World Health Organization

WHO update for rapid test and self-testing guidelines for HIV and STIs

Cheryl Johnson on behalf of global team

WHO, Global HIV, Hepatitis and STI Programmes

Joint UNICEF, UNFPA and WHO meeting with manufacturers and suppliers – 30 November 2022

Outline

- Background

- Key developments, policy updates and priorities
  - Rapid testing
  - Self-testing & self-sampling

- Way forward: Summary
  - HIV
  - STI

In vitro diagnostic medical devices (IVDs) for testing services

1 Rapid diagnostic tests

Steps: Minimal
Results: 1-20 min, same day results
Specimen: Fingerprick blood & oral fluid

Throughput: 5-10 per 5-15 min
Price per test: ~$0.82-$5.00
Performance: WHO PQ standards across HIV, STIs, Hepatitis
Where: Virtually anywhere (PHC & Community level, as well as higher level facilities and labs)
Who: Virtually anyone (trained lay providers, HCW, lab techs etc)
Storage: Generally no electricity or refrigeration needs

2 Self-test

Steps: Minimal
Results: 1-20 min, same day results
Specimen: Fingerprick blood & oral fluid

Throughput: Vast, but variable by distribution approach
Price per test: ~$1.00-5.00
Performance: WHO PQ standards across HIV, STIs, Hepatitis
Where: Virtually anywhere (PHC & community level etc)
Who: Most anyone (videos/demonstrations can help users)
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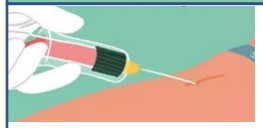
3 Other simple assays & Immunoassays



Steps: Moderate to complex
Results: ~30 min–3hrs, turnaround time varies by setting generally next day
Specimen: Serum, plasma

Throughput: 9 per 15-30 min to 90 per hr (varies with batching)
Price per test: Variable (>$1.00)
Performance: WHO PQ standards across HIV, STIs, Hepatitis
Where: Health facilities (some PHC, but mostly higher level facilities and labs as some assays need automation
Who: Trained facility staff and lab techs only etc
Storage: Electricity and refrigeration needs

4 Nucleic acid techniques (NAT)

Steps: Moderate to Complex
Results: ~1hrs–4hrs, turnaround up to 35 days (varies by setting), turnaround time not same day
Specimen: Plasma & DBS (RNA and TNA)

Throughput: Widely variable by device (8-384 per 8hr shift)
Price per test: $8-25 (not including $$$ device)
Performance: Data must support Mx claim (%PA)
Where: Health facilities (some PHC, higher level facilities & labs
Who: Trained facility staff and lab techs only etc)
Storage: Electricity and (mostly) refrigeration needs

Factors for product selection

Operational characteristics for consideration:

- Test purpose (aid for diagnosis, monitoring)
- Specimen type
- Detection type
- Time to result
- Storage and stability
- Staff and skill level
- Equipment and consumables required
- Quality control (internal/external)

Additional considerations

- Aims and population
- Contributing to best algorithm and programme need
- Programme & public health impact
- Implementation and feasibility
- Price and service costs
- Training needs
- Support and supervision

Source: WHO, 2019: https://apps.who.int/iris/bitstream/handle/10665/335902/9789240011809-eng.pdf

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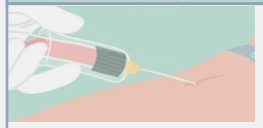

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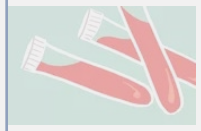

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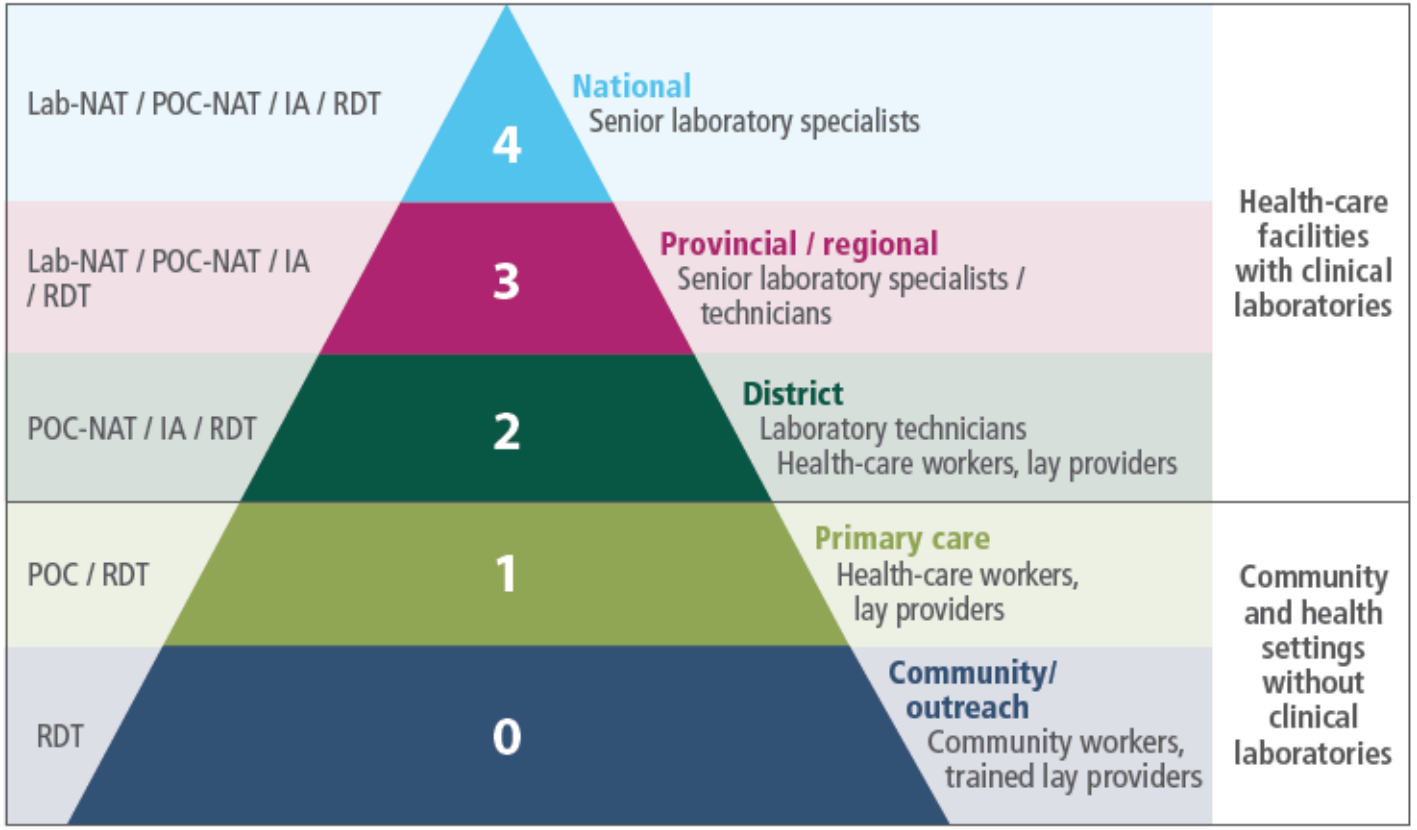
Tiers of testing services

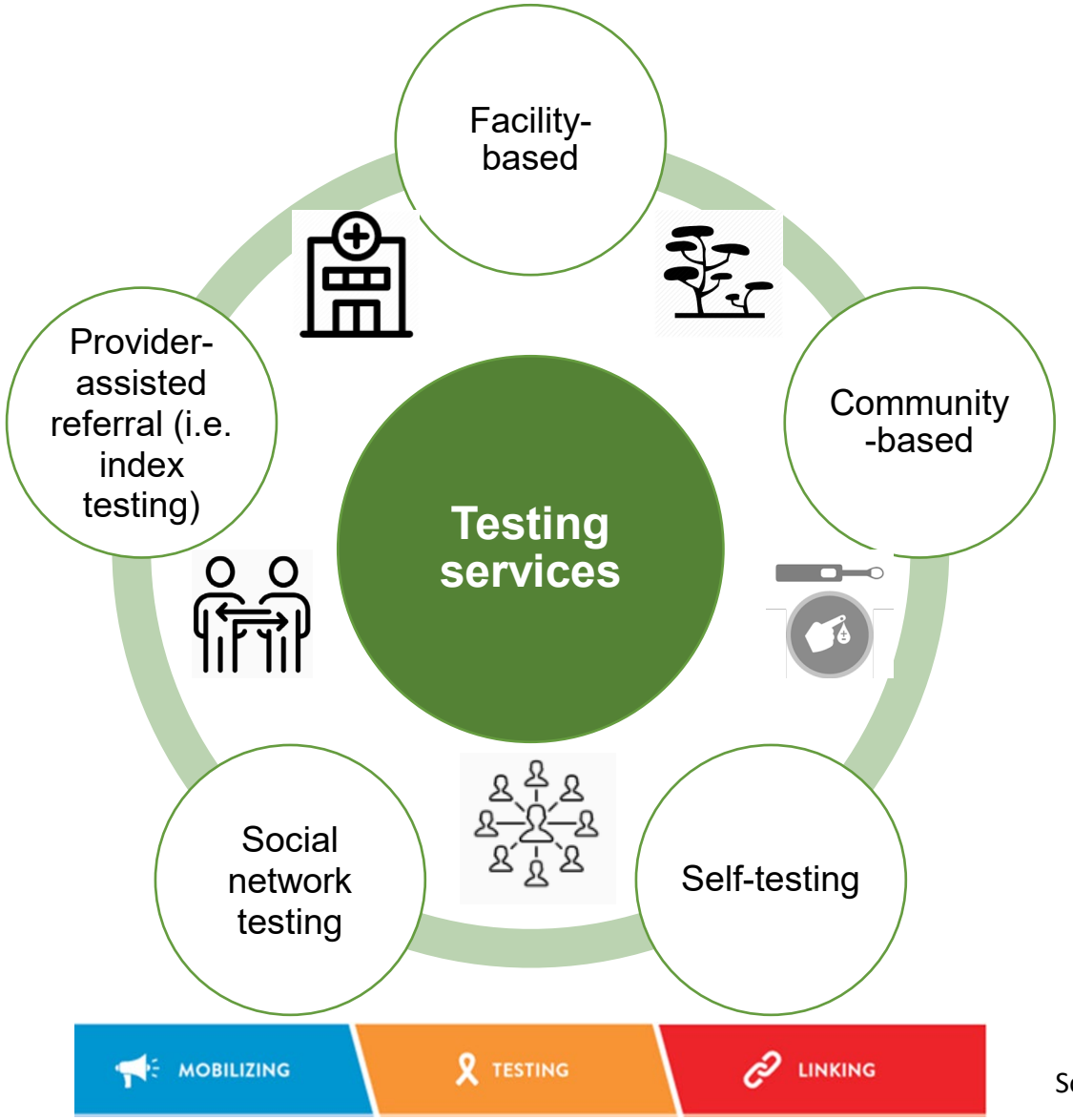


IA: enzyme immunoassay; Lab-NAT: laboratory-based nucleic acid testing; POC-NAT: nucleic acid testing at point-of-care; RDT: rapid diagnostic test, including HIV self-testing.

