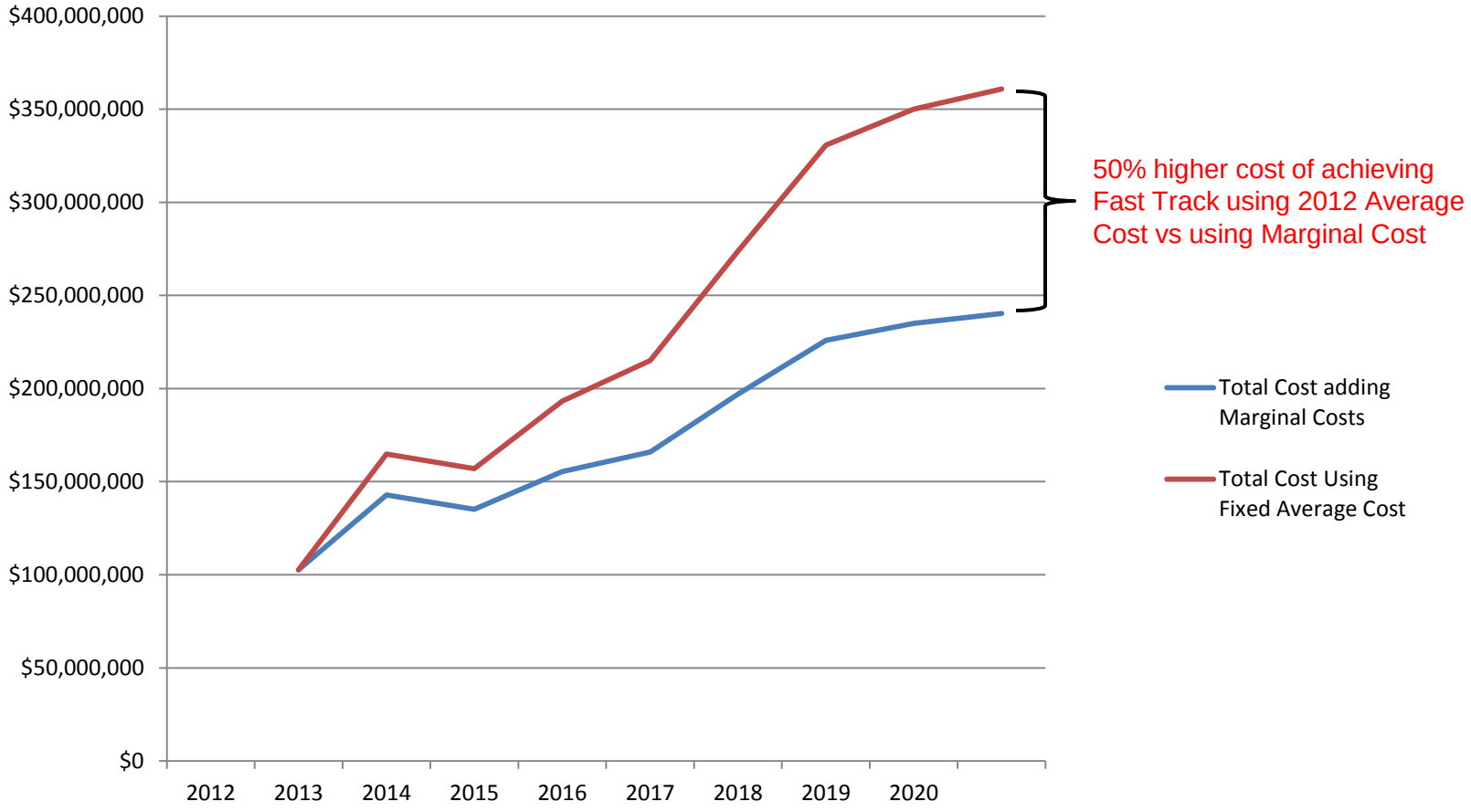
Direct testing and treatment spending per patient averages ~$540…



