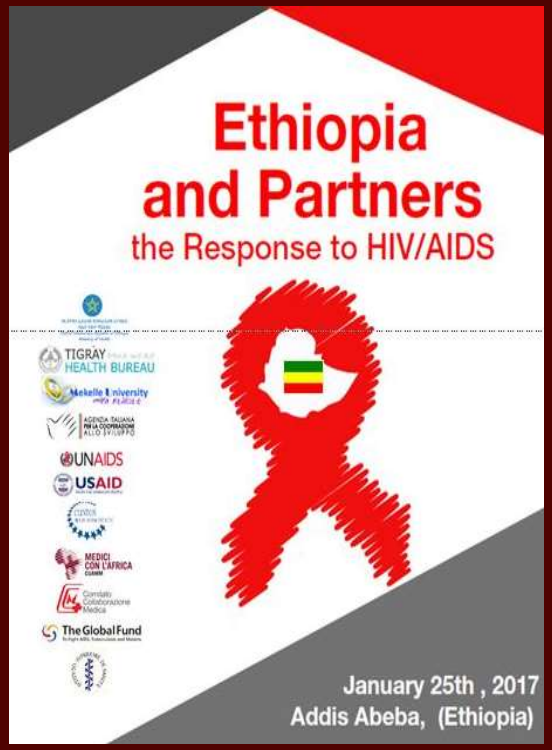
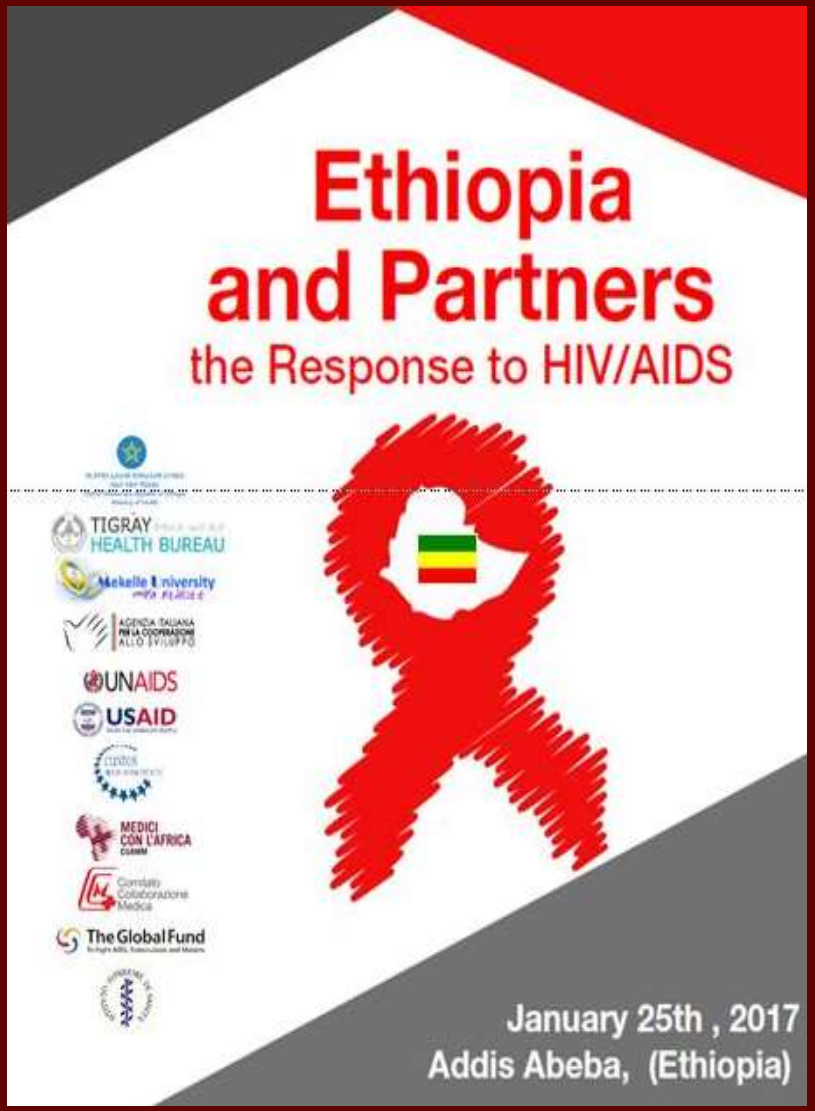


Addressing the barriers to ending AIDS by 2030

Stefano Vella

Center for Global Health

Istituto Superiore di Sanità - Rome - Italy



- **The goal**
- Where we are
- The barriers
- A way forward

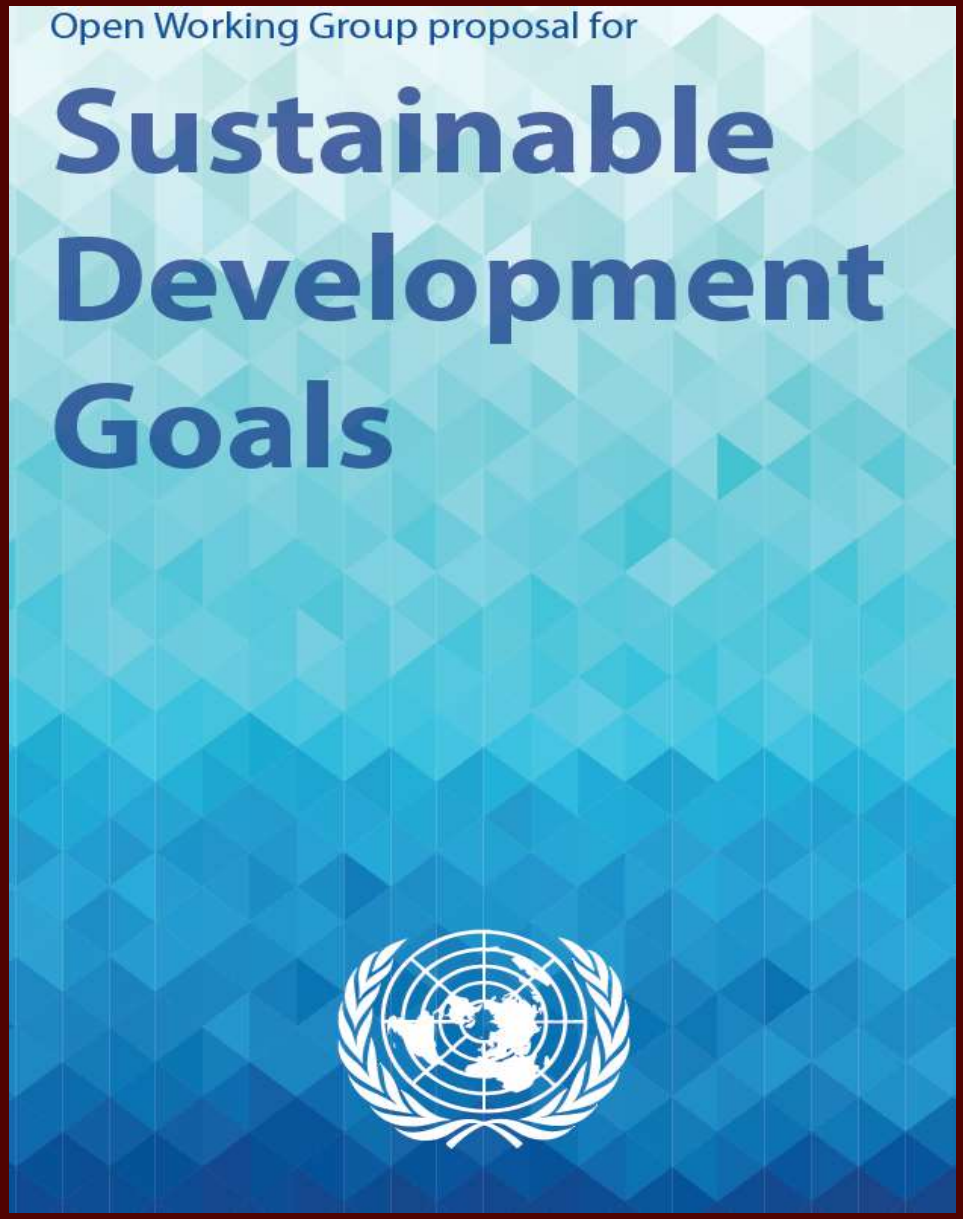

Open Working Group proposal for
Sustainable Development Goals

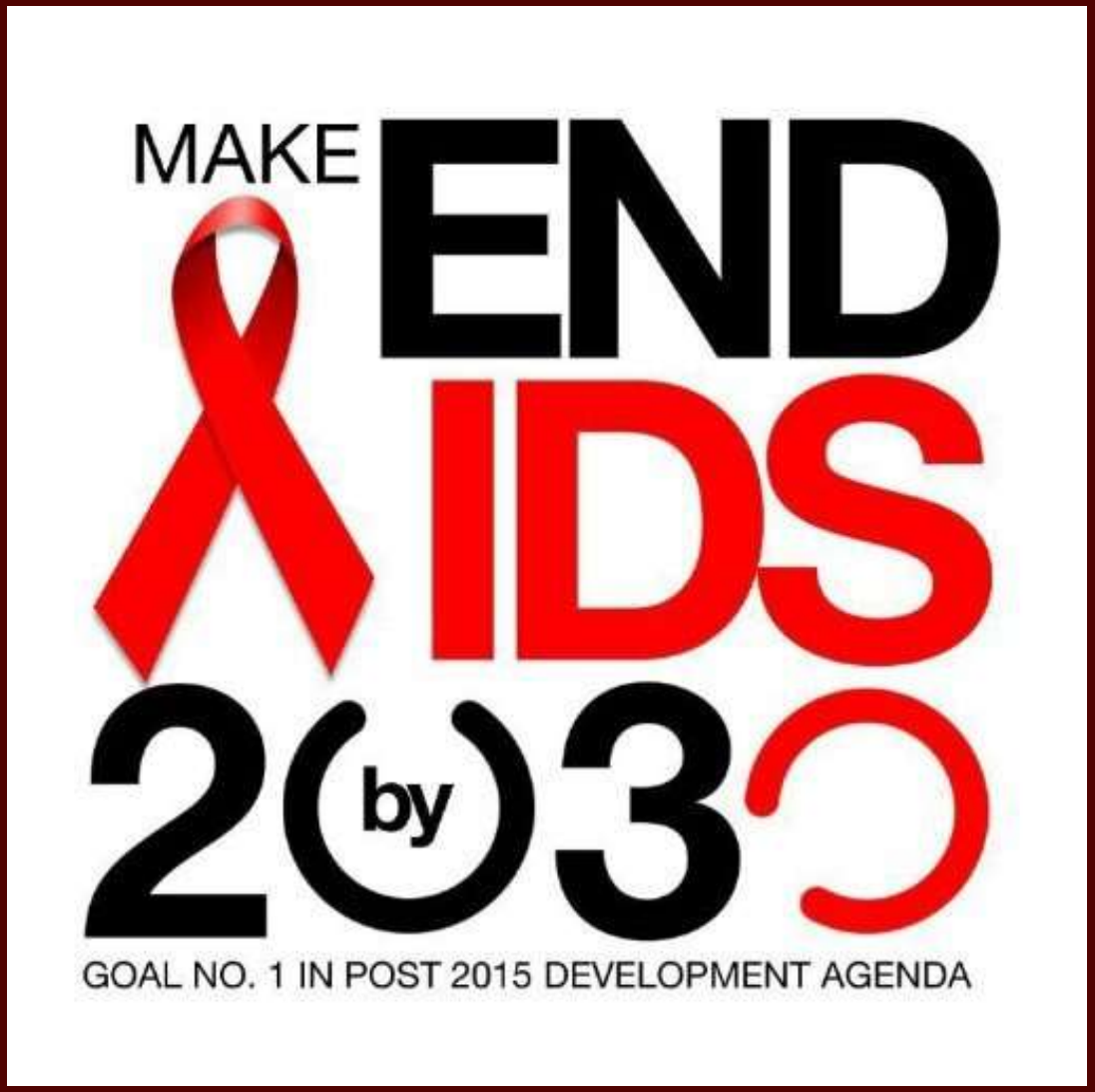
Table 1.2
The 17 SDGs

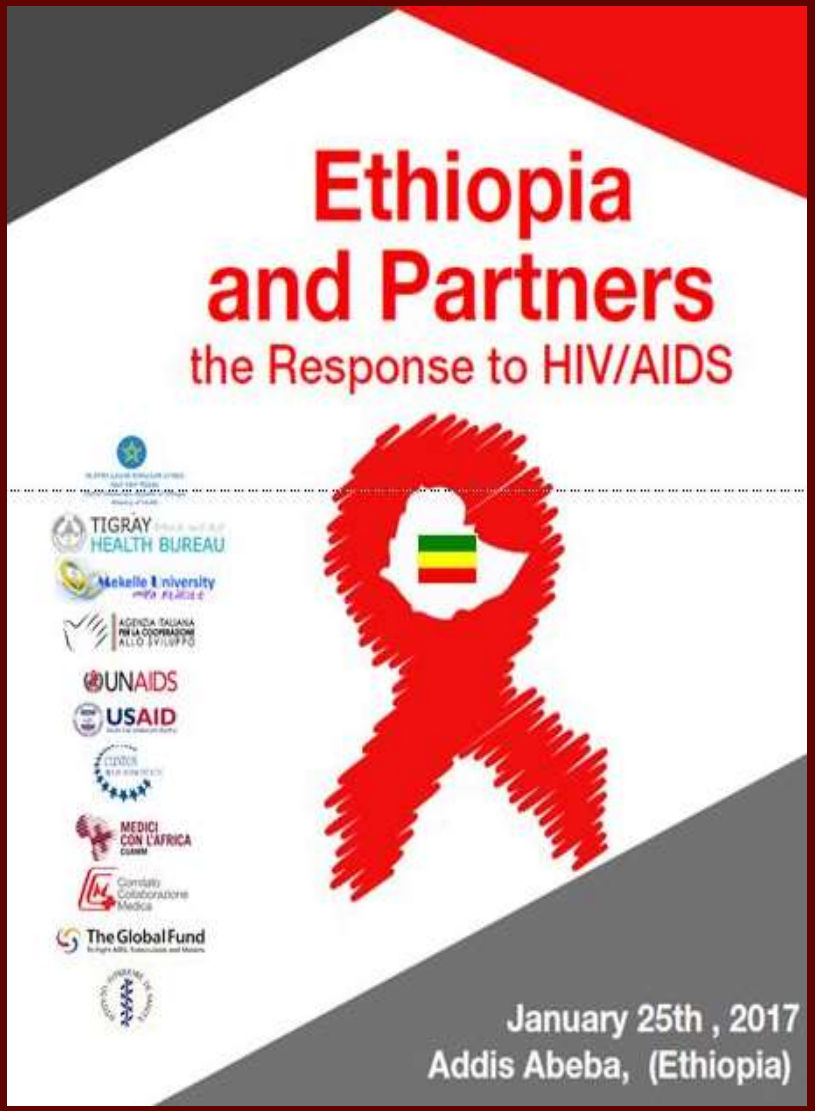
1	End poverty in all its forms everywhere
2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3	Ensure healthy lives and promote well-being for all at all ages
4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5	Achieve gender equality and empower all women and girls
6	Ensure availability and sustainable management of water and sanitation for all
7	Ensure access to affordable, reliable, sustainable and modern energy for all
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10	Reduce inequality within and among countries
11	Make cities and human settlements inclusive, safe, resilient and sustainable
12	Ensure sustainable consumption and production patterns
13	Take urgent action to combat climate change and its impacts[a]
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development

[a] Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

Goal #3 - Ensure healthy lives and promote well-being for all at all ages

- ✓ By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births
- ✓ By 2030, end preventable deaths of newborns and children under 5 years of age
- ✓ **By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases**
- ✓ By 2030, reduce by one third premature mortality from non-communicable diseases
- ✓ By 2030, through prevention and treatment promote mental health and well being
- ✓ By 2030, ensure universal access to sexual and reproductive health-care services.


MAKE
END
AIDS
2030
by
GOAL NO. 1 IN POST 2015 DEVELOPMENT AGENDA



- The goal
- **Where we are**
- The barriers
- A way forward

Global summary of the AIDS epidemic

Number of people living with HIV in 2015	**Total**	36.7 million [34.0 million – 39.8 million]
	Adults	31.8 million [30.1 million – 33.7 million]
	Women	16.0 million [15.2 million – 16.9 million]
	Children (<15 years)	3.2 million [2.9 million – 3.5 million]
People newly infected with HIV in 2015	**Total**	2.1 million [1.9 million – 2.4 million]
	Adults	1.9 million [1.7 million – 2.1 million]
	Children (<15 years)	240 000 [210 000 – 280 000]
AIDS deaths in 2015	**Total**	1.1 million [940 000 – 1.3 million]
	Adults	1.0 million [1.2 million – 1.5 million]
	Children (<15 years)	190 000 [170 000 – 220 000]

Source: UNAIDS/WHO estimates.

World Health Organization

HIV PREVENTION

Needle Exchange

Drucker E, AIDS 1998

Male circumcision

Auvert B, PloS Med 2005
Gray R, Lancet 2007
Bailey R, Lancet 2007

Treatment of STIs

Grosskurth H, Lancet 2000

Microbicides for women

Abdool Karim Q, Science 2010

Female Condoms

Oral pre-exposure prophylaxis

Grant R, NEJM 2010 (MSM)
Baeten J , NEJM 2012 (Couples)
Thigpen M, NEJM 2012 (Heterosexuals)
Choopanya K, Lancet 2013 (IDU)

Male Condoms

HIV Counselling and Testing

Coates T, Lancet 2000
Sweat M, Lancet 2011

Opioid substitution therapy

Mathers BM, Lancet 2010

Treatment for prevention

Cohen M, NEJM, 2011
Donnell D, Lancet 2010
Tanser, Science 2013

Behavioural Intervention

Note: PMTCT, Screening transfusions, Universal precautions, etc. have not been included

The New England Journal of Medicine

Established in 1812 as THE NEW ENGLAND JOURNAL OF MEDICINE AND SURGERY

Volume 365 August 11, 2011 Number 6

Prevention of HIV-1 Infection with Early Antiretroviral Therapy

HPTN 052 Study Team

- 1,763 HIV-serodiscordant couples in 9 countries
- 96% reduction in HIV transmission when ART started in HIV-infected partner at CD4 count of 350-550 compared to <250

New Prevention Technologies gives hope

- PrEP works (when used)
  - New meds and dosing regimens for oral PrEP may improve uptake, ↓cost

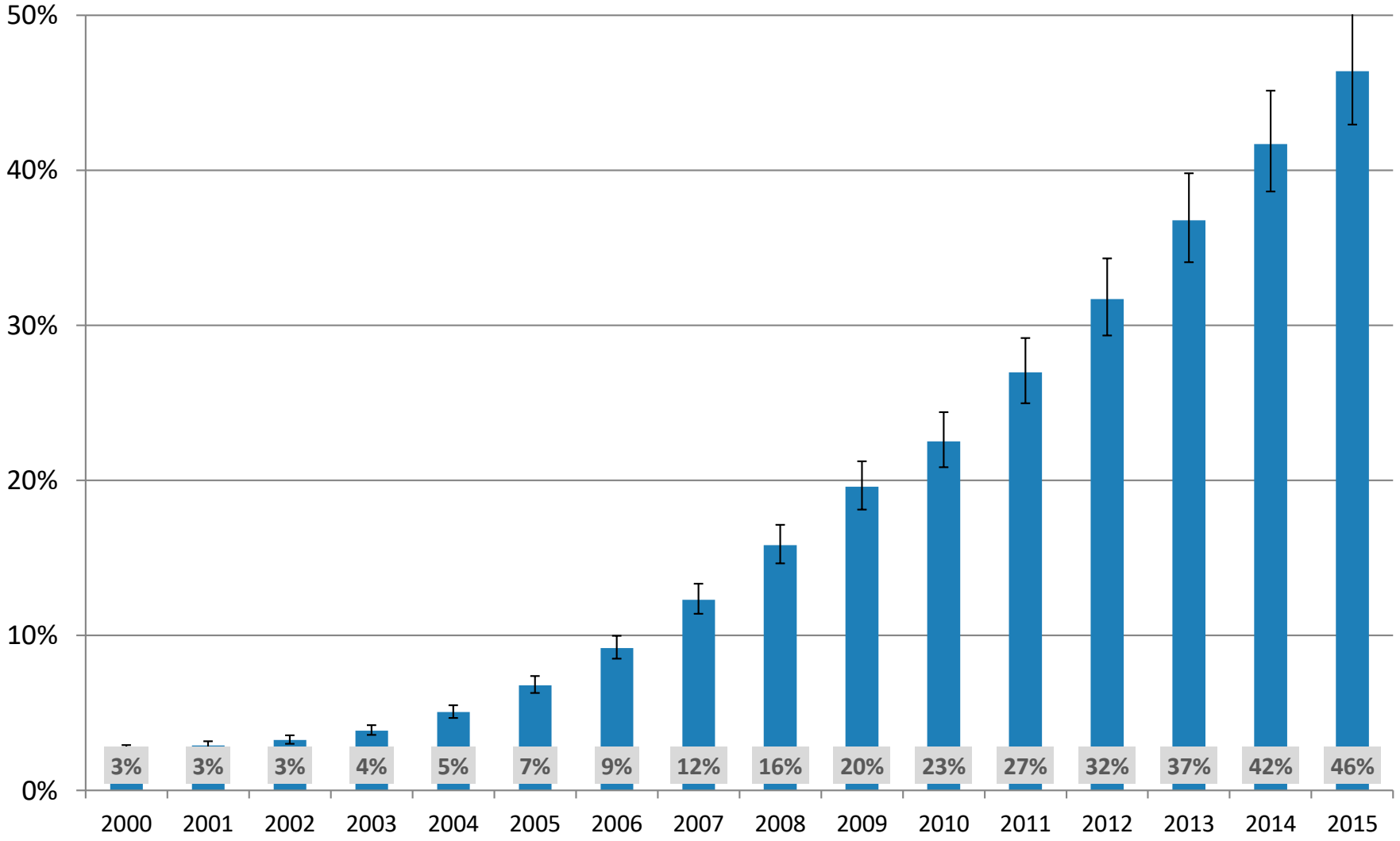
- Circumcision is highly effective

- Microbicides
  - Rectal gels may offer new anal protection
  - Rings may offer MPT opportunities

- Harm reduction for IDU works, and shall be implemented

- Vaccine may be closer than thought just a couple of years ago

ART coverage over time



Source: UNAIDS/WHO estimates.

