Responding to an evolving epidemic to sustain long-term HIV epidemic control—Implications for HIV testing

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CQUIN: Differentiated Service Delivery across the HIV Testing Cascade
Durba, 10-12 July 2024

Disclosures

- No relationships with pharmaceutical or medical commodity companies to disclose
- I have never administered an HIV test to a client
- I have never managed a facility or community HIV testing programme
- I have never developed or implemented a national HIV testing strategy

Aim

A motivating question: With reaching 95-95-95 targets and low new HIV infections—*do we need to test less?*

Things to think together about today:

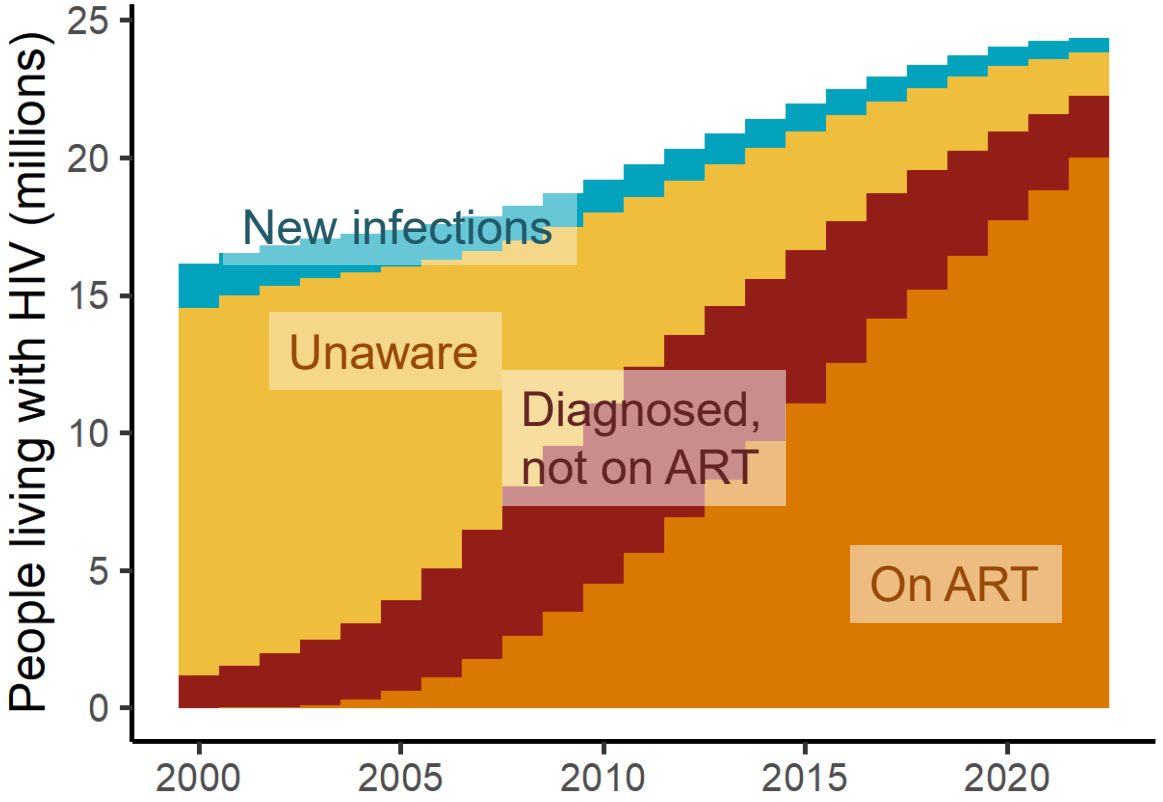
1. How does the changing HIV epidemic and transmission dynamics in our region affect HIV testing strategies?

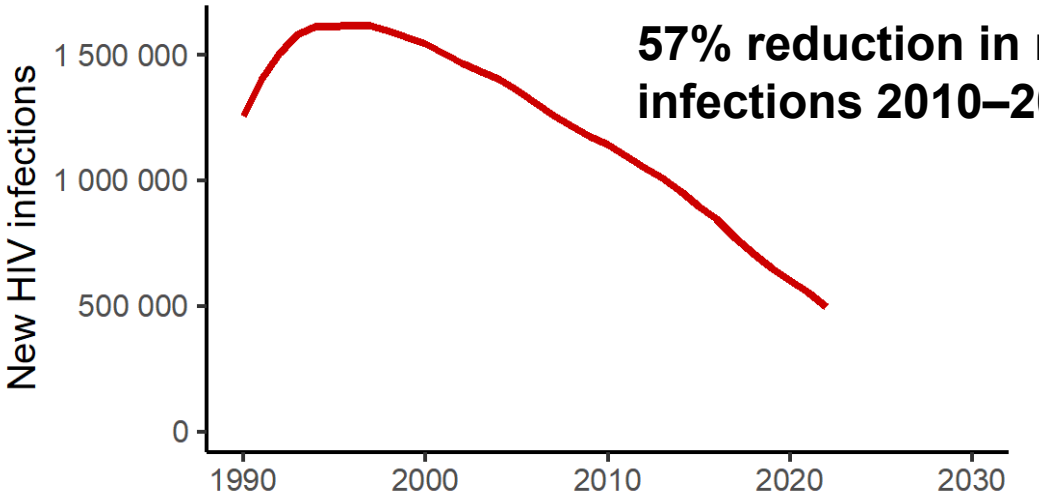
2. What are the impacts of current strategy decisions over short-, medium-, and long-term?

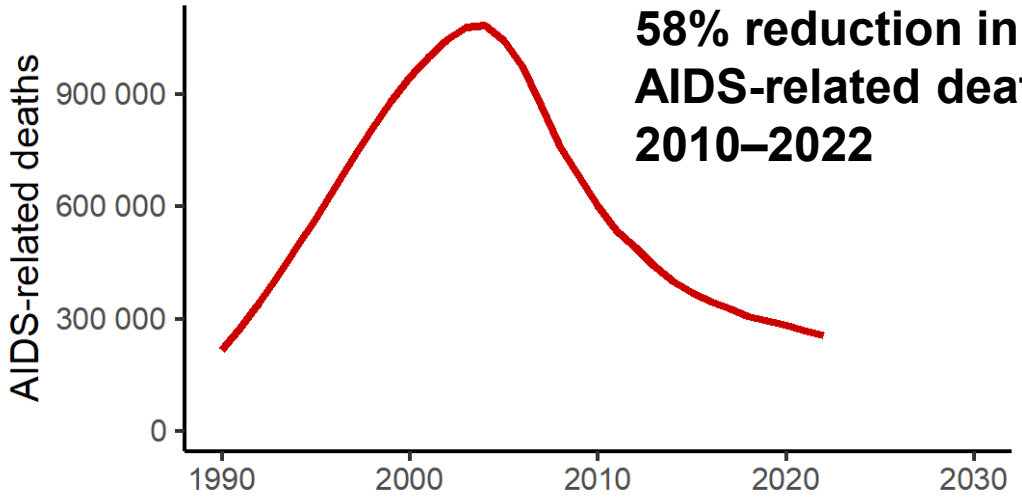
1. Our changing HIV epidemic

HIV Infection Trends in Eastern and Southern Africa

Adults living with HIV: Sub-Saharan African countries, 2000-2022

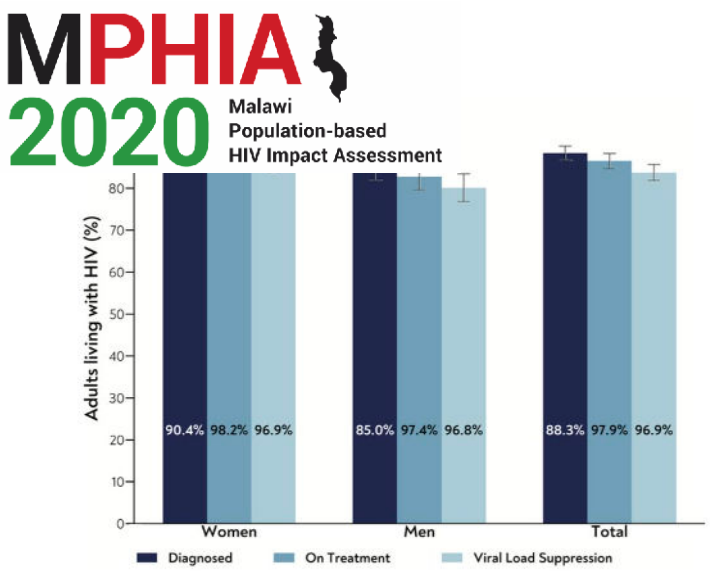


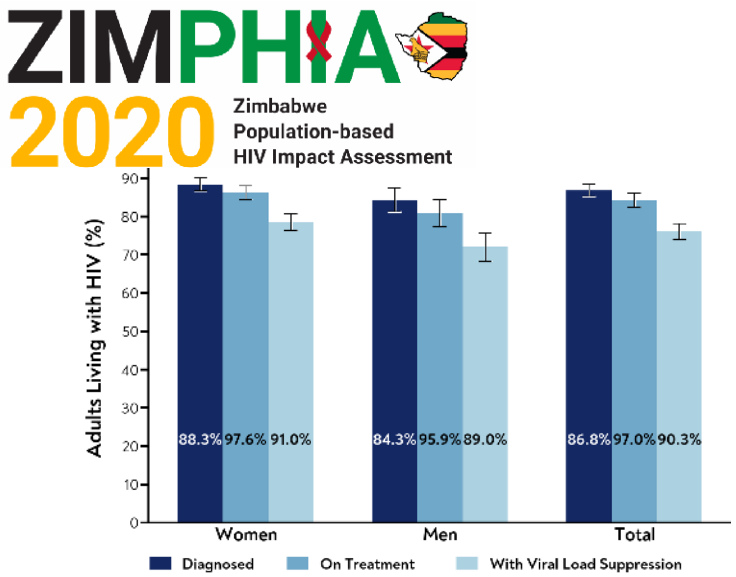


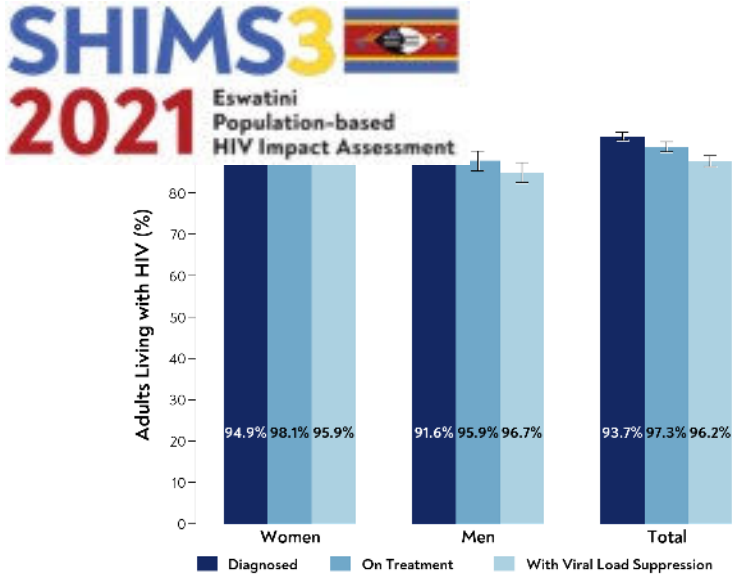


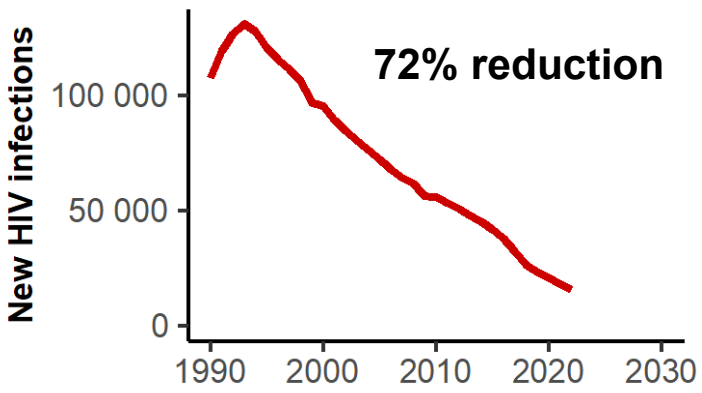
Source: UNAIDS 2023 epidemiological estimates.

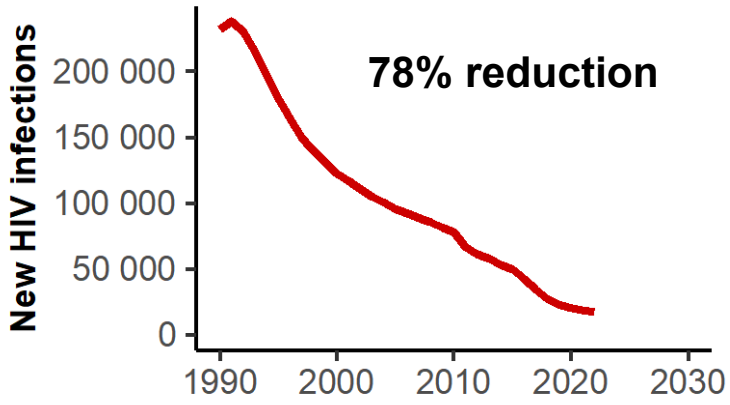
Countries attaining 95-95-95: 2030 targets in reach