+95% of all HIV testing worldwide is done at level 0 or 1 (health centres & community)

RDTs (including self-tests) are most commonly used test for HIV and an increasingly important tool for STIs and viral hepatitis

Understanding testing services: a cross-cutting programme perspective



- **Different purposes for testing**
  - **Case-finding focused testing**: Implementation focused on reaching undiagnosed PLHIV and facilitating linkage to care. Generally, includes specific targeted.
  - **Prevention focused testing**: Ensuring those people stay negative and identifying HIV early in those with high ongoing risk. Core services e.g. PMTCT/ANC, VMMC, PrEP, AGYW, KP services
  - Aim is to achieve a strategic mix that is person-centered and contributes to larger treatment and prevention goals.

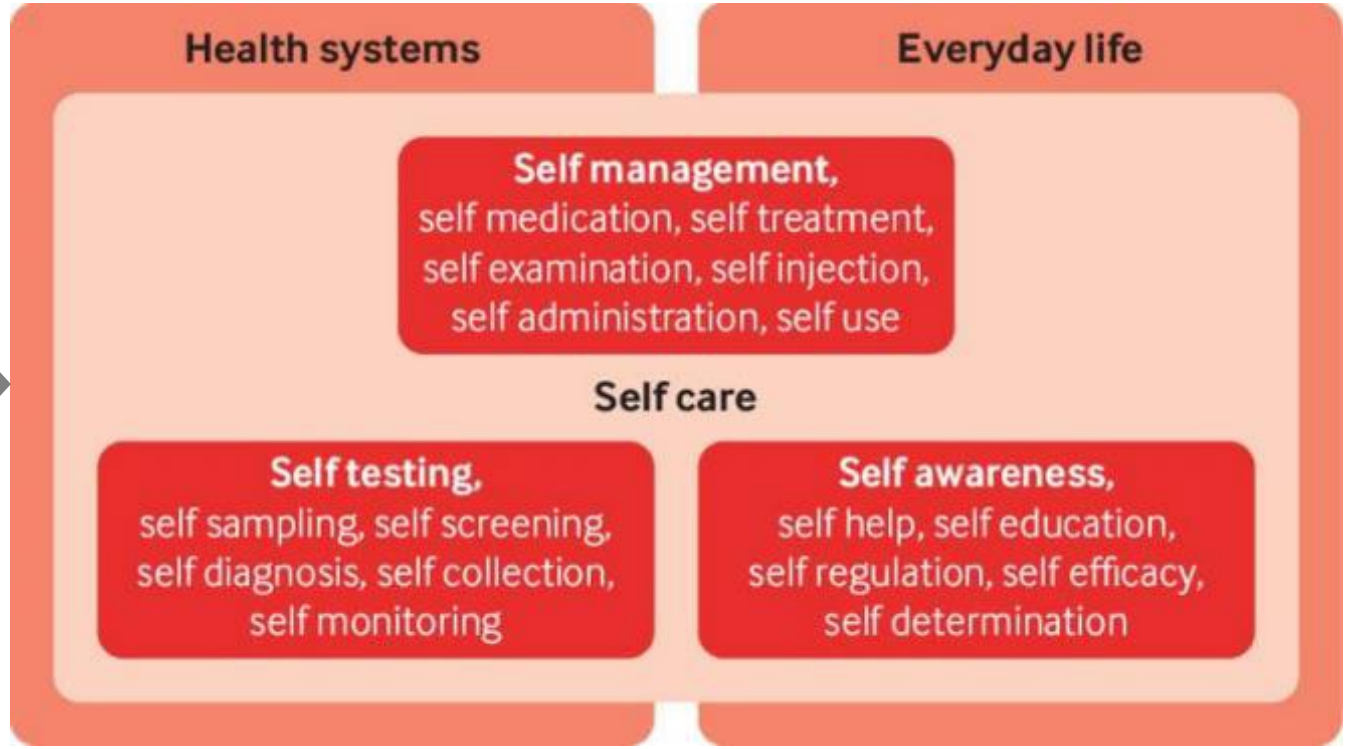
- **Different scale and providers**
  - Diagnosis with rapid tests and includes range of cadres often lay providers, community workers as well as self-testing and self-sampling
  - Testing providers have many tasks including mobilizing, testing, linking; often integrating work with other disease
  - Testing sites vary widely (mobile & fixed, big & small, high & low throughput). In some settings testing in ANC/PHC settings and lower-level sites without clinical labs and limited staff capacity

Source: WHO, https://www.who.int/publications/i/item/978-92-4-155058-1

Self-care and self-testing

Self-care

The ability of individuals to promote health, prevent disease, maintain health, and cope with illness and disability with or without support of a healthcare provider.



Source: WHO, 2019, https://www.who.int/reproductivehealth/self-care-interventions/access-health-services/en/

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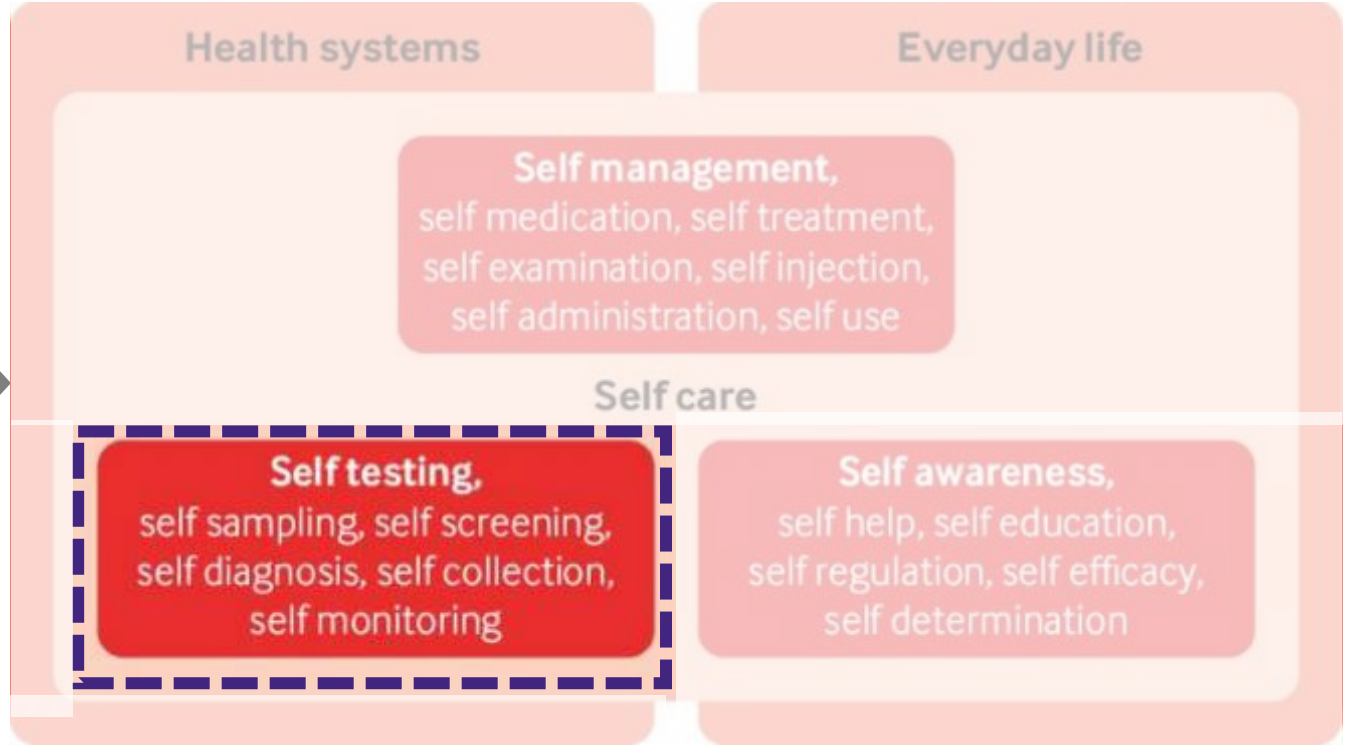

Source: WHO, 2019, https://www.who.int/reproductivehealth/self-care-interventions/access-health-services/en/

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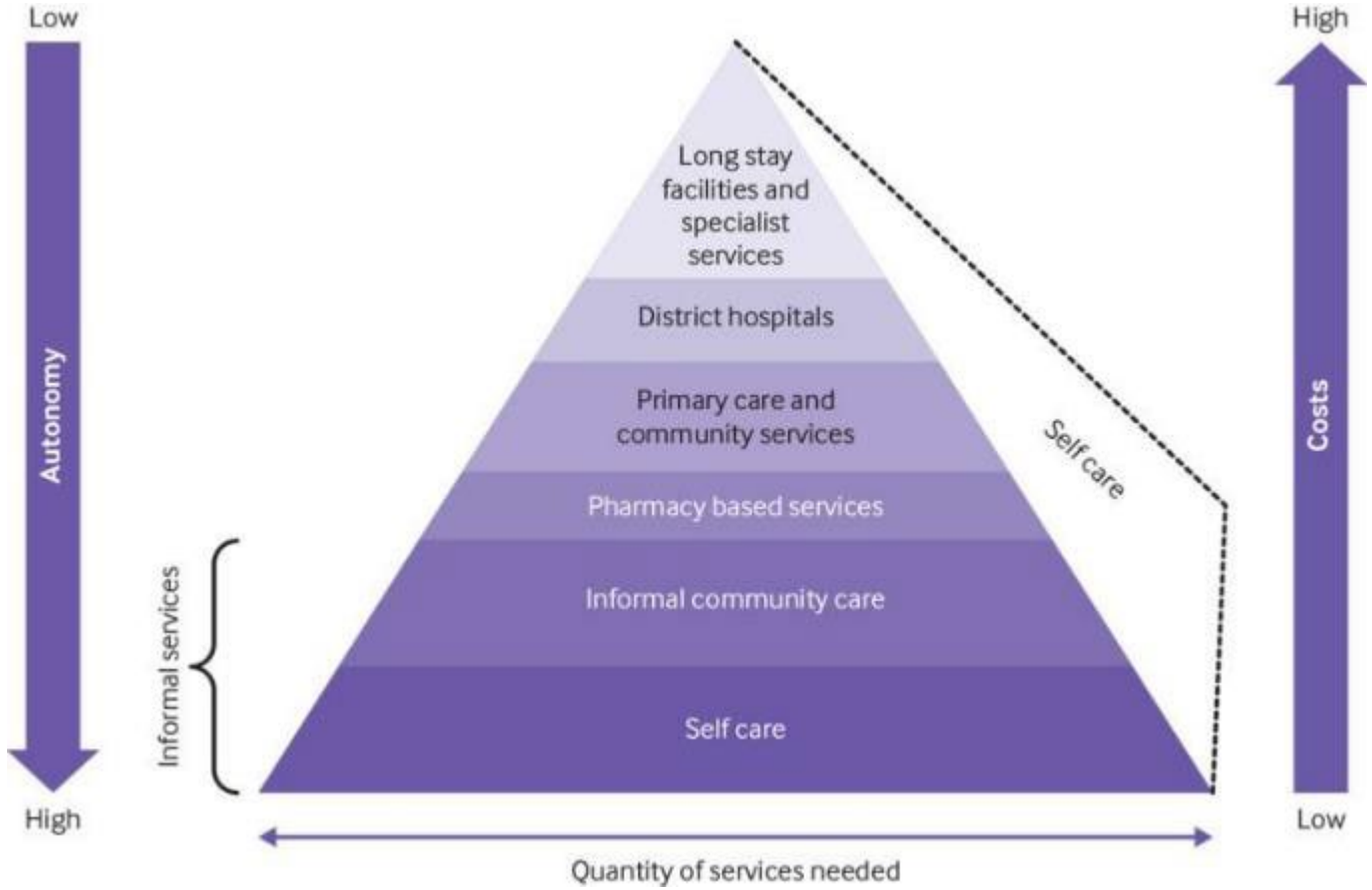
Self-care and self-testing: critical to health system