World Health Organization

Initiation of antiretroviral therapy according major international HIV guidelines (2016)

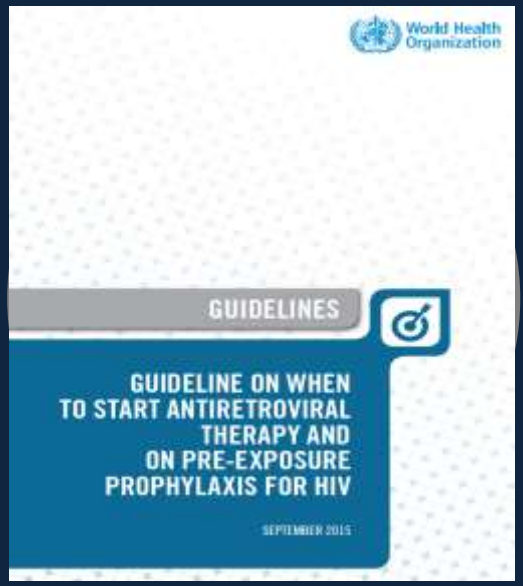
Criteria		WHO 2016[1]	EACS[2]/PENTA 2016[3]	DHHS 2016[4, 5]
Adults and adolescents	**CD4 count ≤ 350 cells/µL**	Treat (as priority)	Treat (strongly recommended)	Treat
	CD4 count 350-500 cells/µL	Treat	Treat	Treat
	CD4 count > 500cells /µL	Treat	Treat	Treat
Pregnancy/Breastfeeding		Treat	Treat	Treat
Infants and children		Treat (advanced disease or age <5 years as priority)	Treat (symptomatic disease or age <3 years or severe immunosuppression as priority)	Treat (advanced disease or age <1 year or severe immunosuppression as priority)
TB co-infection (timing of ART initiation after starting TB treatment)		Within 8 weeks (within 2 weeks if severe ID)	CD4 < 50 cells/µL: within 2 weeks CD4 > 50 cells/µL: within 8 -12 weeks	CD4 < 50 cells/µL: within 2 weeks CD4 > 50 cells/µL: within 8 weeks
HBV co-infection		Treat	Treat	Treat
HCV co-infection		Treat	Treat (treat HCV first if CD4 > 500 cells/µL)	Treat (treat HCV first if CD4 > 500 cells/µL)
Acute HIV infection		Not specified	Treat	Treat

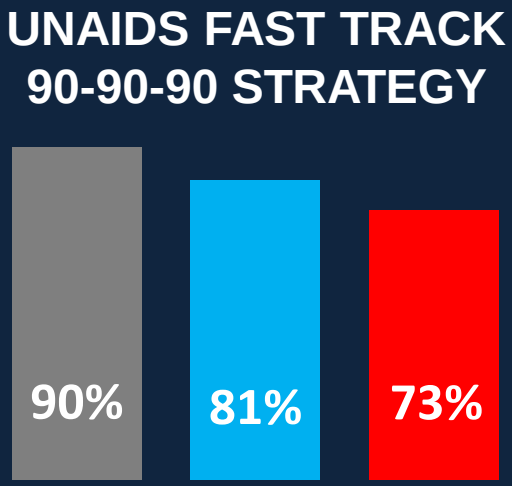
References:

1. http://www.who.int/hiv/pub/arv/arv-2016/en/
2. http://penta-id.org/hiv/penta-trials-treatment-guidelines.html
3. https://aidsinfo.nih.gov/contentfiles/lvguidelines/adultandadolescentgl.pdf
4. https://aidsinfo.nih.gov/contentfiles/lvguidelines/pediatricguidelines.pdf

World Health Organization

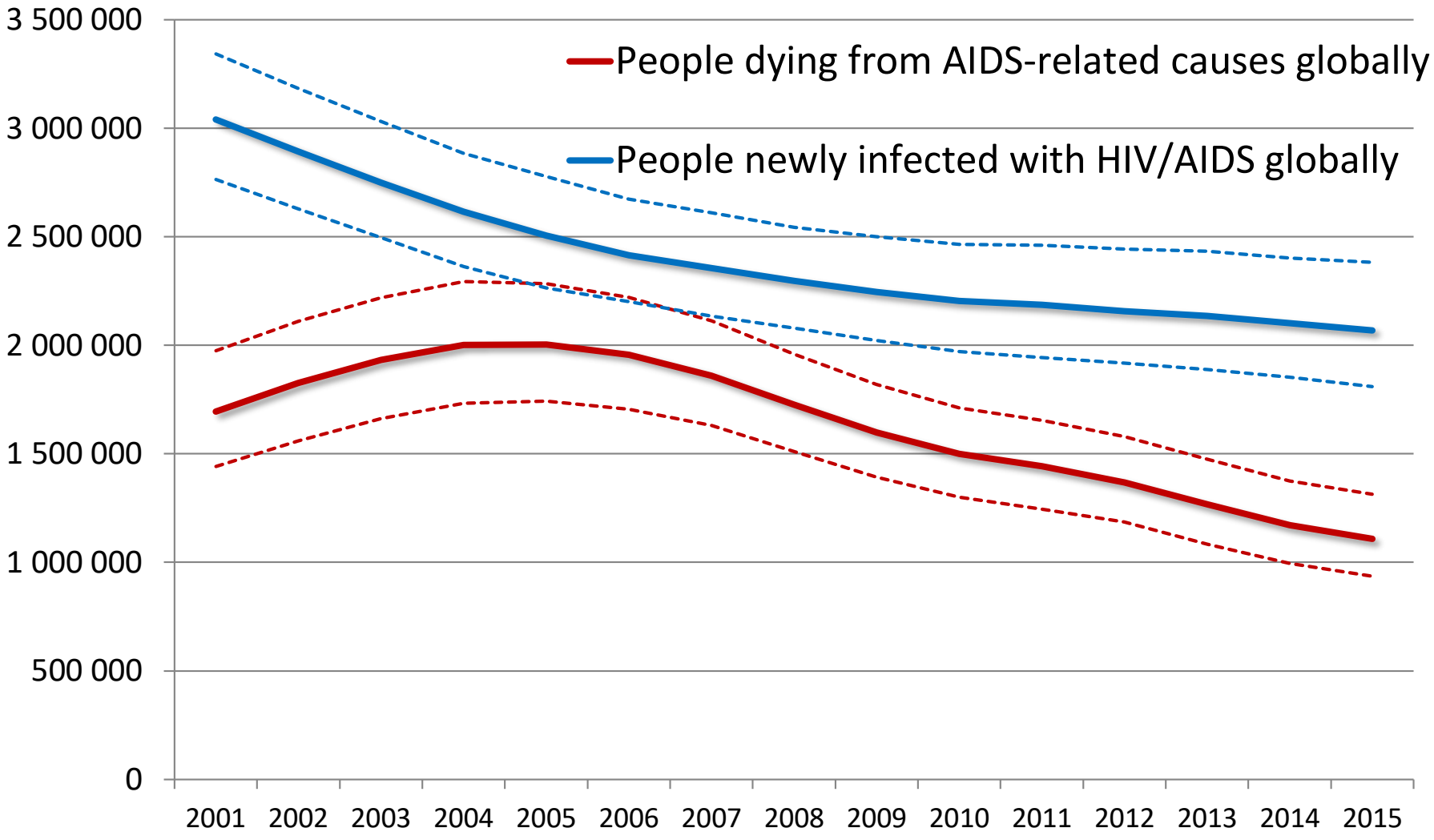
THE NEW WHO ELIGIBILITY CRITERIA AND THE UNAIDS 90 90 90 TARGETS ARE CONVERGING ELEMENTS OF THE SAME GOAL: ENDING AIDS BY 2030





By combining the personal health benefit (reducing HIV mortality & morbidity) with the Public Health benefit (reducing transmission) they foster universal access to care and treatment, provide operational advantage, and contribute to global equity

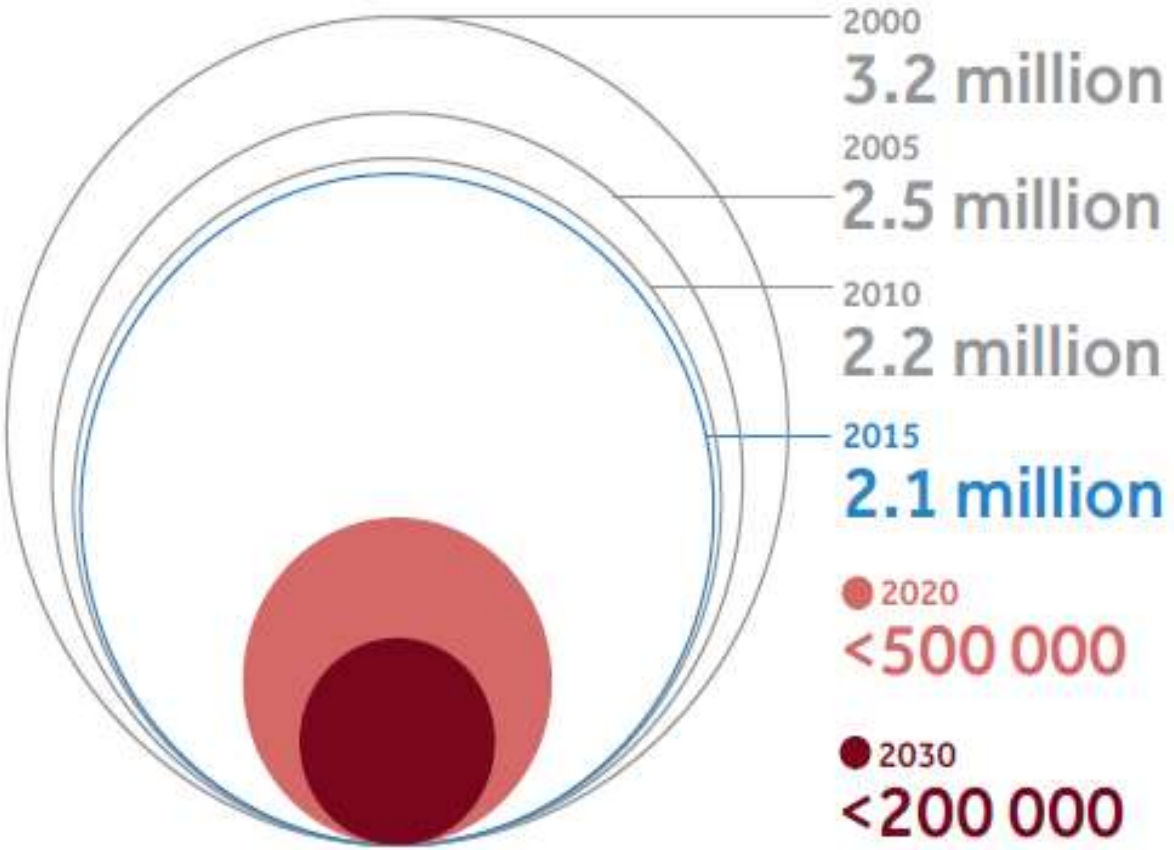
Decline in HIV incidence and mortality over time



Source: UNAIDS/WHO estimates.

World Health Organization

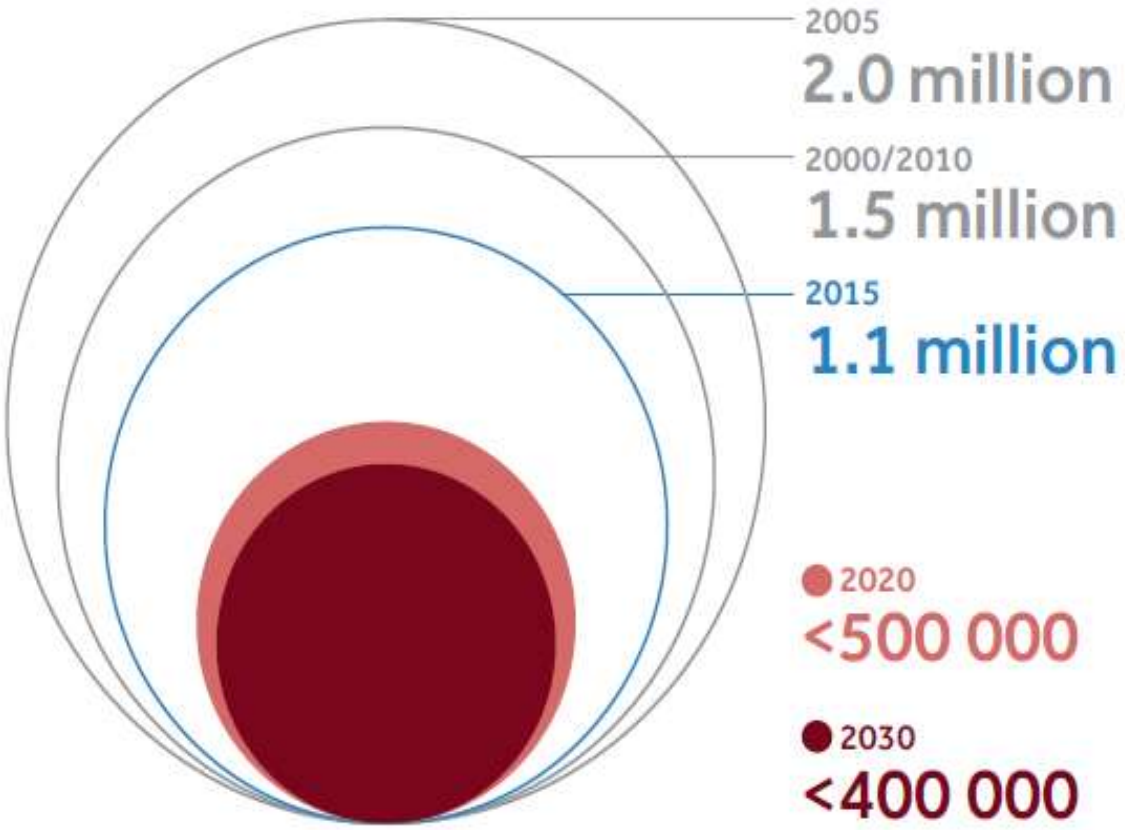
Number of people newly infected with HIV



Source: UNAIDS/WHO estimates.
The red shading shows future targets.

World Health Organization

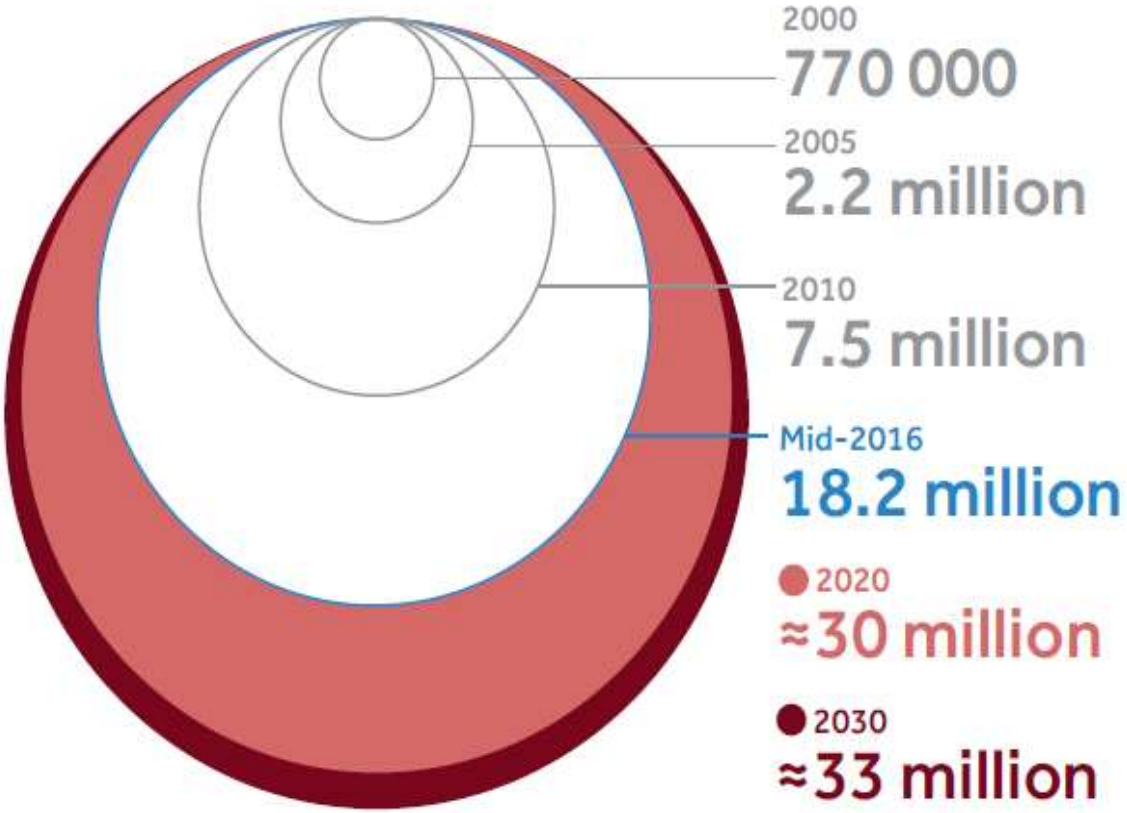
Number of people dying from HIV



Source: UNAIDS/WHO estimates.
The red shading shows future targets.

World Health Organization

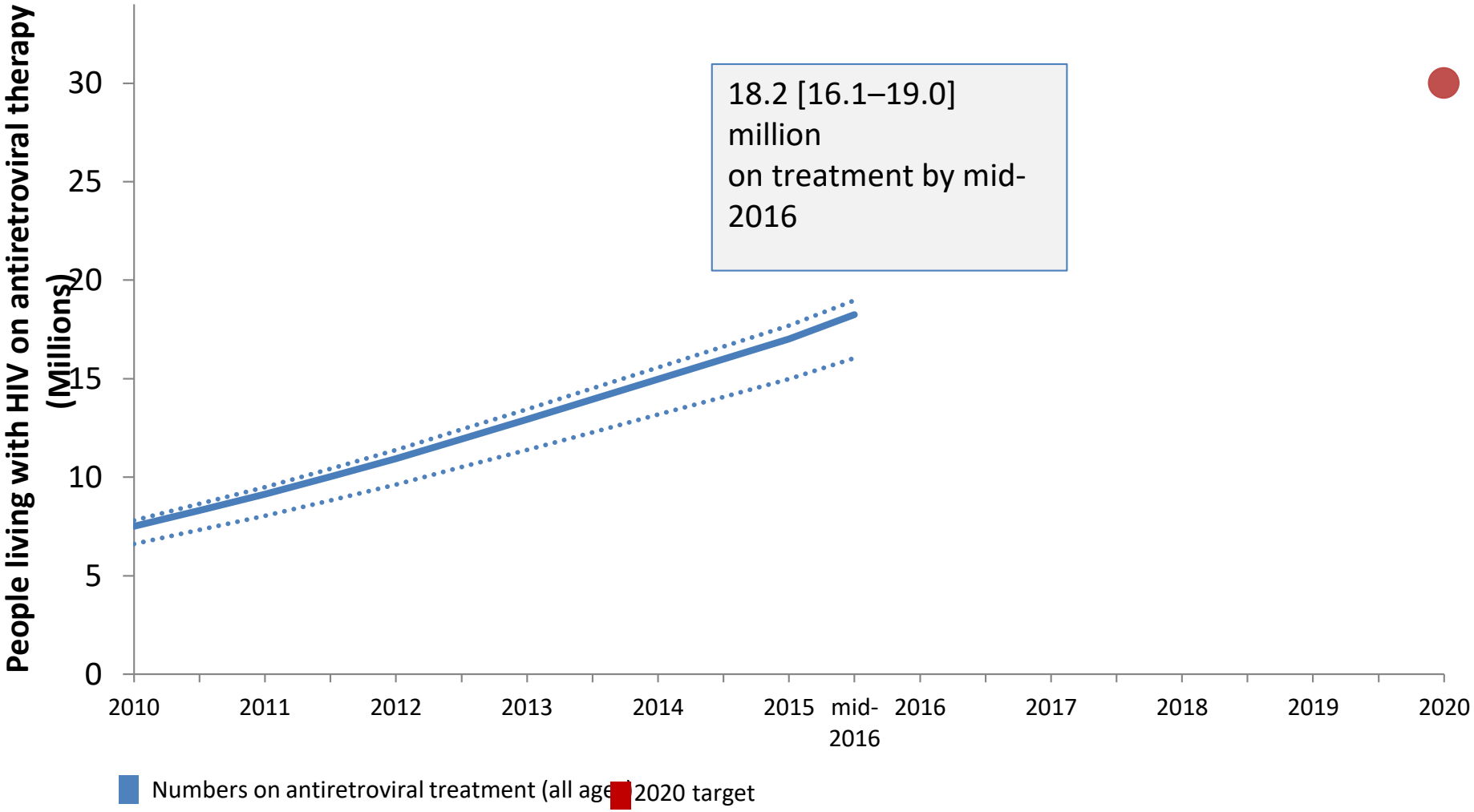
Number of people receiving antiretroviral treatment



Source: UNAIDS/WHO estimates.
The red shading shows future targets.

World Health Organization

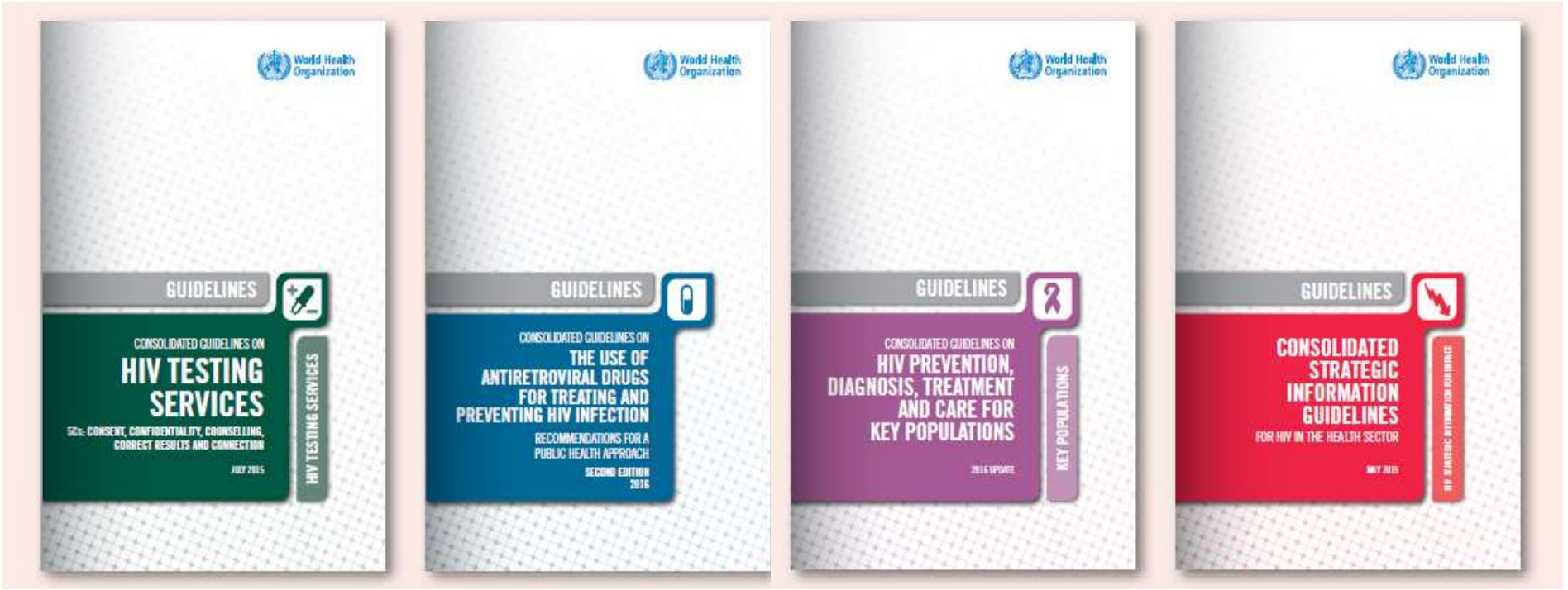
Increase in people receiving ART over time



Source: UNAIDS/WHO estimates.