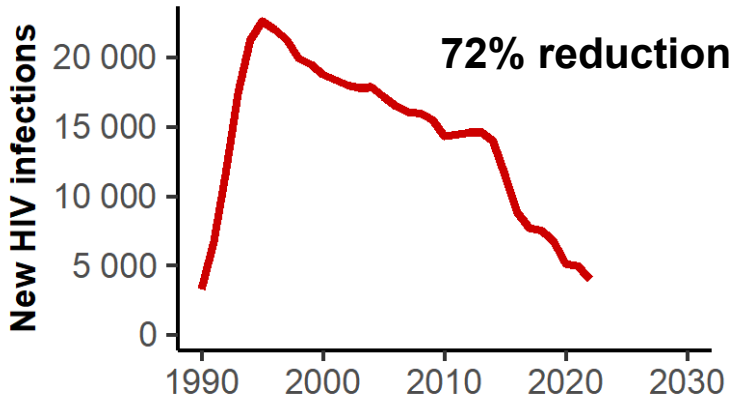








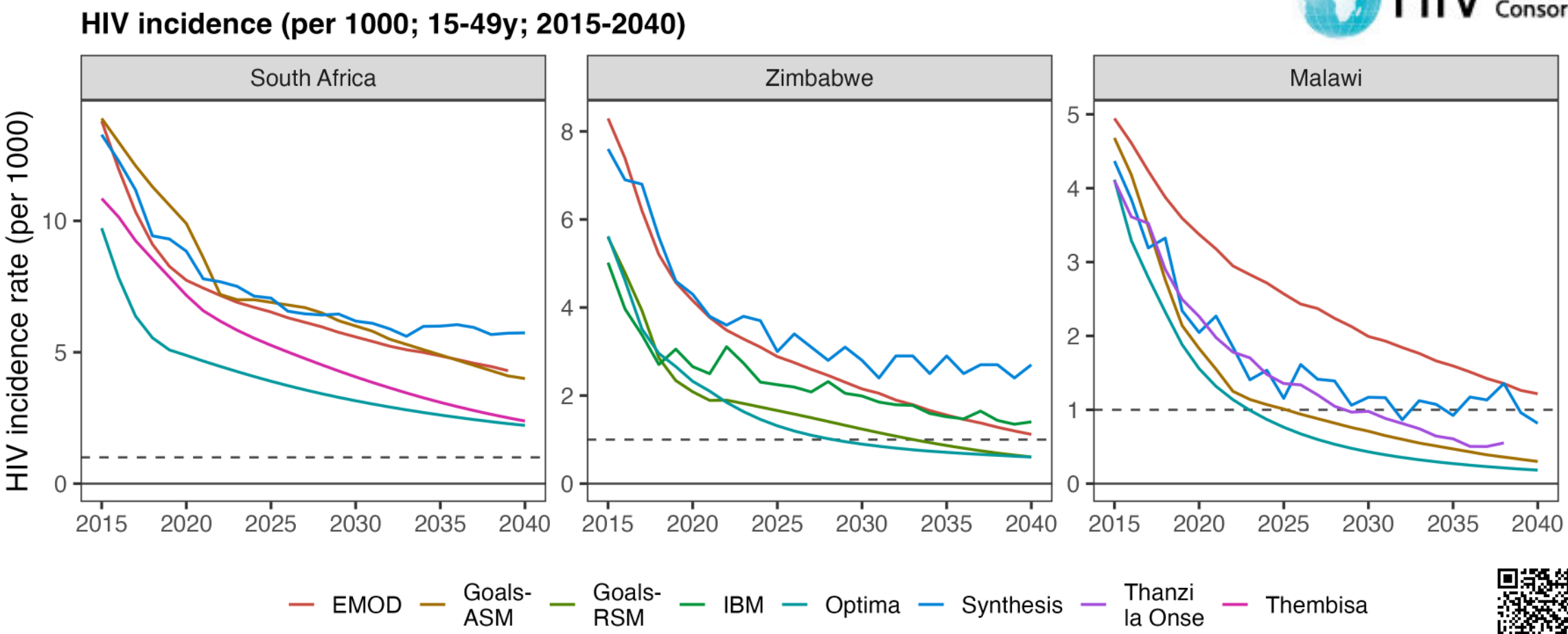




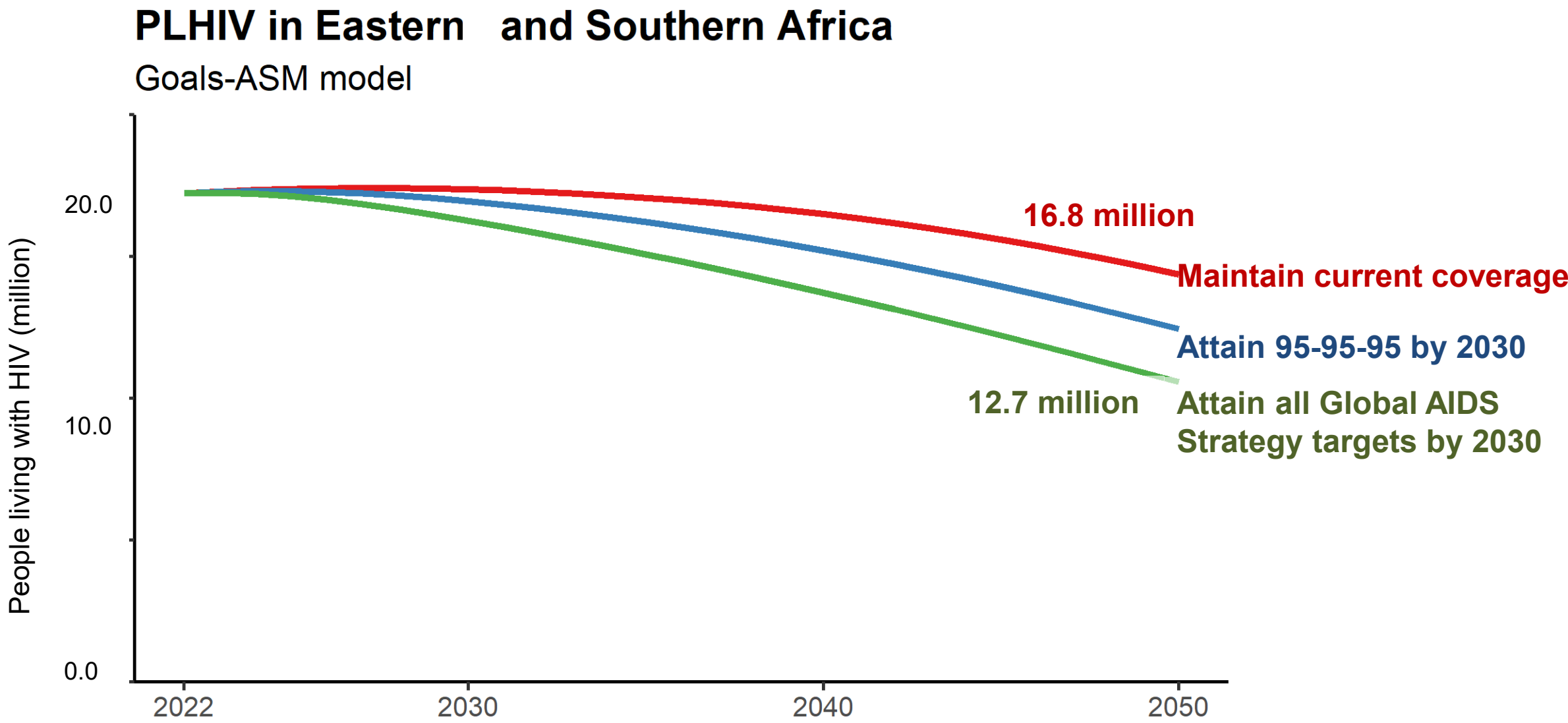
Source: PHIA surveys and UNAIDS 2023 epidemiological estimates.

Future projections: HIV incidence will continue to decline for 15+ years, with active programmes to maintain current treatment and prevention coverage

HIV Modelling Consortium

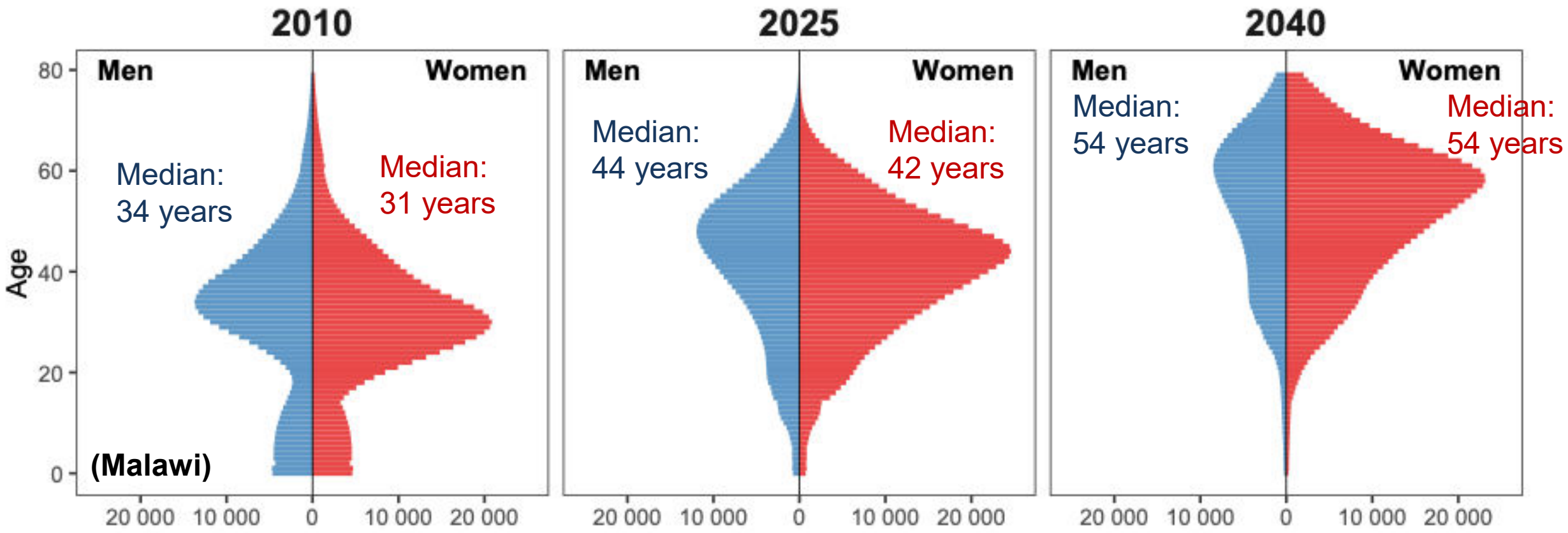


Large number of people living with HIV requiring services long into the future

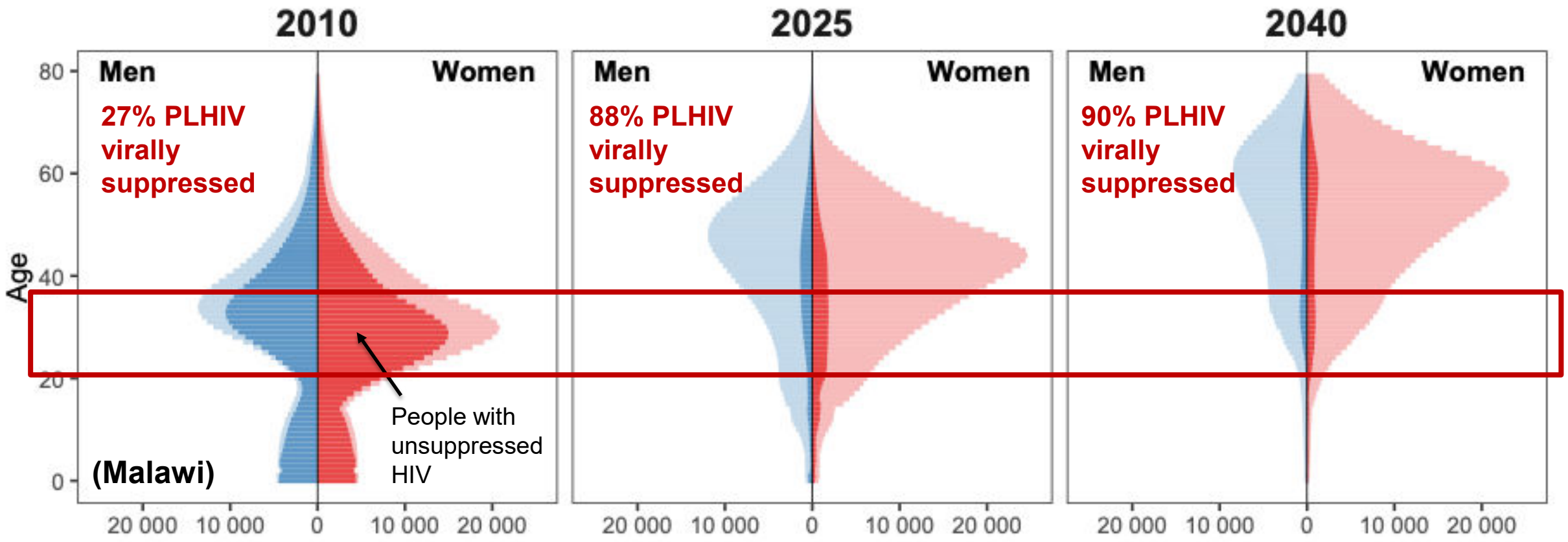


John Stover, UNAIDS Technical Consultation, 20-21 July 2023

Vignettes of a changing HIV epidemic



Vignettes of a changing HIV epidemic

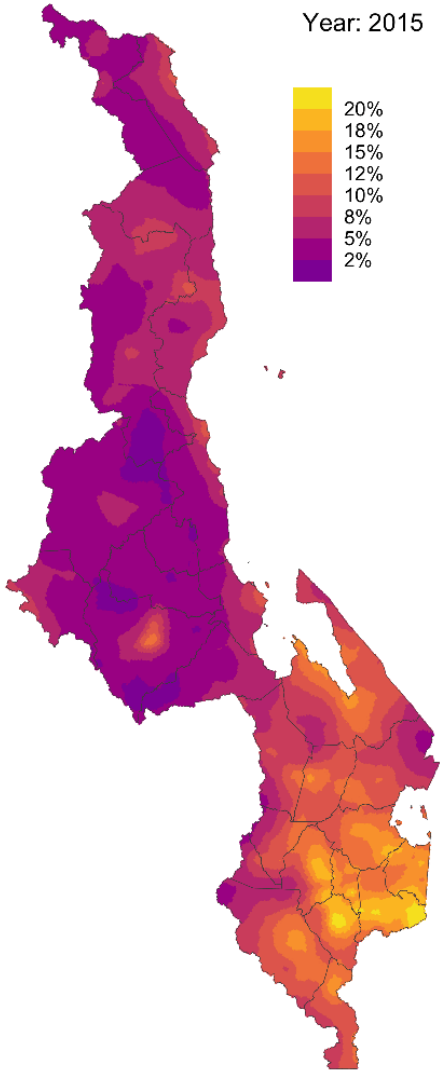


❖ Implications: **HIV care** packages, **Untreated** population, **At risk** population

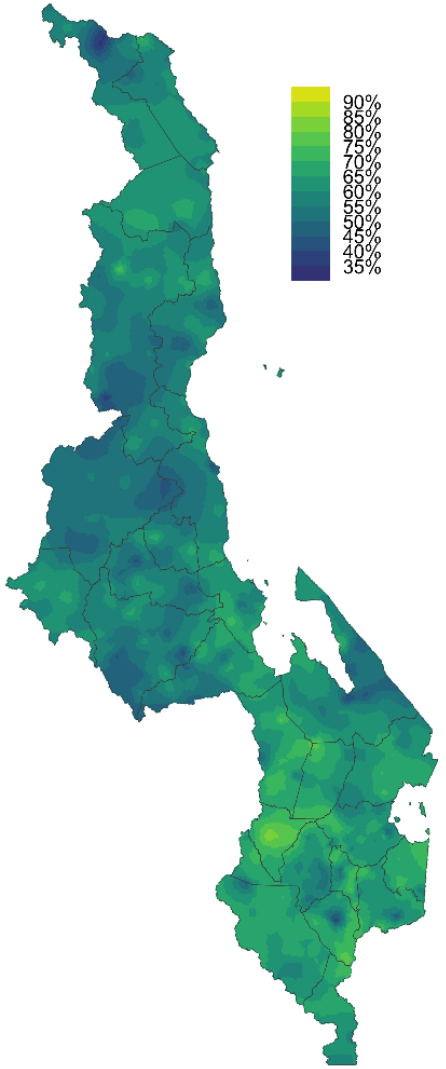
Vignettes of a changing HIV epidemic

Malawi: geospatial epidemic 2016-2023

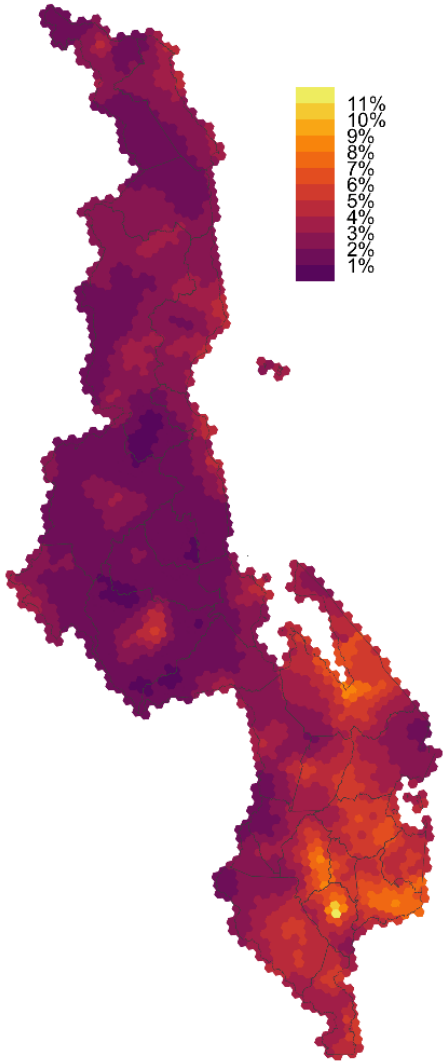
HIV prevalence
(Age 15-49 years)