- Increase engagement and autonomy
- Increase access and equity
- Improve quality of care
- Increase efficiency
- Reduce costs to health system and individuals
- Expand UHC efforts

Source: Remme 2019, https://www.bmj.com/content/365/bmj.l1228

Self-testing Framework

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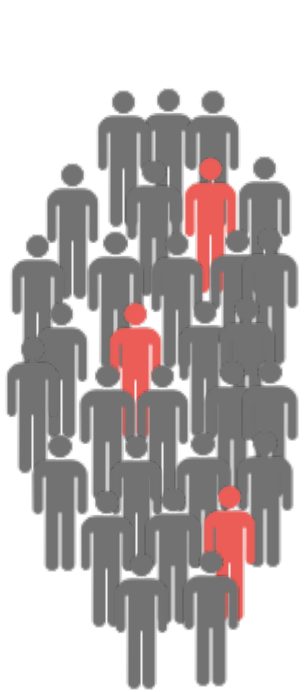
PREPARATION

- Demand generation
- Support package
- Accessible & affordable



Uptake among at-risk groups

DIRECT ACTION

- Link to treatment
- Re-link to Tx
- Disclosure/Shared knowledge of status
- Link to Prevention
- Triaged out of Health System

DIRECTIMPACT

- Health: Reduced Morbidity & Mortality
- Reduced Transmission & Infections Averted
- Cost and Time Savings (Health System & Users)

ADDITIONAL IMPACT

Social & Economic

- Population Productivity & Growth
- Social Benefit Social Harm

Health Systems

- Efficiency
- Expanded Coverage
- Equity of Health

**Adapted framework based on BMGF & UNITAID HIVST Meeting in January 2017*

DIFFERENT POPULATIONS **DIFFERENT CONTEXTS** **DIFFERENT GEOGRAPHIES**

HIV

Rapid testing & Self-testing

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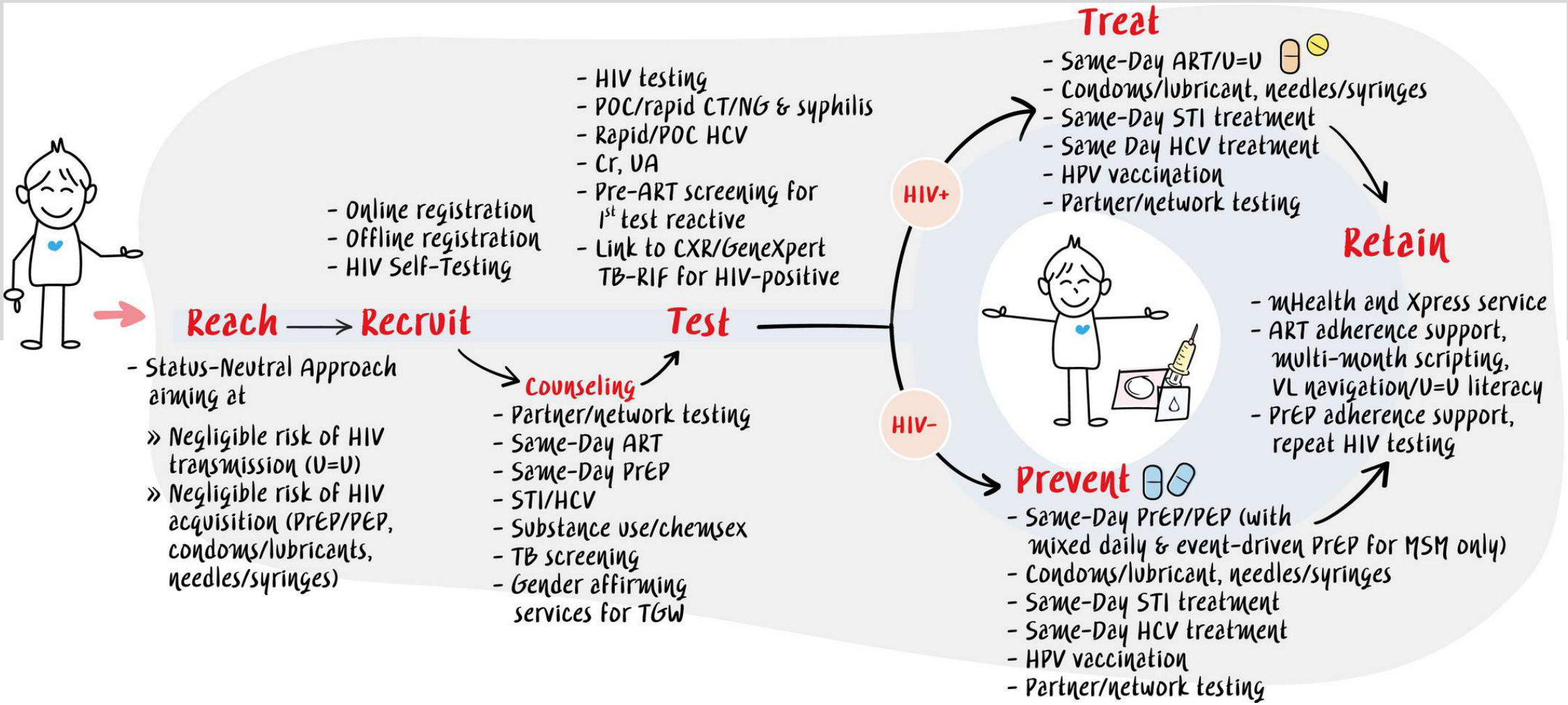
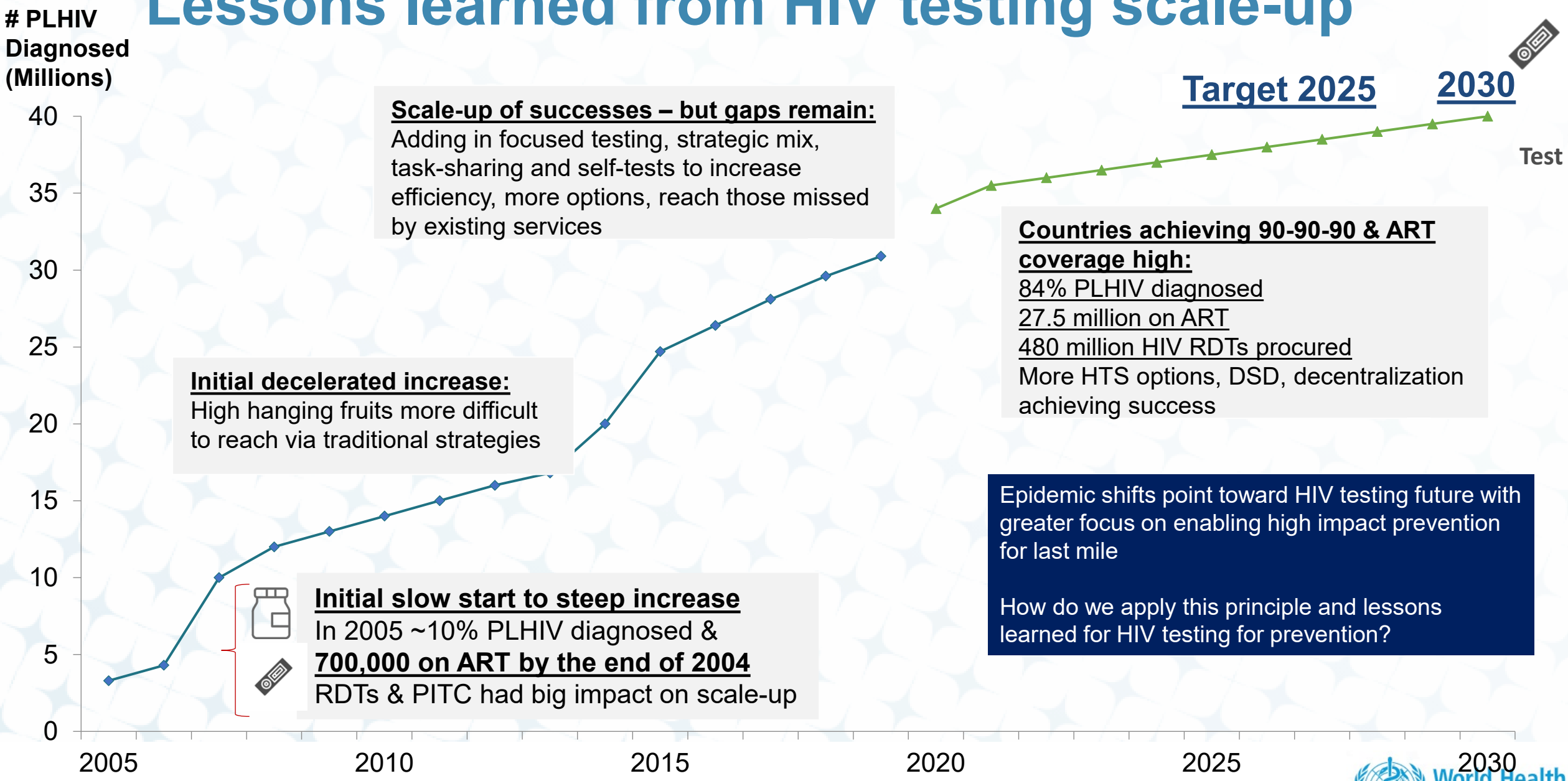
Push toward status neutral testing



Vannakit JIAS 2020: https://bit.ly/2E8oFjL

Lessons learned from HIV testing scale-up



Scale-up of successes – but gaps remain:
Adding in focused testing, strategic mix, task-sharing and self-tests to increase efficiency, more options, reach those missed by existing services

Countries achieving 90-90-90 & ART coverage high:
84% PLHIV diagnosed
27.5 million on ART
480 million HIV RDTs procured
More HTS options, DSD, decentralization achieving success

Initial decelerated increase:
High hanging fruits more difficult to reach via traditional strategies

Initial slow start to steep increase
In 2005 ~10% PLHIV diagnosed &
700,000 on ART by the end of 2004
RDTs & PITC had big impact on scale-up

Epidemic shifts point toward HIV testing future with greater focus on enabling high impact prevention for last mile

How do we apply this principle and lessons learned for HIV testing for prevention?