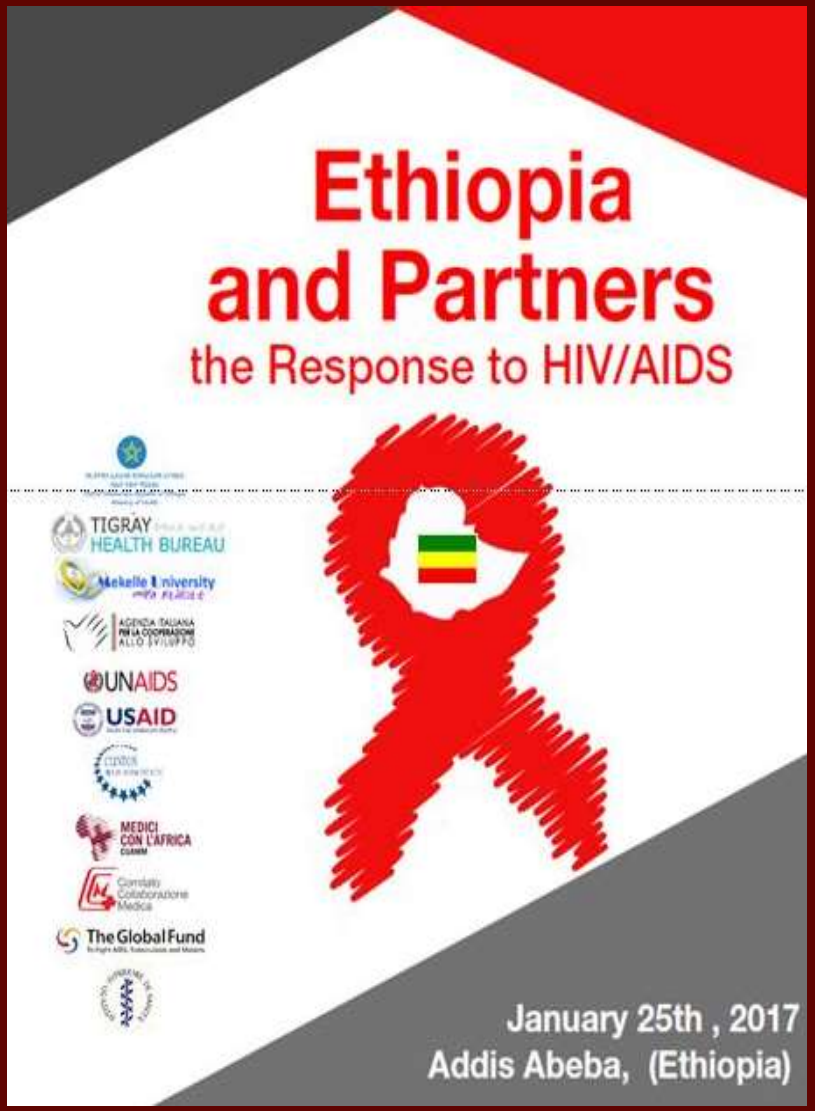
World Health Organization

WHO has developed four core sets of guidelines to support Fast-Track action in countries



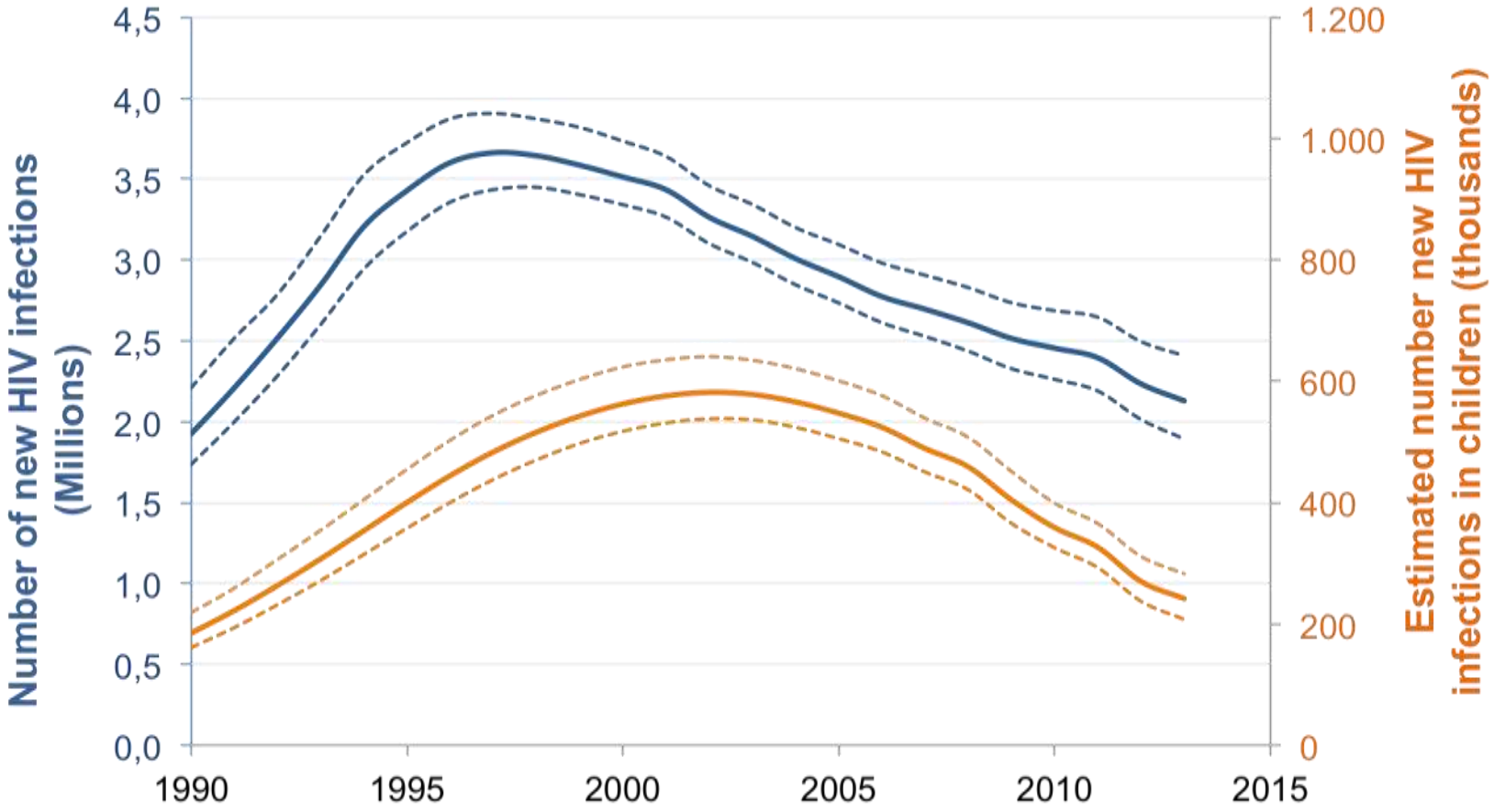
Source: WHO

World Health Organization



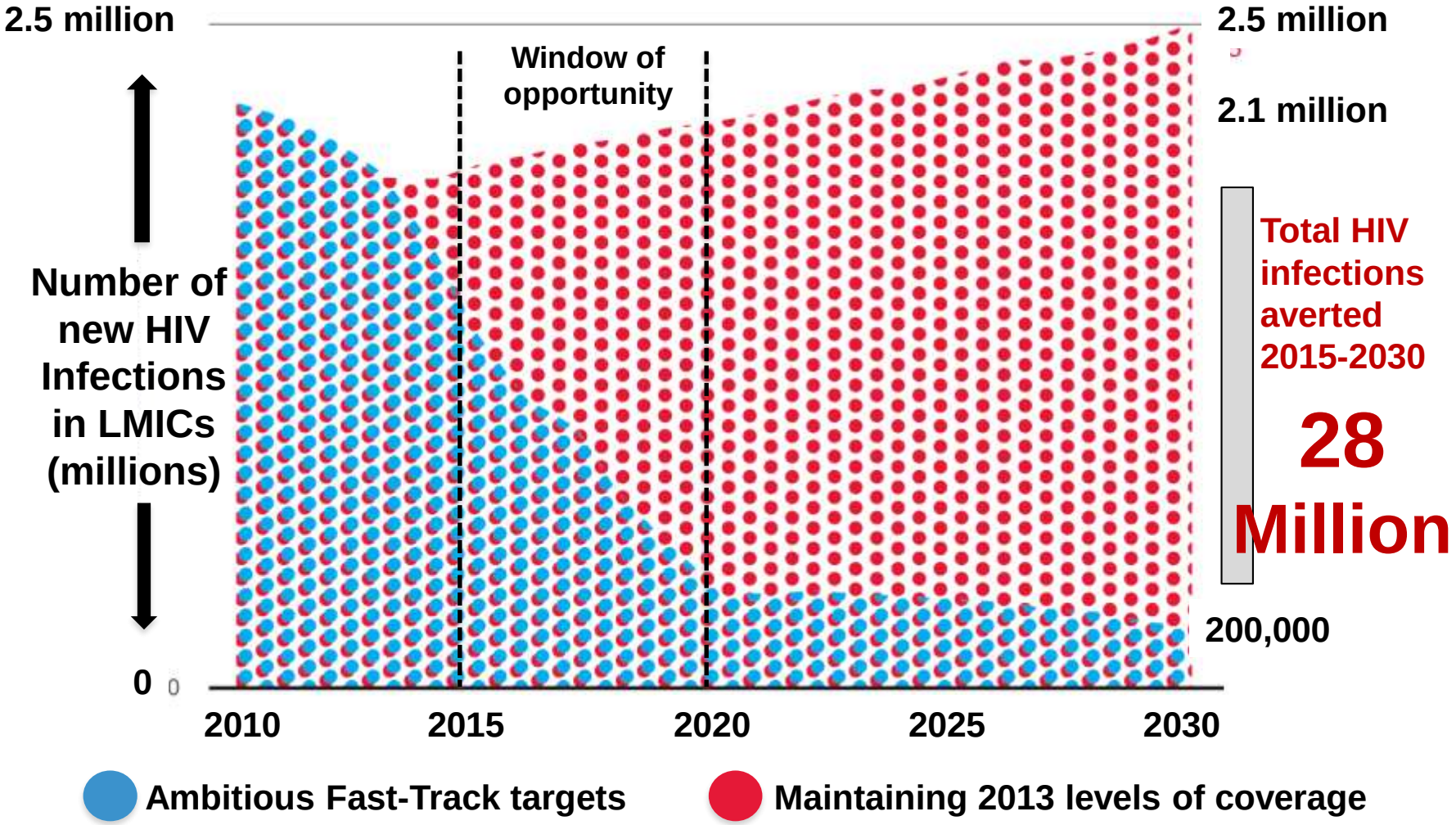
- The goal
- Where we are
- **The barriers**
- A way forward

…however, the global number of new HIV infections in adults and children is still unacceptably high



Source: *UNAIDS Global Report 2014*

“The AIDS response is at a crucial juncture, both in its immediate trajectory and its sustainability…”



Source: Adapted from UNAIDS Fast-track Report

Addressing barriers to the end of AIDS by 2030

The introduction of combination antiretroviral therapy (ART) in 1996 was the first milestone in the fight against HIV/AIDS, and its impact has been huge. Today, we have solid proof that early ART initiation provides benefit for the health of the HIV infected people[1,2] and reduces the risk of HIV transmission.[3] The concept of treatment as prevention is gaining ground, with decreasing HIV incidences proportional to ART coverage.[4,5] However, with HIV testing lagging behind, prevention cannot rely solely on expanded access to ART: combination prevention shall necessarily include both biomedical and non-biomedical interventions. On the biomedical side, the efficacy of pre-exposure prophylaxis (PrEP) has been confirmed by numerous randomised trials, with PrEP "on demand" adding convenience to this preventive strategy.[6] Therapeutic developments are also on the way, with injectable, long half-life antiretrovirals (possibly helping to increase ART adherence, definitely suitable for prevention). Finally, in the search for a cure, recent breakthroughs suggest that reactivation and killing of latently infected cells could be possible one day. Will a cure or remission strategy, whenever available, be accessible to the millions already infected? That's another question.

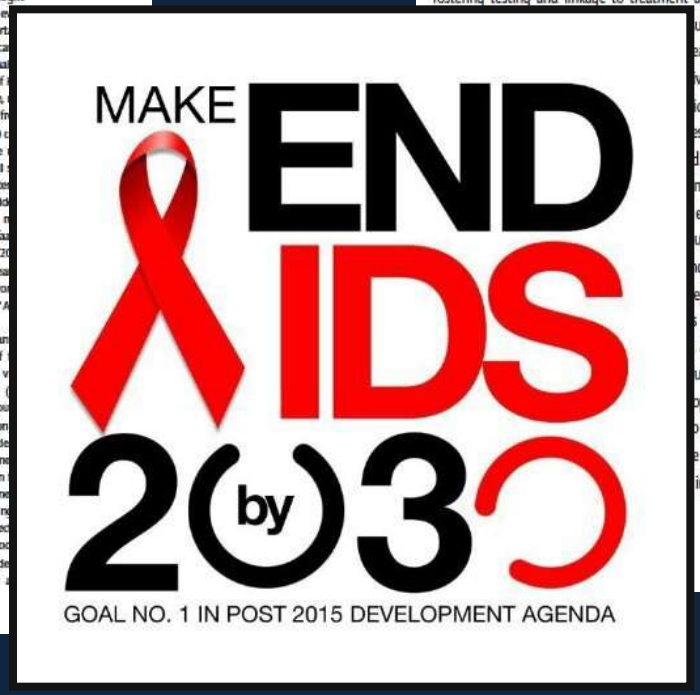
In the year 2000, opening the Durban IAS Conference, Justice Edwin Cameron said that "our overriding and immediate concern should be to find ways to make accessible for the poor what is within reach of the affluent". The subsequent creation of the Global Fund to Fight AIDS, Tuberculosis, and Malaria and of the Presidents Emergency Plan for AIDS Relief, the increasing penetration of generic antiretrovirals, and the availability of resources for countries' AIDS programmes, held enormous promise. A promise that has actually delivered—with 15 million people on ART before the end of 2015, an accomplishment considered very difficult when this target was set in 2011 by UNAIDS.[7]

Unfortunately, despite the undebatable successes, 2 million new infections happen every year worldwide, and a significant proportion of the 40 million infected people are estimated to live undiagnosed. These numbers will be sobering for those with enthusiastic views regarding the third Sustainable Development Goal (SDG)—*Ensure healthy lives and promote well-being for all at all ages*—which calls for an end to the AIDS epidemic by 2030. To make it happen, three major challenges are in front of us.

The first challenge is scientific: the discovery of an HIV vaccine. Treatment as prevention alone will not be able to stop the epidemic. Despite increasing ART access, there will be no end of AIDS without a preventive vaccine made available for populations living in high prevalence areas and for key affected and marginalised populations around the world. New constructs of HIV epitopes eliciting broadly neutralising antibodies, indicate that an HIV vaccine may be closer than thought just a few years ago.[8] And a vaccine providing e
relatively weak protection might still have an import
synergistic effect with increased ART coverage, beca
the number of potential HIV transmitters will be sma

The second challenge is operational. Expansion of
treatment programmes is expected in years to come,
least because of the switch of the eligibility criteria fr
starting treatment when CD4 count is less than 500
per µL to treatment of all infected. Although the
In numbers to be treated may not be huge, it will
represent a challenge for already stressed health syste
Clinical and transmission benefits will become evid
in the years to come, but the immediate benefits
not be so evident to programme managers. Wafaa
Sadr posed several important questions during the 20
Vancouver conference: Shall all populations start ea
How will the START trial be interpreted in the real wo
How will we sustain ART for all, and who will pay? A
how do we minimise inequalities and disparities?

In addition, ART attrition represents a substan
barrier to the achievement and maintenance of
UNAIDS targets of 90% in care and 90% with v
suppression. Barriers are not only biomedical (
ART toxicity) but also structural and behaviou
Because of the new entry criteria, the proportion
asymptomatic patients will increase: these patie
may perceive no short-term benefit from treatme
with consequent treatment cessation, especially in
face of onerous ART procurement or toxic regime
Therefore, the aspirational dream of implementin
test-and-treat approach for millions of HIV-infec
will never be accomplished without innovative mod
of care: patient-centred, decentralised, and outside
health facilities. Indeed, lay health-care workers



From Durban to Durban: end of AIDS further than hoped

The International AIDS Conference in July celebrated the success of antiretroviral treatment (ART) in reducing illness and death.[1] The pall of despair that hung over the the previous Durban conference in 2000 has truly lifted, and in one of the great success stories of global health 17 million people have begun ART. Despite this achievement the mood was sombre as the goal of an end to AIDS receded; but it was also purposeful, and we can do much to bring the goal closer.

We commend the UNAIDS 90-90-90 strategy for fostering testing and linkage to treatment and WHO

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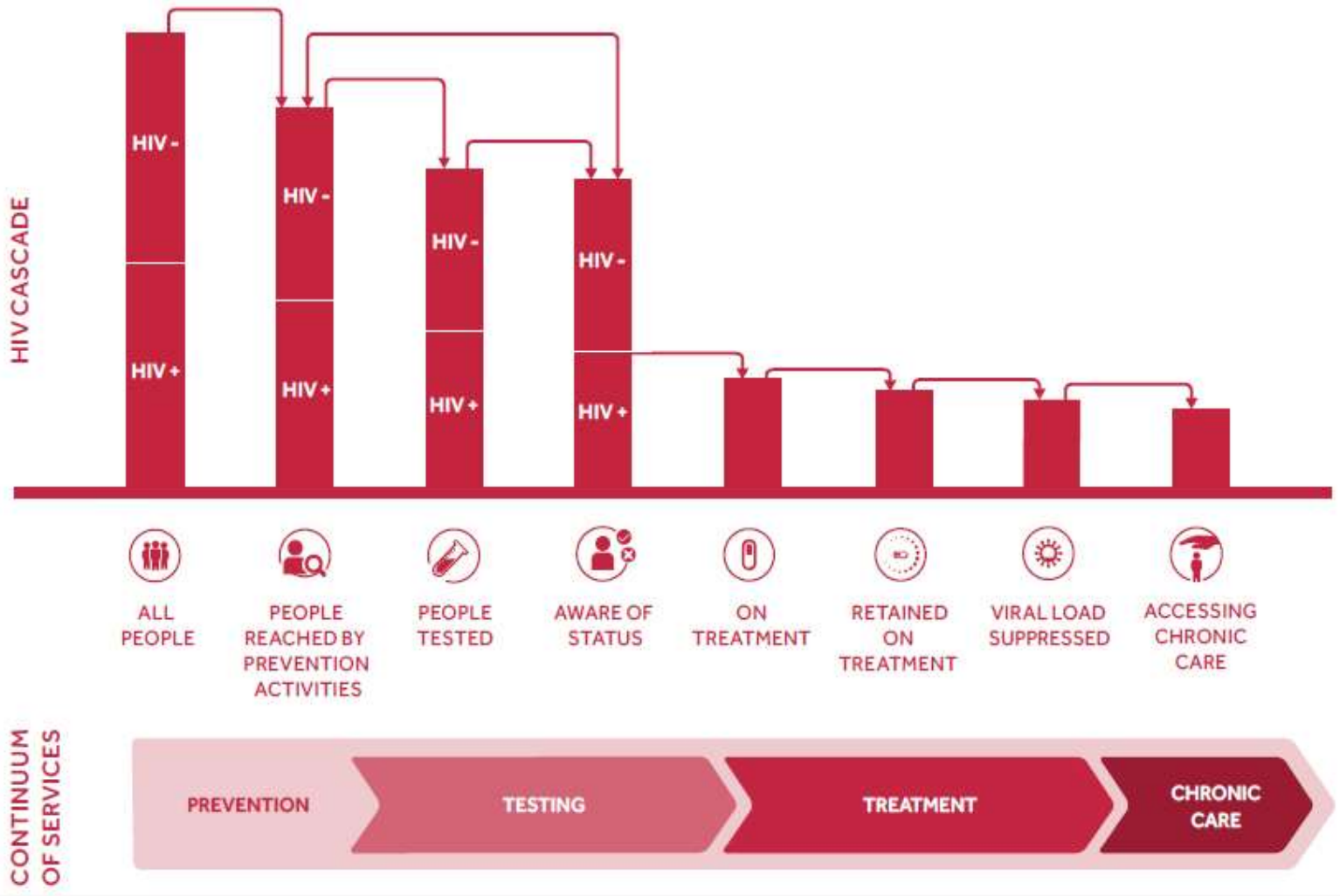
stagnating at 2·1 million annually, with many countries experiencing unexpected increases.[4] IHME's independent estimates are even higher—74 countries with increased HIV incidence and 2·5 million new infections every year.[5] In many countries, including Botswana, South Africa, and Swaziland, HIV incidence remains distressingly high, even as we approach or attain the ambitious 90-90-90 treatment goals. Moreover, in a cluster randomised test and treat trial in KwaZulu-Natal, TasP did not reduce new HIV infections.[6] True that the HPTN 052 results provide incontestable proof of treatment as prevention efficacy among carefully selected stable partners in a meticulously monitored research setting.[7] But we are not yet seeing, nor should we expect to see, comparable population level effectiveness in the real world. Without underestimating the transformative effects of treatment in reducing AIDS morbidity and mortality and slowing HIV transmission, we will not end this epidemic with tablets alone.

The START[8] and Temprano[9] trials finally showed that immediate ART initiation in adults with CD4 counts greater than 500 cells per µL reduces the risk of primary events by 57% compared with deferring ART until CD4 count falls below 350 per µL. The number of deaths, however, was the same in both arms and the absolute difference in the primary clinical endpoint was modest, perhaps because both trials were stopped prematurely.[10,11] On balance, the personal health benefits combined with the public health benefit

Addressing the barriers

- *HIV testing*
- *Stigma*
- *Late presentation*
- *Low ART coverage*
- *Retention in care and ART*
- *Key populations*
- *Financing*

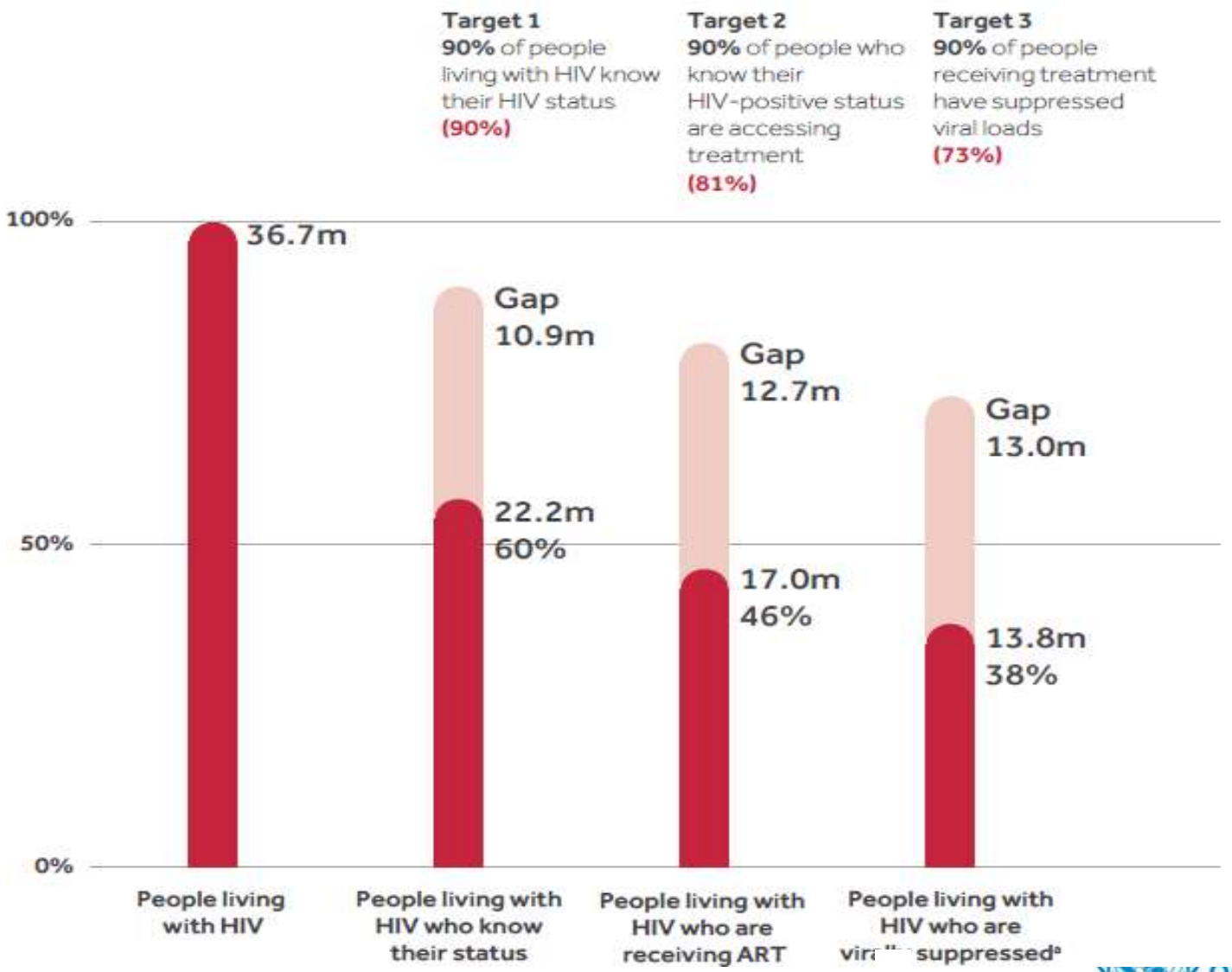
Universal health coverage to end AIDS



Source: Global Health Sector Strategy on HIV, 2016-2021.

World Health Organization

Improvements are needed at each stage of the cascade of HIV testing and treatment services, 2015



Source: UNAIDS/WHO estimates.

Stigma: Major impediment to HIV prevention and treatment

Stigma impedes AIDS prevention

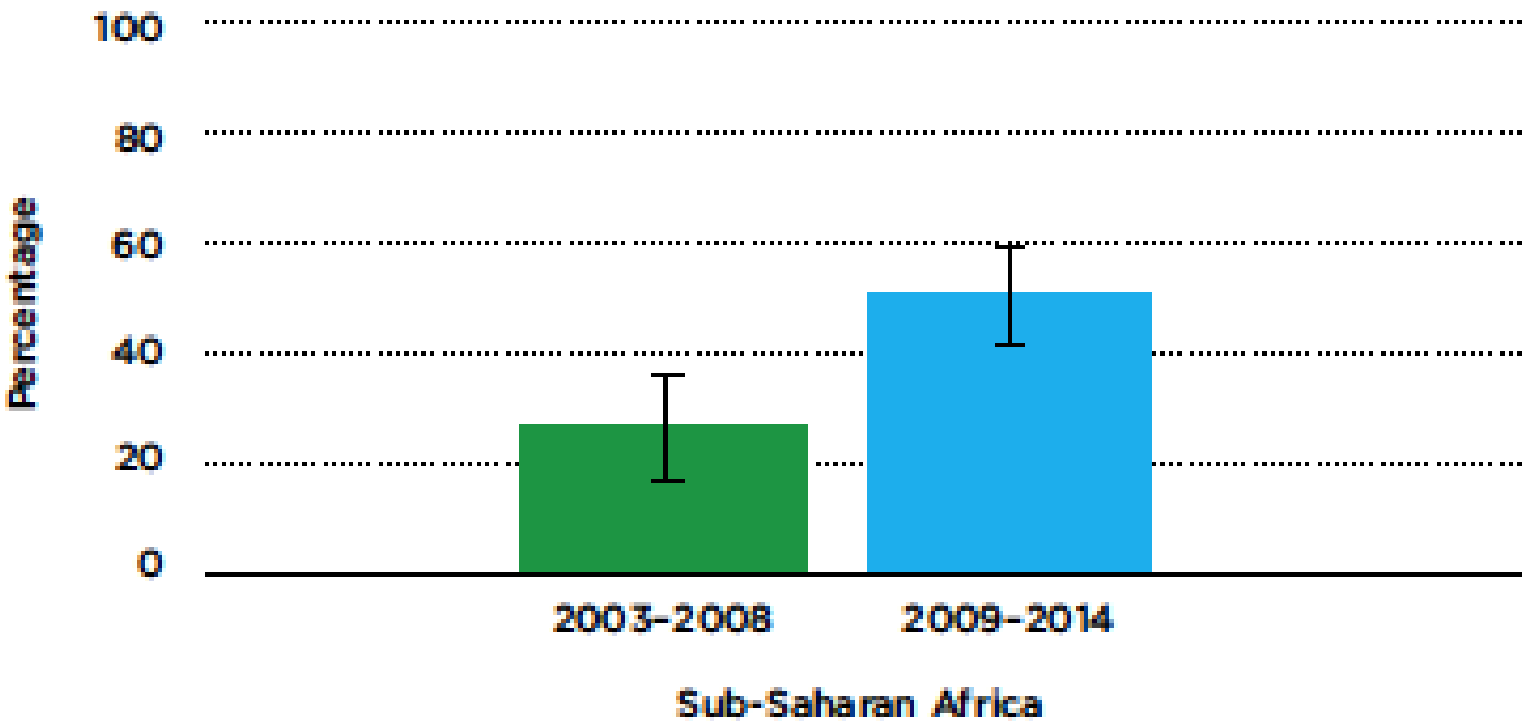
nature

Medical advances cannot help those who deny they are at risk of HIV and avoid HIV tests. **Salim S. Abdool Karim** describes how such attitudes may be overcome.