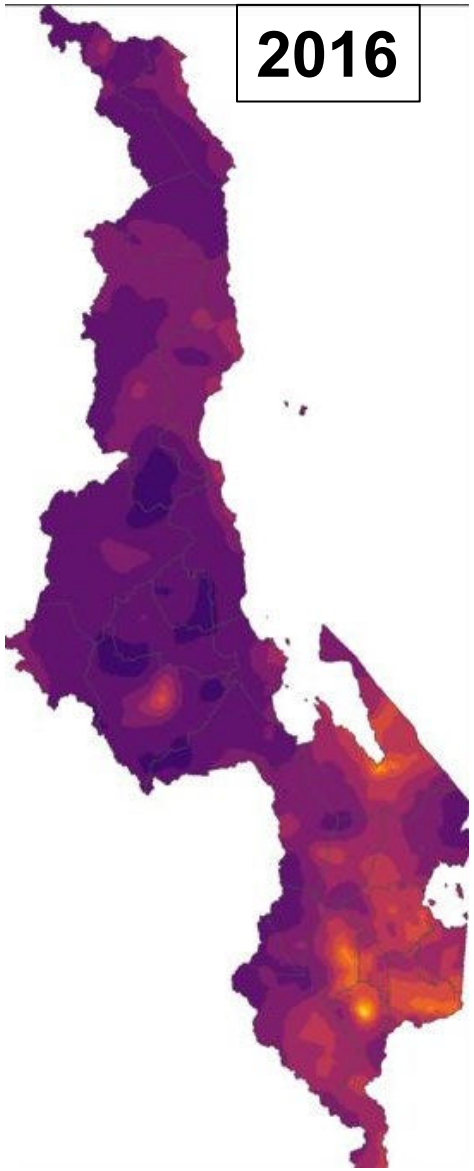


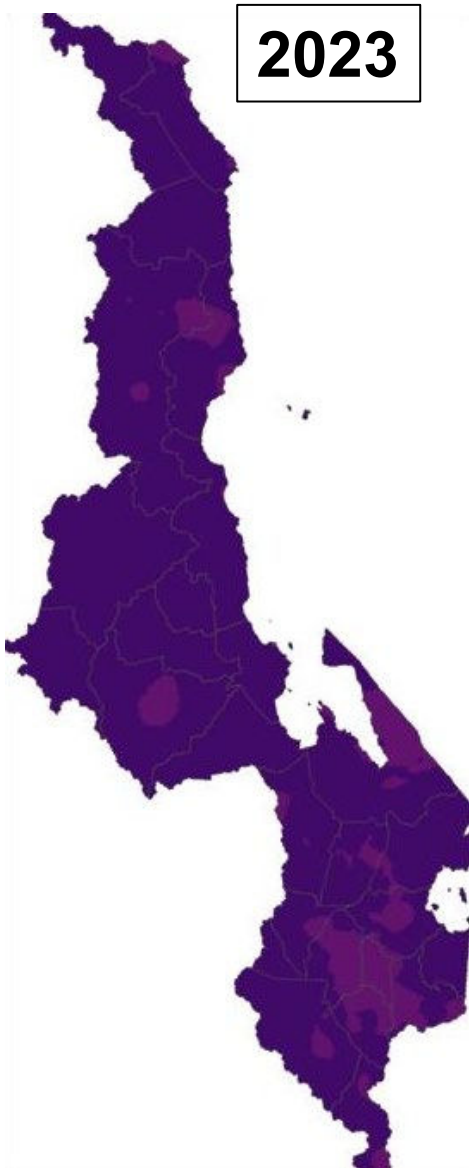
VL suppression
(VL <1000)

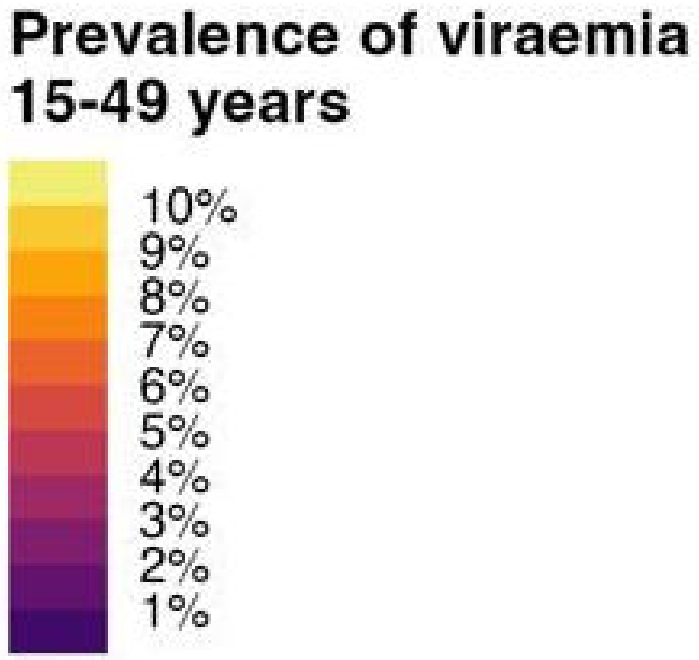


Prevalence of viraemia
(% all adults 15-49 with VL >1000)









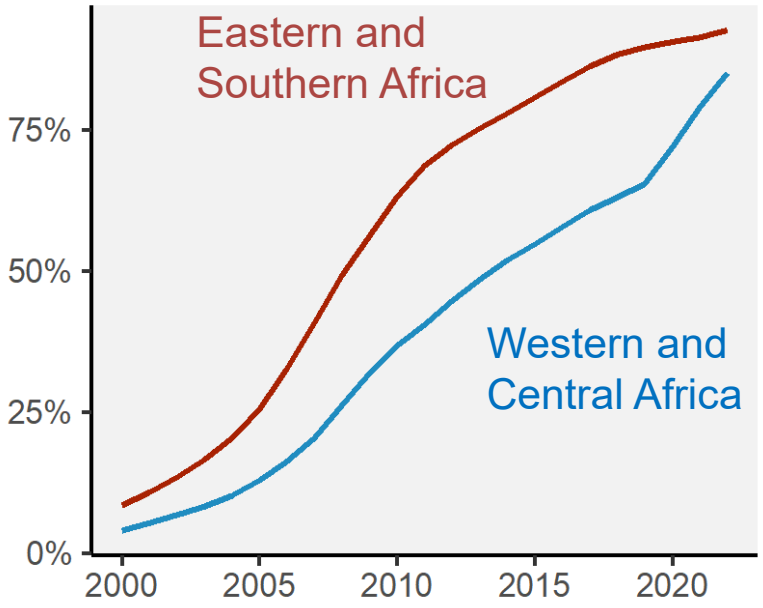
(Percentage of all adults with unsuppressed HIV → potentially transmissible)

(Malawi)

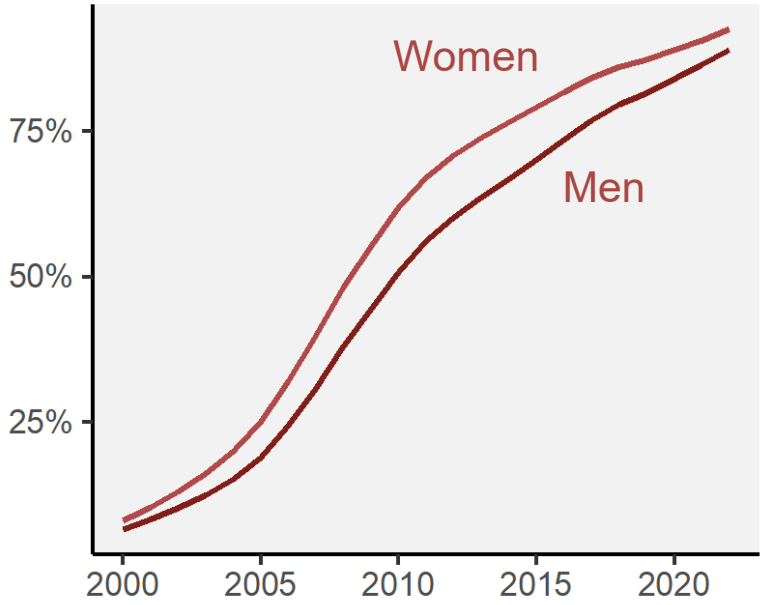
2. How did we get here?

HIV awareness: marked progress in all populations, but disparities

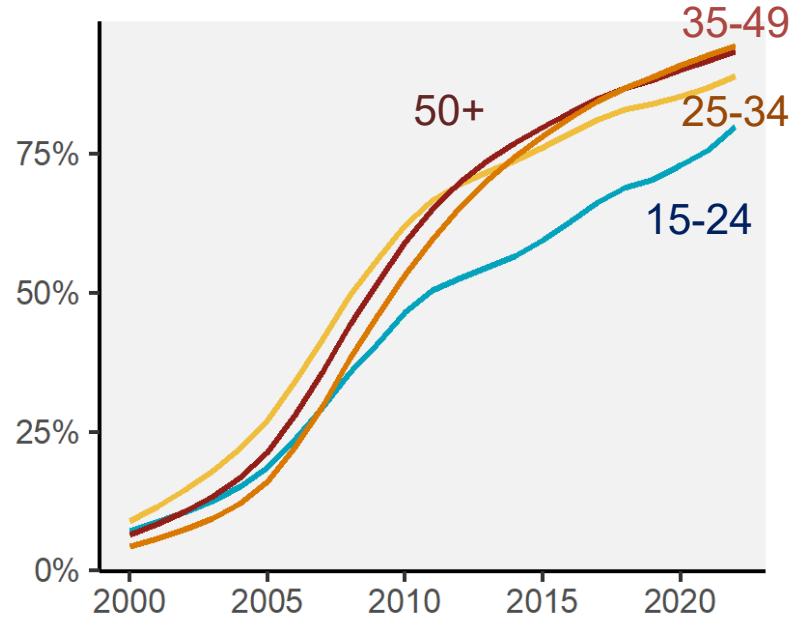
Regional disparities



Gender disparities



Age disparities

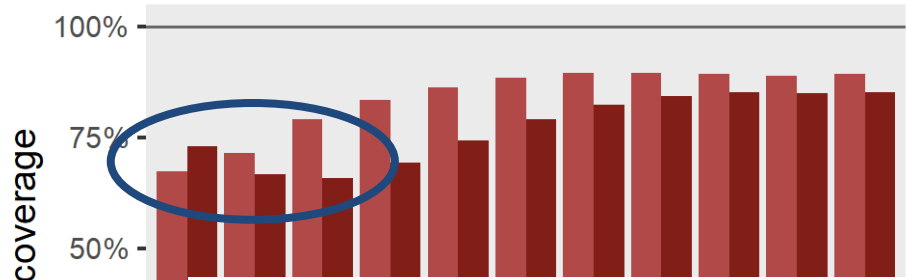


Giguere et al. *Lancet HIV* 2021; updated with UNAIDS 2023 HIV estimates

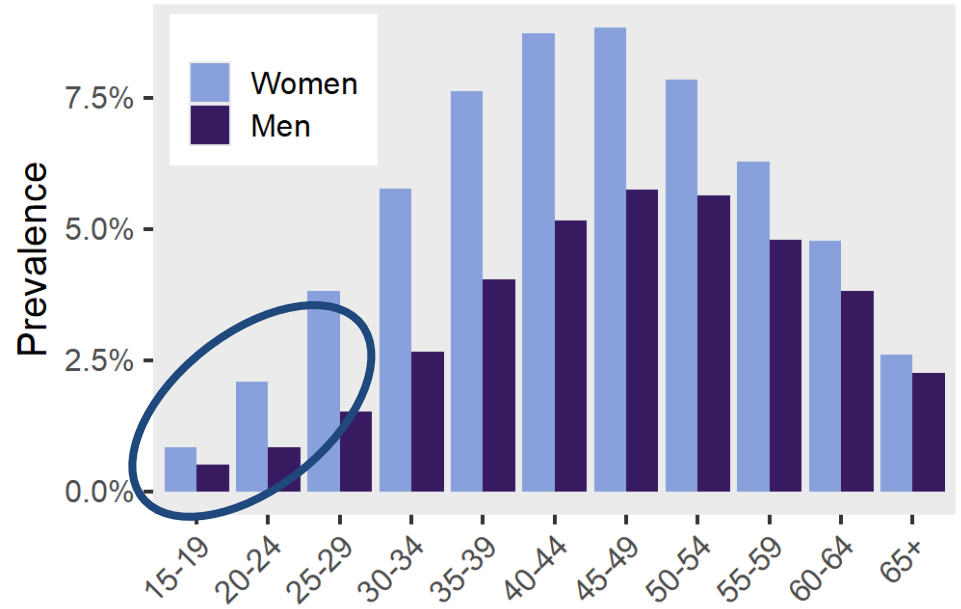
Focus on the numbers: absolute gaps in awareness