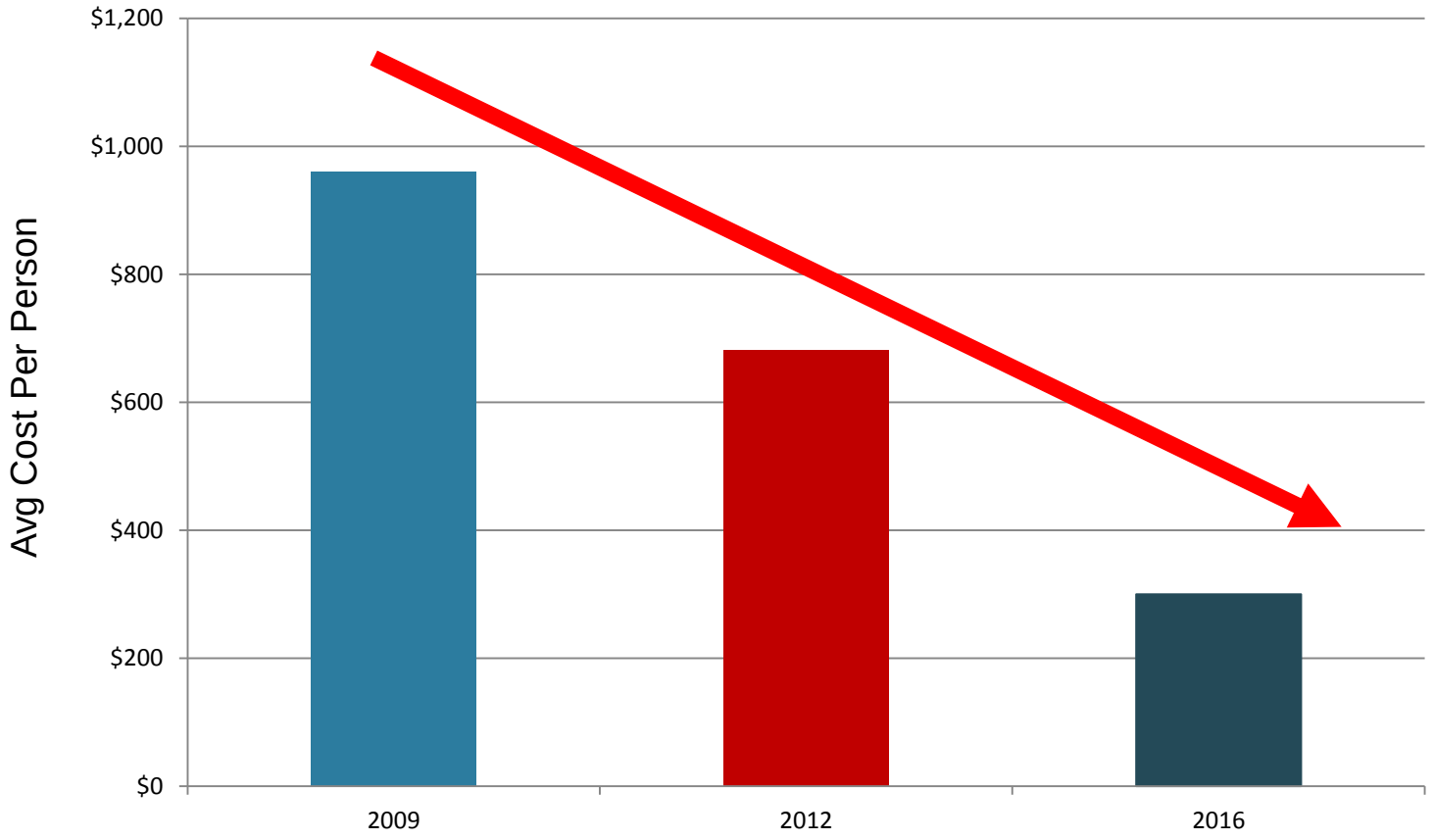
Source: PEPFAR COPs; National NASAs. Note: Direct spending numbers are derived from NASAs, most (but not all) dating from 2012; Most (but not all) commodity spending numbers date form 2014. Direct spending totals include those for clinical care, community care, PMTCT, HTC, and Labs; excludes HSS, program management, key pops, and surveillence. Country spending averages have been calculated by dividing the specific total dollar spend into the reported program size (from UNAIDS) for the relevant year.


HIV spending on care and treatment per person living with HIV
$900
$100
$10
Haiti
Rwanda
Botswana
Thailand
Namibia
Brazil
Colombia
Malaysia
Burundi
Uganda
Swaziland
South Africa
Kenya
Ethiopia
Burkina Faso
Cambodia
DRC
Zimbabwe
Côte d'Ivoire
Ukraine
y = 0.4695x + 0.6315
R² = 0.2054
Viet Nam
Mozambique
Mali
Zambia
Togo
Ghana
Guinea
Nigeria
Angola
CAR
Indonesia
Malawi
Myanmar
Cameroon
Chad
South Sudan
India
Low-income countries
$1,045
Middle-income countries
$12,745
Per capita income