Source: UNAIDS Together we will end AIDS 2012

17.1 million people living with HIV do not know their HIV status

Awareness of HIV status among people aged 15–49 living with HIV in sub-Saharan Africa



Source: Analysis based on DHS and the South African National HIV Prevalence Surveys.

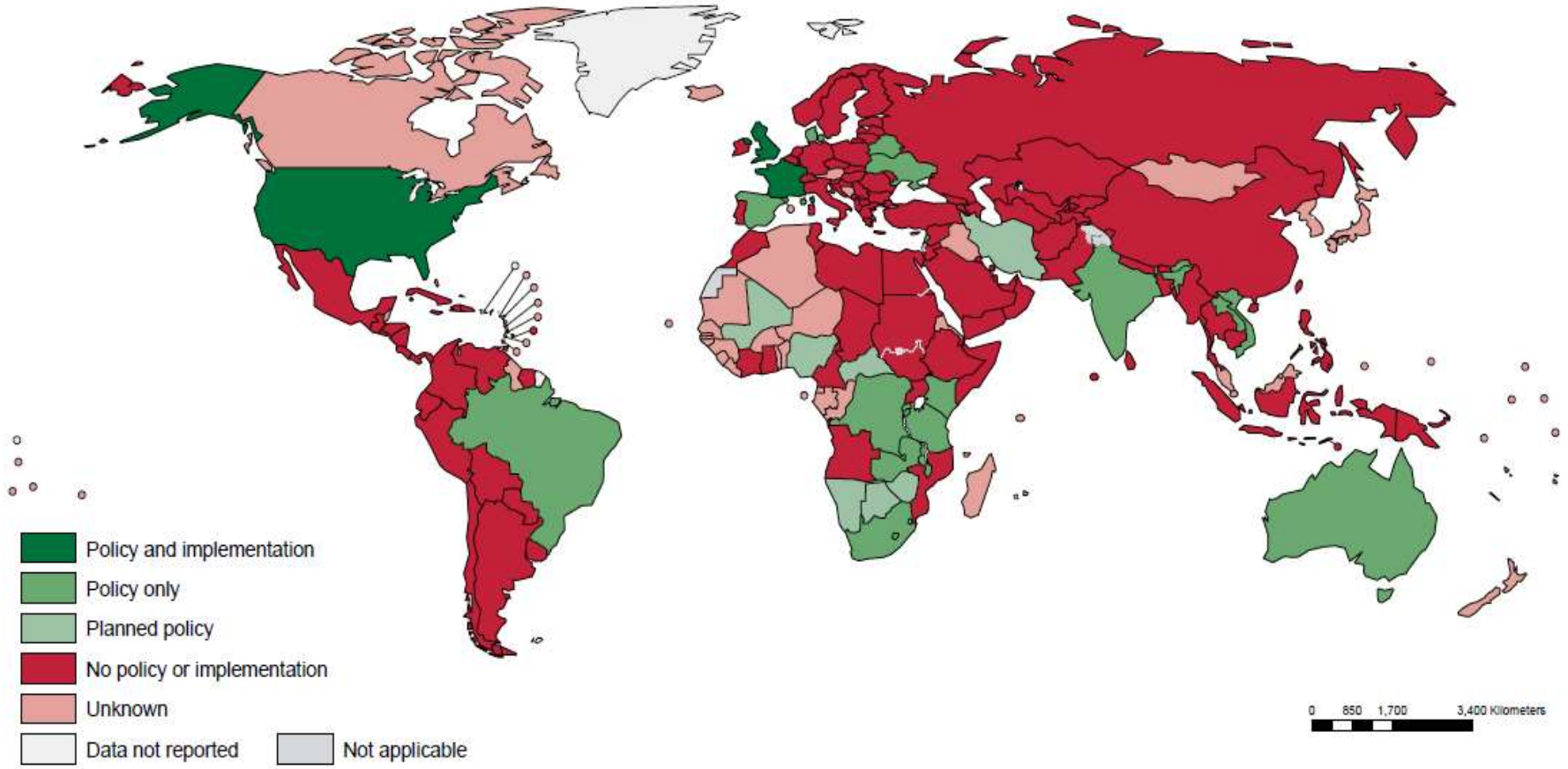
Testing challenges

- Policies and laws
- Stigma and discrimination
- Delivery

A way forward: HIV self-testing

- Available since 1990s
- UNAIDS policy since 2004
- Private non-medical affair
- Convenience and comfort with instant robust results
- Circumvent barriers
- Preferred modality
- heterosexual men, young people, health workers in high prevalence settings, and key populations

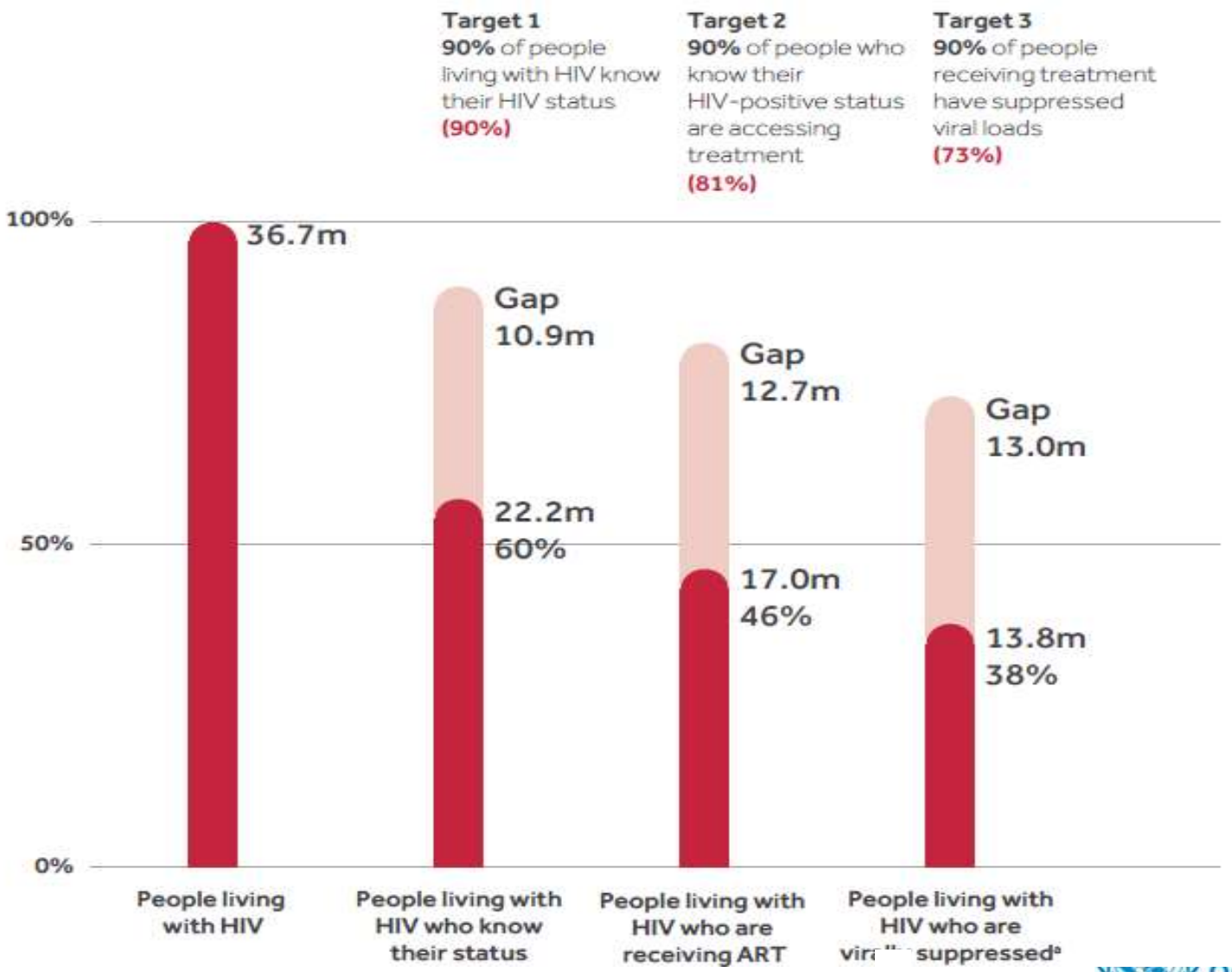
Countries that have included or that plan to include HIV self-testing in their national policies, October 2016



Source: WHO 2016 survey (HIV Country Intelligence Tool).

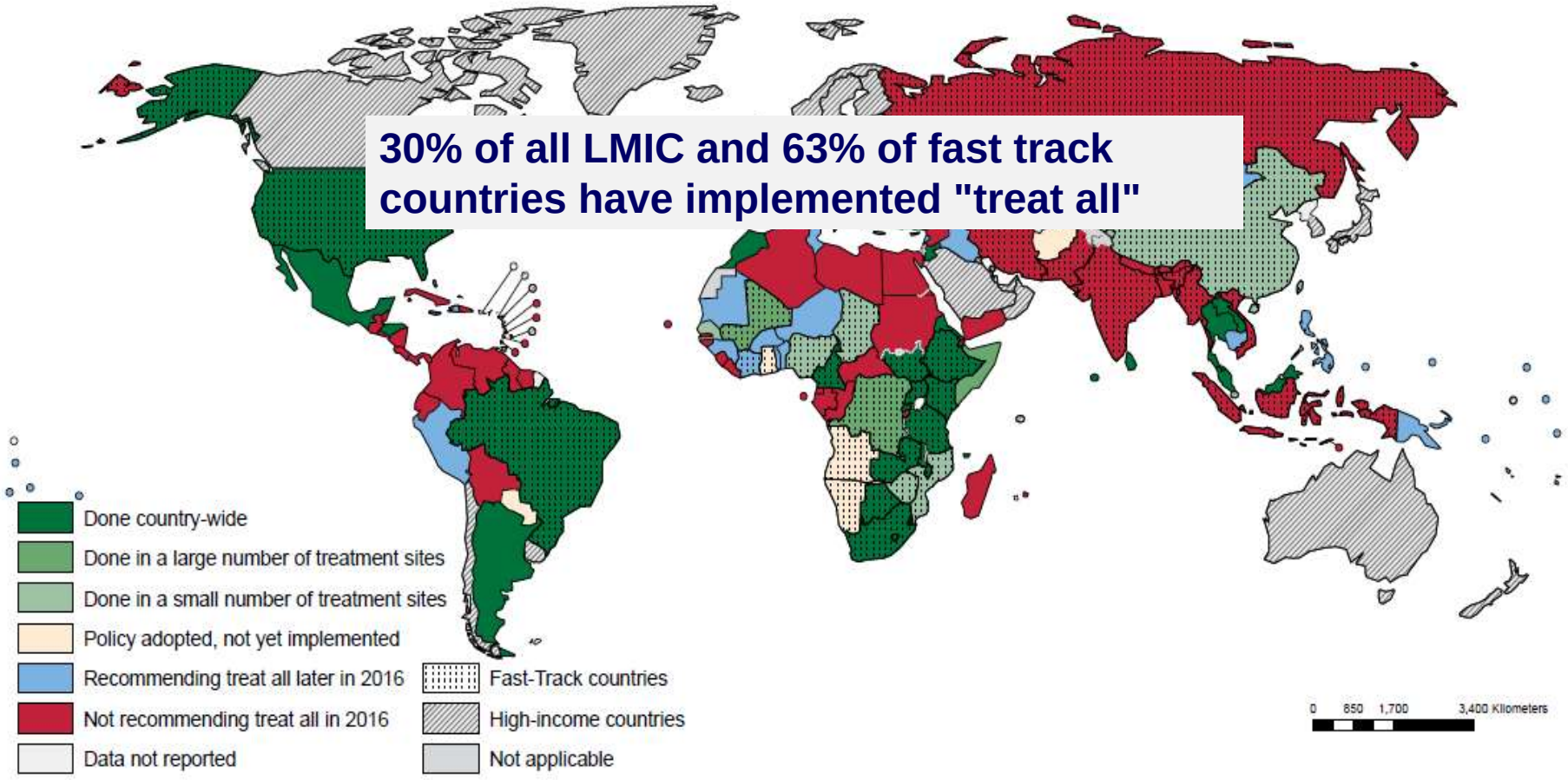
World Health Organization

Improvements are needed at each stage of the cascade of HIV testing and treatment services, 2015



Source: UNAIDS/WHO estimates.

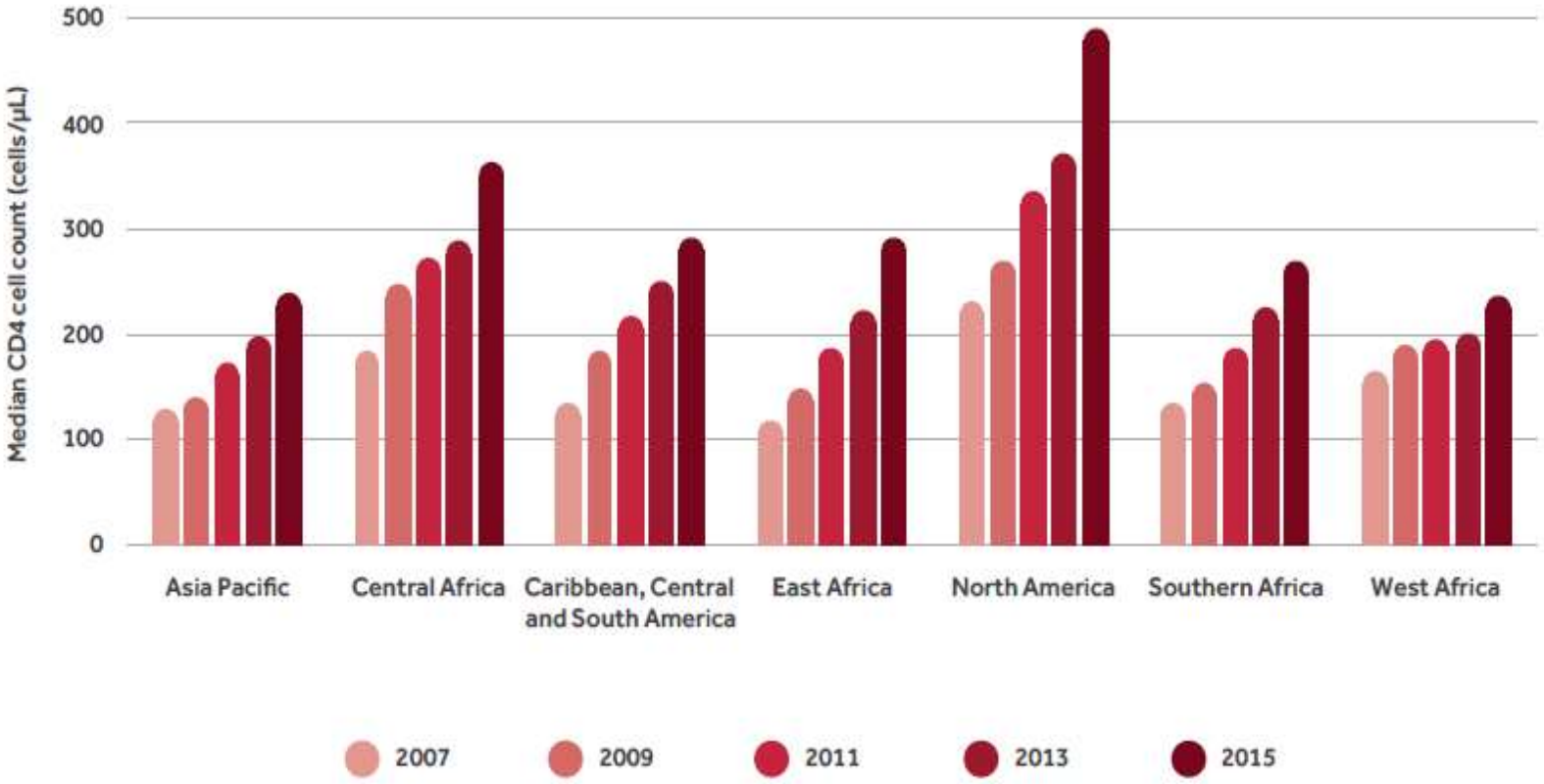
Implementation of the "treat all" recommendation among adults and adolescents living with HIV, October 2016



Source: Global AIDS Response Progress Reporting (WHO/UNICEF/UNAIDS) and WHO HIV Country Intelligence Tool.

World Health Organization

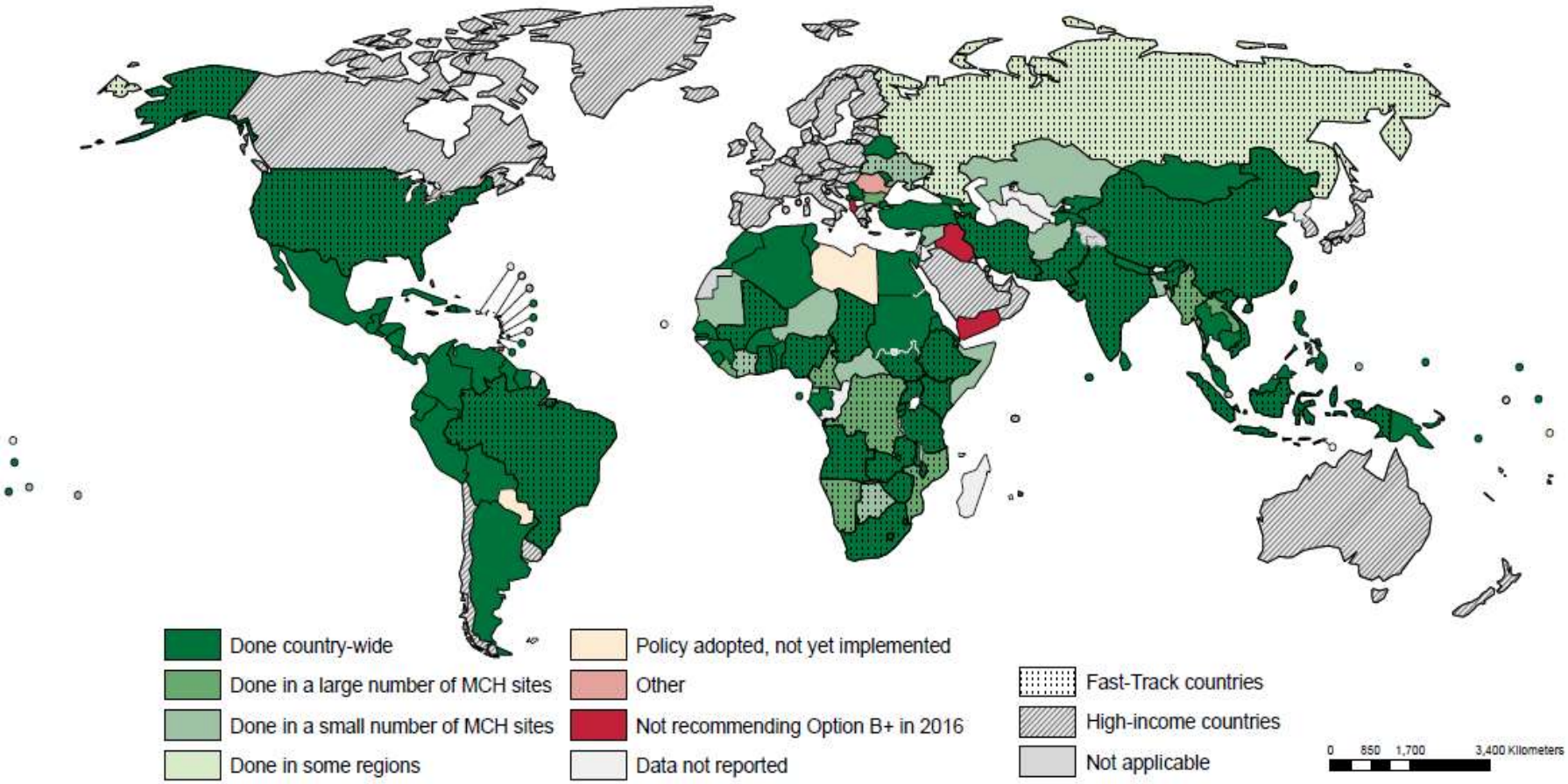
Median CD4 cell count at ART initiation have increased significantly in all regions, however its still very low were prevalence is higher



Source: Report prepared for the IeDEA-WHO Collaboration: global analysis of retention in care in initial HIV care and treatment program, on behalf of the International Epidemiologic Databases to Evaluate AIDS (IeDEA) *(54)*.

World Health Organization

Provision of lifelong ART to pregnant and breastfeeding women living with HIV, October 2016



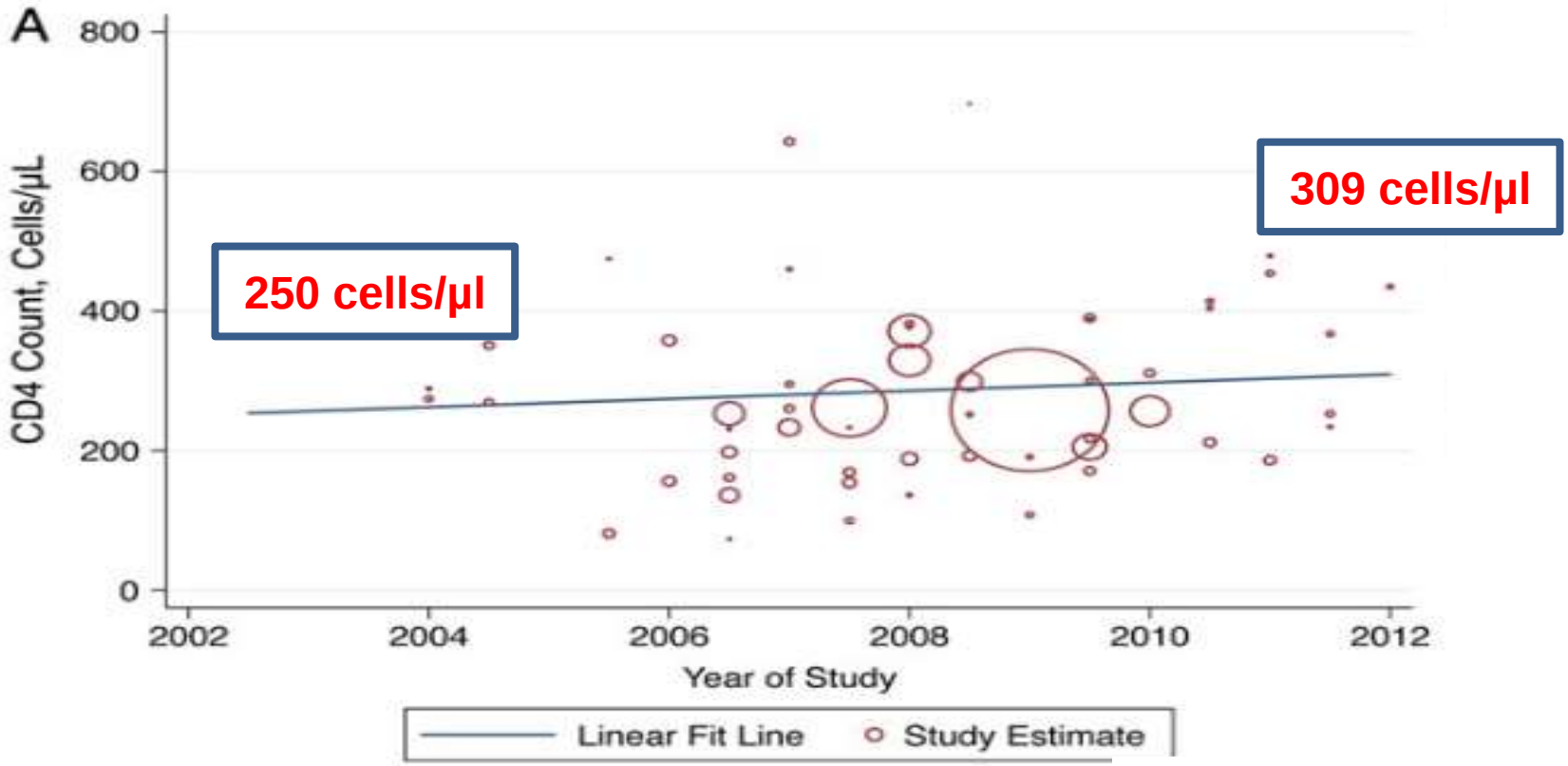
Source: Global AIDS Response Progress Reporting (WHO/UNICEF/UNAIDS) and WHO HIV Country Intelligence Tool.