ART coverage by age

Sub-Saharan African countries, Dec 2022

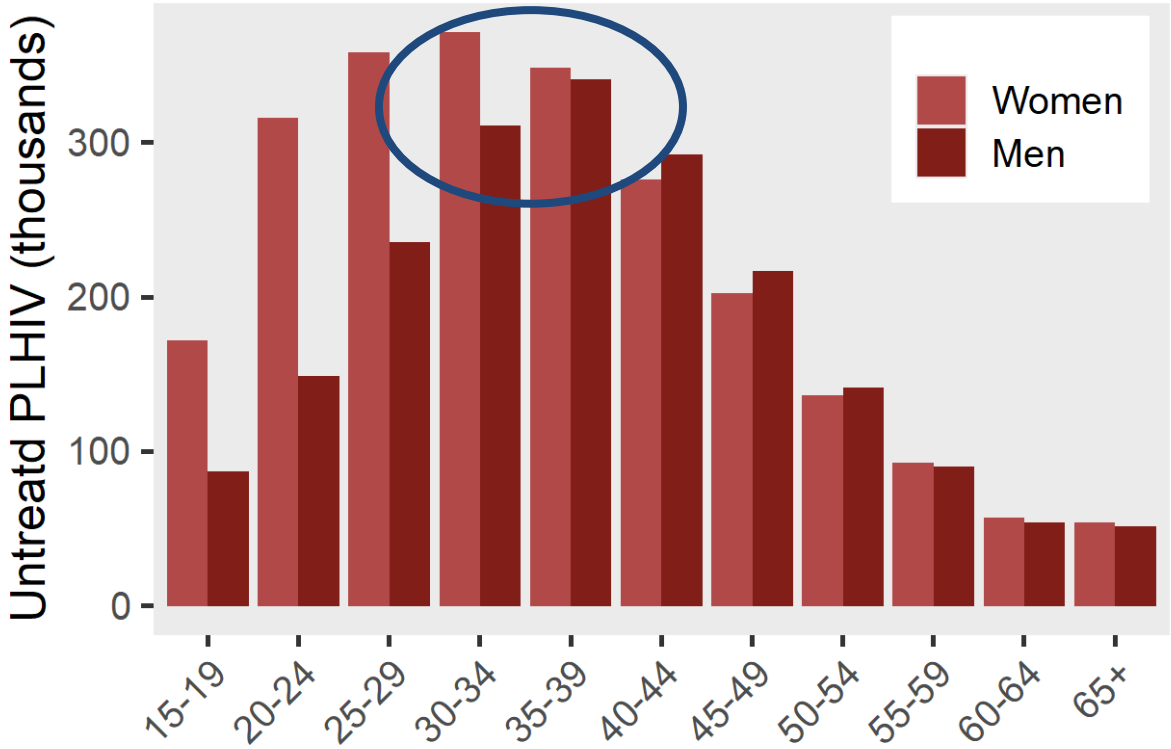


HIV prevalence by age



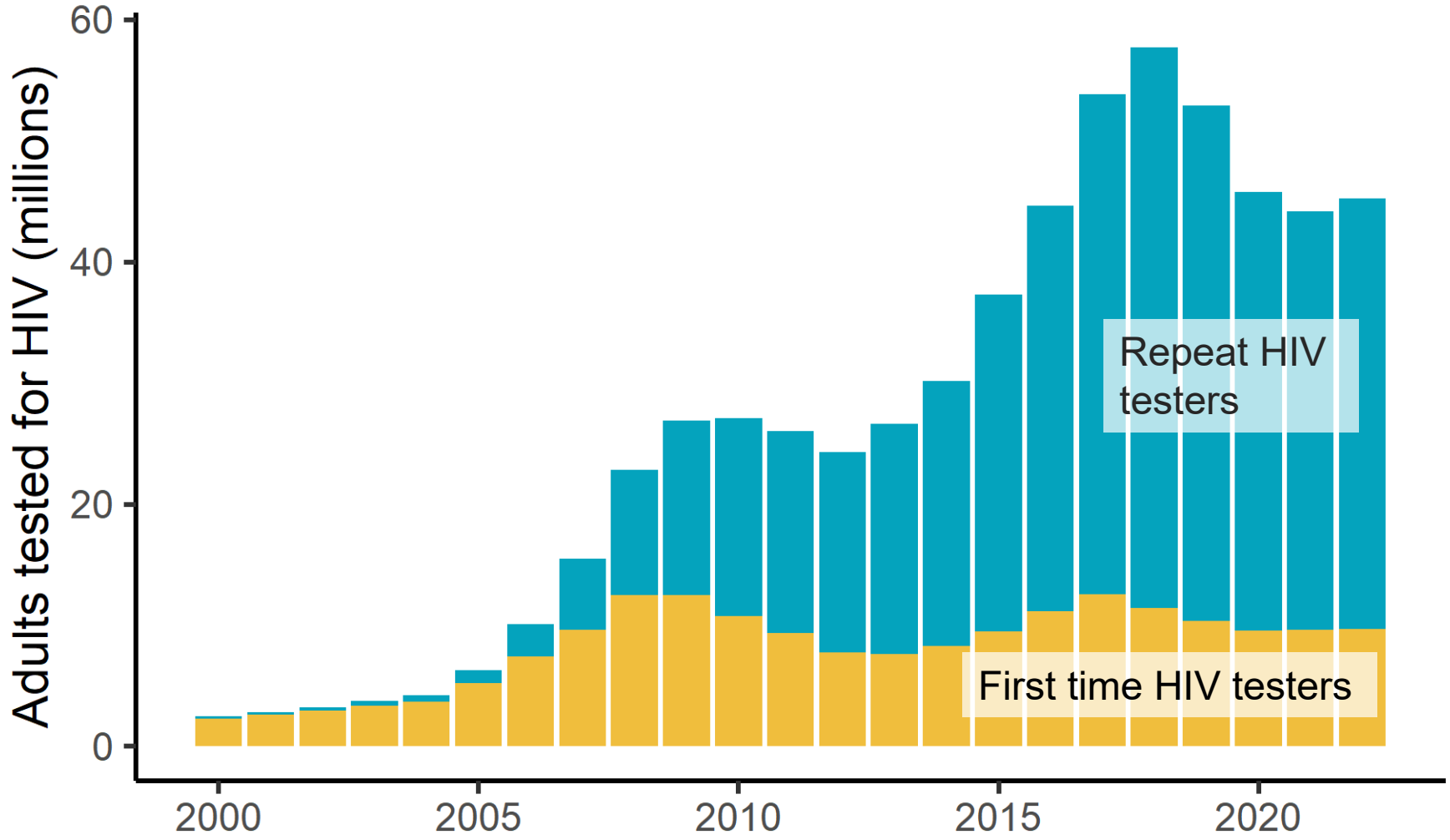
Number of undiagnosed PLHIV

Sub-Saharan African countries, Dec 2022



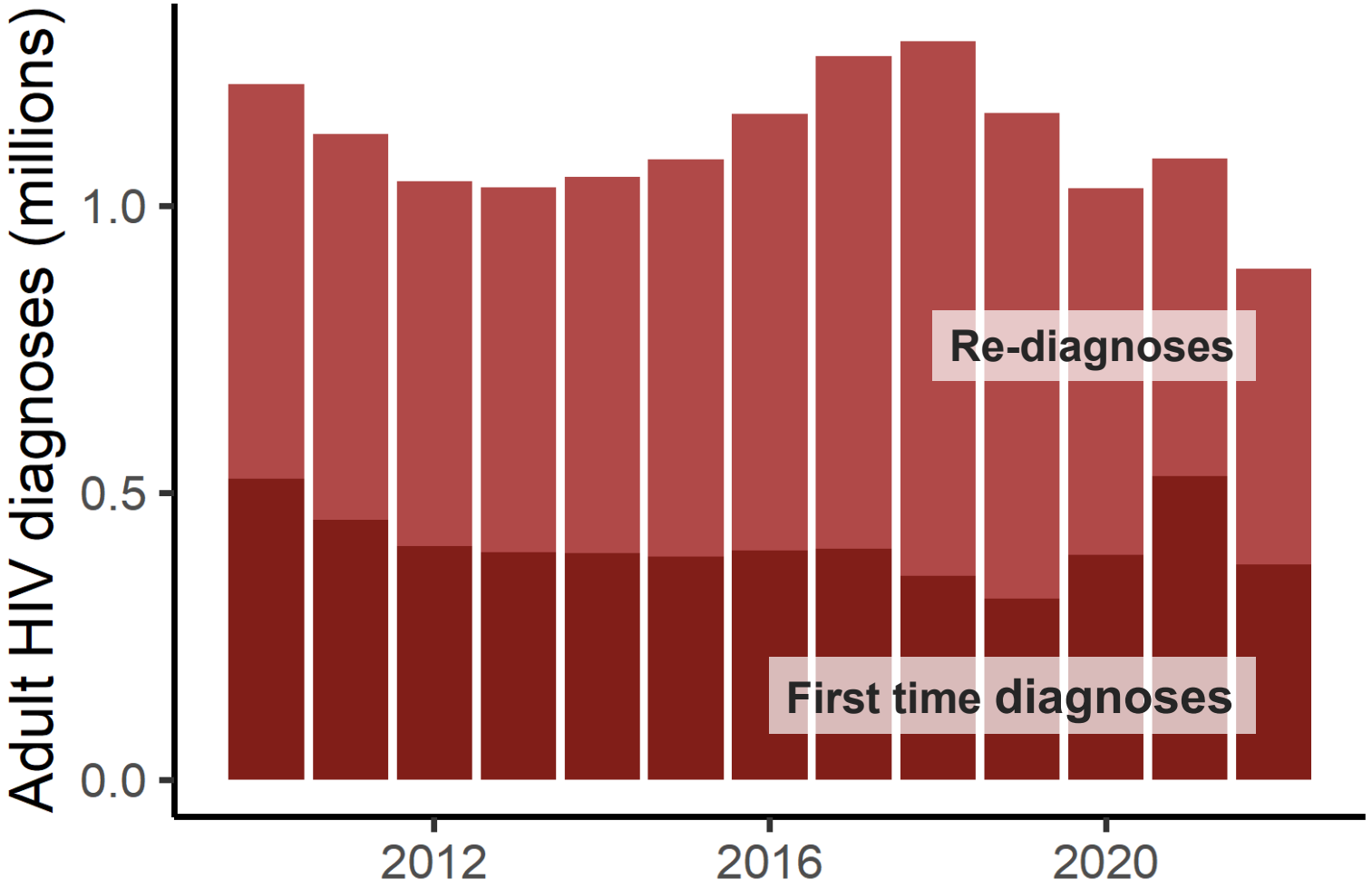
UNAIDS HIV estimates 2023

Adults tested for HIV



UNAIDS 2023 Estimates; *excludes: South Africa, Kenya, Zimbabwe, Mozambique, Ethiopia, Burundi, Burkina Faso, Dem Rep Congo, Benin*

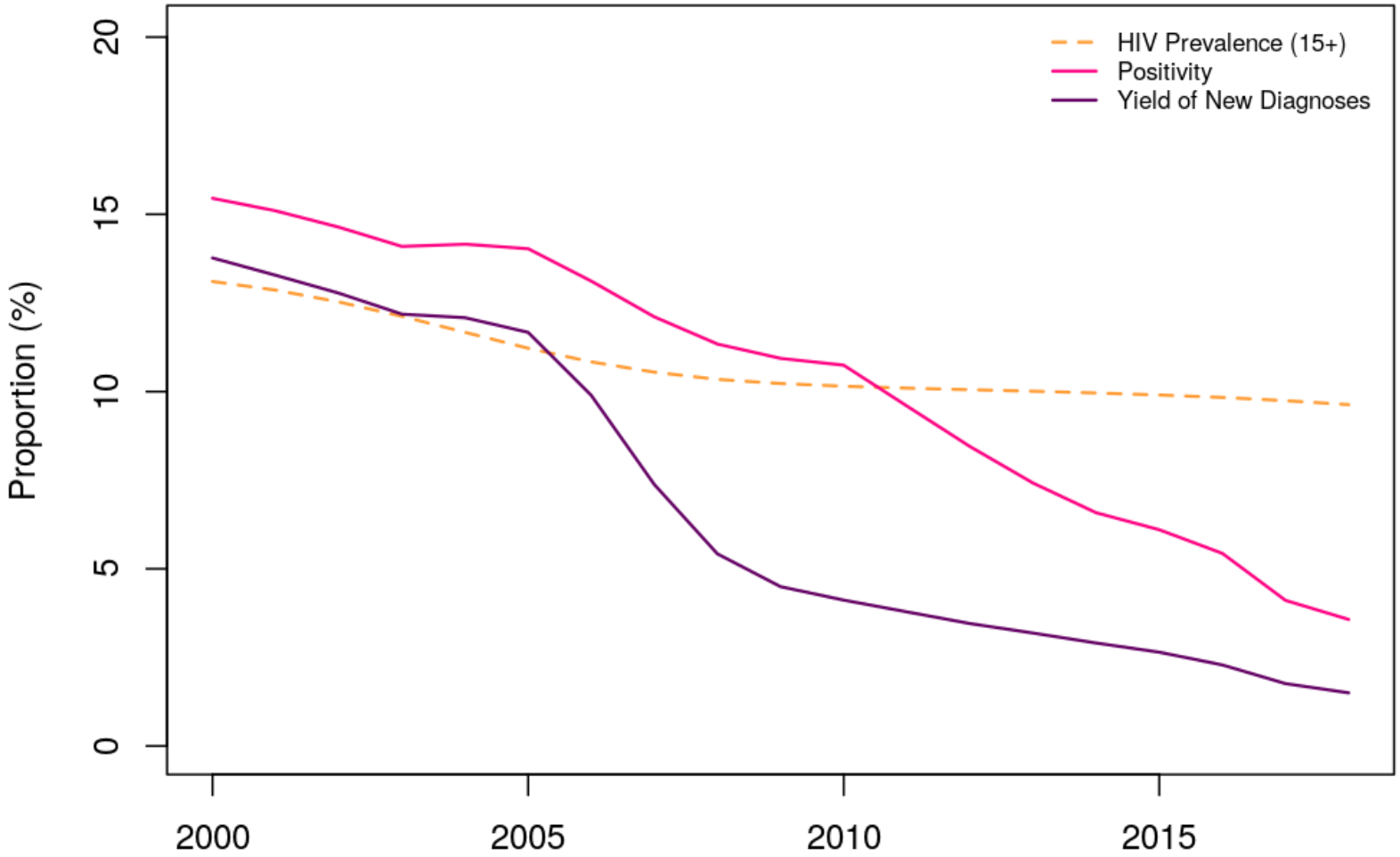
HIV diagnoses (adults)



- In 2022: **~60% of tests HIV positive tests were 're-diagnoses'**
- Critical pathway to care re-entry

Giguere et al. *Lancet HIV* 2021
UNAIDS 2023 Estimates; *excludes: South Africa, Kenya, Zimbabwe, Mozambique, Ethiopia, Burundi, Burkina Faso, Dem Rep Congo, Benin*

Declining HIV testing positivity: *The mark of success!*



HIV prevalence

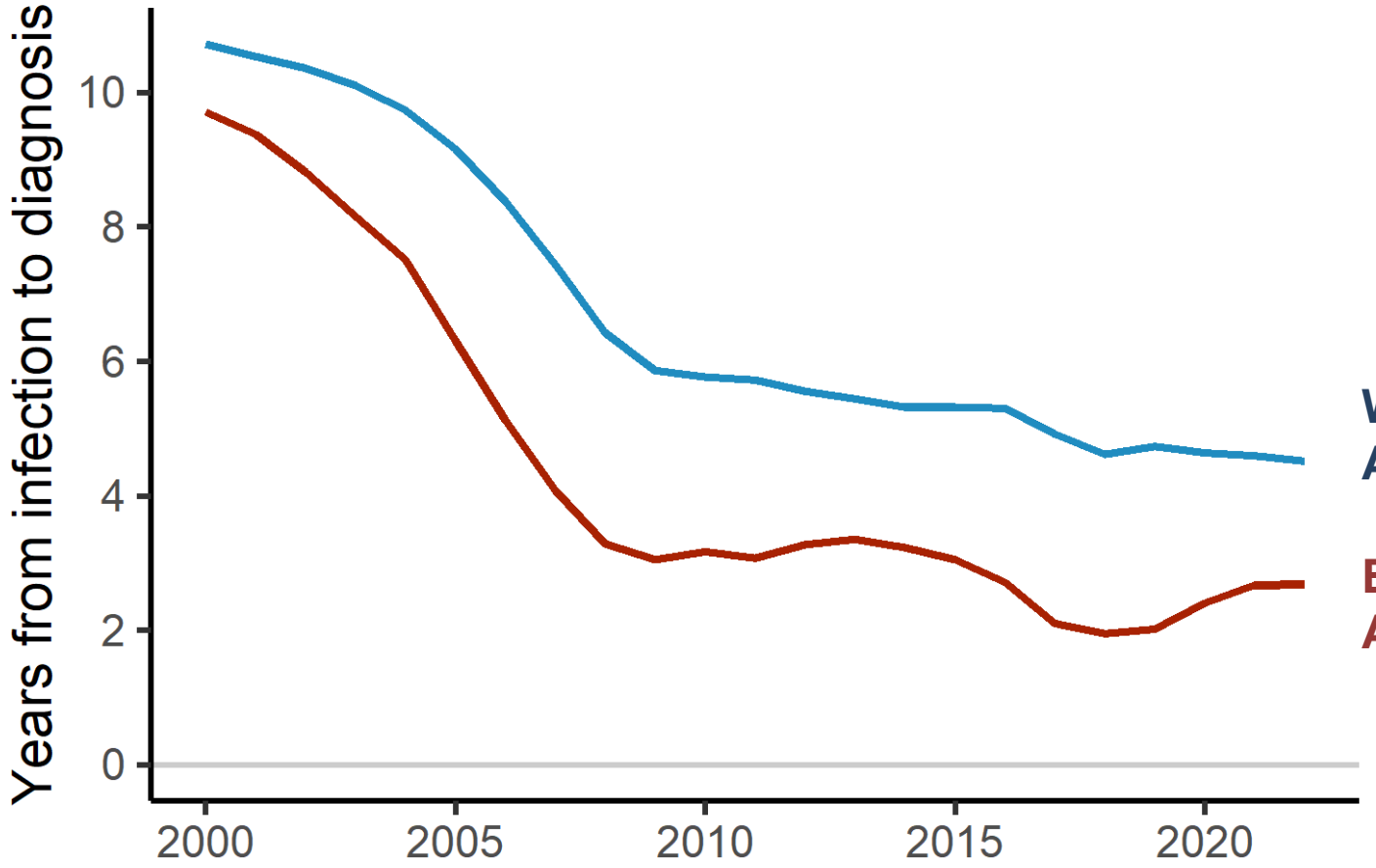
% Testing Positive (positivity or yield)