Source: WHO forecast 2020; UNAIDS 2021; WHO 2005; CHAI 2015; WHO, UNICEF, PEPFAR, GFTAM 2018; GAM reporting 14 October 2020

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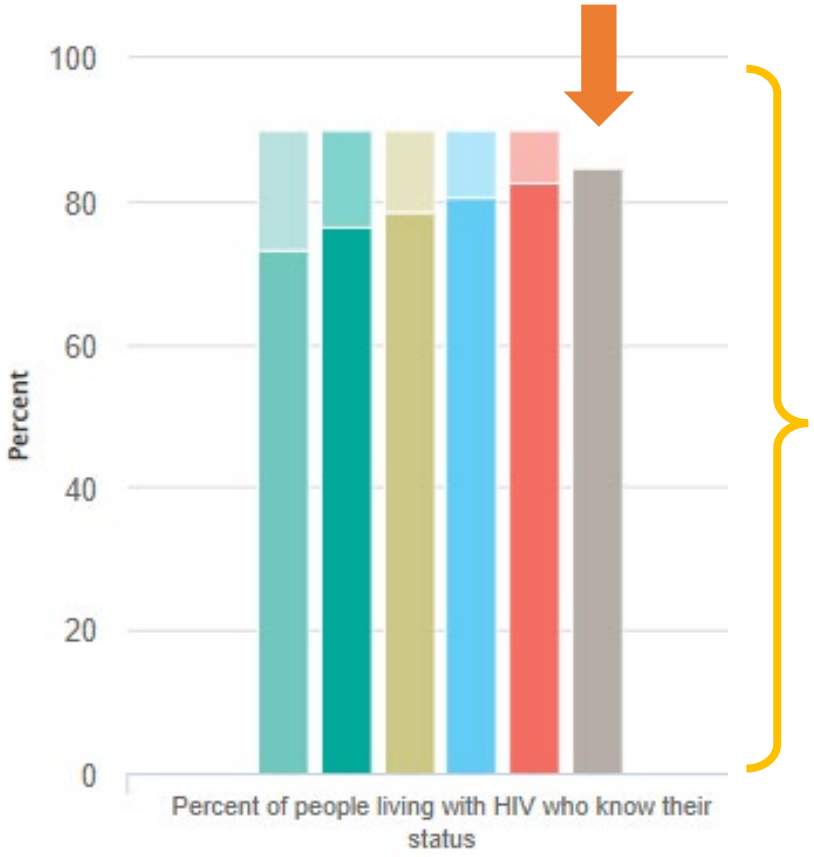
Understanding gap: Who is missing?

15% of all PLHIV remain undiagnosed (UNAIDS 2022)



But large gaps remain and HTS needs to be prioritised to achieve 95-95-95

- **Midlife-older men in ESA**
  - Greatest absolute gap in diagnosis aged 35-49
  - Aged 25-39 highest transmission group
- **Key populations (KP) and their partners/contacts**
- **Adolescents & young people** (age 15-24) incl from KP and in high HIV burden settings
- **FP service** attendees in high HIV burden settings
- **Partners of PLHIV**
- **STI patients**
- **LTFU clients needing re-engagement** (including those affected by COVID-19 disruptions)

~75% of HIV transmission in SSA context driven by those with established infection

Maheu-Giroux 2021: https://www.thelancet.com/journals/lanhiv/article/PIIS2352-3018(20)30315-5/fulltext; Eaton AIDS 2022; Fraser AIDS 2022

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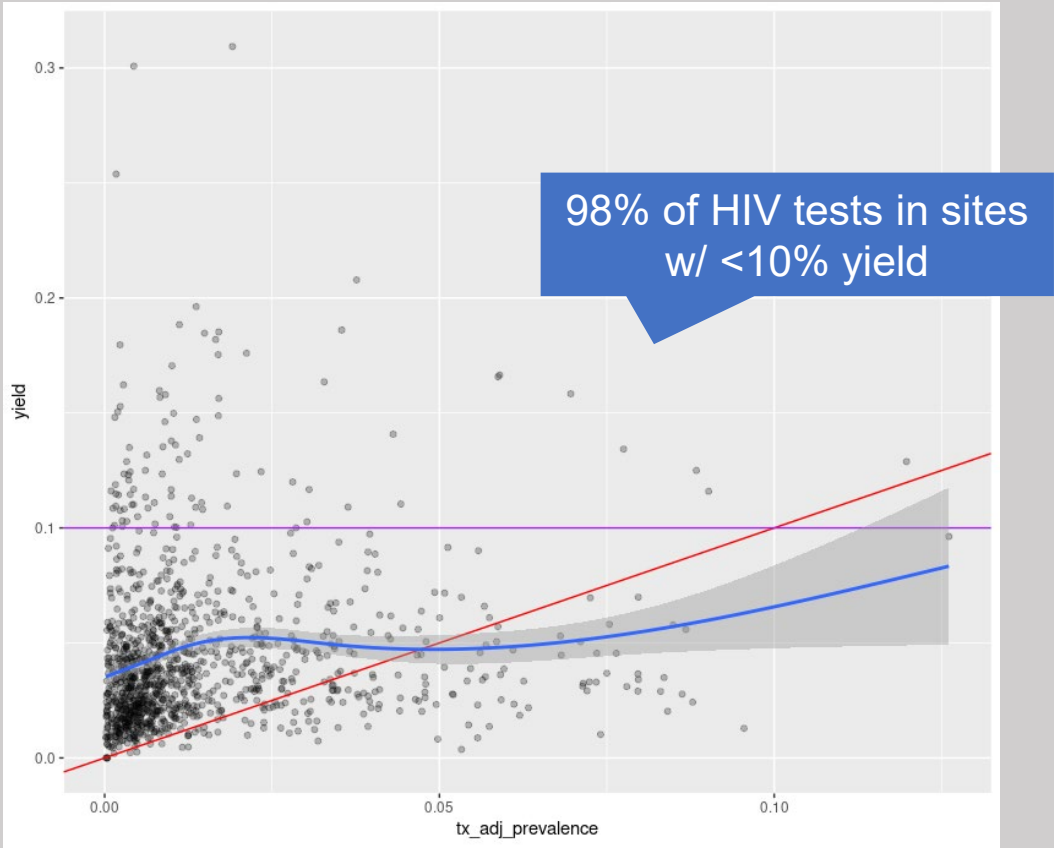
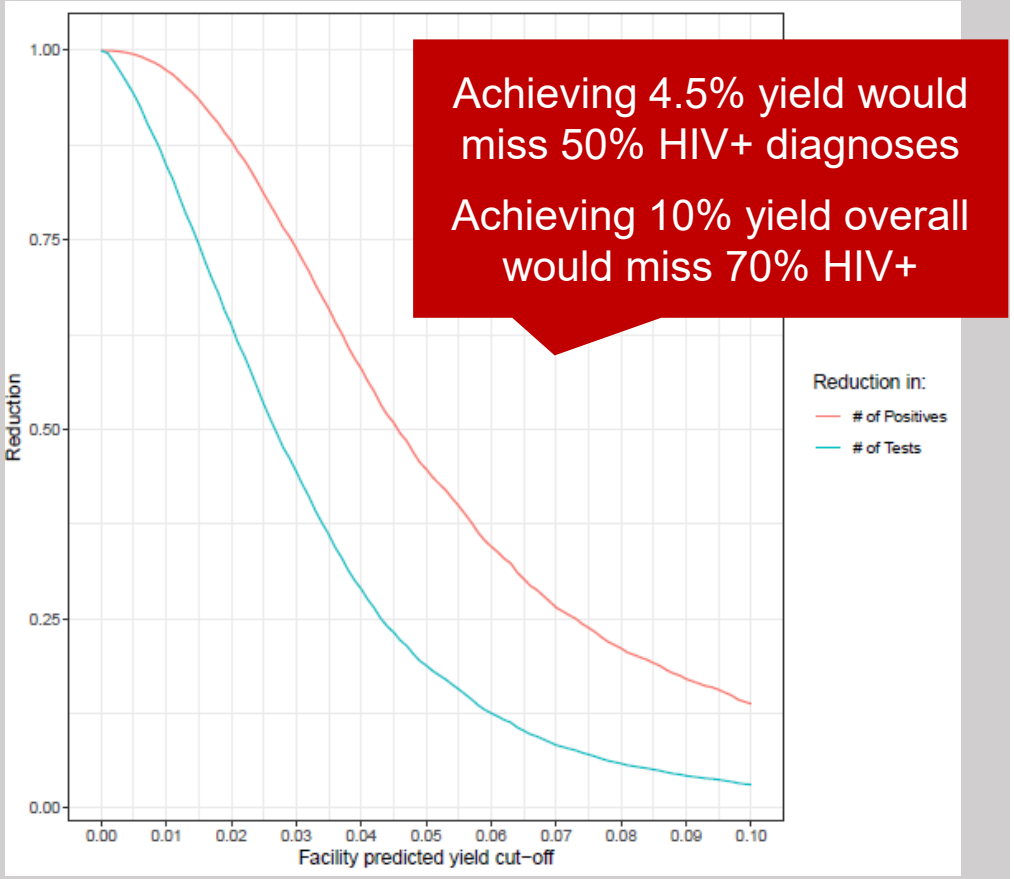
Finding the balance of targeted testing is challenging, and can have significant impact on achieving global goals