World Health Organization

Antiretroviral treatment coverage is still very low in many regions

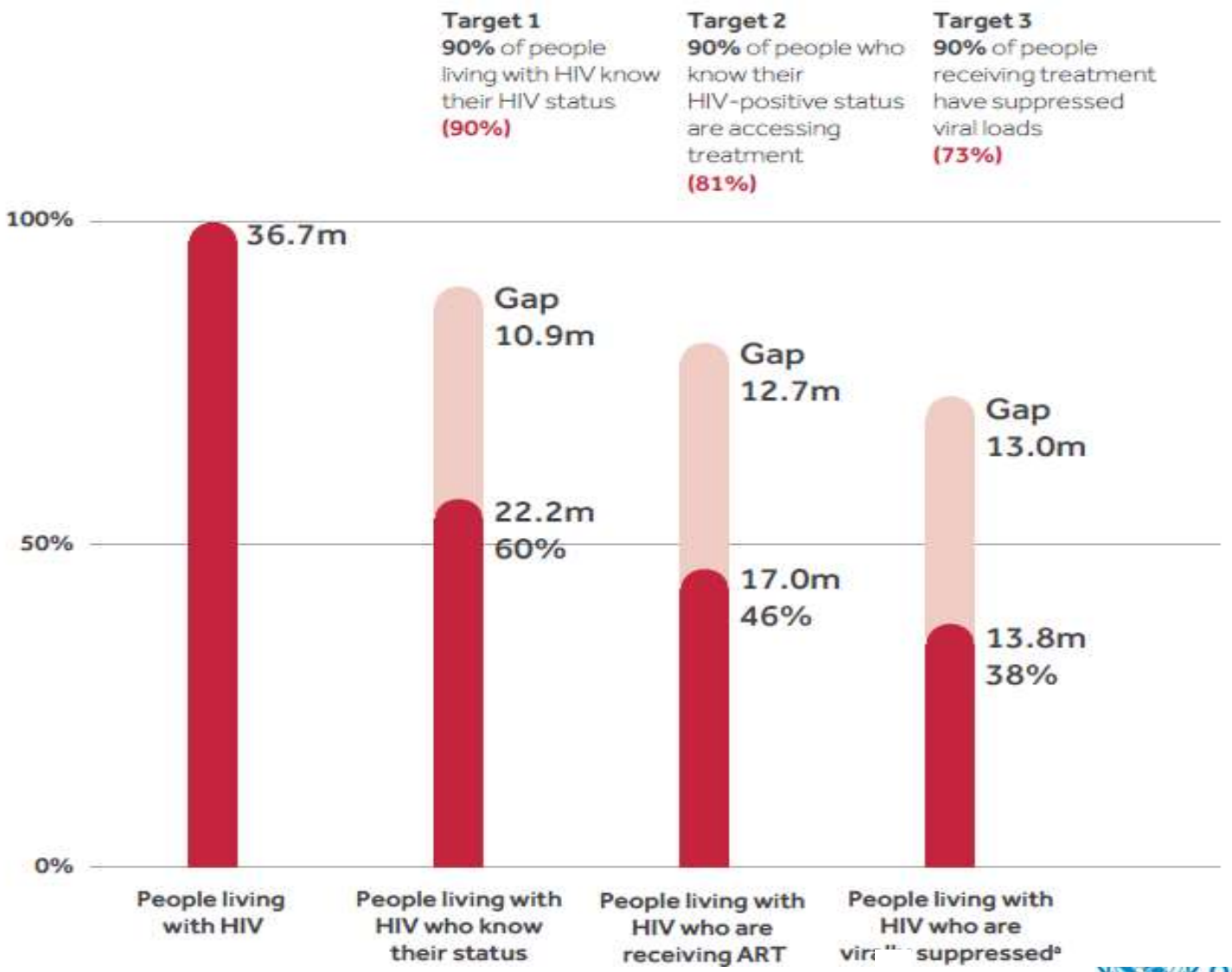
Late presentation

Trends in CD4 Count at Presentation to Care and Treatment Initiation in Sub-Saharan Africa, 2002–2013: A Meta-analysis



Siedner , *CID* 2015

Improvements are needed at each stage of the cascade of HIV testing and treatment services, 2015



Source: UNAIDS/WHO estimates.

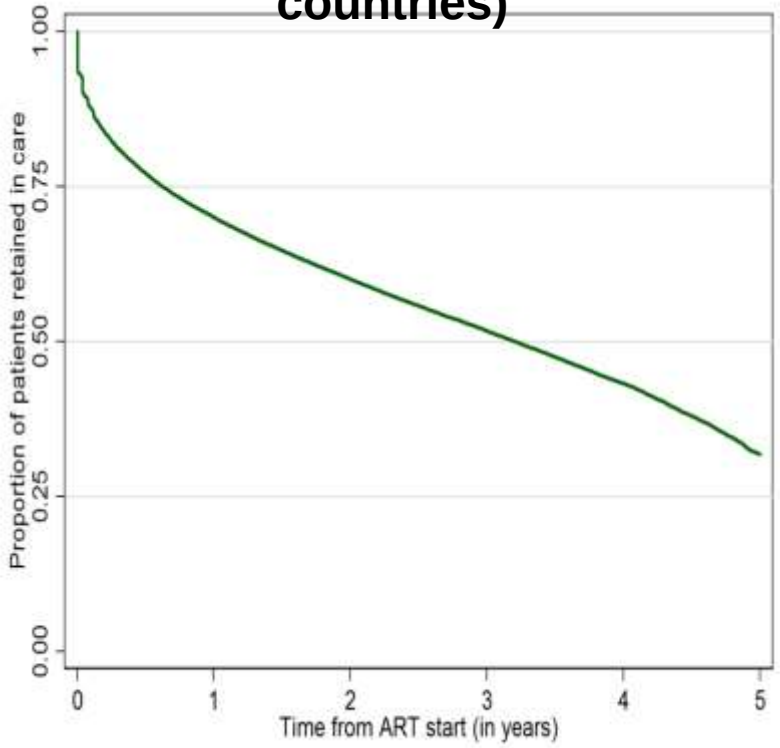
CARE & ART RETENTION

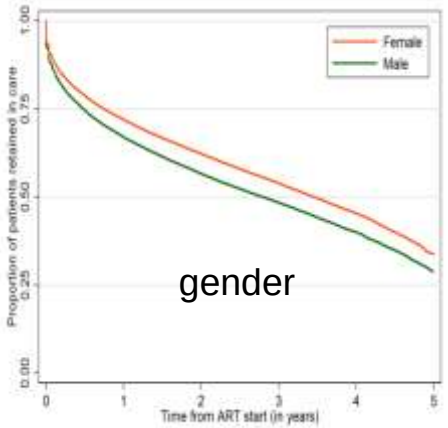
Starting patients on ART is just the first step….

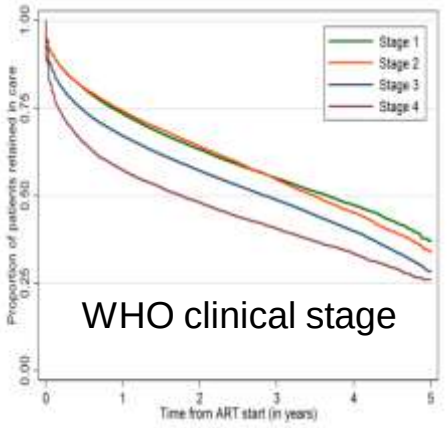
…..retaining people in therapy and keep the virus fully suppressed (for years) is far more complicated….

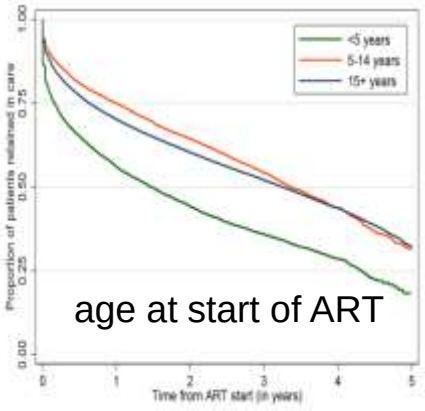
Retention in HIV care programmes

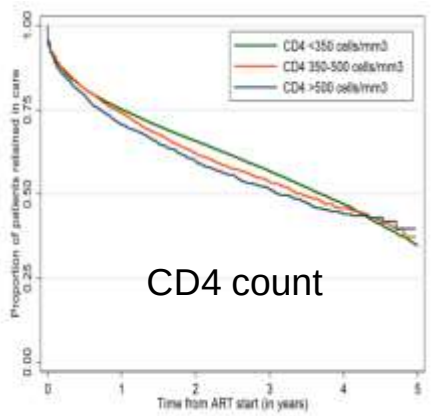
Global analysis of retention in care in initial HIV care and treatment program in the IeDEA regions (41 countries)











WHO-IeDEA collaboration, 2015


SIMPLIFY THE
WAY I GET ARVs
I AM TIRED OF
WALKING

The new ART eligibility criteria will increase the proportion of asymptomatic patients in ART programs. As they are still well, these patients may perceive no short-term benefit from entering treatment, with consequent ART cessation, especially in the face of onerous ART procurement or regimens with persistent side effects.

“ Why shall I take this pill every day if I am feeling well “ ?

“ Yes, I stopped my medication because I feel better and think I am cured”

Innovative models of HIV care are needed

Simplification of ART delivery, at least for asymptomatic and clinically stable patients, through full community-based care models, including motivational counseling and HIV infection literacy programs run by trained community health workers.

Comparing ART monitoring strategies in adults/adolescents with HIV in 2016
(IAS, DHHS, EACS and WHO ART guidelines)

GUIDELINES	Time point /frequency of VL testing				Time point /frequency of CD4 testing		
	At ART initiation	After ART initiation	After VL suppression	VL threshold (treatment failure criteria)	At ART initiation	After ART initiation	After VL consistently suppressed and clinically stable on ART
IAS (2016)	yes	1-2 months	Every 3-6 months	>200 copies/ml	yes	Every 3-6 months	If clinically indicated
DHHS (2016)	yes	1-2 months	Every 3-6 months	>200 copies/ml	yes	Every 3-6 months	Every 12 months
EACS (2016)	yes	3-6 months	Every 3-6 months	>50 copies/ml	yes	Every 3-6 months	Every 12 months
WHO (2016)	no	6 **and** 12 months	Every 12 months	> 1000 copies/ml	yes	Every 6-12 months	If clinically indicated

M Vitoria, Nov 2016

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19TH ICASA
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00	10	09	04	57	23
YEARS	MONTHS	DAYS	HOURS	MINUTES	SECONDS

search Go

How HIV advances in HIV care can inform other health care models

1. **Integrated models of care:**

   → from HIV, to HIV + TB, to HIV + TB + HIV co-morbidities to HIV + TB + Co-Morbidities + NCDs

2. **Differentiated Models of Care:**

   → client-centered approach, to simplify and adapt services to reflect the preferences and expectations of various groups of people living with HIV (PLHIV) while reducing unnecessary burdens on the health system.

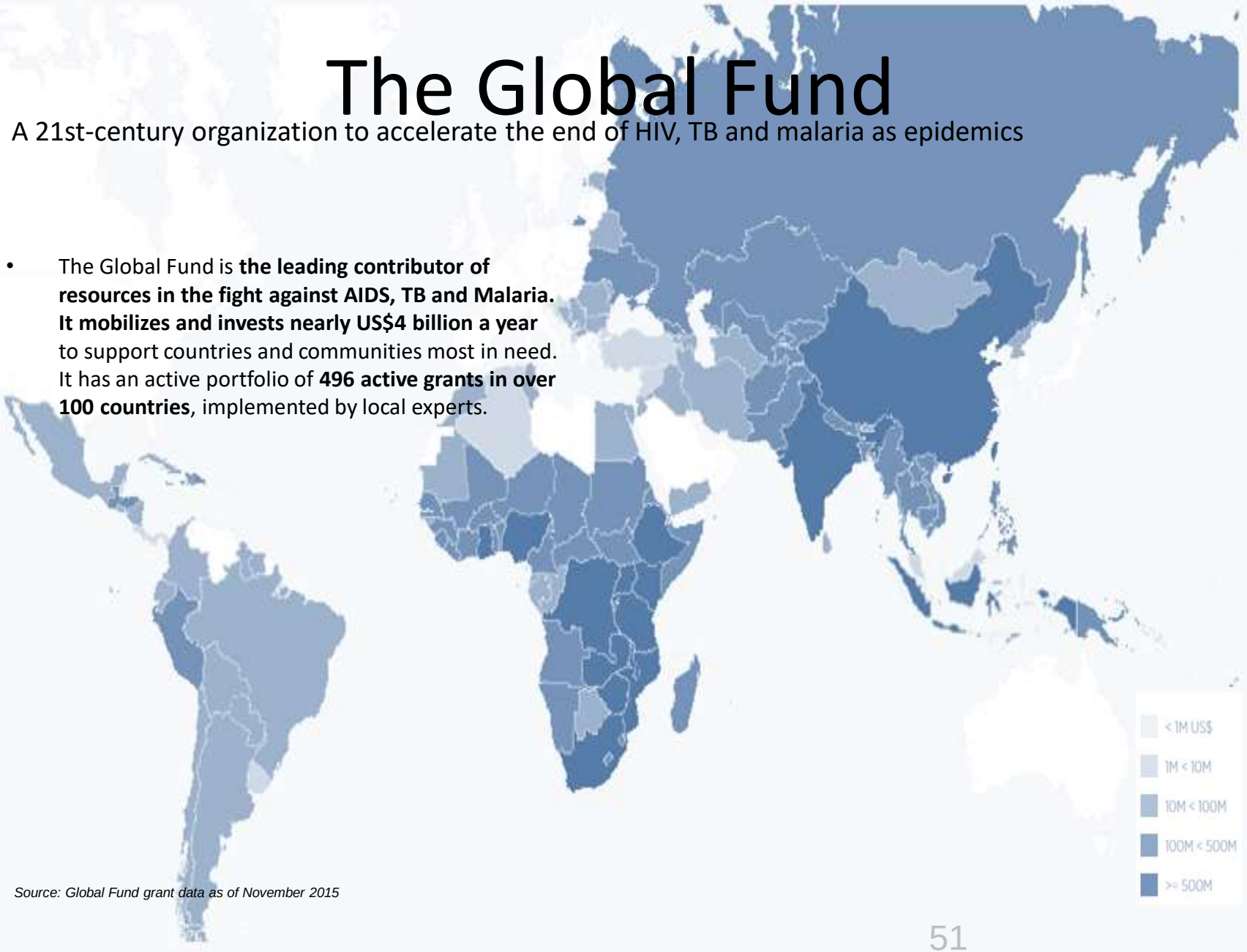
   → this model could easily also be applied to NCD care

Financing

The Global Fund

A 21st-century organization to accelerate the end of HIV, TB and malaria as epidemics

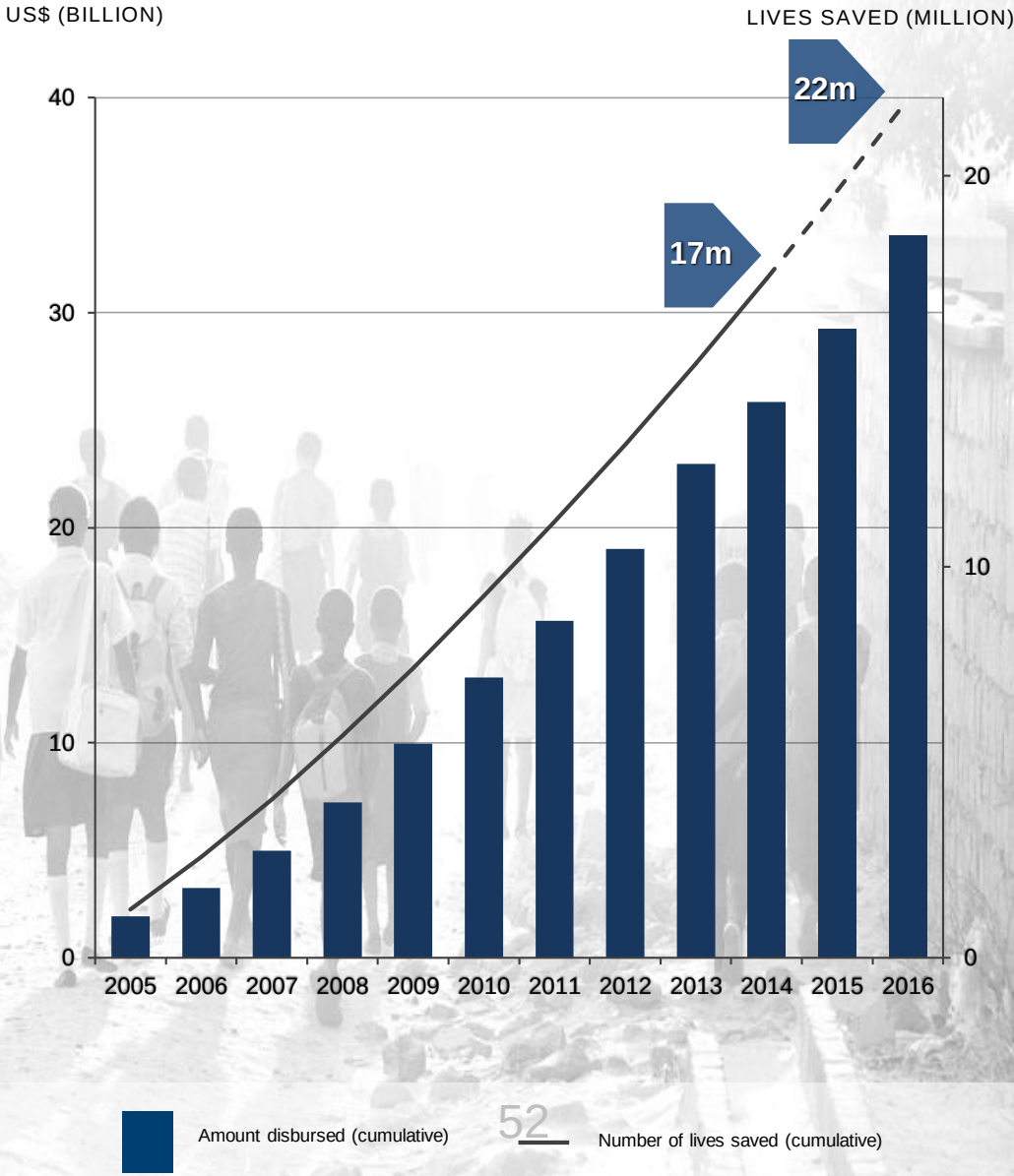
- The Global Fund is **the leading contributor of resources in the fight against AIDS, TB and Malaria. It mobilizes and invests nearly US$4 billion a year** to support countries and communities most in need. It has an active portfolio of **496 active grants in over 100 countries**, implemented by local experts.



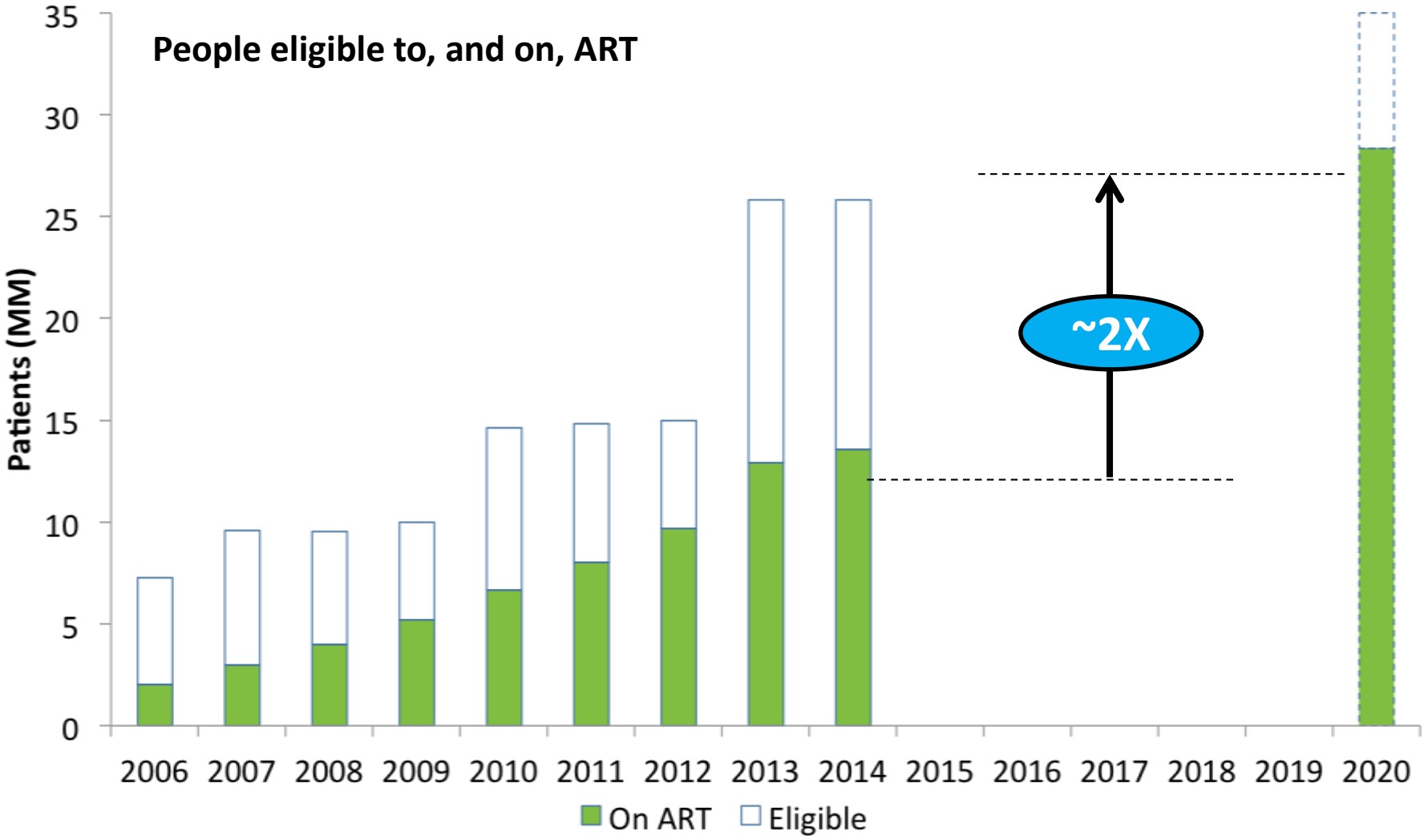
Source: Global Fund grant data as of November 2015

Number of lives saved through Global Fund Supported Programs

With significant gains achieved to date, we are on the **right side of the tipping point** to control HIV, TB and malaria



The next target: almost doubling the number of people on ART



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

FINANCING

1 THE AIDS RESPONSE STILL REMAINS DONOR DEPENDENT IN MANY COUNTRIES

HIV continues to remain more donor dependent than other health programmes, although HIV expenditure constitutes only a small fraction of total health expenditure across all income groups. Programmes for key populations continue to be mainly funded through international donors, which makes their sustainability questionable once the donors withdraw.

2 SIGNIFICANT FINANCIAL GAPS AT THE COUNTRY LEVEL ARE MADE WORSE BY INEFFICIENT SPENDING

Despite considerable amounts of funding for HIV over the past 15 years, important financial gaps remain in all low- and middle-income countries, with the problem made worse by inefficient allocation and implementation of resources. Across the board, HIV responses remain uneven—variations of unit costs can be observed not only between regions and types of epidemic but also within the same country.

3 FUNDING FOR CIVIL SOCIETY ORGANIZATIONS IS BEING ROLLED BACK

Many civil society organizations are reporting cutbacks in the funding available for core functions such as advocacy, accountability, mobilization, networking and community delivery of services. When current health systems are insufficient for an effective and efficient response, funding of civil society and community organizations is needed more than ever.