% First-time diagnosis

Malawi 2019 National HIV Estimates; Maheu-Giroux et al, AIDS 2019

Timeliness of HIV diagnosis

Median years from HIV infection to diagnosis



Western & Central Africa: 4.5 years

Eastern & Southern Africa: 2.7 years

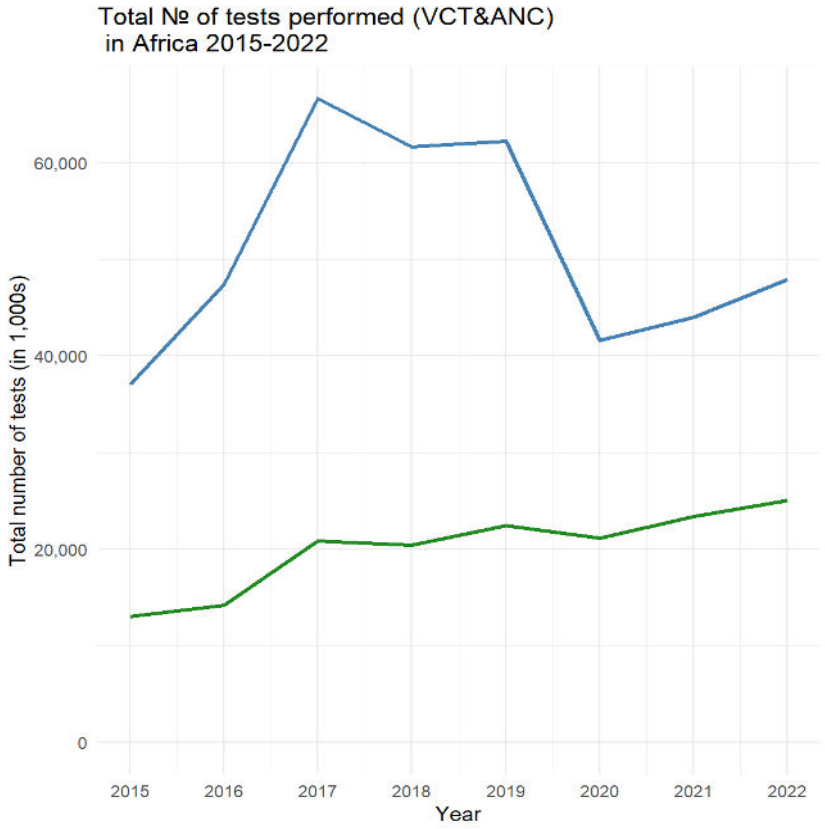
Giguere et al. *Lancet HIV* 2021; updated with UNAIDS 2023 HIV estimates

3. Impact of reducing testing on sustaining HIV epidemic control

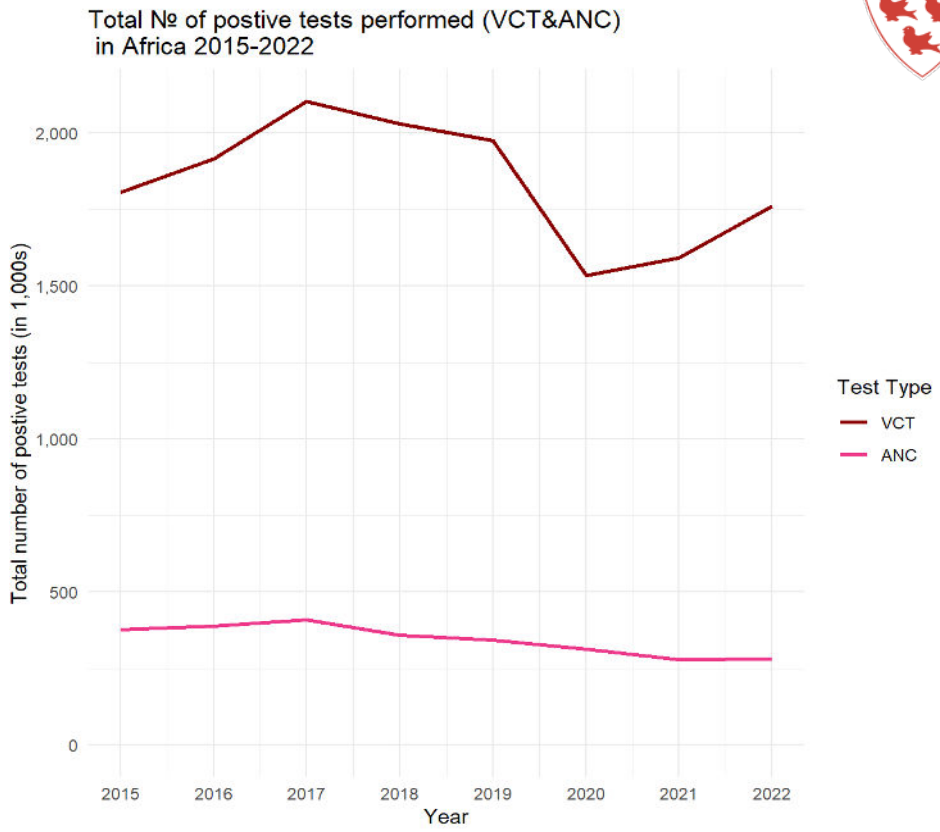
Impact of reducing testing


McGill UNIVERSITY

2017-2020: 32% reduction in tests conducted

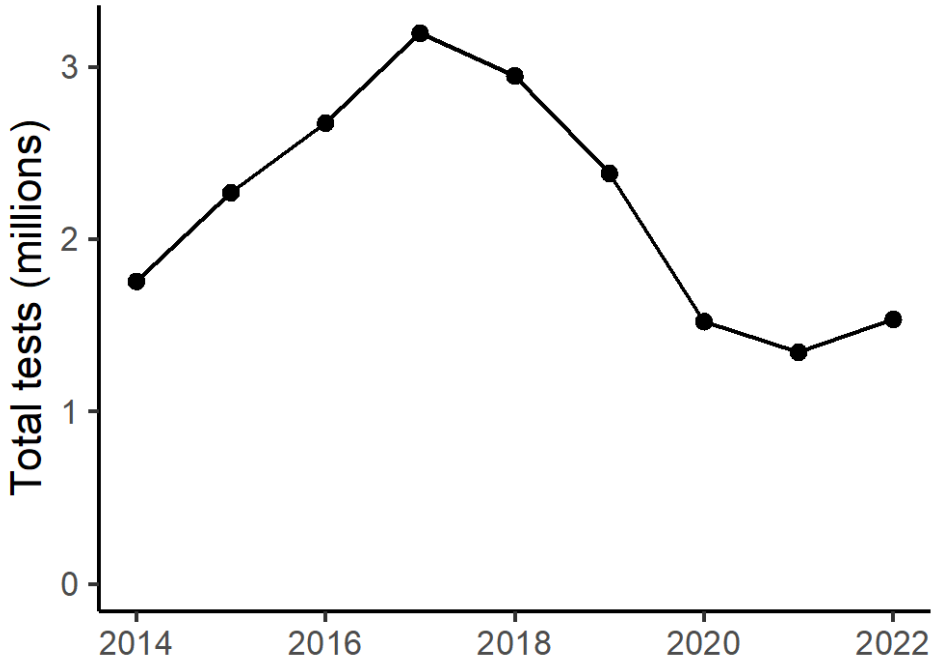


2017-2020: 28% reduction in number diagnosed

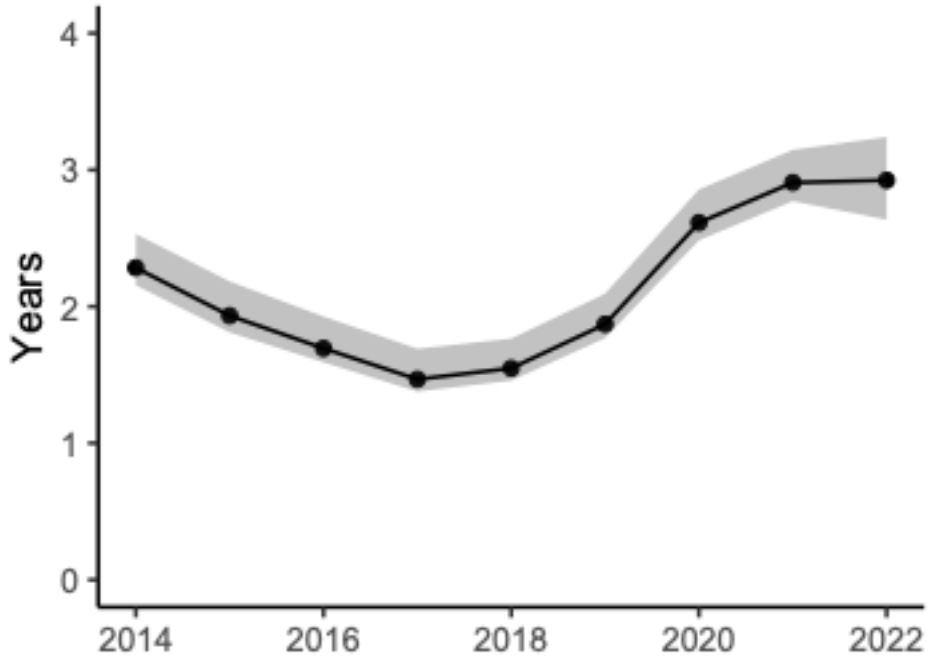


Large impact: time-to-diagnosis

Zimbabwe: Total HIV tests (adults)



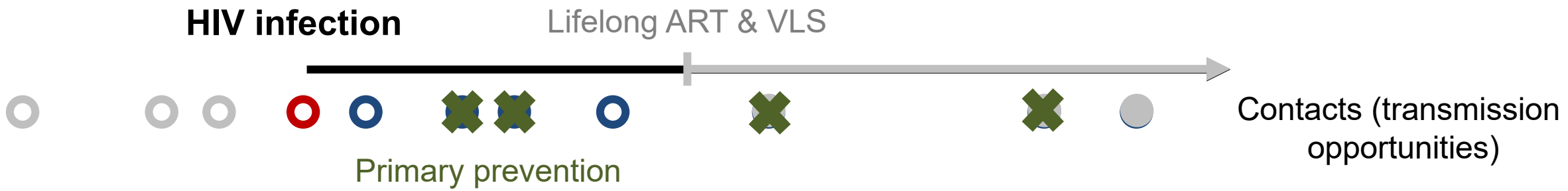
Zimbabwe: Median years from infection to HIV diagnosis



- 2017–2021: time from infection to diagnosis **nearly doubled**
  - **1.5 years** in 2017 to **2.9 years** in 2023

Timely diagnosis—key to sustained epidemic control

- Sustaining epidemic control: **each person with HIV transmits to <1 person** (on average)
  - Ideally <<1 → faster incidence decline



Reduce time-to-diagnosis by half:

❖ Same impact—half as much prevention

4. Medium- and long-term impacts of current HIV testing programme decisions

Articles

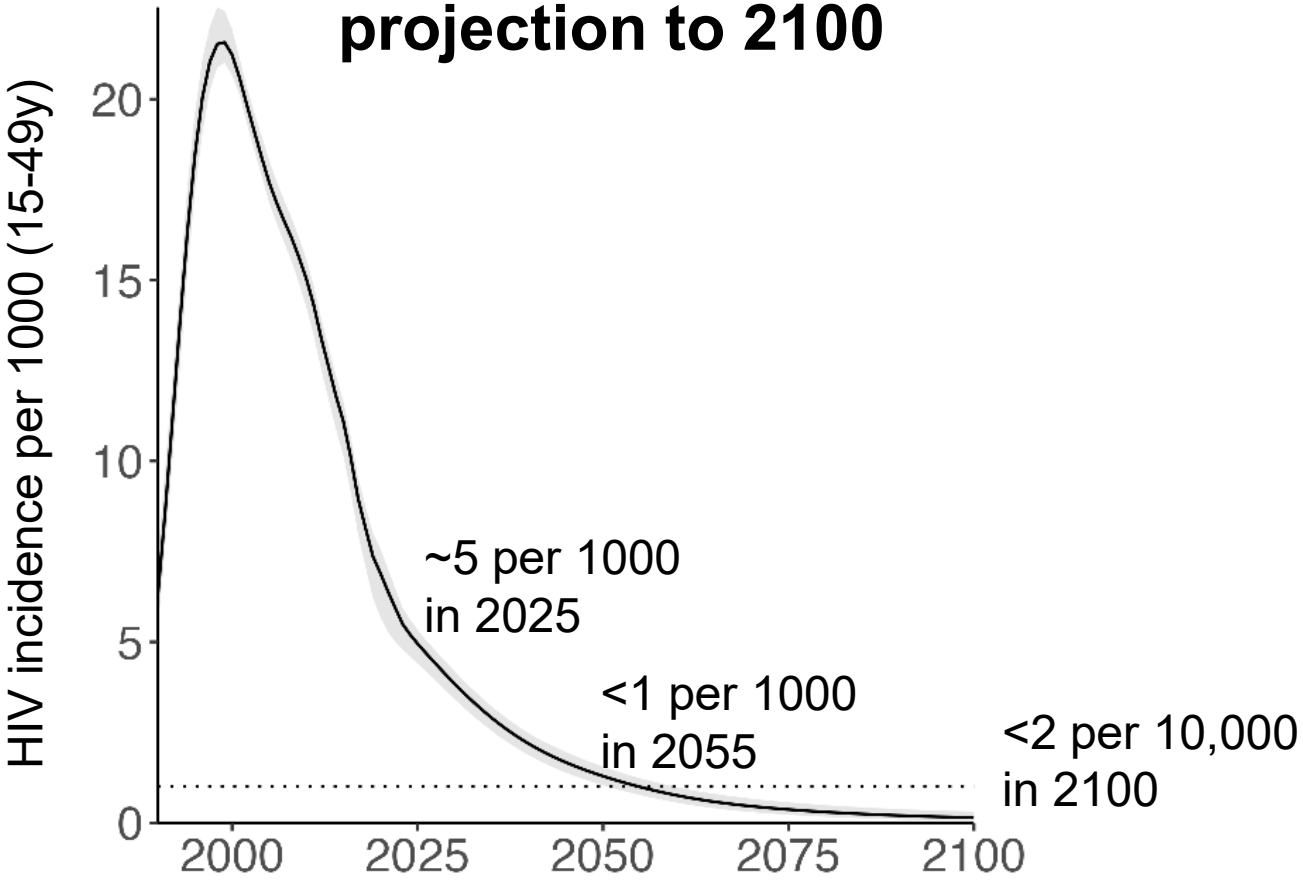
Future HIV epidemic trajectories in South Africa and projected long-term consequences of reductions in general population HIV testing: a mathematical modelling study

Stefan P Rautenbach, Lilith K Whittles, Gesine Meyer-Rath, Lise Jamieson, Thato Chidarikire, Leigh F Johnson, Jeffrey W Imai-Eaton**

Rautenbach *at al. Lancet Public Health* 2024

South Africa: sustaining current programmes to 2100

South Africa: HIV incidence projection to 2100

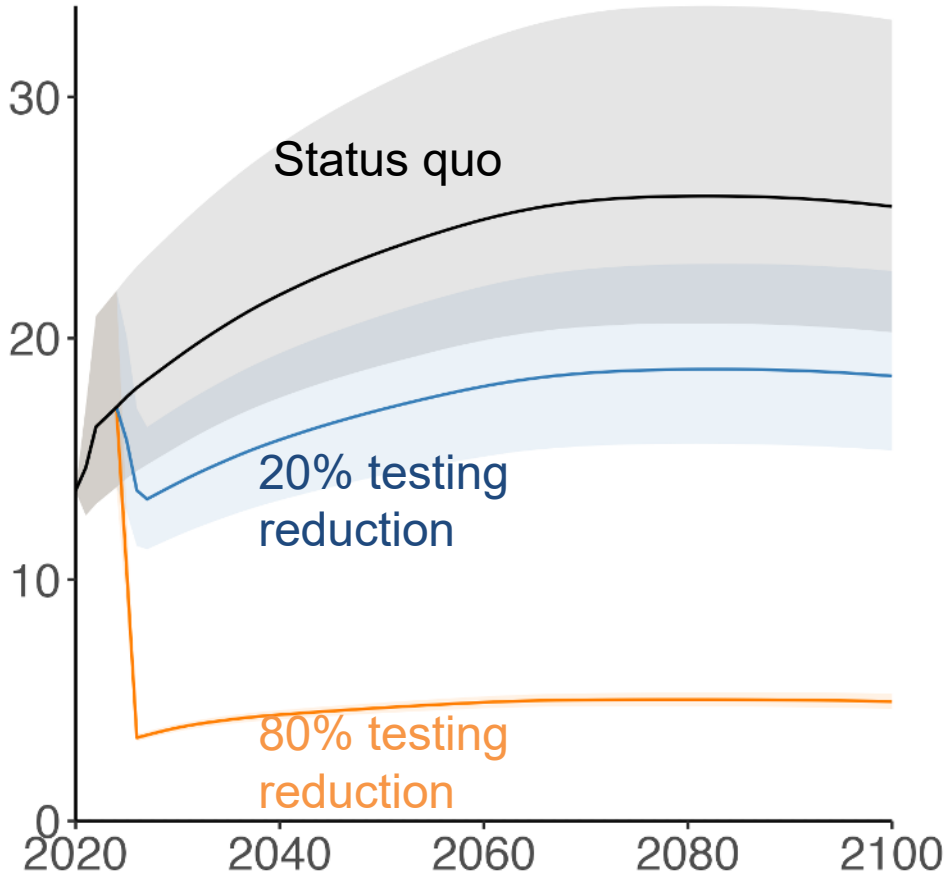


'Status quo' projection

- 40 tests per 100 adults each year (~20 million by 2040)