Other PITC compared to treatment-adjusted prevalence at sub-national level



Reductions in number of tests and positives based on Other PITC yield targets

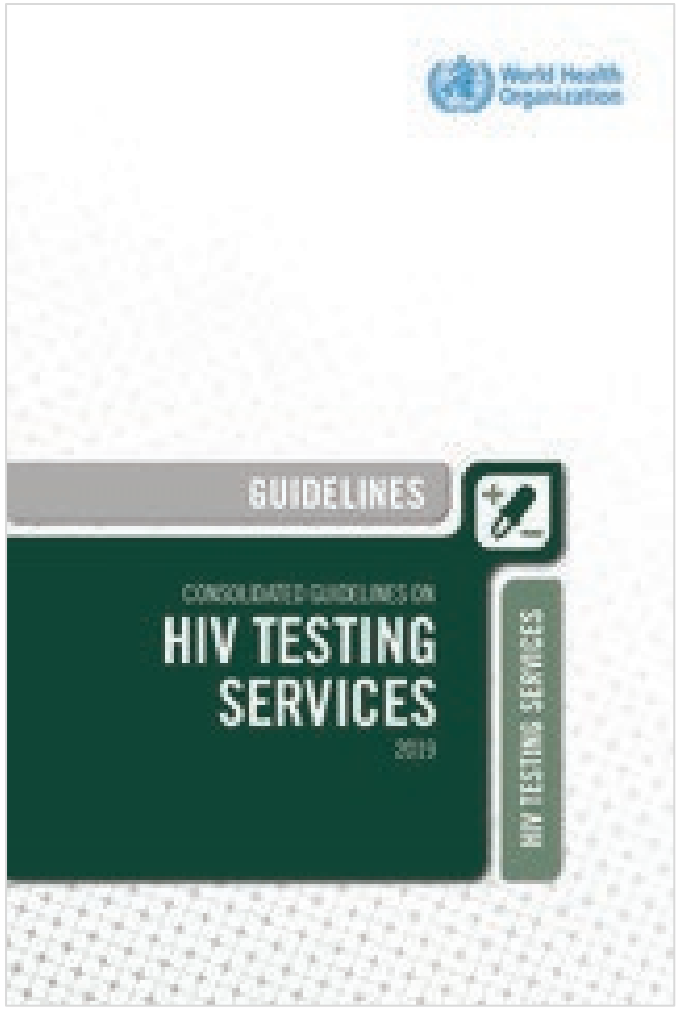


Source: Special analysis sub-set of countries, Oct 2021, Other PITC by SNU2 yield and testing, correspondence Ian Fellow, Jeff Eaton, Ray Shirashi, Stephanie Behel, Rachel Golin, Jessica Rose, Mike Grillo, Mary Mahy, Rachel Baggaley, Cheryl Johnson, Vincent Wong

Importance of maintaining sufficient HTS & PITC coverage in key places

- But be more focused there are clear missed opportunities and ensure does not drop and undermine global goals
- Leading up to and during COVID-19 we learned that reductions in PITC led to reductions in HIV diagnoses and ART initiations
- **Key areas of focus:**
  - Other PITC still critical for achieving global goals
  - Offering testing for all STI clients – often not done even in high HIV burden settings
  - Offering testing for all people with TB esp in high HIV burden settings – usually done but some gaps
  - Offering testing in FP in high burden settings (post ECHO push) – virtually never done - need to find ways to do this (HIVST while waiting could be an easy approach)
  - Opportunities for ethical acceptable partner testing as part of these clinical settings
  - ANC is a given - but in the high incidence settings re-testing including in PN period
  - “Screening in” tools (not screening out) to nudge testing & reduce missed opportunities as well as HIVST

WHO HIV testing guidelines package



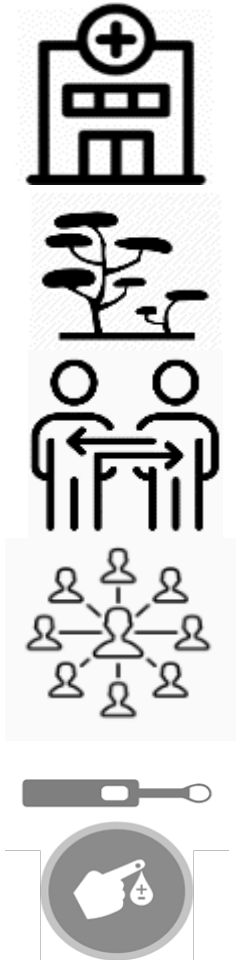
Currently being updated and covering following topics:

- Self-testing new uses
- Recency testing
- Multiplex testing (HIV, HBV, Syph)
- Expanding social network testing approaches beyond KP
- HTS for CAB-LA

https://www.who.int/publications/i/item/978-92-4-155058-1

WHO-recommended HIV testing approaches

HTS is an important gateway to treatment and prevention for individuals, partners, couples and families



Facility-based: Offering HIV testing in a facility, e.g. VCT, in-patient and out-patient clinics, ANC, **TB**, **STI**, **family planning/contraceptive services**
Community-based: Offering HIV testing in natural setting of the community, e.g. outreach, CBOs, workplace, clubs, bars.
Provider-assisted referral (i.e. index testing or assisted partner notification): Assisting individuals with HIV by contacting their sexual and/or drug injecting partners and offering them HIV testing services; and offering HIV testing to biological children.
Social network-based approaches: whereby key populations offer HTS to their social, sexual and drug injecting partners at risk of HIV. Includes HIV+ and HIV- key populations
HIV self-testing: Offering self-test kit for individual, and/or their partner, enabling them to collect their sample (oral or blood), perform test, and interpret results in private. All reactive results need confirmation.

Source: WHO 2019

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Adapting National HIV Testing Algorithms

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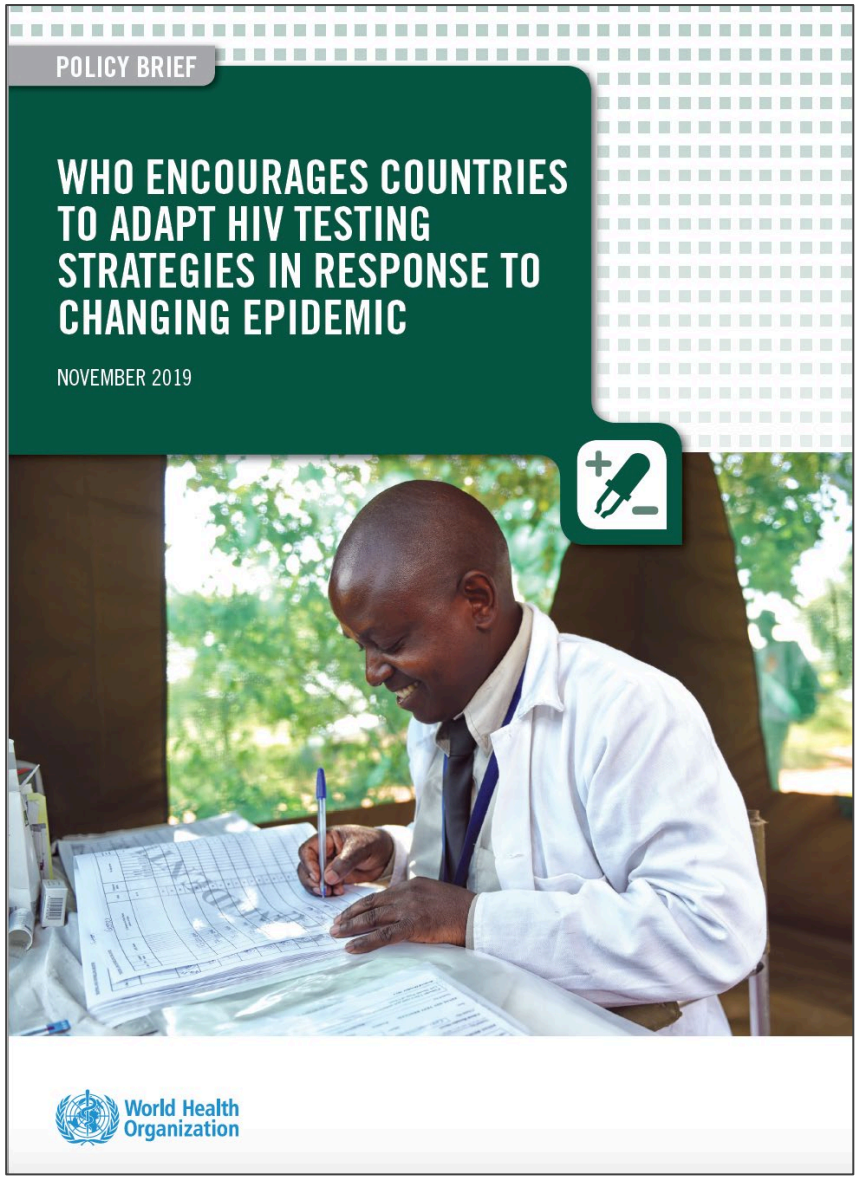


WHO recommends all countries currently using two consecutive reactive tests for an HIV-positive diagnosis to move torward using three consecutive reactive tests for an HIV-positive diagnosis. This is increasingly important as treatment-adjusted HIV prevalence and national HTS positivity continues to decline over time.

- **Ensure that the testing strategy has a positive predictive value ≥99% (PPV)**
  - Meaning of the persons classified as HIV+, ≥99% will truly be living with HIV
  - PPV depends on positivity rate among testing population

- **Quality assured assays, such as WHO prequalified, should be used:**
  - **≥99% sensitivity:** fewer than 1 *'false negative'* for 100 truly positive
  - **≥98% specificity:** fewer than 2 *'false positive'* for 100 truly negative
  - Either rapid diagnostic tests (RDTs) or enzyme immunoassay (EIA, CLIA, ECL)

Performance: Sensitivity and specificity is comparable, but a substantially higher number of indeterminate results with an algorithm containing WB (nearly half were among HIV+).

Programmatic outcomes: Significantly longer time to diagnosis, higher loss to follow-up, and lower linkage to care with algorithms containing WB.

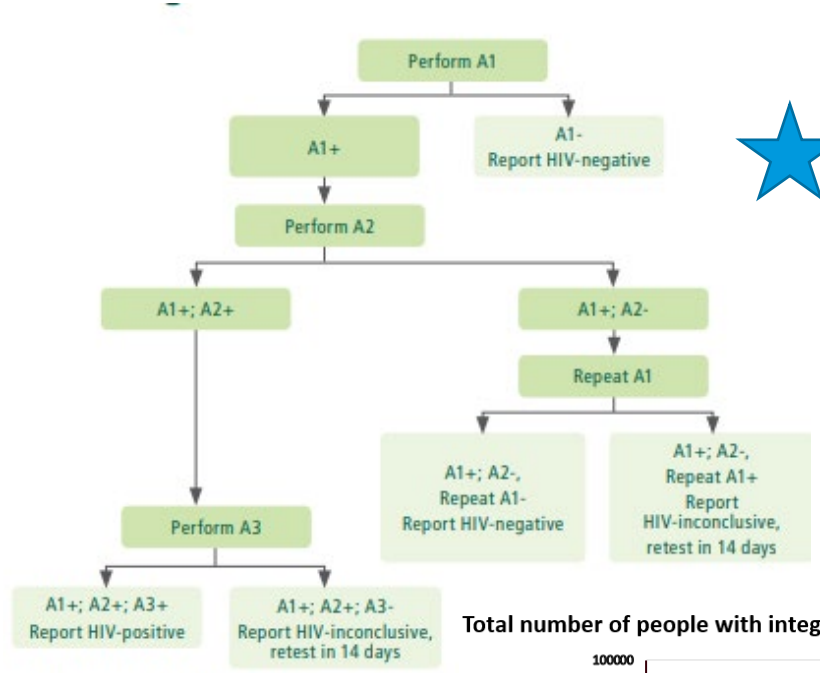
Values and preferences: Generally both clients and provider favor algorithms without WB.