4 GLOBALLY, AN ADDITIONAL US$ 8-12 BILLION NEEDS TO BE AVAILABLE ANNUALLY BY 2020

Increasing funding for treatment is crucial to achieving the goal of ending the AIDS epidemic as a public health threat. Globally, an additional US$ 8–12 billion needs to be available annually by 2020. Equally important is the need for increased funding for comprehensive programmes for key populations in order to improve access to testing, treatment outcomes, retention in antiretroviral therapy and HIV prevention. Highly efficient use of the resources is a must.

5 RESOURCES ARE NOT ALWAYS ALLOCATED TO PLACES AND POPULATIONS WHERE THEY WILL MAKE THE MOST IMPACT

Resources are not always allocated to places and populations where they will make the most impact, and any move towards better allocative efficiency requires careful political negotiations and a full consideration of equity and human rights. The unprecedented funding for the HIV response has generated a vast amount of data, tools, analysis and strategic information about locations and populations, but that does not always translate into policy shifts or changes in how business is done.

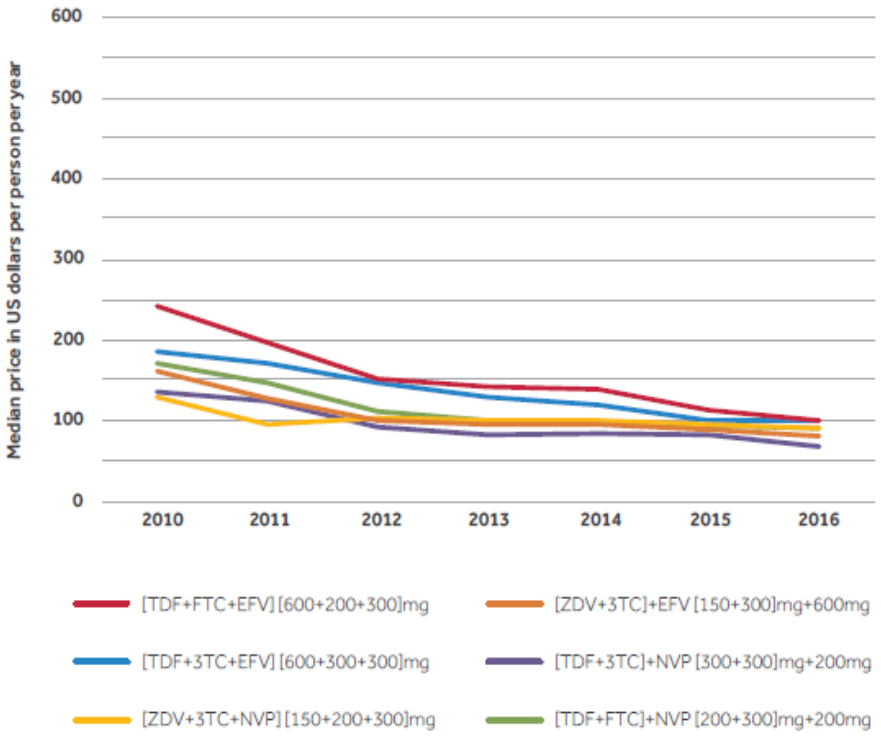
UNAIDS – 2015 - How AIDS changed everything

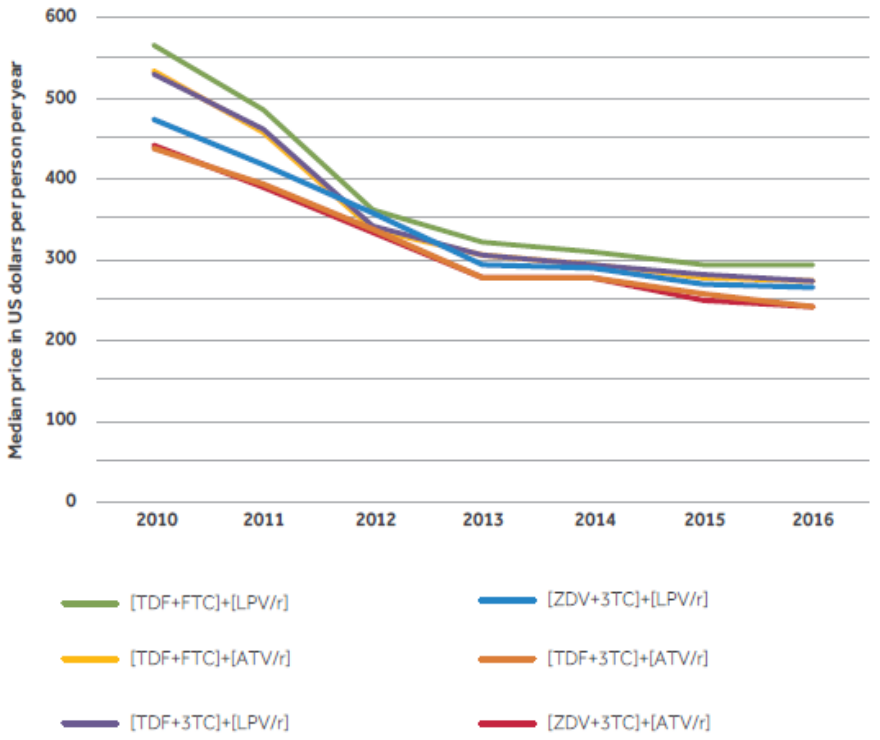
Moving towards end of AIDS: main results and new ambitious targets…

Key parameters	2005	2015	2020	2030
New HIV infections	3 million	2 million	500,000	200,000
AIDS-associated deaths	2.4 million	1.2 million	500,000	400,000
PLHIV accessing ART	1.5 million	15 million	30 million	ALL
Investments for global HIV response (US$)	7 billion	20 billion	32 billion	29 billion

WHO & UNAIDS reports , 2014 & 2015

Prices are still falling, but second-line ART costs three times more than first-line ART

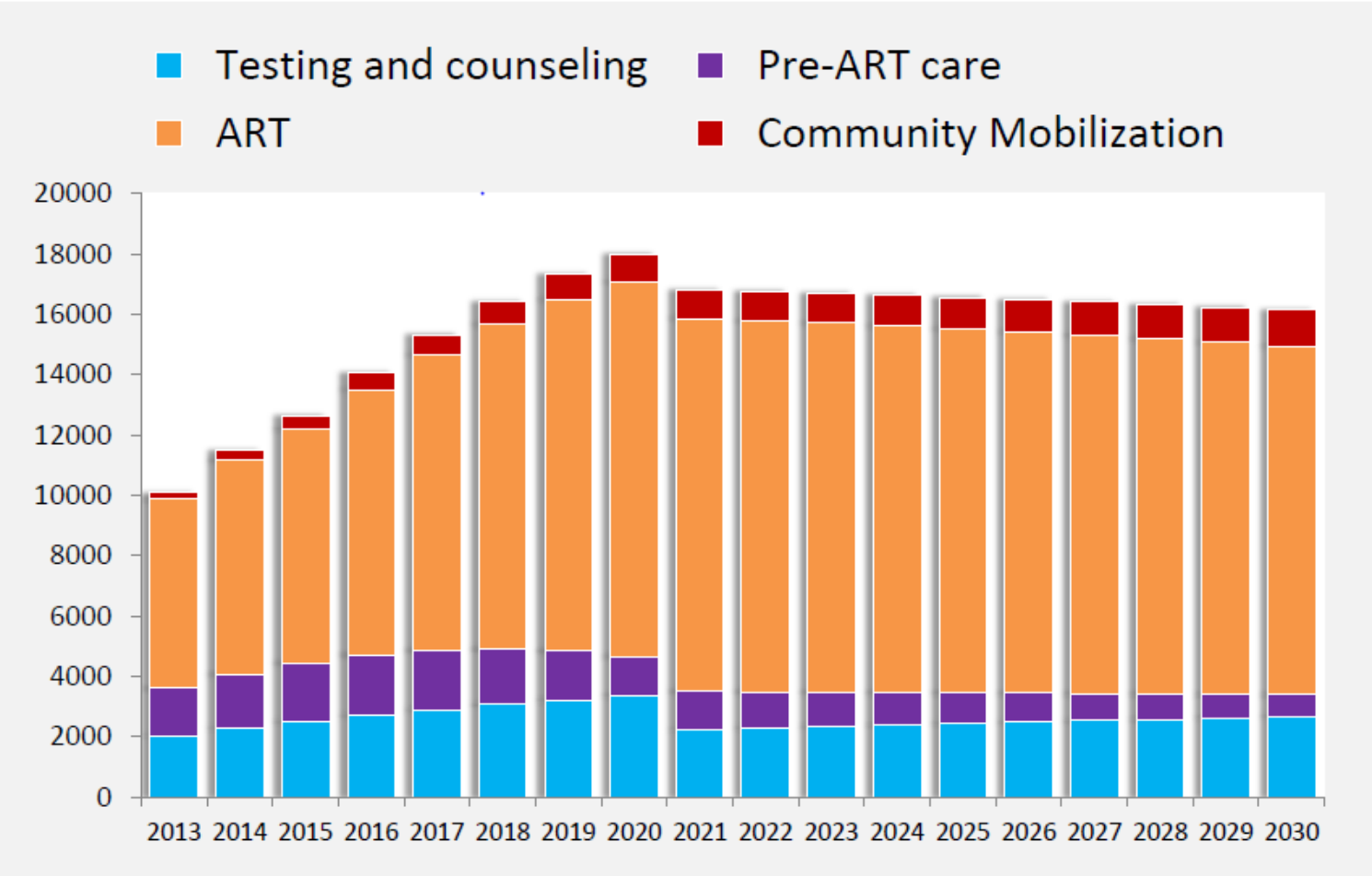




Source: WHO Global Price Reporting Mechanism.

World Health Organization

Resource Needs for Treatment, Care and Support US$ Million



Political Committment

The next barrier: Political committment

- To avoid global investments shifting elsewhere, we definitely need to **revitalise community mobilisation and the HIV/AIDS transformative partnership model** we used in the past decades.

- We need to make clear to world leaders that we are definitely **not close to the solution**, that without political support to the HIV/AIDS community the window of opportunity which science has opened will be missed, and that the AIDS epidemic is set to grow again **without strong continued financial support** for country programmes.

The next barrier: Human Rights not respected everywhere

- To avoid global investments shifting elsewhere, we definitely need to **revitalise community mobilisation and the HIV/AIDS transformative partnership model** we used in the past decades.

- We also need to make clear to world leaders that we are definitely **not close to the solution**, that without political support to the HIV/AIDS community the window of opportunity which science has opened will be missed, and that the AIDS epidemic is set to grow again **without strong continued financial support** for country programmes.


POSITIVE
HIV
POSITIVE

Key populations

Diversity of HIV epidemics: interventions shall be targeted

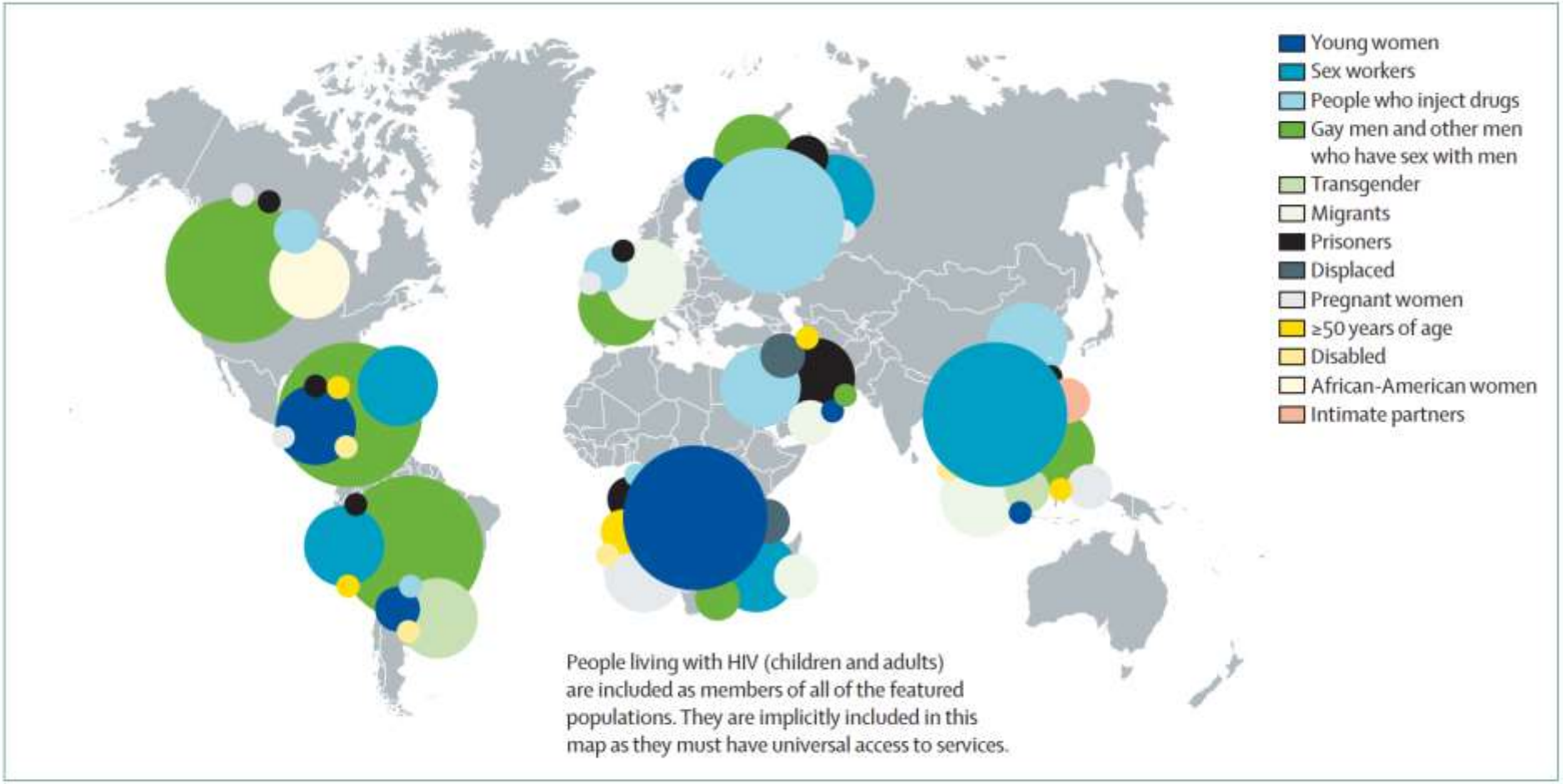


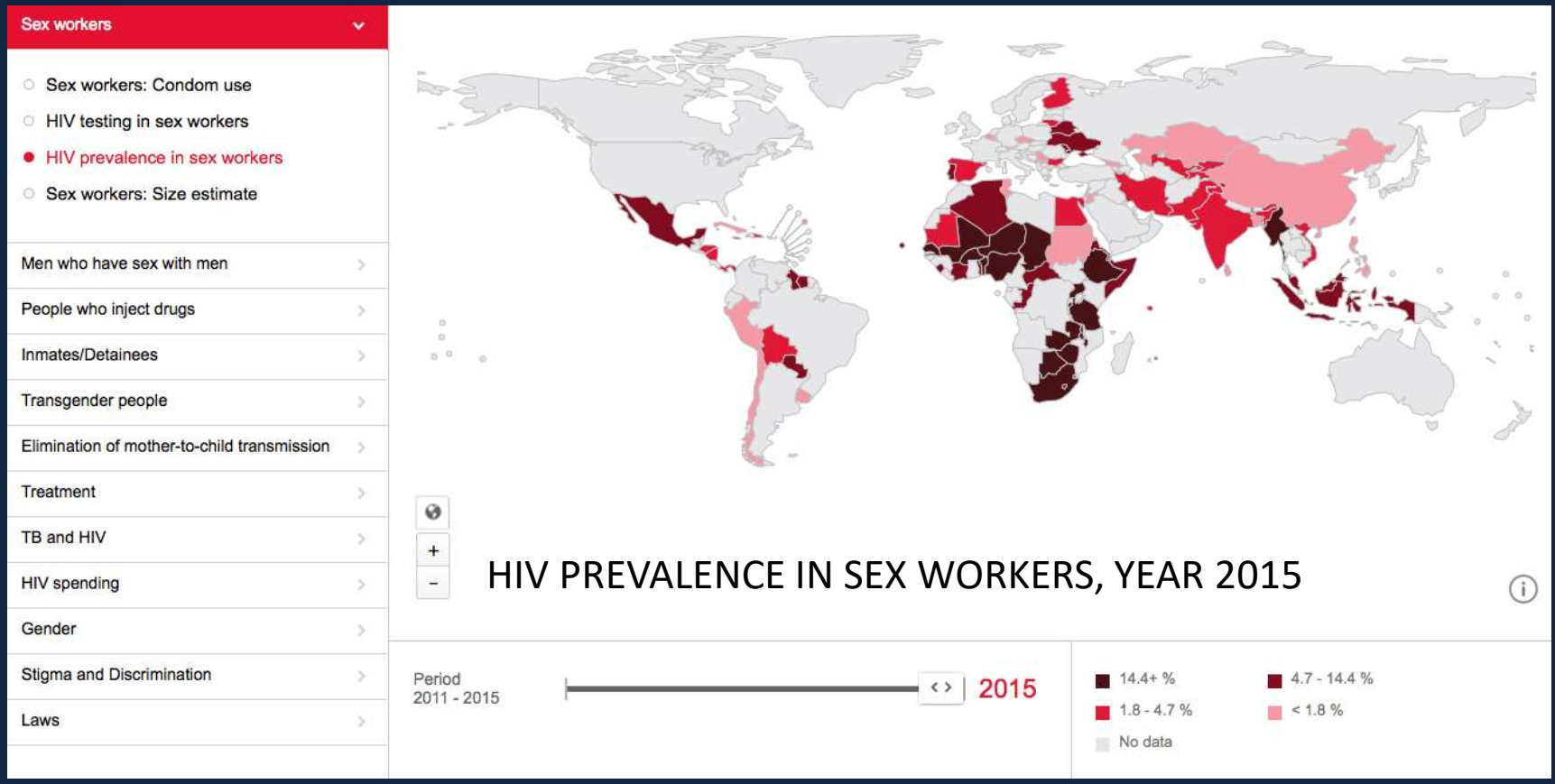
Figure 4: **The importance of location and population**
Source: The Gap Report.[4]

KAP…

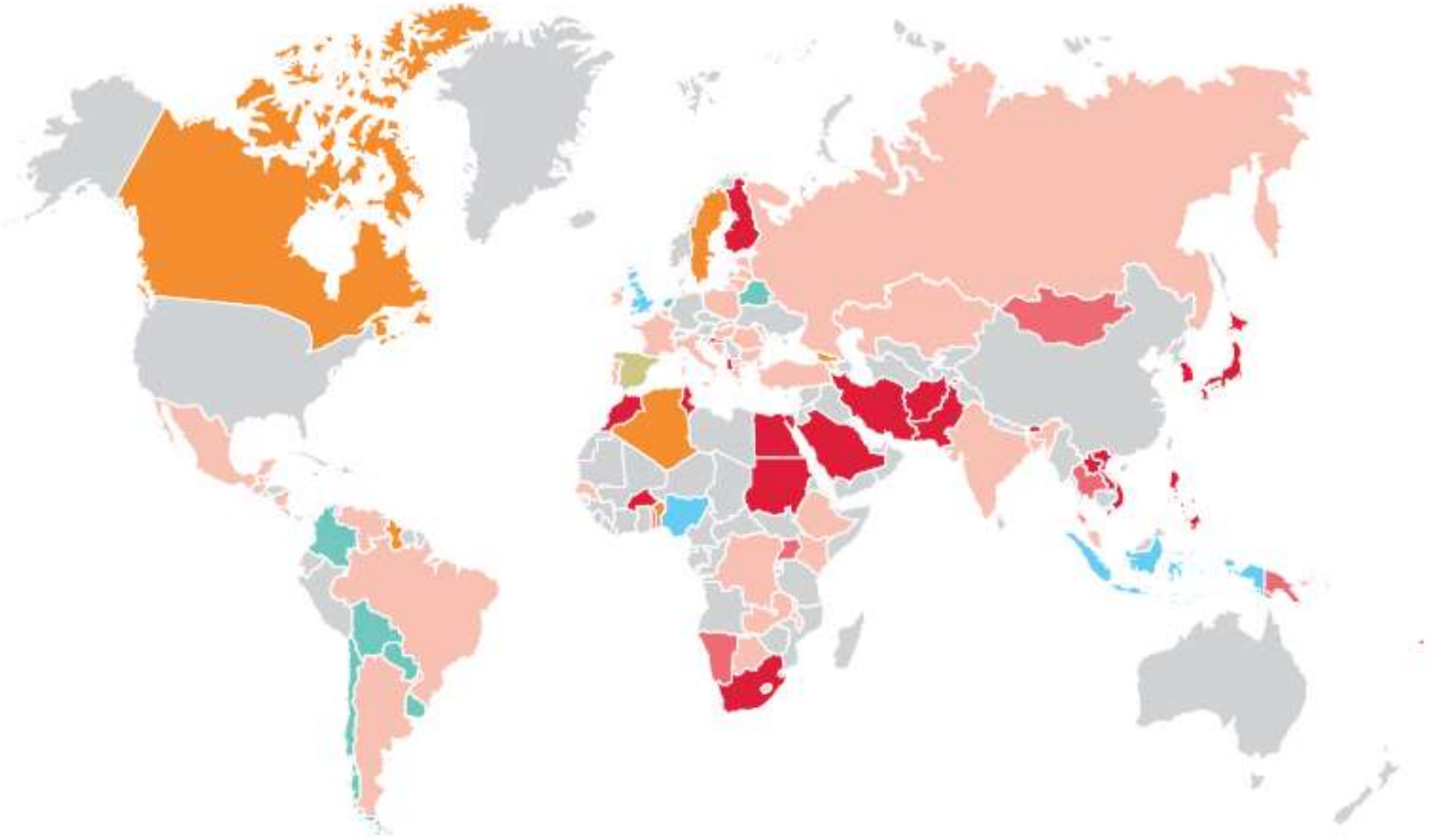
- People who use drugs
- Men having sex with men
- Women having sex with women
- Transgender people
- Sex workers
- Incarcerated people
- Displaced people, refugees
- Migrants
- ……

HOMELESS

SEX WORKERS

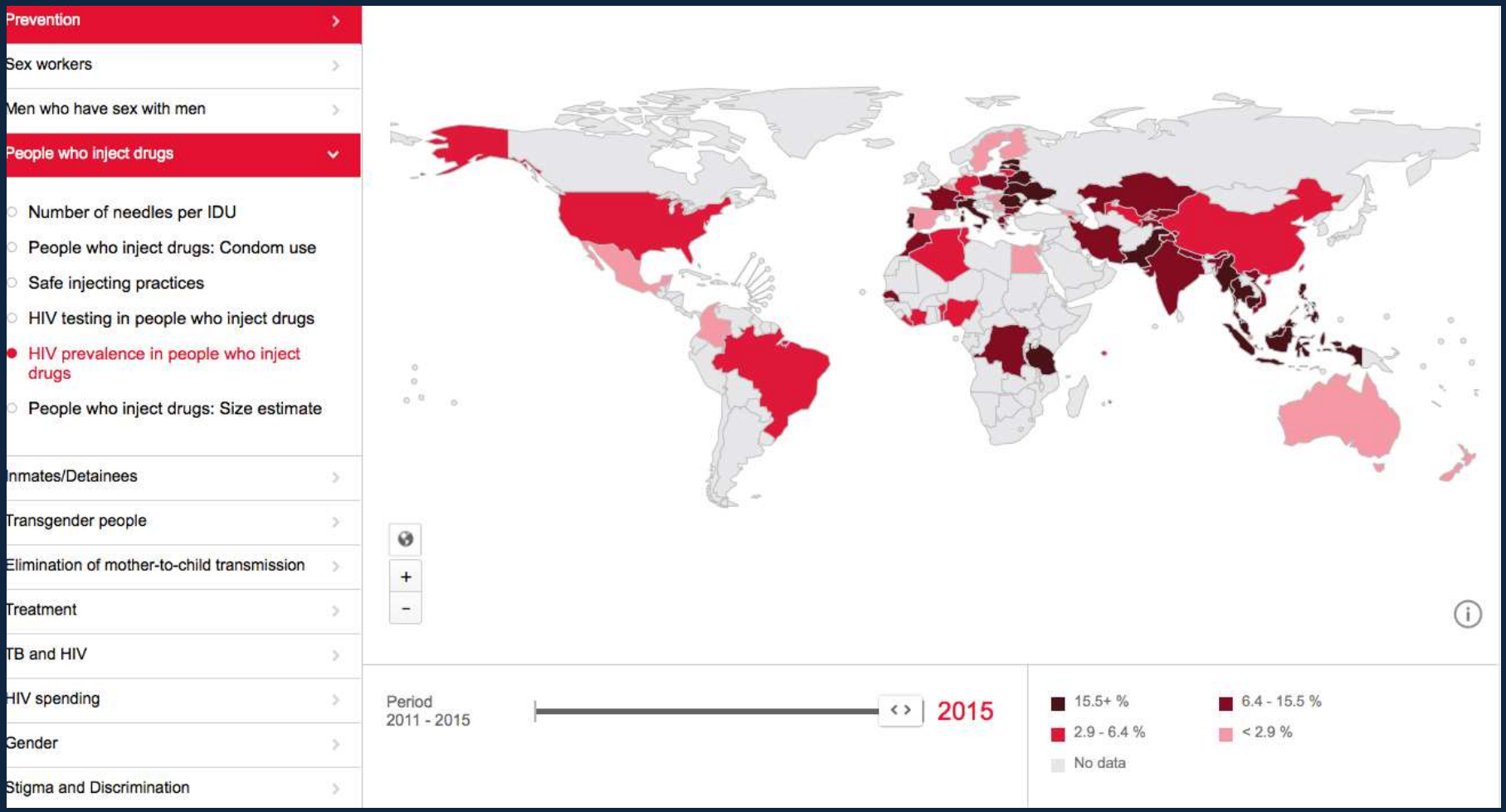

Sex workers
Sex workers: Condom use
HIV testing in sex workers
HIV prevalence in sex workers
Sex workers: Size estimate
Men who have sex with men
People who inject drugs
Inmates/Detainees
Transgender people
Elimination of mother-to-child transmission
Treatment
TB and HIV
HIV spending
Gender
Stigma and Discrimination
Laws
+
-
HIV PREVALENCE IN SEX WORKERS, YEAR 2015
Period
2011 - 2015
2015
14.4+ %
4.7 - 14.4 %
1.8 - 4.7 %
< 1.8 %
No data