Thembisa model v4.5; Rautenbach *at al. Lancet Public Health* 2024

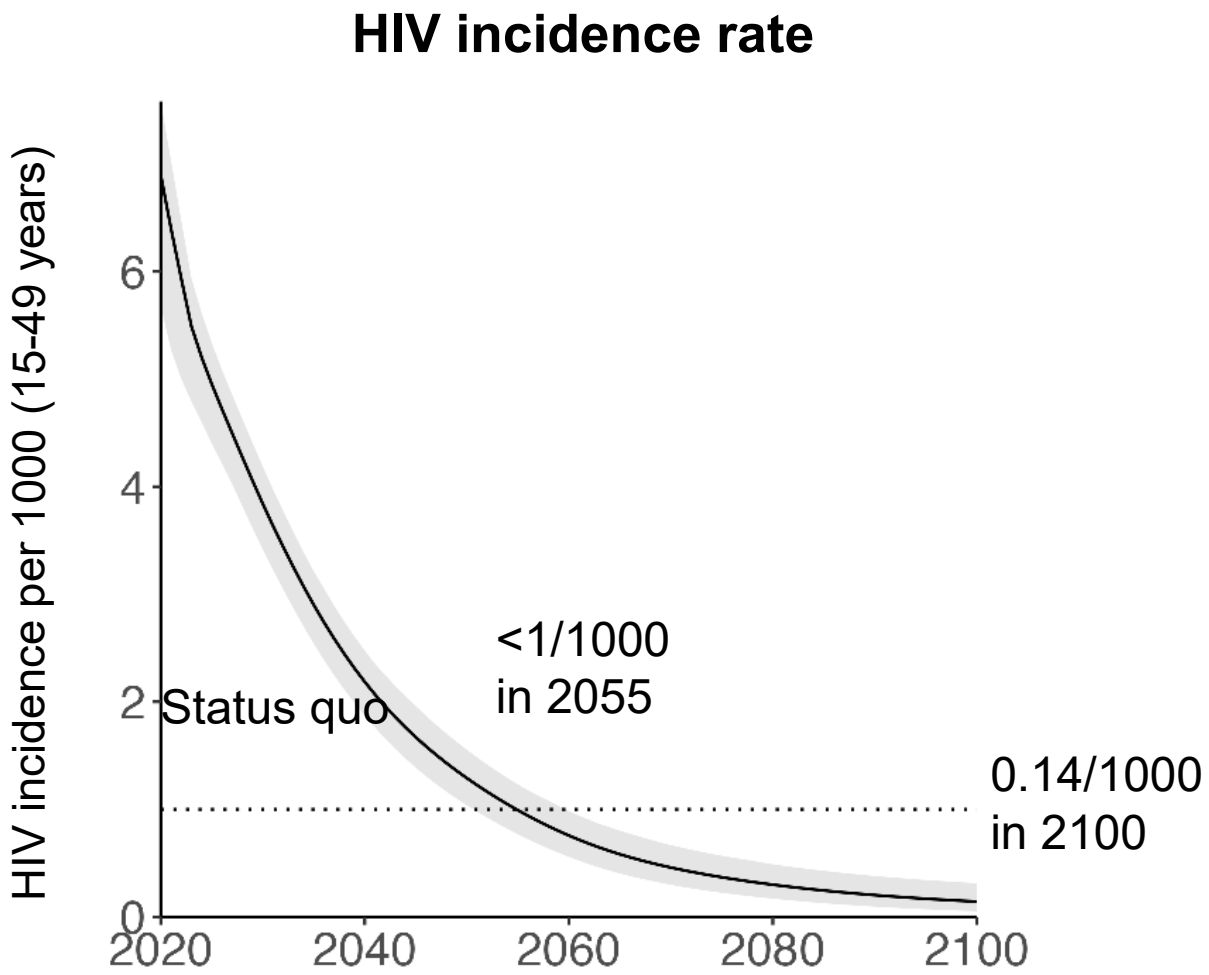
Future HIV testing scenarios



- **Reducing 'general HIV testing' from 2025**
  - 20% reduction in total testing
  - 80% reduction in total testing
- **Maintained ANC, symptom-based, and passive partner notification testing** in all scenarios

Rautenbach *at al. Lancet Public Health* 2024

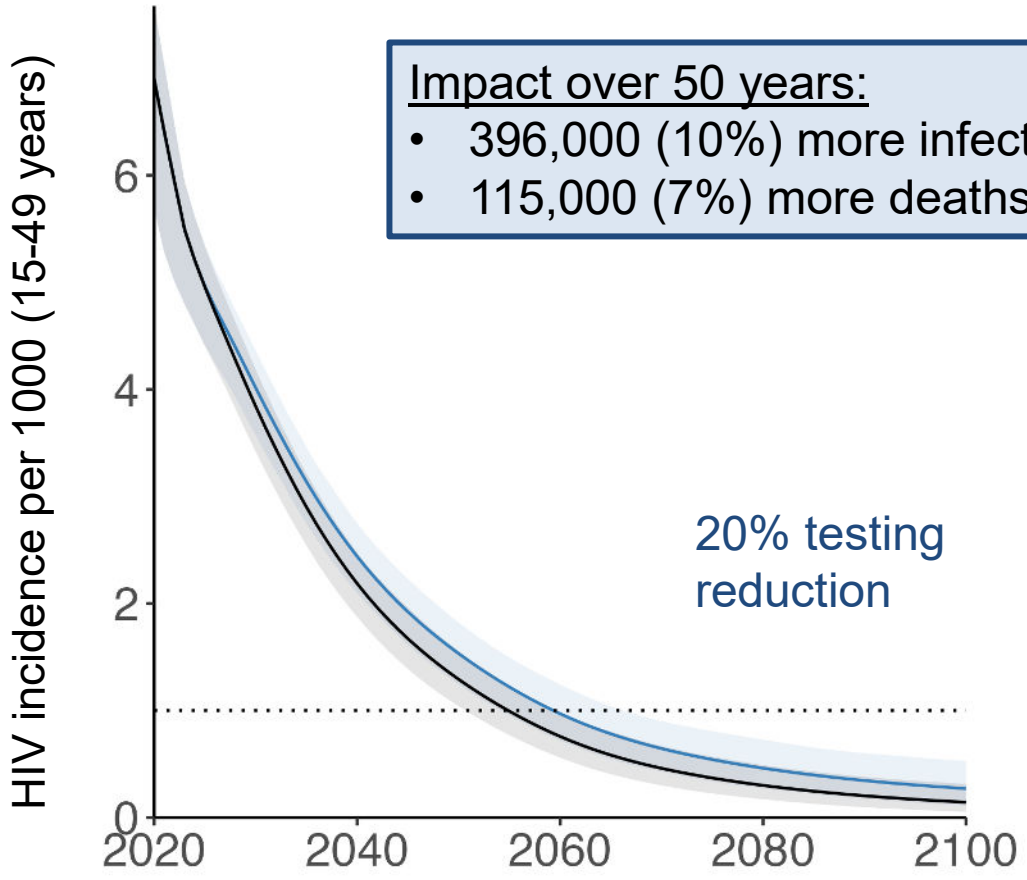
Impacts of HIV testing reduction



Rautenbach *at al. Lancet Public Health* 2024

Impacts of HIV testing reduction

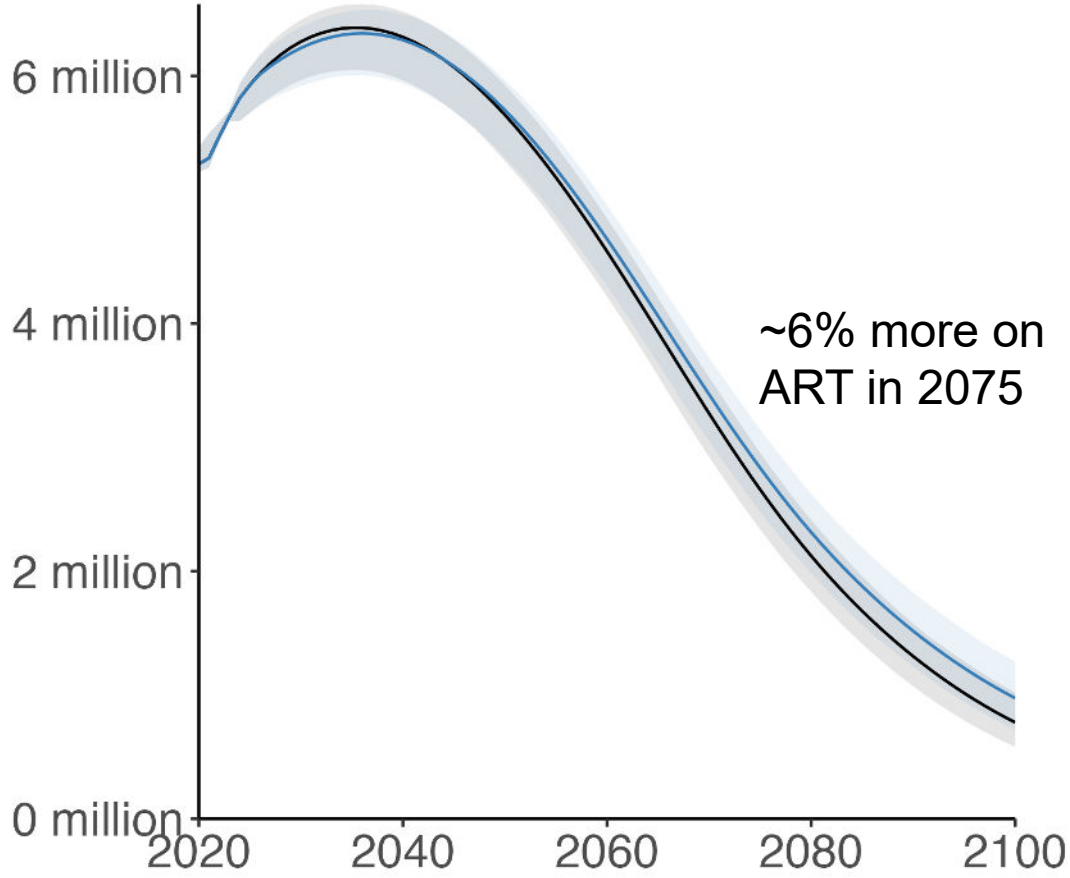
HIV incidence rate



Impact over 50 years:
- 396,000 (10%) more infections
- 115,000 (7%) more deaths

20% testing reduction

Adults on ART

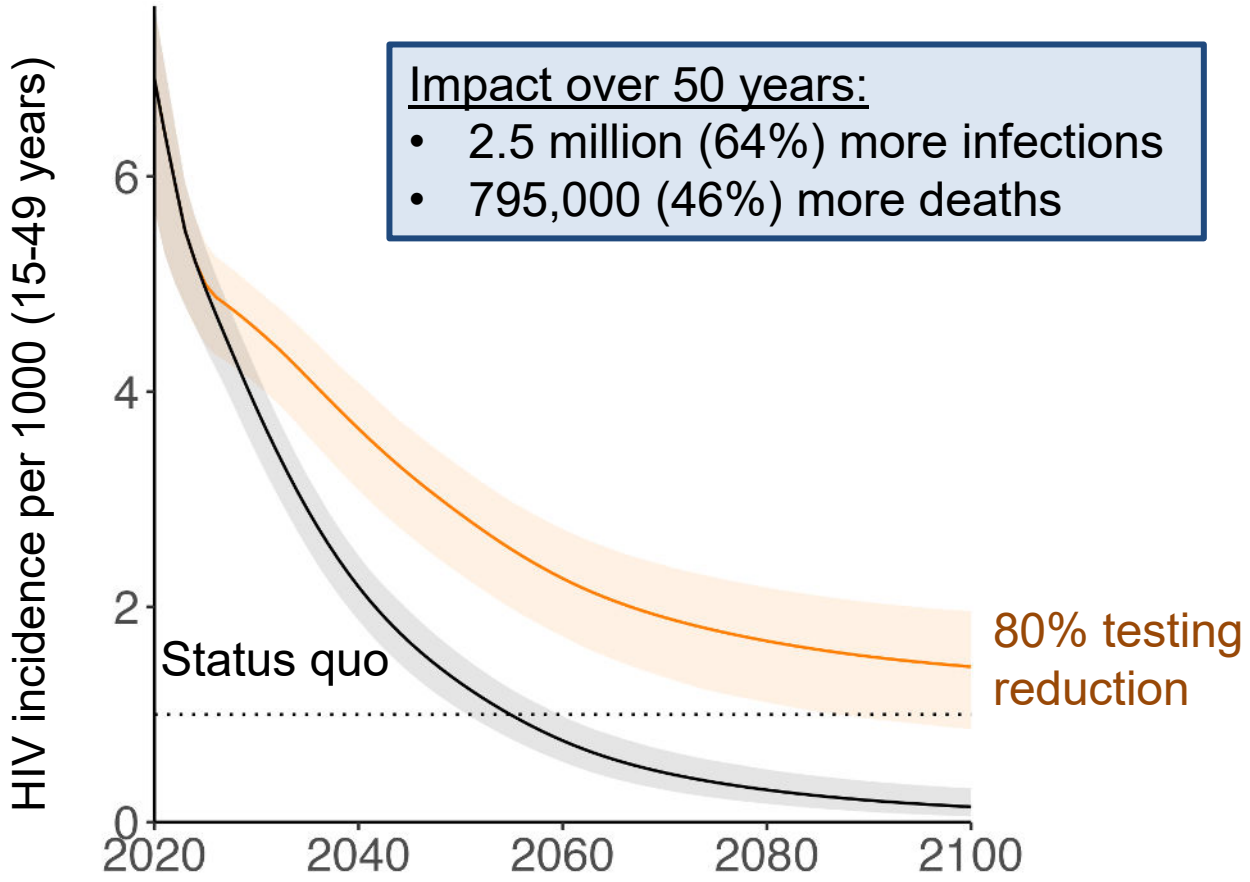


~6% more on ART in 2075

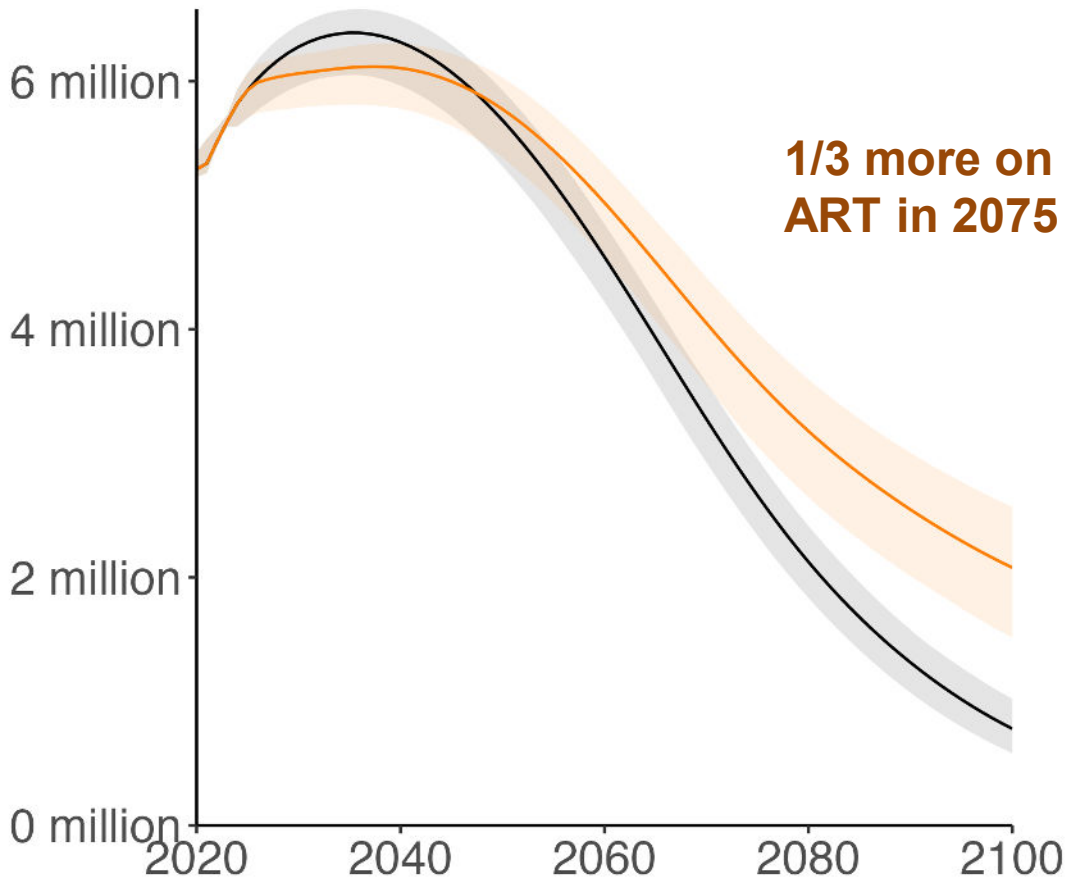
Rautenbach *at al. Lancet Public Health* 2024