Feasibility: Difficult to implement treat all, rapid ART initiation and offer prevention (PrEP) to those at substantial HIV risk when utilizing a WB algorithm. Testing with a WB requires more skilled staff and infrastructure.

Resources use: More resources required for WB-based testing, all studies reported RDT to be substantially less costly than WB-based testing. One programme that stopped WB-based algorithms reported cost savings.

Equity: Moving away from WB likely to improve equity and uptake among people with HIV who do not know their status

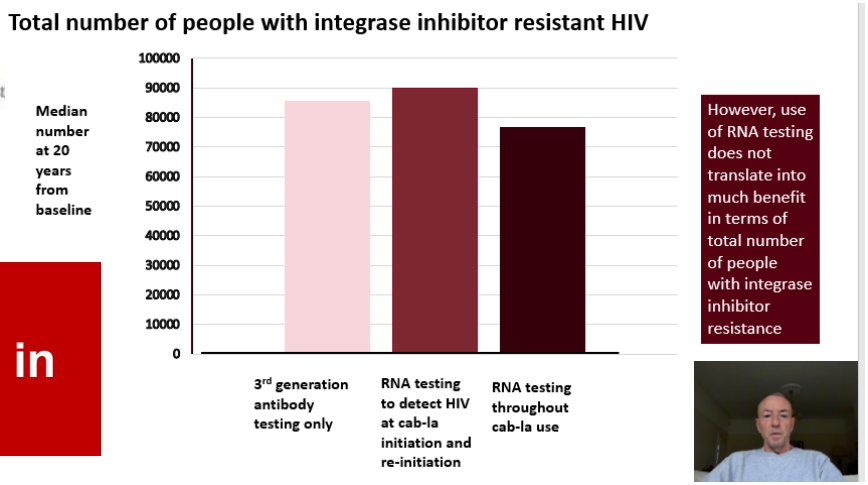
WHO guidance on HIV testing for CAB-LA



A1: Assay 1 (first test); A2: Assay 2 (second test); A3: Assay 3 (third test

Zimbabwe is the first county in Africa to announce regulatory approval for long-acting injectable cabotegravir for HIV prevention

WHO CAB-LA guidance launched in July 2022



WHO recommends countries use the standard national algorithm

- Uses HIV rapid diagnostic tests
- Does not include or recommend NAT testing
- Reliably achieves positive predictive value above 99% when using products that meet WHO standards

Additional NAT pros and cons?

- Mathematical modelling showed that standard algorithms used in LMIC settings (RDTs) are sufficient with very minimal benefits from 4th generation or NAT testing.
- Insufficient availability to meet need
- Most products are not approved for adult diagnosis
- Costly, and would increase CAB-LA costs by at least 50%
- Discrepant results with serology need more complex protocols and testing for follow-up to be resolved
- \+ Could theoretically detect infection earlier and prevent rare cases of resistance (evidence remains uncertain)

WHO guidance indicates that while not required, programmes could include additional NAT testing but would need clear implementation plans, resources, and protocols for resolving discrepant results.

Source: WHO 2022, https://www.who.int/publications-detail-redirect/9789240054097

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Promote policy uptake of HIV Testing Services

HTS Policy Tracker

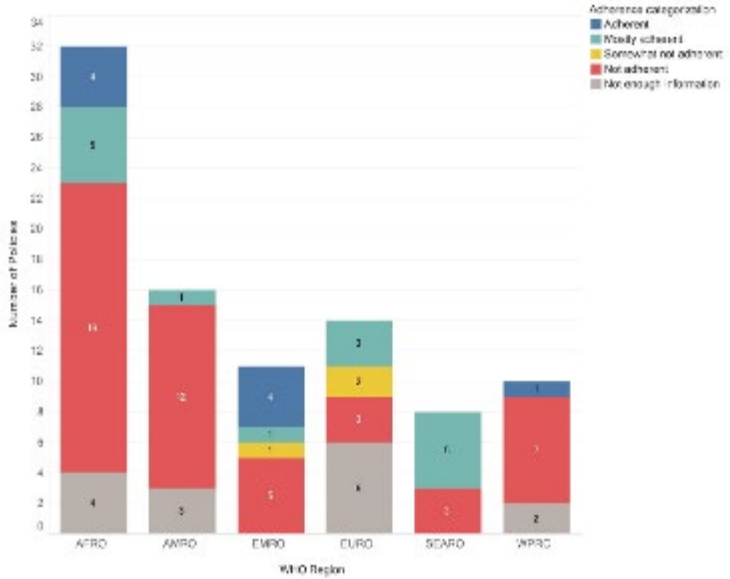
Original research

BMJ Global Health

Country adherence to WHO recommendations to improve the quality of HIV diagnosis: a global policy review

Virginia A Fonner, Anita Sands,[2] Carmen Figueroa,[1] Rachel Baggaley,[1] Caitlin Quinn,[2] Muhammad S Jamil,[2] Cheryl Johnson[2]

Policy review conducted in 2018:
91 countries acroos 6 WHO regions
Overall compliance: 26%



Progress & Challenges 2022

- Compliance w/ WHO guidance increasing
- Dual test adoption going up and needs support
- Transition to 3-test strategy underway and support needed
- WB transition still needed

Updated guidelines since 2019 HTS GL, to date:

WHO Region	New Policies	Compliance 2018	Compliance 2021
AFRO	**41**/47	**28%** (9/32)	**49%** (20/41)
AMRO/PAHO	–	6% (1/16)	–
EURO	–	21% (3/14)	–
EMRO	–	45% (5/11)	–
SEARO	**9**/11	63% (5/8)	**67%** (6/9)
WPRO	**7**/26	10% (1/10)	**71%** (5/7)

AFRO Policy Review (currently in peer revew)

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WHO recommendations on HIV self-testing

Key evidence showed HIVST is:

- Safe and accurate
- Highly acceptable
- Increased access
- Increased uptake and frequency of **HIV testing among those at high risk and who may not test otherwise**
- Comparable linkage and HIV+
- Empowering
- Can be affordable and cost-effective when focused

WHO recommendation:

HIV self-testing should be offered <u>as an approach</u> to HIV testing services

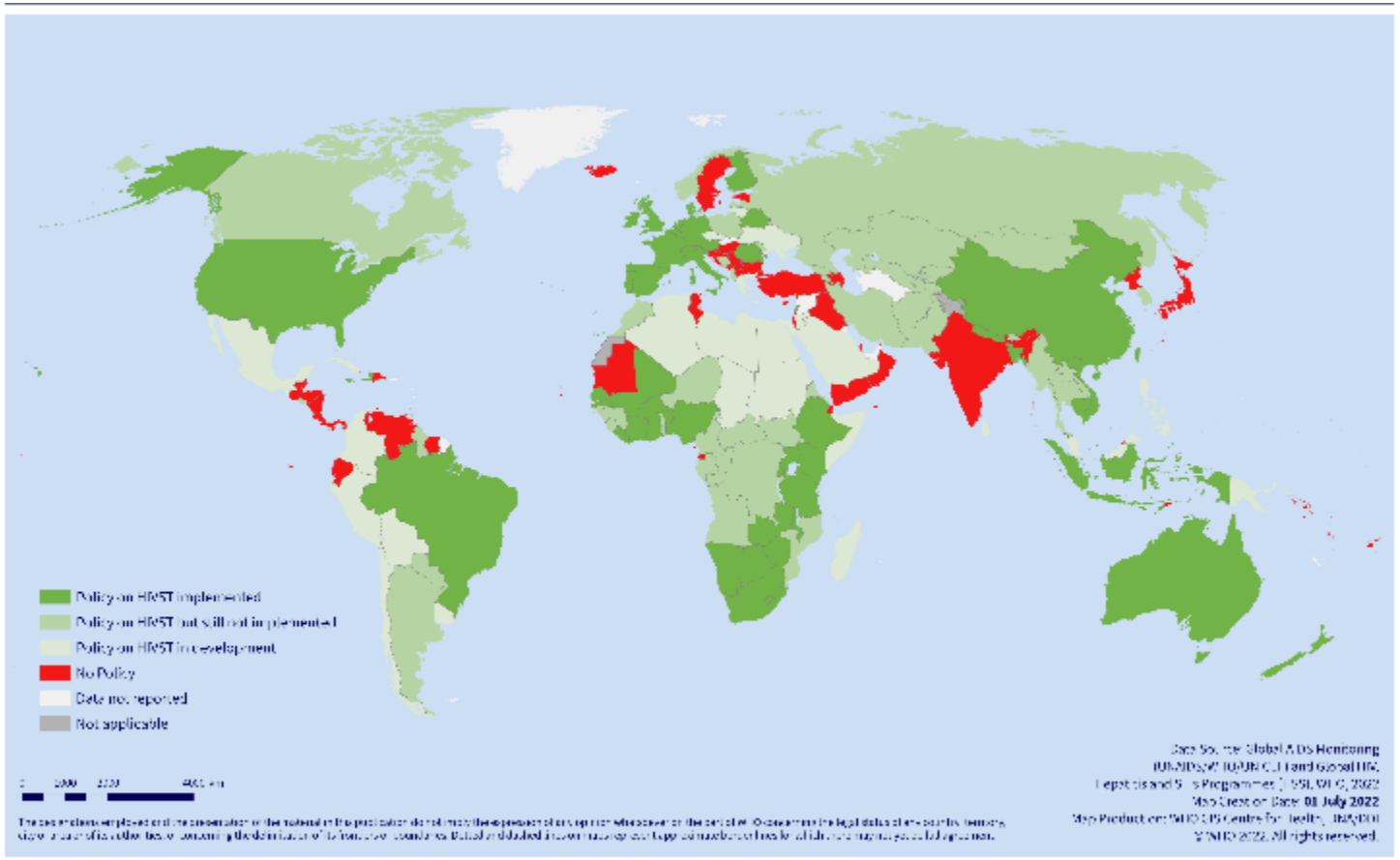
(strong recommendation, moderate quality evidence)

Remarks

- Providing HIVST service delivery and support options is desirable.
- Communities need to be engaged in developing and adapting HIVST models.
- HIVST does not provide a definitive HIV-positive diagnosis. Individuals with a reactive test result must receive further testing from a trained tester using the national testing algorithm.