Criminalization of any aspect of sex work, by country, 2016



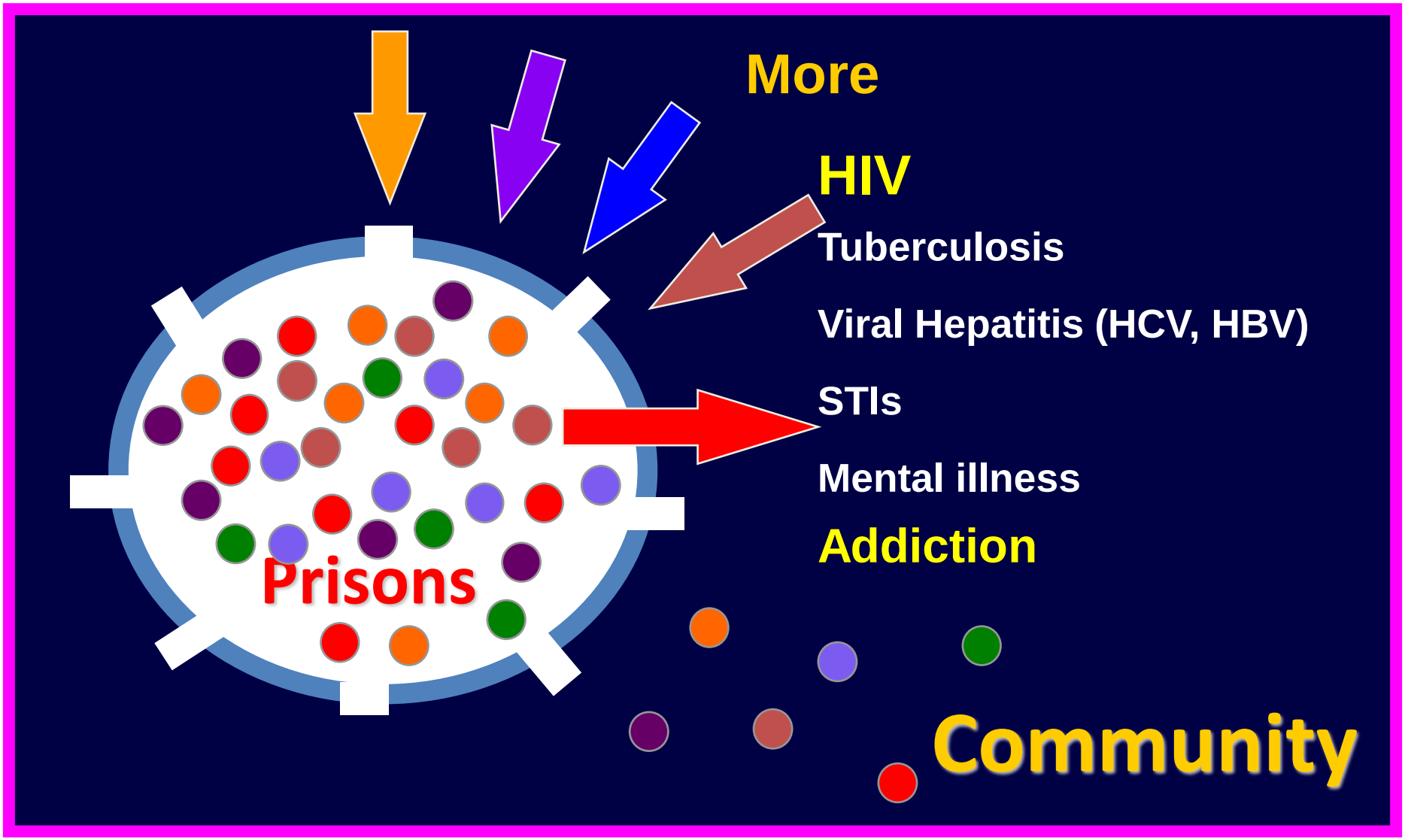
DRUG ADDICTION

HIV PREVALENCE IN PEOPLE WHO INJECT DRUGS, YEAR 2015

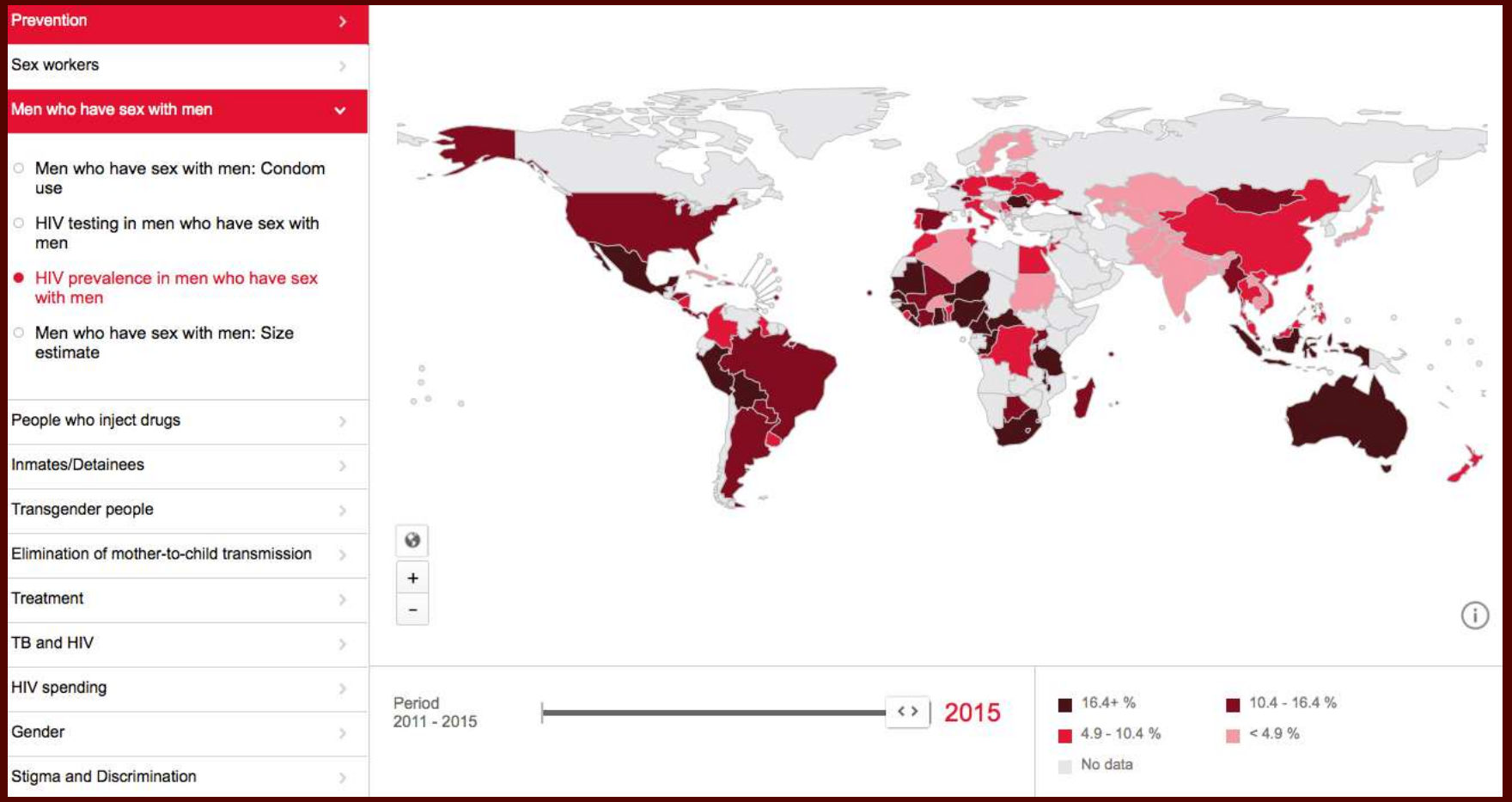


INCARCERATED

Syndemics & Prisons as Amplifiers: Semipermeable Membranes



HIV PREVALENCE IN MSM, YEAR 2015

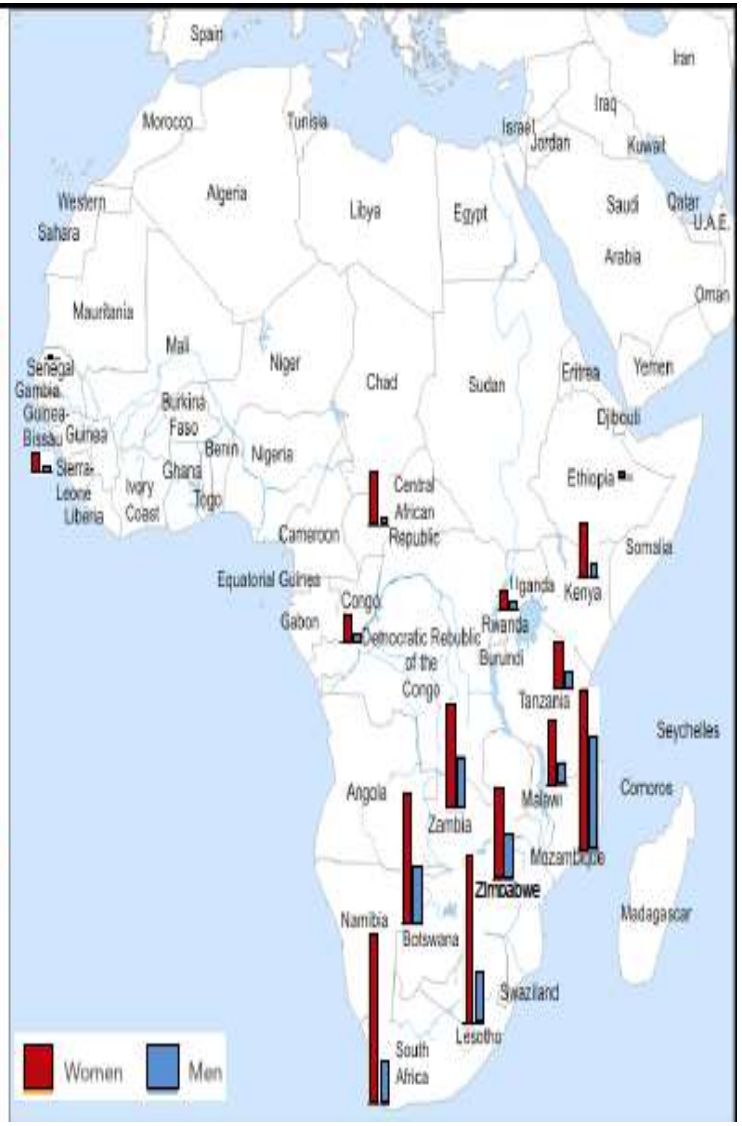


EXPLOITED YOUNG WOMEN

High rates of HIV among key populations: young women in Africa

HIV in 15–24 year men and women (2008–2011)

Young women have up to 8 times more HIV than men



Source: Adapted from UNAIDS 2012

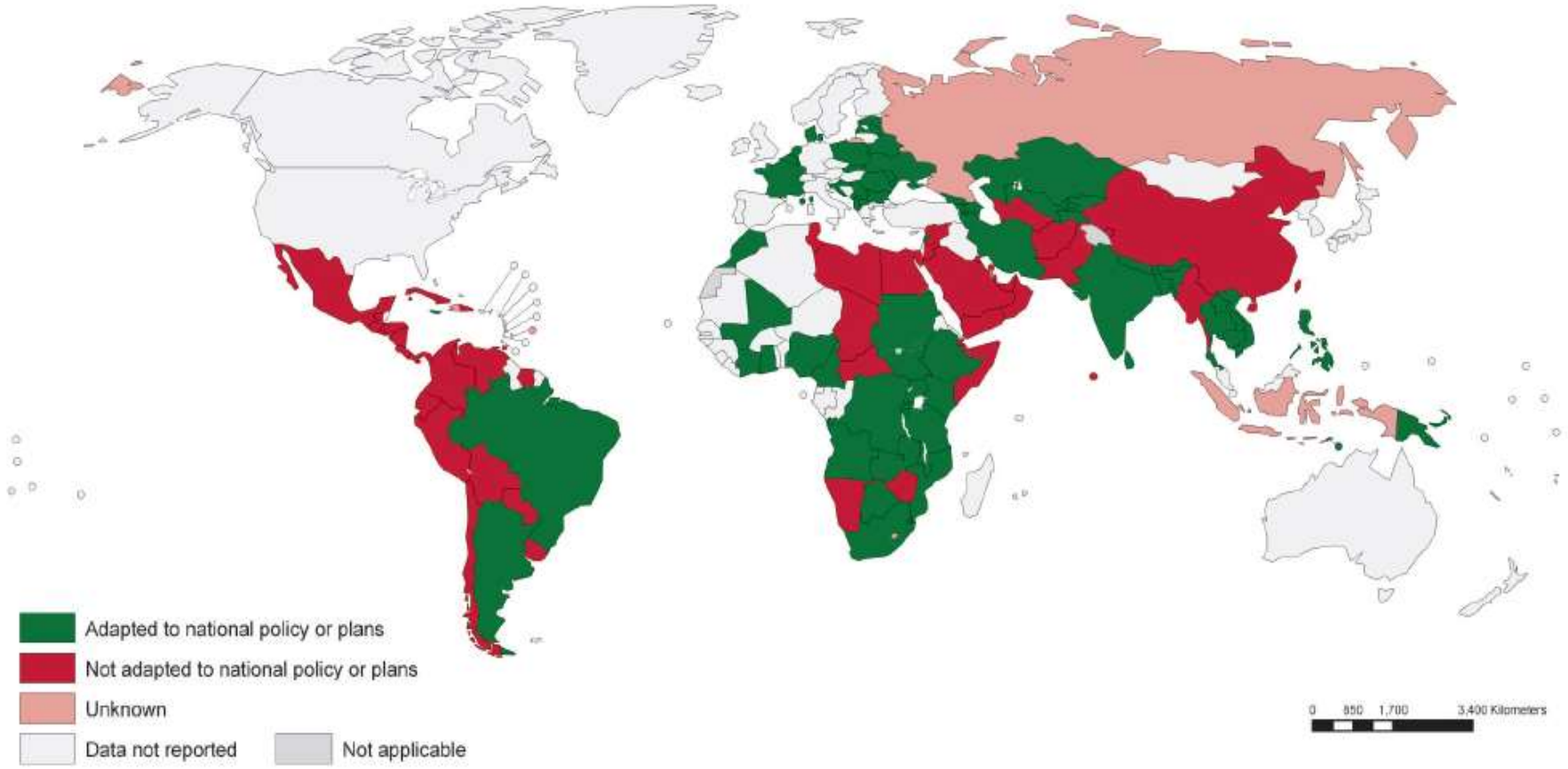
HIV prevalence in young pregnant women in rural Vulindlela, South Africa (2005-2008)

Age Group (Years)	HIV Prevalence (N=1237)
≤16	10.6%
17-18	21.3%
19-20	33.0%
21-22	44.3%
23-24	51.1%

CAPRISA

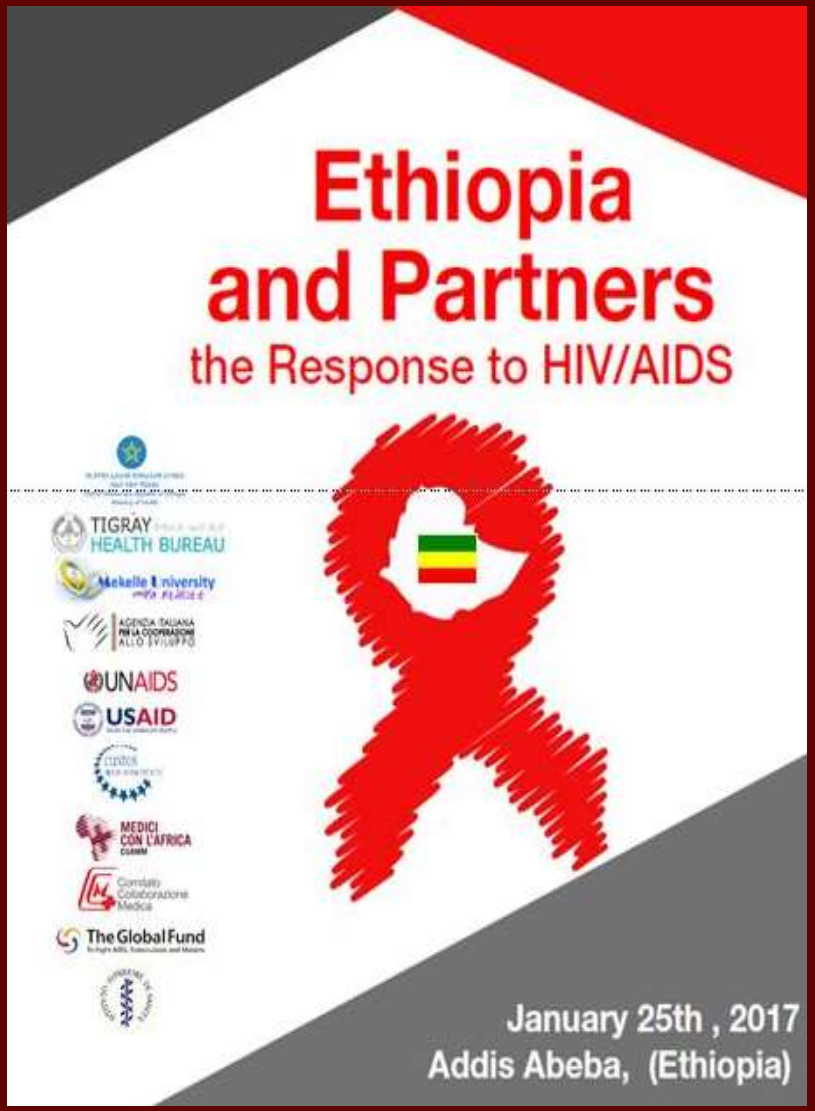
DISPLACED PEOPLE

Countries are adapting the WHO guidelines for key population services in their national HIV policies or plans, October 2016



Source: WHO 2016 survey (WHO Country Intelligence Tool).

World Health Organization



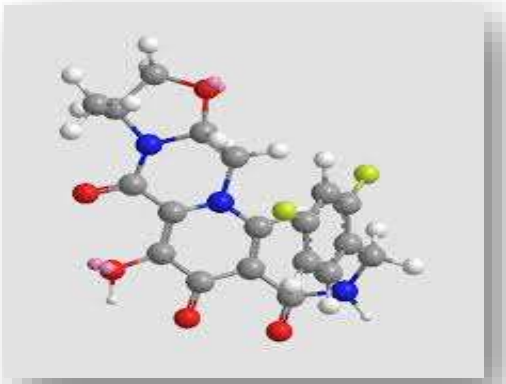
- The goal
- Where we are
- The barriers
- **A way forward**

Long Acting Injectable Nano-Suspensions:

TMC278LA (Rilpivirine; PATH)

- NNRTI (Rilpivirine)
- Oral formulation in Complera™
- Long acting: up to 3 months?
- Multiple trials:
  - Dose ranging PK; PK/PD
  - Phase-2: HPTN 076

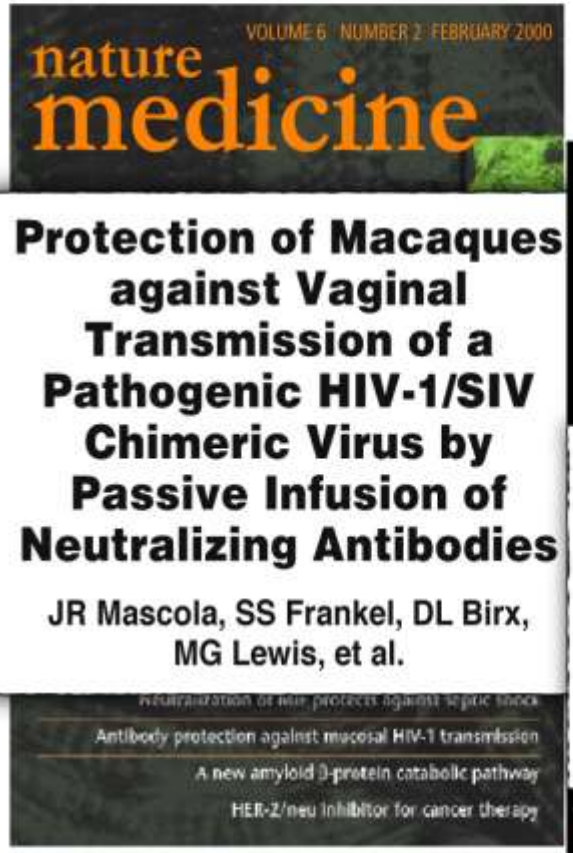
Cabotegravir (GSK ‘744; ViiV)

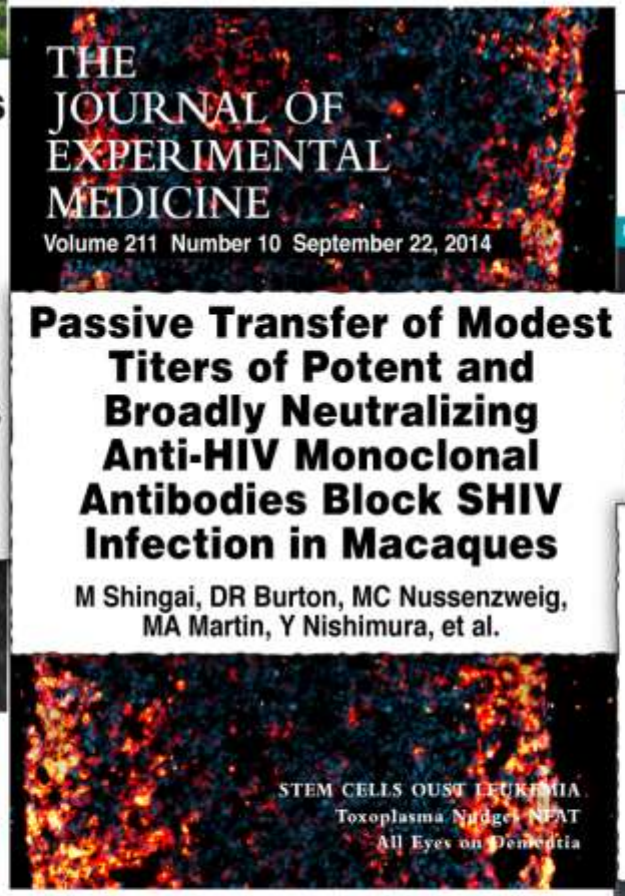


- Integrase inhibitor
- Similar to Dolutegravir
- Safe in humans with oral run-in
- Activity up to 3 months?
- NHP model efficacy
- Phase 2: Éclair and HPTN 077


Continent-wide climate impacts on bumblebees pp. 177 & 177
Hiding deadly nuclear waste in a deep hole p. 332
Making the grade on robot jumping p. 311
Science
AAAS
Toward an HIV vaccine

Passive Transfer of Neutralizing Antibodies for Prevention of SHIV Infection





A. FAUCI, IAS 2015

Published online June 18, 2015

Science

HIV-1 Neutralizing Antibodies Induced by Native-Like Envelope Trimers

RW Sanders, H Dean, DR Burton, JP Moore, et al.