Impacts of HIV testing reduction

HIV incidence rate



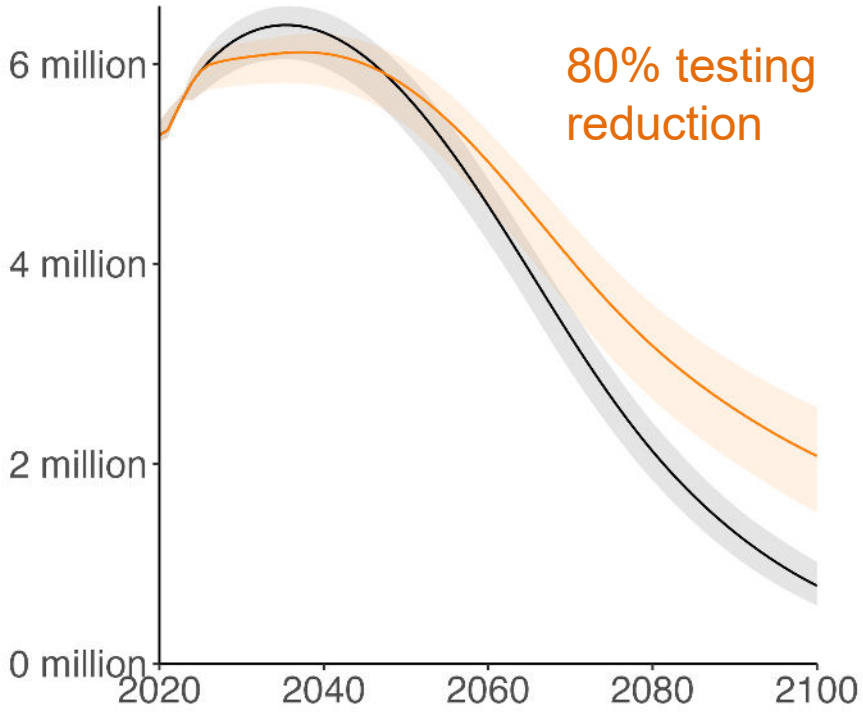
Adults on ART



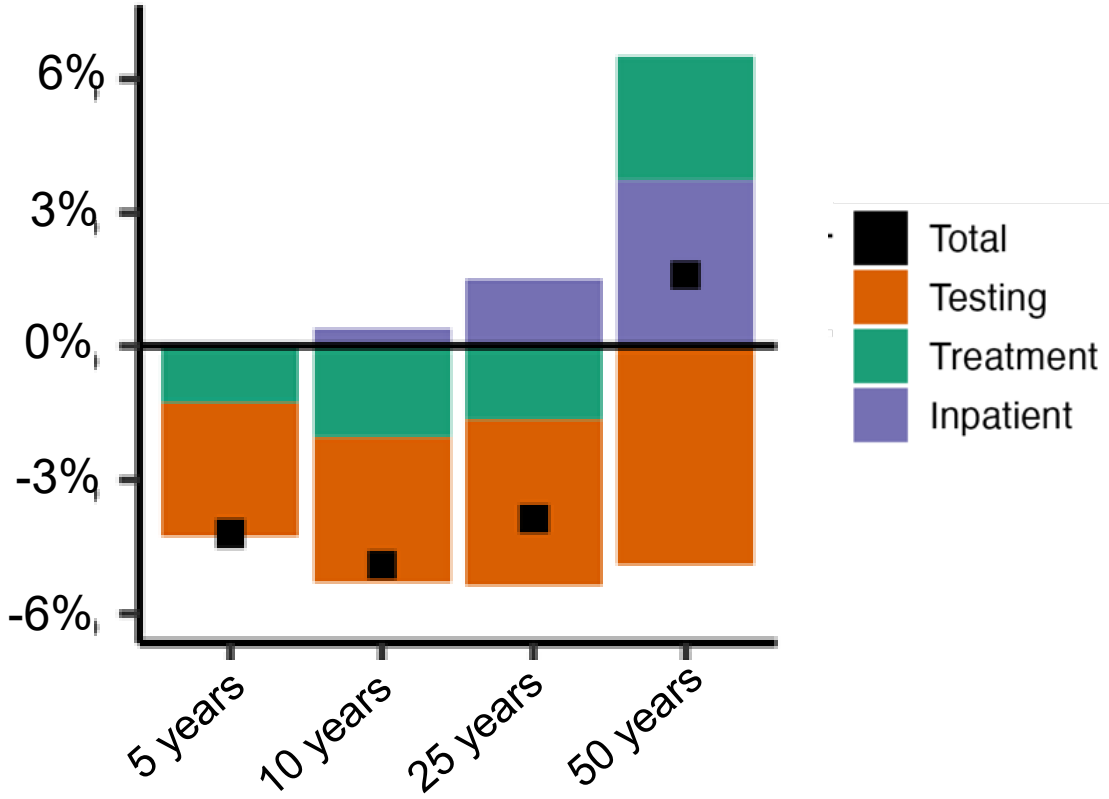
Rautenbach *at al. Lancet Public Health* 2024

Modest Short-term health resources savings from scaling-back HIV testing, but higher long-term costs

Adults on ART



Difference in cumulative costs vs. baseline



Rautenbach *at al. Lancet Public Health* 2024

HIV testing to sustain epidemic control

1. Shift focus from 'proportion aware' (first 95) to **short time from infection to diagnosis** [or re-diagnosis]

2. Think **long-term:** need to continue *rapidly* diagnosing & re-diagnosing a *smaller and smaller* number of people newly acquiring HIV
   - **Easy access** to HIV testing for anyone who wants it

3. Focus **frequent testing among those at elevated risk** of transmitting HIV infection

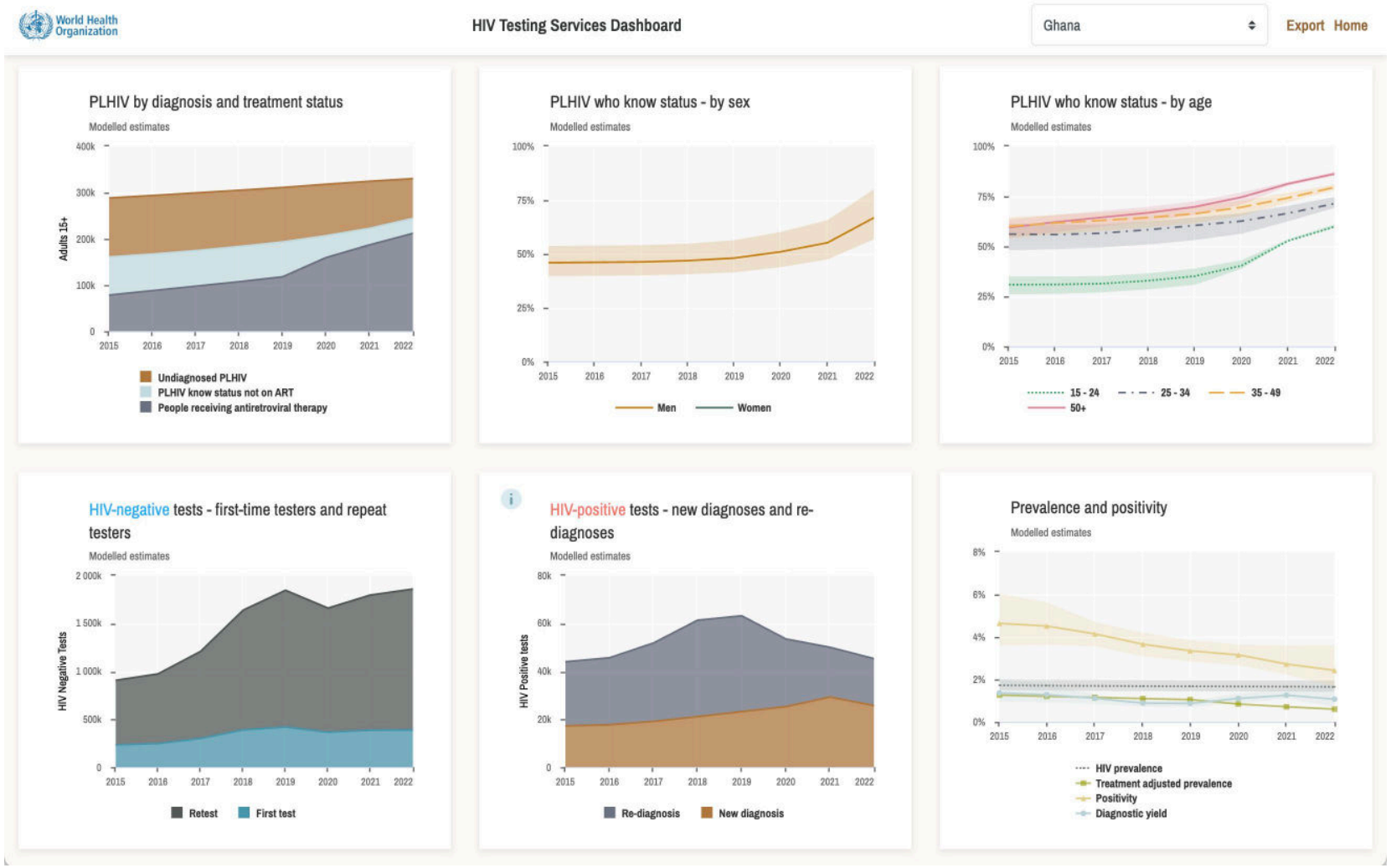
- Reach and maintain **low and declining positivity** among populations at risk
  - Monitor **universal testing at key entry points**: ANC, STI, outpatient, inpatient, PrEP

Are we testing enough people?

- Indicators to identify groups that need more testing:
  - **High positivity** or stagnant positivity among at risk populations
  - High percentage of **diagnoses with advanced HIV disease**
  - Among those newly diagnosed: **high percentage tested for the first time**, or last tested many years ago