Source: WHO 2016

National policy & implementation of HIV self-testing, June 2022



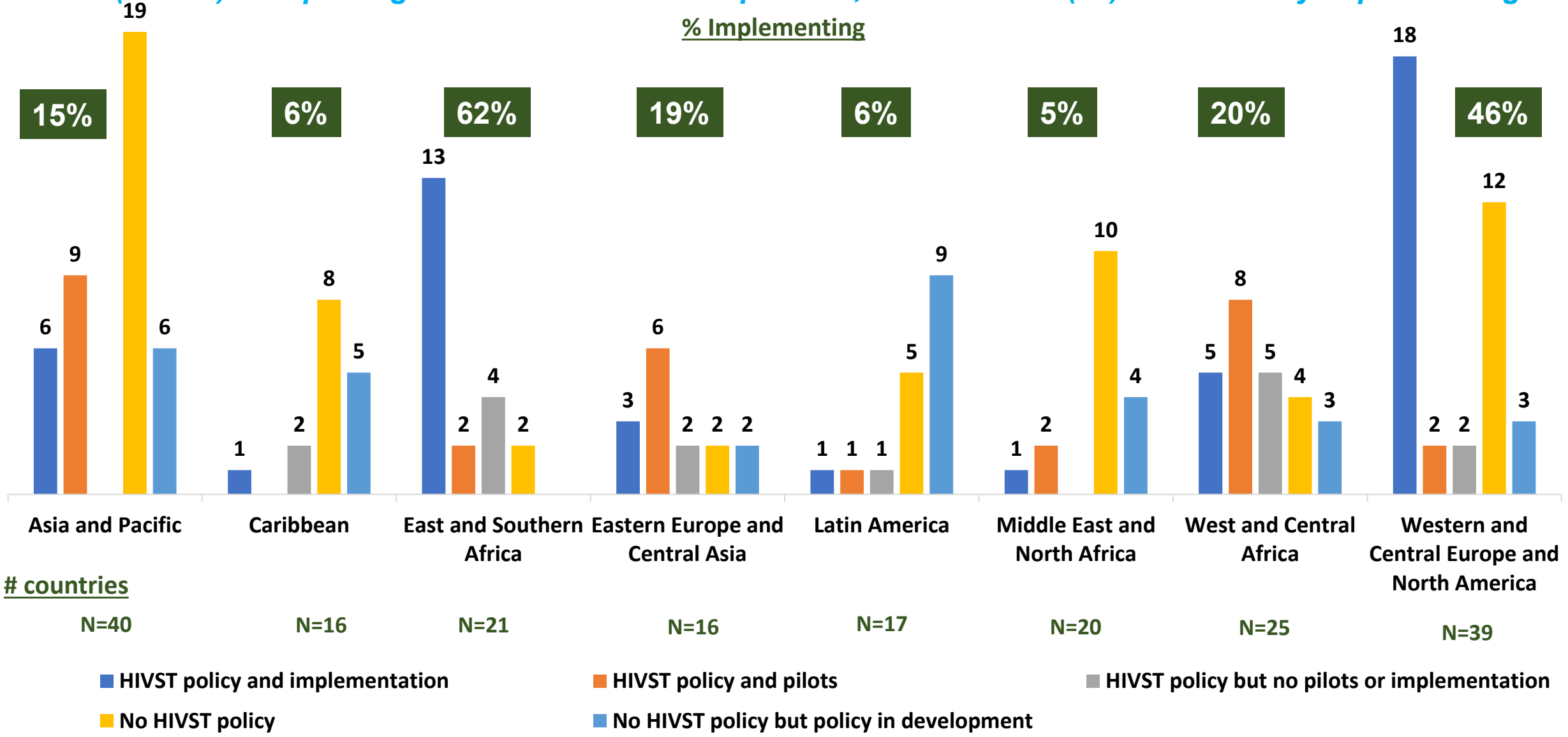
98 countries with national policies supportive of HIV self-testing and 52 of them were routinely implementing.

Of these, at least 92 countries have products registered

Another 30 countries are in the process of developing policies.

National HIVST policy and implementation 2021 status, by region

48% (94/194) of reporting countries have HIVST policies, of these 51% (48) are routinely implementing



Source: Global AIDS Monitoring (UNAIDS/WHO/UNICEF) and Global HIV, Hepatitis and STIs Programmes (HSS), WHO, 2021

HIVST products with WHO PQ, ERPD or approval from founding member of IMDRF*

Test (manufacturer)	Specimen	Approval
Mylan HIV Self Test (Atomo Diagnostics, Australia)	Blood	WHO PQ
autotest VIH® ** (AAZ Labs, France)	Blood	CE mark
BioSURE HIV Self Test ** (BioSURE , United Kingdom Ltd)	Blood	CE mark ERPD
Exacto® Test HIV (Biosynex, France)	Blood	CE mark ERPD
INSTI® HIV Self Test ** (bioLytical Lab., Canada)	Blood	WHO PQ
OraQuick® In-Home HIV Test (OraSure Technologies, USA)	Oral fluid	FDA, CE Mark
OraQuick® HIV Self Test (OraSure Technologies, USA)	Oral fluid	WHO PQ
SURE CHECK® HIV Self Test (Chembio Diagnostic Systems Inc., USA)	Blood	WHO PQ
Check Now HIV Self-Test (Abbott Rapid Diagnostics, Jena GmbH, Germany)	Blood	WHO PQ
Wondfo HIV self-test (Guangzhou Wondfo Biotech Co., Ltd.)	Blood	WHO PQ

- WHO PQ products available for US$1.00-3.10 through Global Fund
- More information available via PAHO strategic fund
- Pipeline for products remains strong
- Blood and oral both WHO PQed

HIC, high-income countries; **FDA**, Food and Drug Administration; **ERPD,** Expert Review Panel for Diagnostics; **Gen,** test generation; **LMIC**, low- and middle-income countries, **MRSP**: maximum suggested retail price; **NA**, not available.
* Includes products prequalified by WHO, approved by a regulatory authority in one of founding-member countries of the International Medical Device Regulators Forum or eligible for procurement on recommendation of Unitaid/Global Fund Expert Review Panel for Diagnostics. ** These products sold in more than one packaging format.
Note: Product details based on information provided by the manufacturers at the time of report preparation.

WHO-Unitaid 2022

AIDS 2022

World Health Organization

Changes in HIV self-testing commodities

Products emerge in European markets €20-30

Some LMIC private sector markets HIVST pricing $10-15; LMIC public sector price $3.00

Unitaid investment results in additional LMIC public sector product price reduction $1.99
Global Fund tender via Wambo 1.99-3.10 for all procurement

Unitaid

The Global Fund
To Fight AIDS, Tuberculosis and Malaria

Efforts to pool procurement increase as shipping costs and delivery increase

2012/13 | 2014/15 | 2016/17 | 2018/19 | 2020/21 | 2022/23

HIVST available in USA for $40-50
LMIC research price $4-5

LMIC research price $3.15

Buy down on 1 product reaches $ in LMIC public sector market; LMIC private sector expands with minimal price change $5-15

BILL & MELINDA GATES foundation

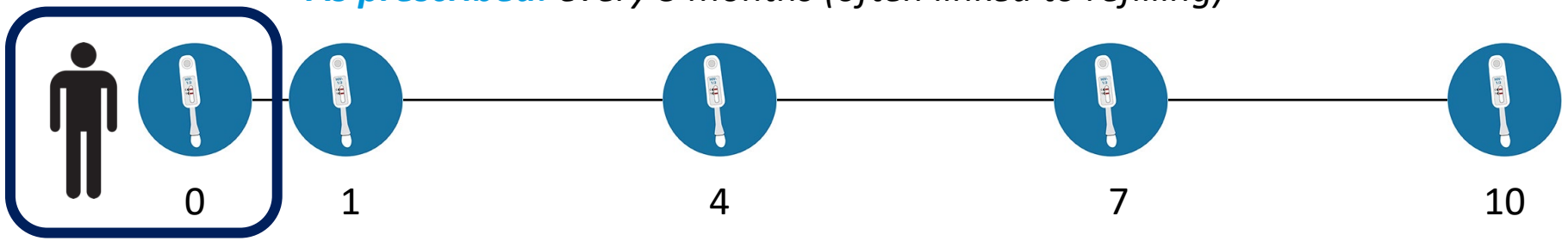
New lost cost products come into the market $1.00 for LMIC public sector

WHO guidance on HIV self-testing for PrEP delivery

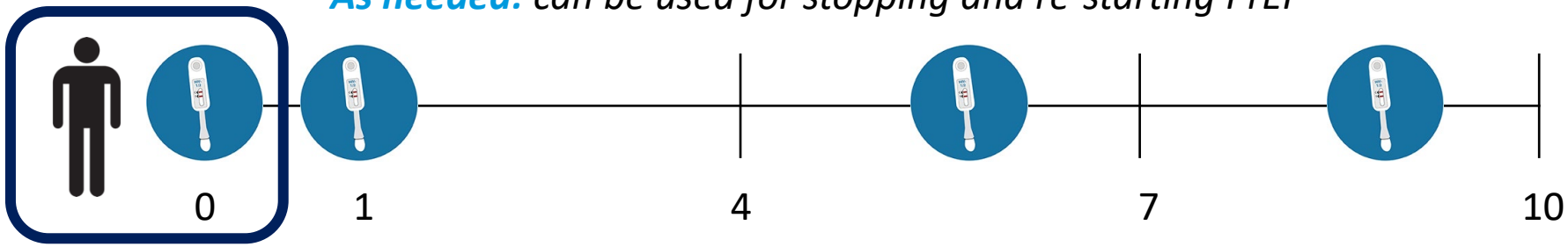
HIVST for PrEP initiation

HIVST for PrEP continuation

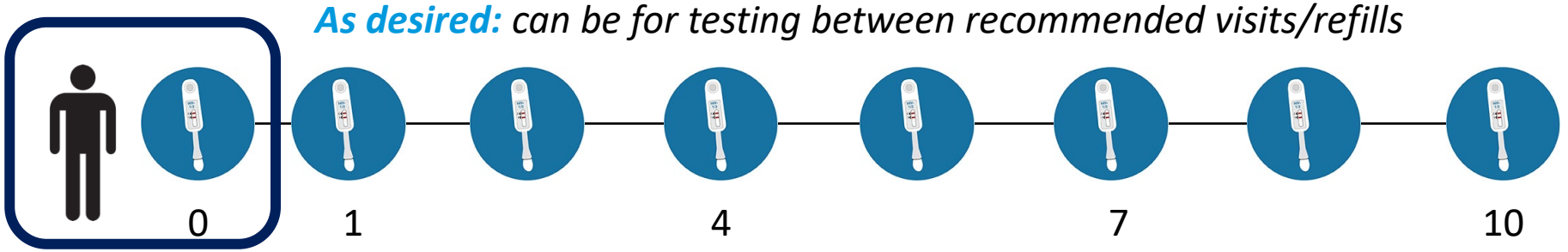
As prescribed: *every 3 months (often linked to refilling)*



As needed: *can be used for stopping and re-starting PrEP*



As desired: *can be for testing between recommended visits/refills*



Months since PrEP initiation

Source: WHO 2022
https://www.who.int/publications/i/item/9789240053694

World Health Organization

Slide adapted, courtesy of Katrina Ortblad

HIVST and simplified HTS for expanding PrEP options

Dapivirine vaginal ring

Safe, effective (when used as prescribed), acceptable, **women-initiated method**

WHO recommendation and guidelines in 2021

HIVST could be an option as **no systemic absorption of PrEP**

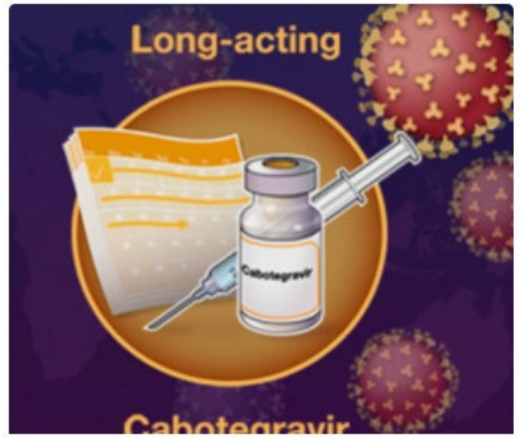
9 December 2021 | Statement

WHO continues to support its conditional recommendation for the dapivirine vaginal ring as an additional prevention option for women at substantial risk of HIV

Long-acting injectable cabotegravir

Very limited implementation experience outside of clinical trials

Specific HIV testing considerations (more on this for the future!)