- Stabilized form of native trimer stimulated autologous NAb production in rabbits and non-human primates

nature structural & molecular biology

June 22, 2015

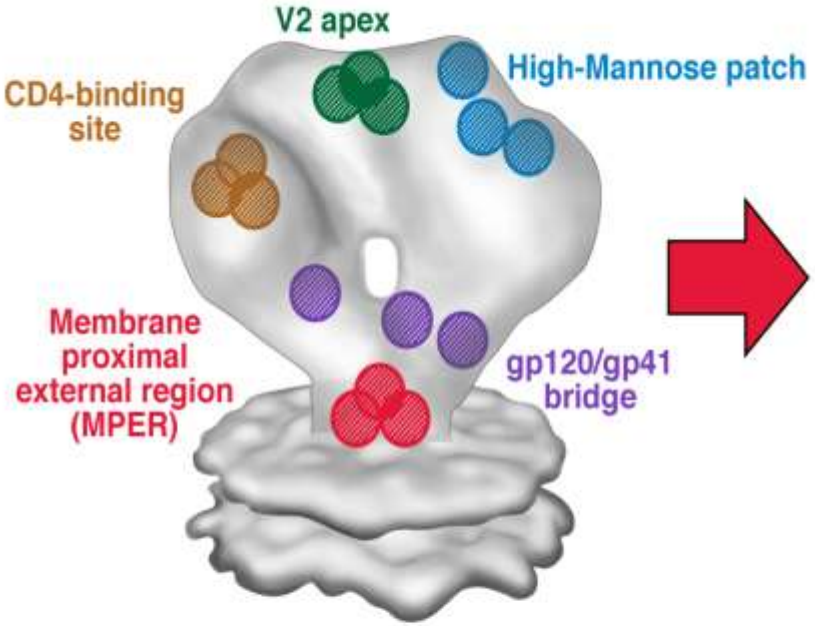
Crystal Structure, Conformational Fixation, and Entry-related Interactions of Mature Ligand-free HIV-1 Env

YD Kwon, M Pancera, P Acharya, IS Georgiev, JR Mascola, PD Kwong, et al.

- Unliganded HIV-1 envelope trimer, capable of binding broadly neutralizing antibodies
- Characterized and fixed in pre-fusion, closed conformation
- Potential utility as vaccine immunogen

A. FAUCI, IAS 2015

Fundamental Challenge in HIV Vaccinology: Convert Neutralizing Epitopes to Immunogens Inducing bNAbs



Neutralizing epitopes

Immunogen

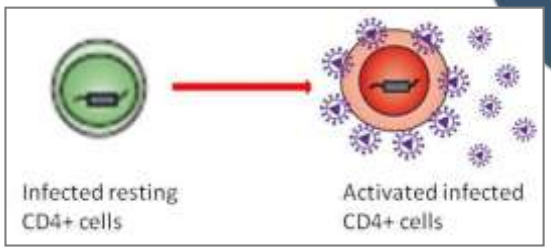
Induction of bNAbs

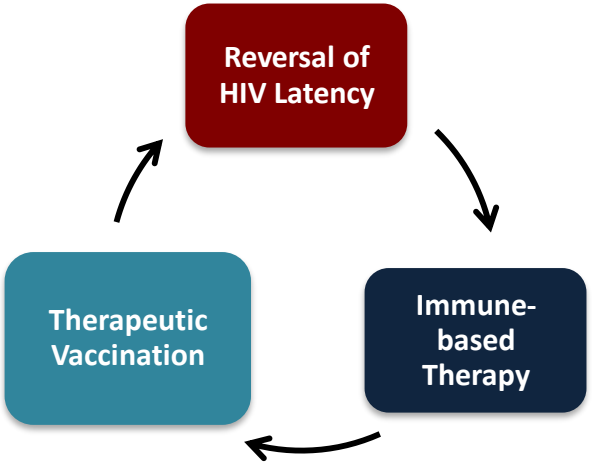
A. FAUCI, IAS 2015

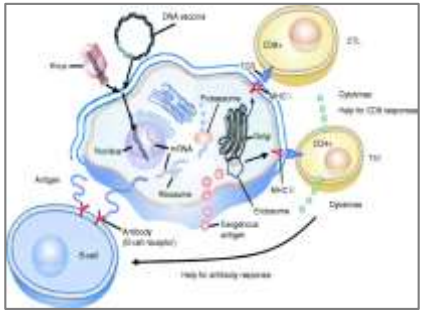
HIV cure

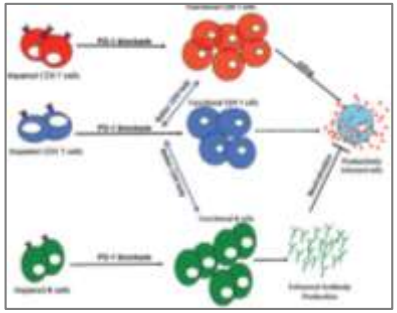
Eradication	Remission
Sterilizing cure	Functional cure
Elimination of all HIV-infected cells	Long-term health without cART
HIV RNA < 1 cop/mL	HIV RNA <50 cop/mL
Berlin Patient post-BMT	Elite controllers Post-cART controllers

The “Wake up and Kill” strategy









This project has received funding from the European Union’s horizon 2020 research and innovation programme under grant agreement No

Despite the battle not being over,
the way the HIV epidemic was addressed
represents an extraordinary model for Global Health

The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

GLOBAL HEALTH

Response to the AIDS Pandemic — A Global Health Model

Peter Piot, M.D., Ph.D., and Thomas C. Quinn, M.D.

From the London School of Hygiene and Tropical Medicine, London (P.P.); and the National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, MD (T.C.Q.). Address reprint requests to Dr. Piot at the London School of Hygiene and Tropical Medicine, Keppel St., London WC1E 7HT, United Kingdom, or at director@lshtm.ac.uk.

N Engl J Med 2001;344:1210-6.
DOI: 10.1056/NEJMra001333

JUST OVER THREE DECADES AGO, A NEW OUTBREAK OF OPPORTUNISTIC INfections and Kaposi's sarcoma was reported in a small number of homosexual men in California and New York.[1,2] This universally fatal disease, which was eventually called the acquired immunodeficiency syndrome (AIDS), was associated with a complete loss of CD4+ T cells. Within the first year of its description, the disease was also identified in patients with hemophilia, users of injection drugs, blood-transfusion recipients, and infants born to affected mothers. Soon thereafter, a heterosexual epidemic of AIDS was reported in Central Africa, preferentially affecting women.[3,4] Little did we know at the time that this small number of cases would eventually mushroom into tens of millions of cases, becoming one of the greatest pandemics of modern times.

Within 2 years after the initial reports of AIDS, a retrovirus, later called the human immunodeficiency virus (HIV), was identified as the cause of AIDS.[5] Diagnostic tests were developed to protect the blood supply and to identify those infected. Additional prevention measures were implemented, including risk-reduction programs, counseling and testing, condom distribution, and needle-exchange programs. However, HIV continued to spread, infecting 10 million persons within the first decade after its identification.

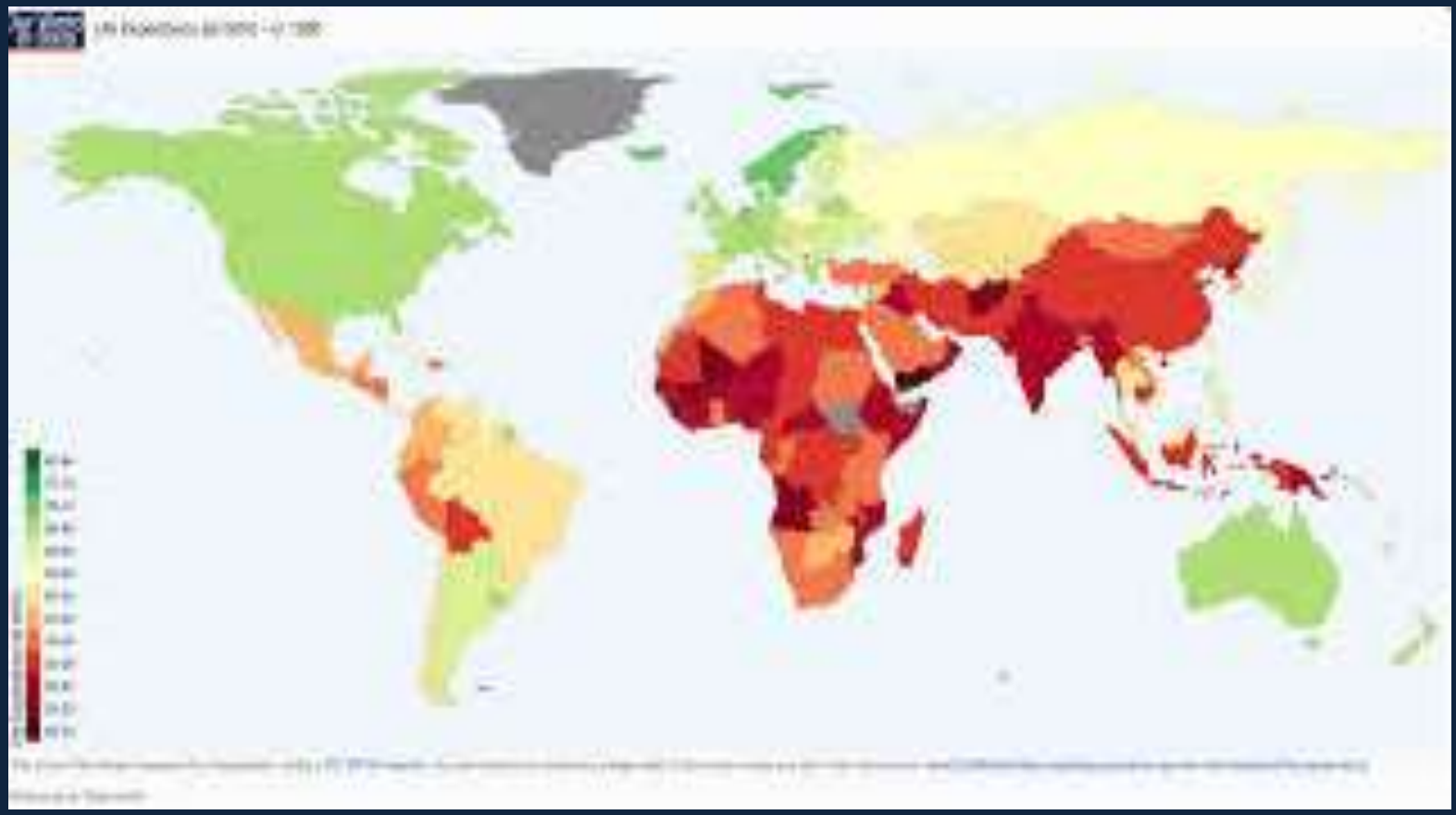
An interactive graphic including a prevalence map, a timeline, and details of HIV structure and life cycle is available at NEJM.org

The second decade of AIDS was marked by further intensification of the epidemic in other areas of the world, including the southern cone of Africa, which saw an explosive HIV epidemic. Asia and the countries of the former Soviet Union also reported a marked increase in the spread of HIV. However, by the mid-1990s, with the discovery of highly active antiretroviral therapy, rates of death in developed countries started to decline. The use of antiretroviral drugs during pregnancy also resulted in a substantial decline in mother-to-child transmission of HIV in high-income countries. However, without access to antiretroviral drugs in low- and middle-income countries, rates of death and mother-to-child transmission continued to increase, with 2.4 million deaths and more than 3 million new infections reported in 2001. Of these new infections, two thirds occurred in sub-Saharan Africa.[6]

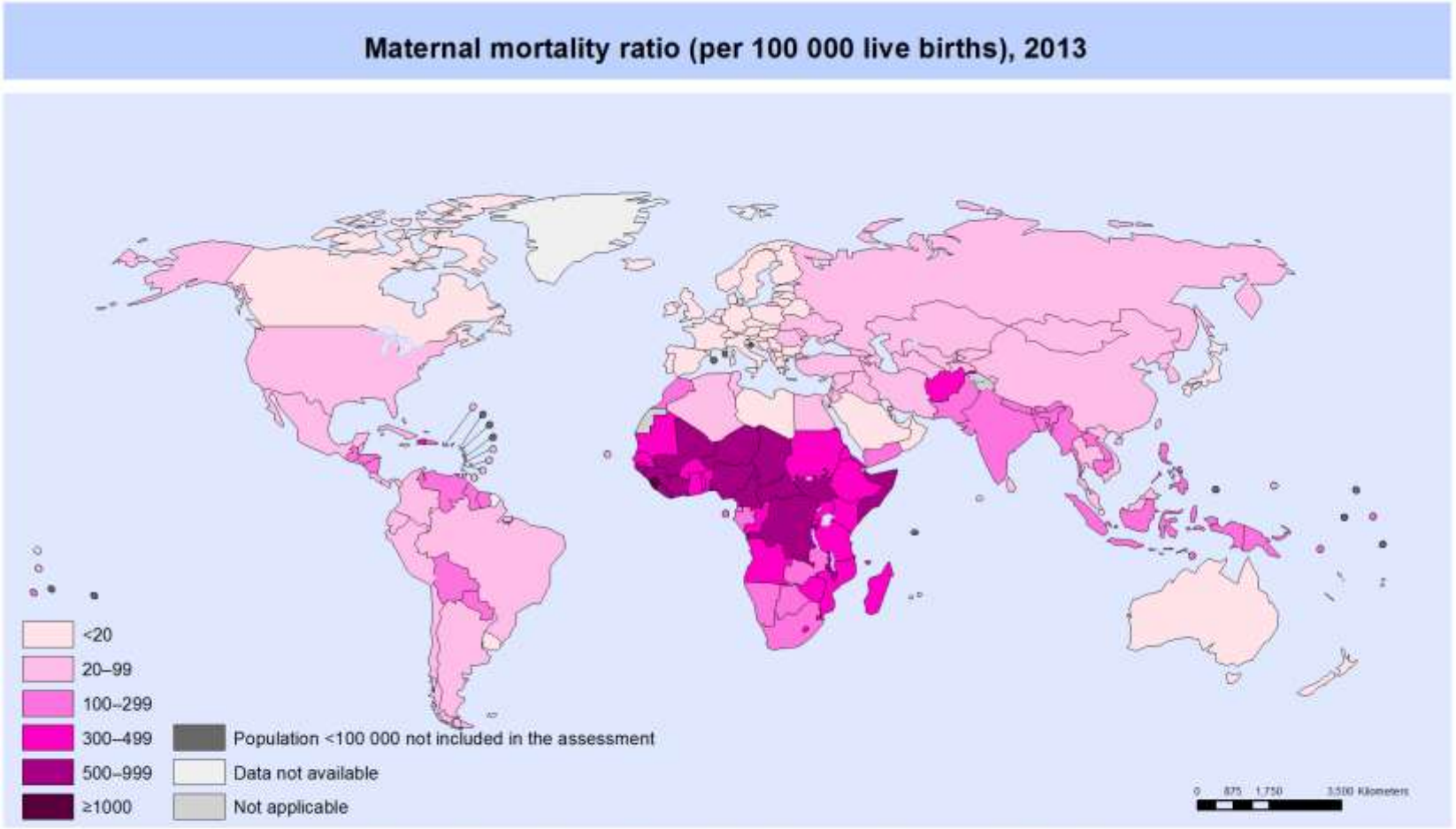
INTERNATIONAL RESPONSE TO AIDS — A GLOBAL HEALTH MODEL

It was not until the third decade of the epidemic that the world's public health officials, community leaders, and politicians united to combat AIDS. In 2001, the United Nations General Assembly endorsed a historic Declaration of Commitment on HIV/AIDS, a commitment that was renewed in 2011.[7] These actions resulted in the formation of the Global Fund to Fight AIDS, Tuberculosis, and Malaria, which was established to finance anti-AIDS activities in developing countries. In 2003, President George W. Bush announced the President's Emergency Plan for AIDS

Life expectancy at birth



Health inequalities around the world: Diseases of poverty

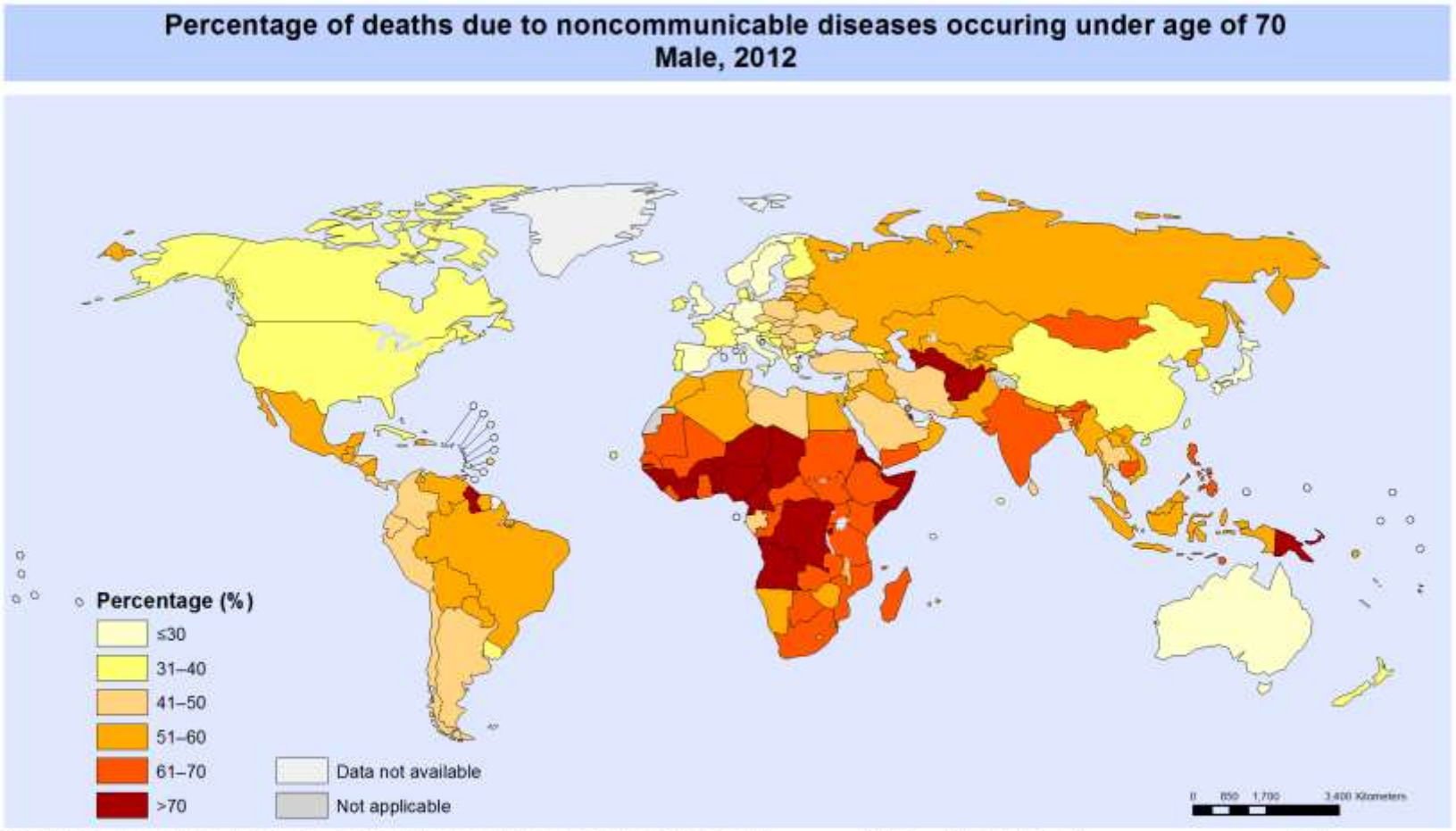


The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Health Statistics and Information Systems (HSI)
World Health Organization

World Health Organization

Health inequalities around the world: Noncommunicable Diseases



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World Health Organization

The Global Fund

Cooperazione Italiana allo Sviluppo
Ministero degli Affari Esteri e della Cooperazione Internazionale

Friends of the Global Fund Europe

The contribution of the Global Fund to Global Health within the framework of the agenda 2030

Istituto Superiore di Sanità, Rome 27 June 2016

HIV AS A INNOVATIVE MODEL FOR GLOBAL HEALTH

It drew together towards the common objective of fighting a major health inequality: scientists, and clinicians, governments and the UN, visionary politicians and economists, international organizations and World Trade Organization, pharmaceutical industry, both proprietary and generics , NGOs and faith based-organizations and patient organizations

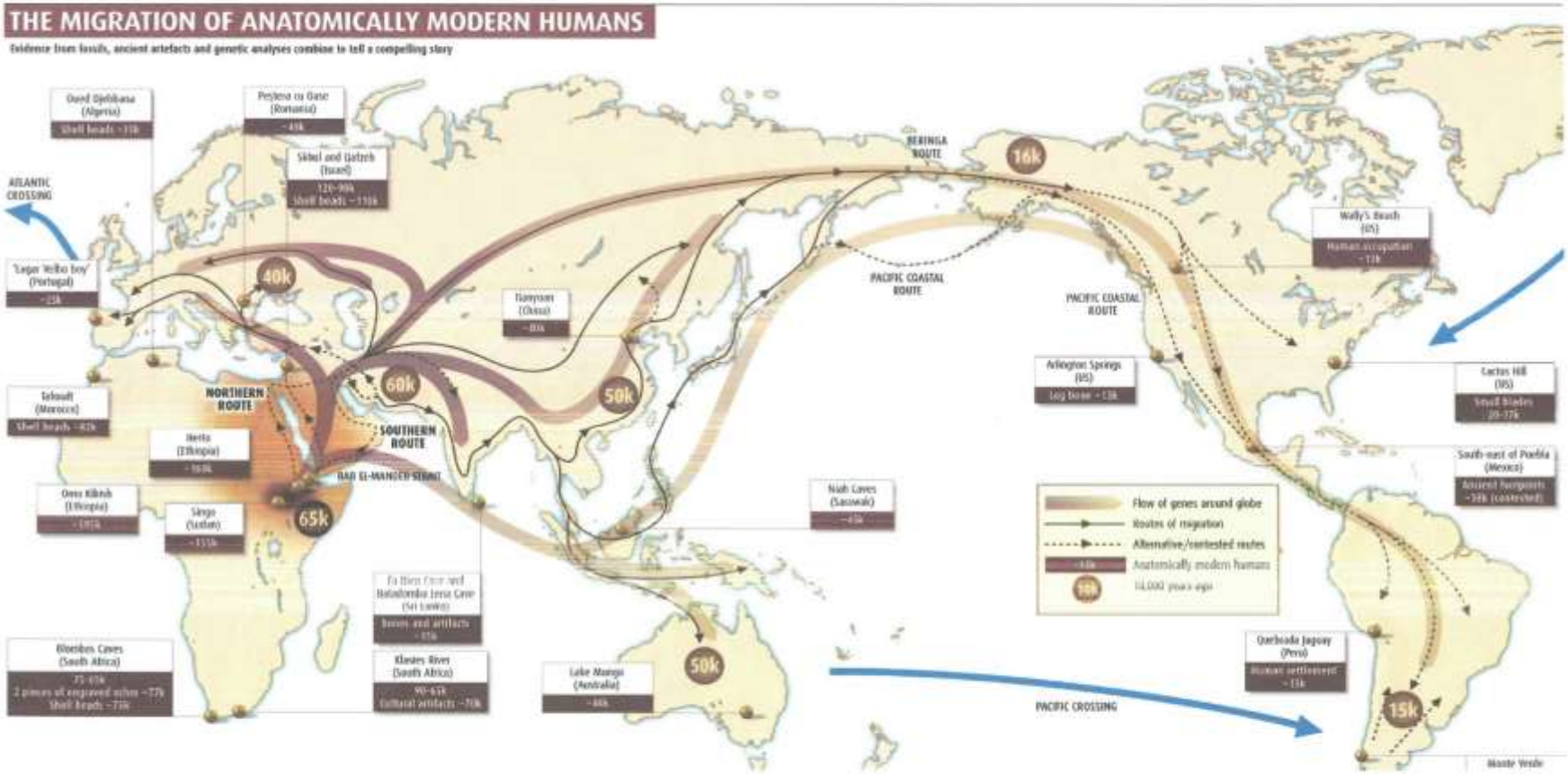
It recognized the supranational character of problems of disease and their amelioration, and the fact that no individual country can adequately address diseases in the face of the movement of people, trade, microbes, and risks.

It mobilized innovative drug production, pricing and procurement, both from generic and proprietary manufacturers

It recognized that people affected by disease have a crucial role in the discovery and advocacy of new modes of treatment and prevention and their equitable access

It based the action on ethical and moral values that recognize that equity and rights are central to the larger goals of preventing and treating diseases worldwide.

from where we all come from…



thank you

Center for Global Health - Istituto Superiore di Sanità
Research and Action against health inequalities

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