5. Tools to support planning

WHO HIV Testing Dashboards

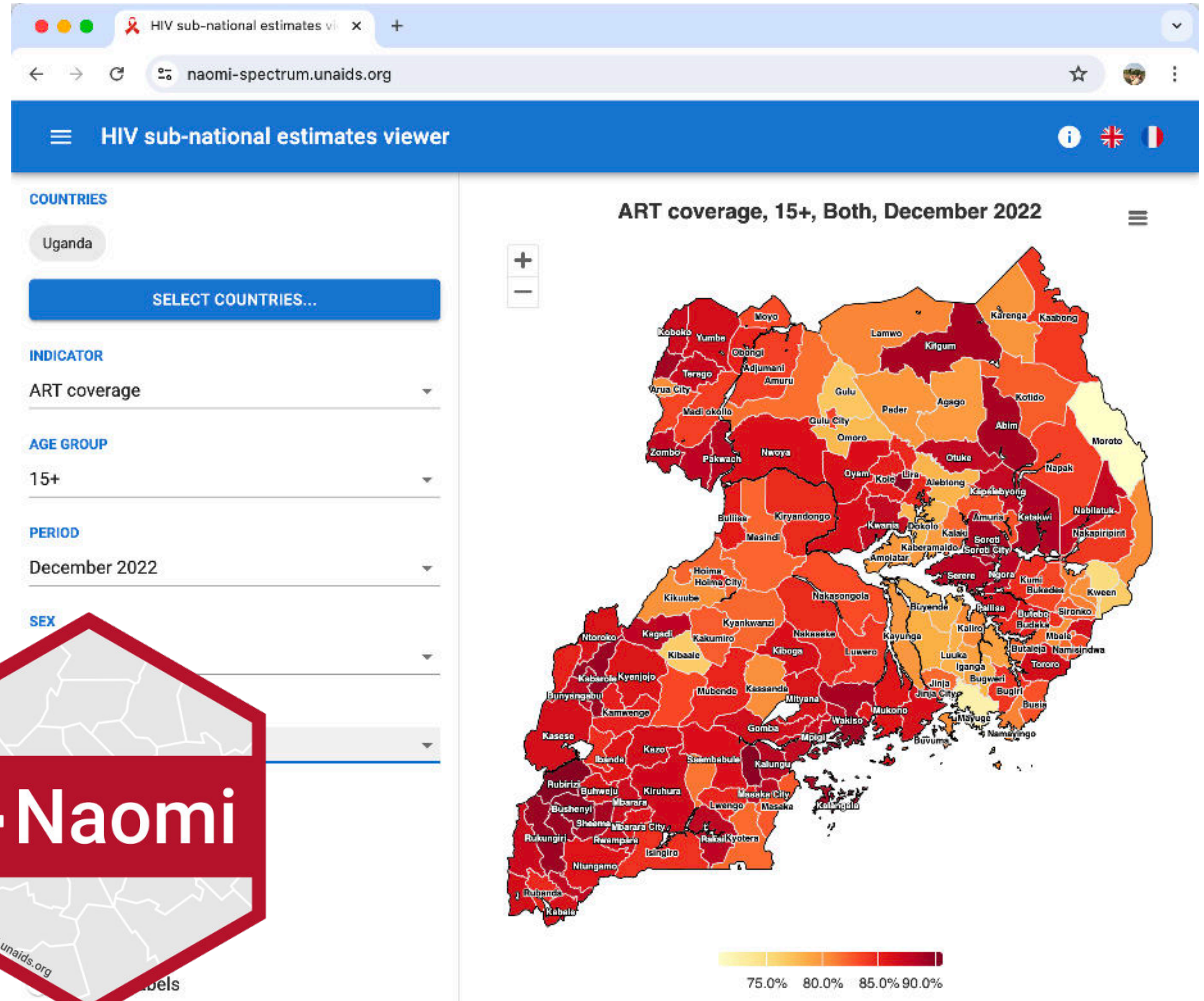


- HIV testing data and modelled estimates submitted to UNAIDS and WHO

❖ First 95 progress
❖ Positivity (yield)
❖ New diagnoses / re-diagnoses

https://whohts.web.app/

District HIV Estimates — UNAIDS Naomi model

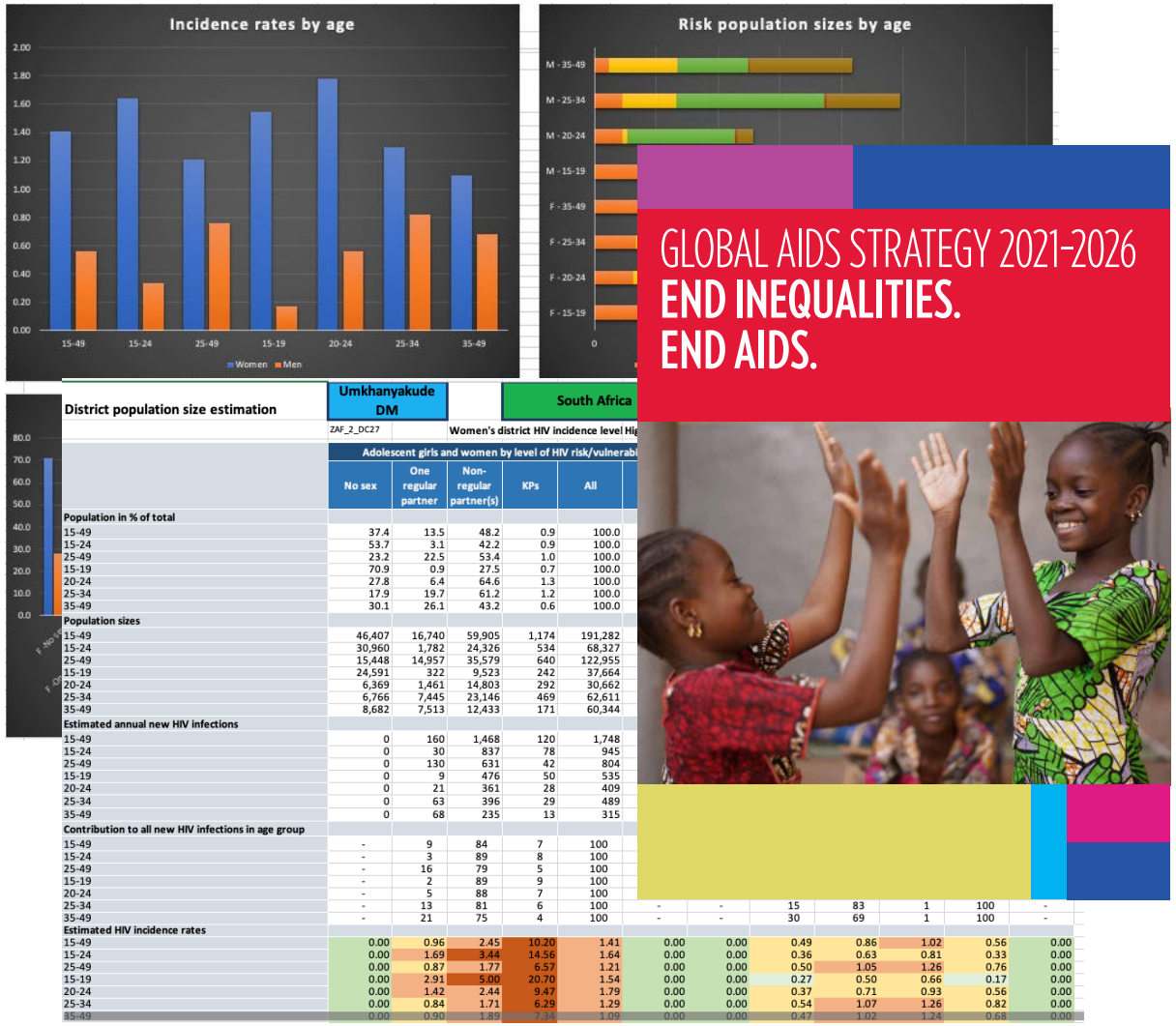


- District level estimates for:
  - HIV prevalence & PLHIV
  - ART coverage, **untreated population**
  - New HIV infections
- By district, sex, age group

- Updated annually by national HIV estimates team

https://naomi-spectrum.unaids.org/

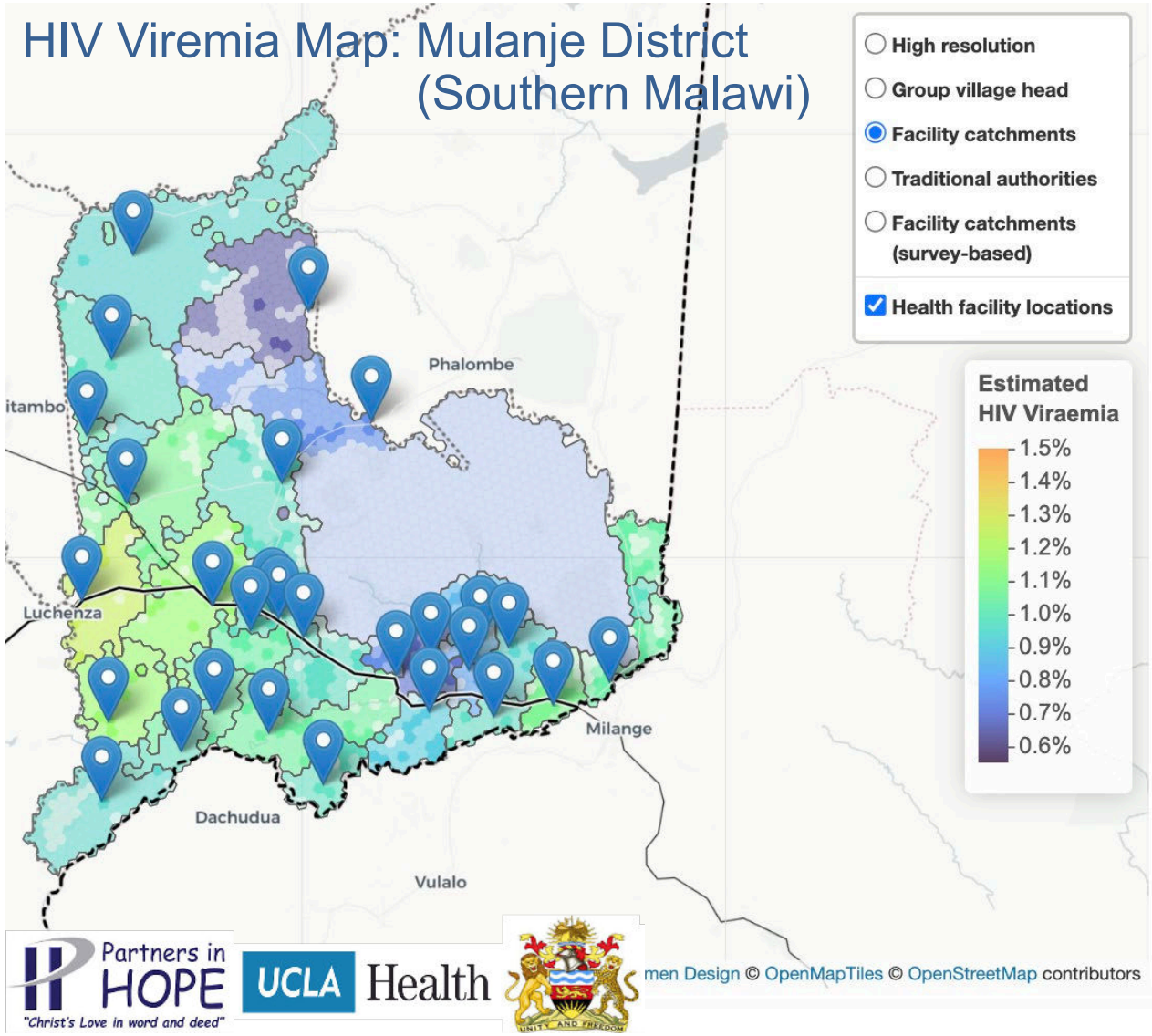
SHIPP Tool (UNAIDS / Global Fund)



"Subnational HIV estimates In Priority Populations" (SHIPP)

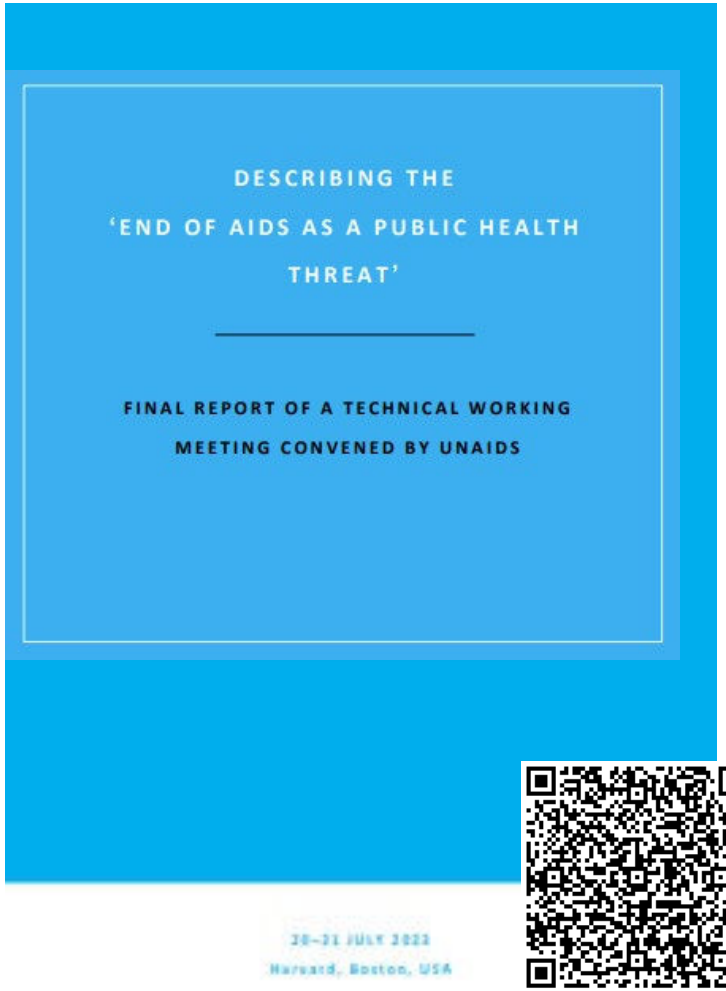
- Excel workbook tool to support programme planning and prioritization
  - Aligned to population stratifications set out in Global AIDS Strategy 2021-2026
- Stratifies **population size** and **new infections** by
  - District
  - Sex
  - Age group
  - **Risk population** (key population, non-regular partners, cohabiting, not sexually active)

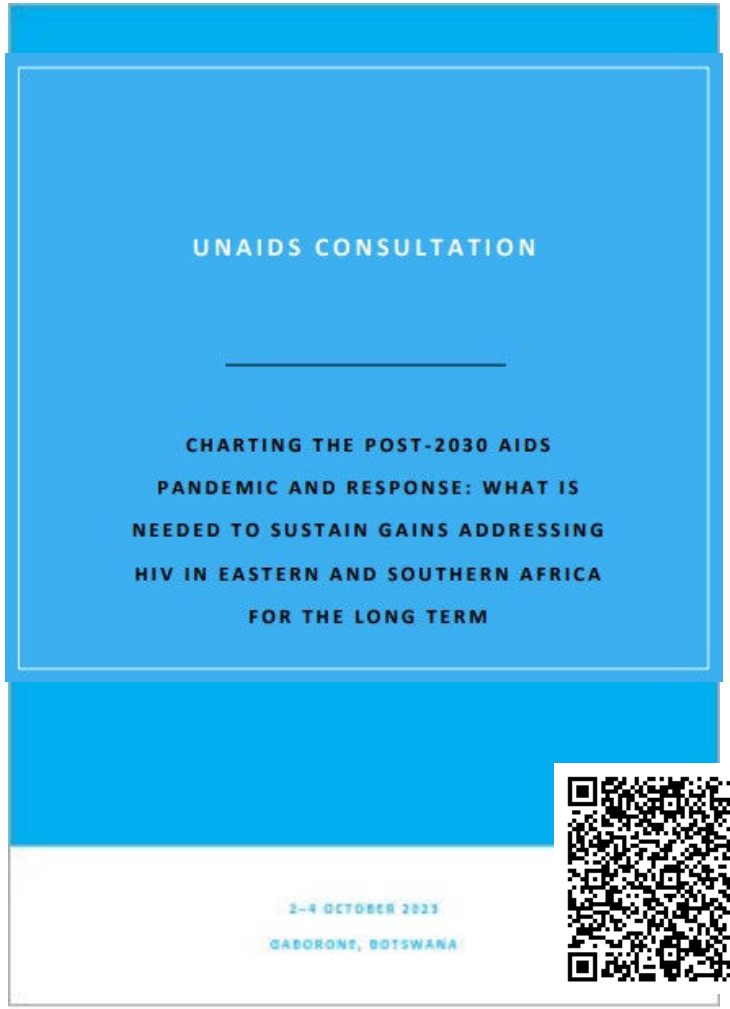
Community-level geospatial mapping



- Focus on locations with high **<u>prevalence of population viraemia</u>**
  - Combine mapping of (1) HIV prevalence, (2) ART coverage, (3) VL suppression
- Integrate multiple data sources:
  - Household surveys (PHIA, DHS)
  - Health facility routine ANC testing
- Overlay with community characteristics

UNAIDS Consultation on HIV projections and transmission dynamics beyond 2030





The HIV response beyond 2030: preparing for decades of sustained HIV epidemic control in eastern and southern Africa

The UN global goal to "end AIDS as a public health threat by 2030"[1,2] has motivated remarkable progress in eastern and southern African countries most affected by HIV. In these countries since 2010, new HIV infections have decreased by an estimated 57% and AIDS-related deaths by 58%.[3] Targeted 90% reductions between 2010 and 2030 are in reach for some countries in eastern and southern Africa that are also on track to attain the UNAIDS 95-95-95 HIV care cascade targets.[4–6]

The 2015 UNAIDS–*Lancet* Commission envisioned "ending AIDS" as achieving disease control, recognising that long-term intervention measures would be needed to maintain the lowered rates of new HIV infections and AIDS-related deaths.[7,8] To sustain HIV epidemic control beyond 2030, countries with high burdens of HIV will need to continue steadily further reducing new HIV infections over coming decades, eventually to below a globally applicable threshold, such as below one new infection per 10 000 HIV-negative population.[9,10] Continued declines in HIV infections are crucial to contain long-term resources required for providing HIV treatment and to avoid risk of resurgent HIV transmission. For countries reaching the UNAIDS 95-95-95 targets, mathematical model projections suggest a further 20% reduction in new HIV infections every 5 years is an ambitious but attainable target to guide prevention strategies.[11,12] Where larger care cascade gaps remain, quickly increasing HIV treatment coverage would rapidly reduce population viraemia, enabling steeper HIV incidence declines.[11–13]

Through a meeting series convened by UNAIDS, the Post-2030 HIV Response Working Group reviewed progress in the HIV response, the evolving nature of the epidemic, how to define long-term epidemic control beyond 2030, and the key programmes, policies, and surveillance required to ensure it is sustained.[9,11] Here, we identify four essential priorities to sustain HIV epidemic control in countries in eastern and southern Africa with large HIV epidemics and successful HIV programmes.[9]

First, effective HIV treatment is the cornerstone of success. Even with continued success in reducing new HIV infections, it is estimated that the 21 million people living with HIV today in eastern and southern Africa will decline only gradually to about 13–17 million people living with HIV by 2050,[9,14] underscoring the need for long-term programmes delivering lifelong antiretroviral therapy. Maintaining extremely high treatment coverage and undetectable viral load is essential for the health of people living with HIV and reducing transmission, representing the powerful alignment of individual and population health outcomes embodied by the U=U (Undetectable=Untransmittable) public health message.[17] Providing antiretroviral therapy will constitute the majority of future resources for HIV programmes. Disruption to supply chains or delivery could precipitate immediate rapid rises in AIDS-related deaths and new HIV infections,[18] while deterioration in HIV treatment continuation or effectiveness at durable viral suppression, for example through increasing drug resistance, risks slowing declines in HIV incidence and thereby increasing future resource requirements for HIV care and treatment.[19]

Second, it is also important to ensure timely HIV diagnosis. HIV testing programmes should transition focus from the proportion of HIV positive people aware of their status in the 95-95-95 targets to ensuring short time to diagnosis which enables rapid viral suppression. HIV testing is fairly inexpensive and should be easily accessible to anyone, increasingly through self-testing,[20] with frequent testing encouraged among people with increased risk of exposure to HIV acquisition.

Third, HIV prevention approaches need to adapt with evolving individual needs and preferences to ensure continued use of prevention methods at levels that keep HIV infections low. The diffuse nature of HIV transmission in contemporary African HIV epid necessitates strategies that engage large popu with moderate HIV risk in effective, easily acc and affordable prevention options, such as condoms and voluntary medical male circum People with increased exposure to HIV acqu including some young people, need more int prevention choices, such as pre-exposure proph Deterioration in HIV testing or prevention thr epidemic control through decelerating or stalli incidence declines,[19] which would be expected t become apparent 5–10 years later.

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