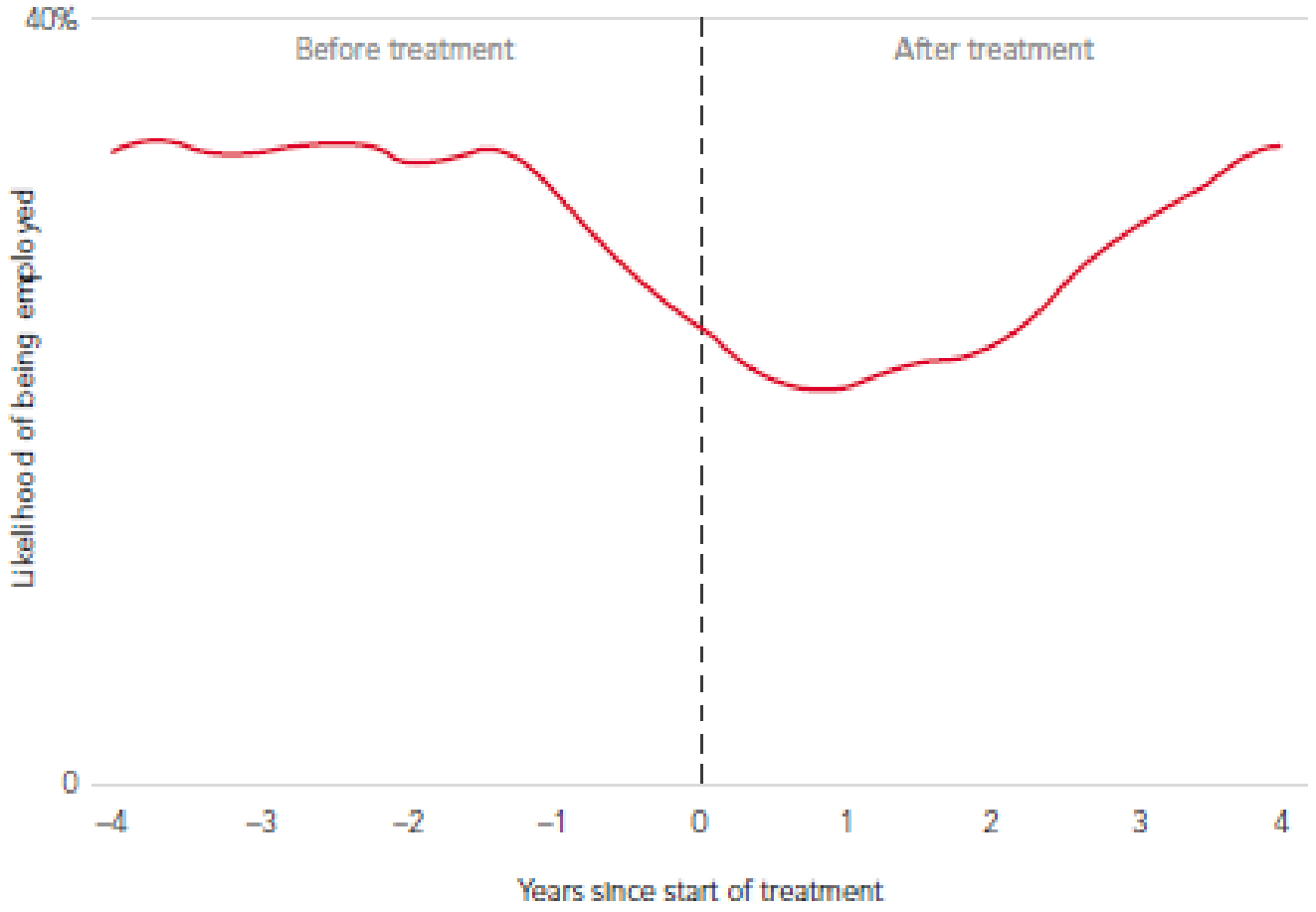
Be Attentive to Marginal Costs!



South Africa:
Significant Economies of Scale Leads to Decreased Cost

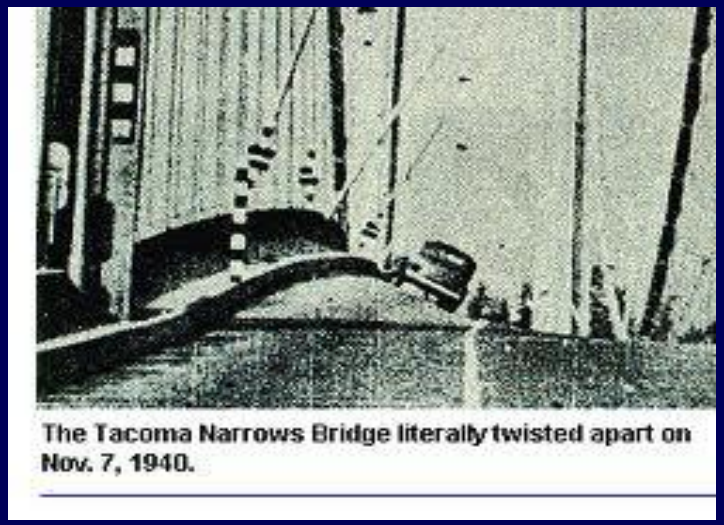


Treatment has a positive economic impact: healthy people go back to work



Source: Bärnighausen T et al. The economic benefits of ART: evidence from a complete population cohort in rural South Africa. *2nd International HIV Workshop on Treatment as Prevention, Vancouver, Canada, 22–25 April 2012.*

Treatment serves as a bridge to the end game



The Tacoma Narrows Bridge literally twisted apart on Nov. 7, 1940.

- Vaccine
- Cure
- ????

However beautiful the strategy, you should occasionally look at the results

--Winston Churchill

Ending AIDS is feasible:

- We have the tools
- Set ambitious targets to realize potential
- Work with community to reach everyone living with HIV to prevent illness, death and transmission
- Global solidarity to finance scale up—focus resources to ensure efficiency and impact
- Mind the Innovation Chasm—we will need optimal diffusion for success

UNAIDS

Thank you

- Mike Ruffner (OGAC)
- David Ripin (CHAI)
- Somya Gupta (IAPAC)
- Brad Hersh (UNAIDS)
- Jose Zuniga (IAPAC)
- Brian Williams (SACEMA)