21 December 2021 | Departmental news

US FDA approved cabotegravir extended-release – the first long-acting injectable option for HIV pre-exposure prophylaxis

World Health Organization

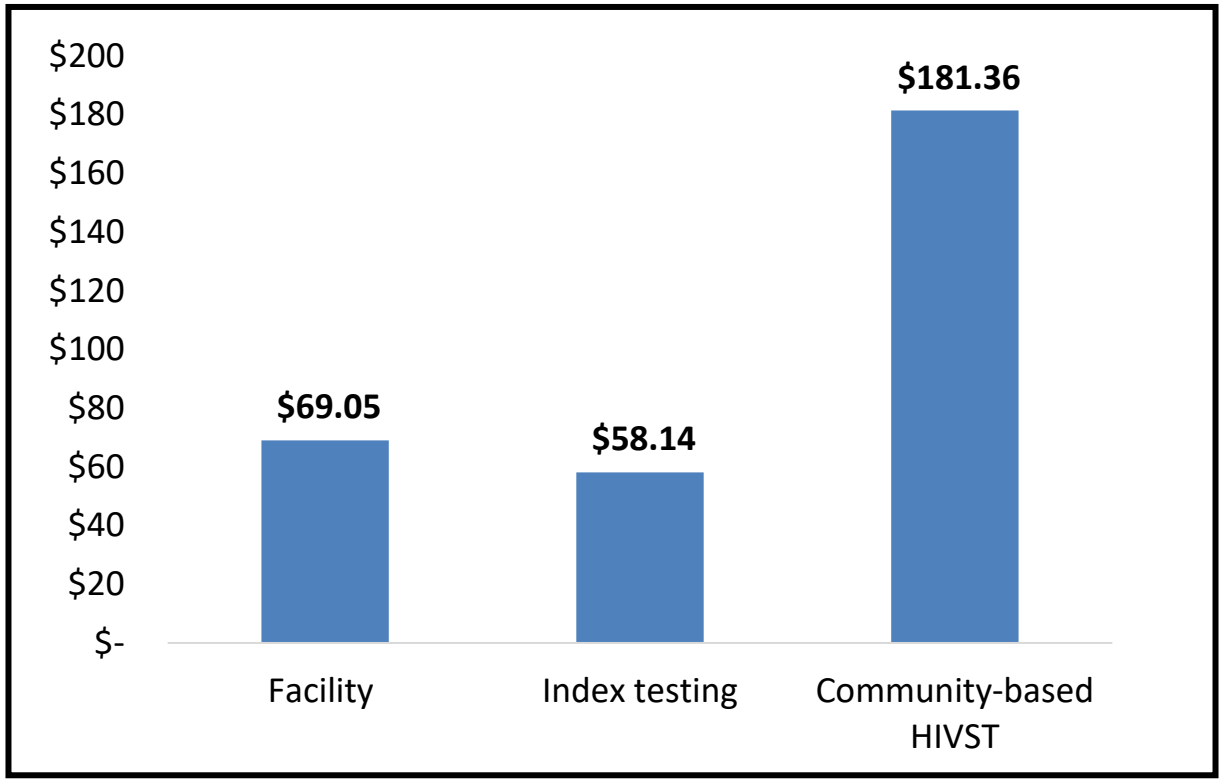
Resulting reduction in testing would yield only modest cost savings, likely to be offset by the need to identify the missed PLHIV through other, more expensive channels

HR and commodity costs for current standard of care compared with screening in OPD

Based on national testing volumes, 2018

	Standard of Care	Screening in OPD	Screening tool savings
Total # of tests (A1)	**10.5M**	**8.9M**	**1.6M**
Total cost	**$23.6M**	**$22.1M**	**$1.5M**
Commodities	*$13.7M*	*$11.7M*	*$2.0M*
Human resources	*$9.9M*	*$10.4M*	*-$0.5M*

Cost per PLHIV identified in Uganda, by strategy



Innovative and efficient approaches for screening adults that INCREASE diagnoses are required.
HIV self-tests** can be used as highly sensitive screening tools that can **drive efficiencies in facility-based HTS while increasing access, testing coverage, and identifications.

Source: CHAI 2021, WHO webinar 2021, forthcoming WHO guidance 2023

STIs

Rapid testing & Self-testing

HIV | STI

Dual HIV/Syphilis Policy Timeline

Forthcoming: use of dual HIV/Syphilis in key populations

2013

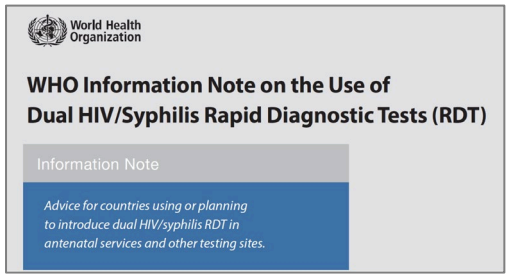
Ondondo et al. Kenya
First published study evaluating the dual HIV/syphilis RDT

2014

Target Product Profile (TPP) developed for dual HIV/Syphilis rapid test

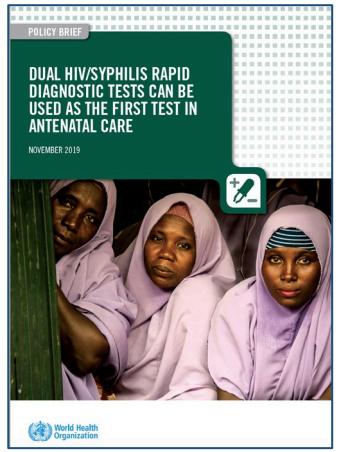
2017

WHO Interim Guidance on the use of dual HIV/Syphilis RDT



2019

WHO recommends dual HIV/Syphilis RDT as first test in ANC settings.



2020

3 products WHO PQed

2021

~2,100 congenital syphilis cases reported by USA in 2020

>100% increase in cases compared to 2019

An estimated 355,000 adverse birth outcomes occur annually due to syphilis

World Health Organization

Source: Emmanuel Fajardo, WHO 2021

Integration: Dual HIV/syphilis RDTs in ANC

WHO recommendation and NEW implementation guidance

All pregnant women should be tested for HIV, syphilis and hepatitis B surface antigen (HBsAg)* at least once and as early as possible, ideally at the first antenatal care visit

Dual HIV/syphilis rapid diagnostic tests (RDTs) can be considered as the first test in HIV testing strategies and algorithms in ANC settings.

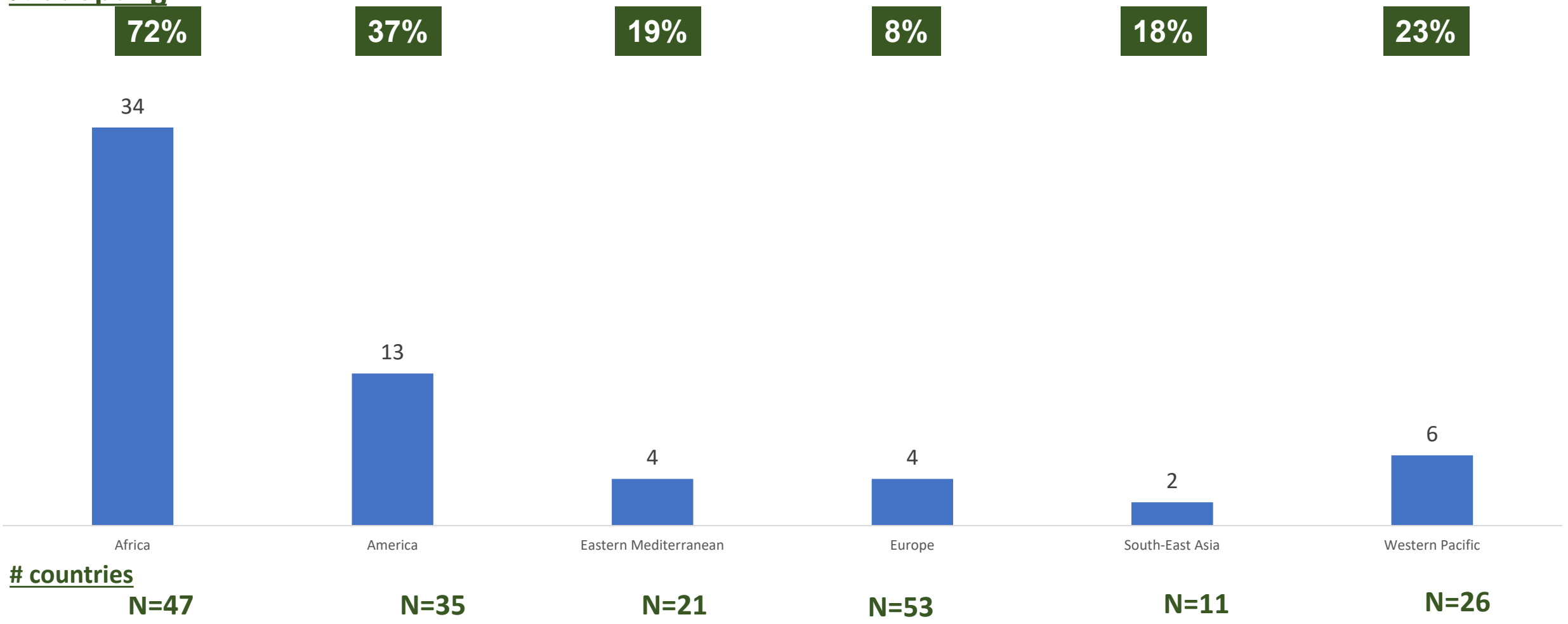
*Particularly in settings with a ≥2% HBsAg seroprevalence in the general population.

Dual test cost savings
Opportunities for Triple E / Future Multiplex
Recommended for KP now as well

https://www.who.int/publications/i/item/dual-hiv-syphilis-rapid-diagnostic-test

Country adoption of dual HIV/syphilis test in ANC, 2022 status by WHO region

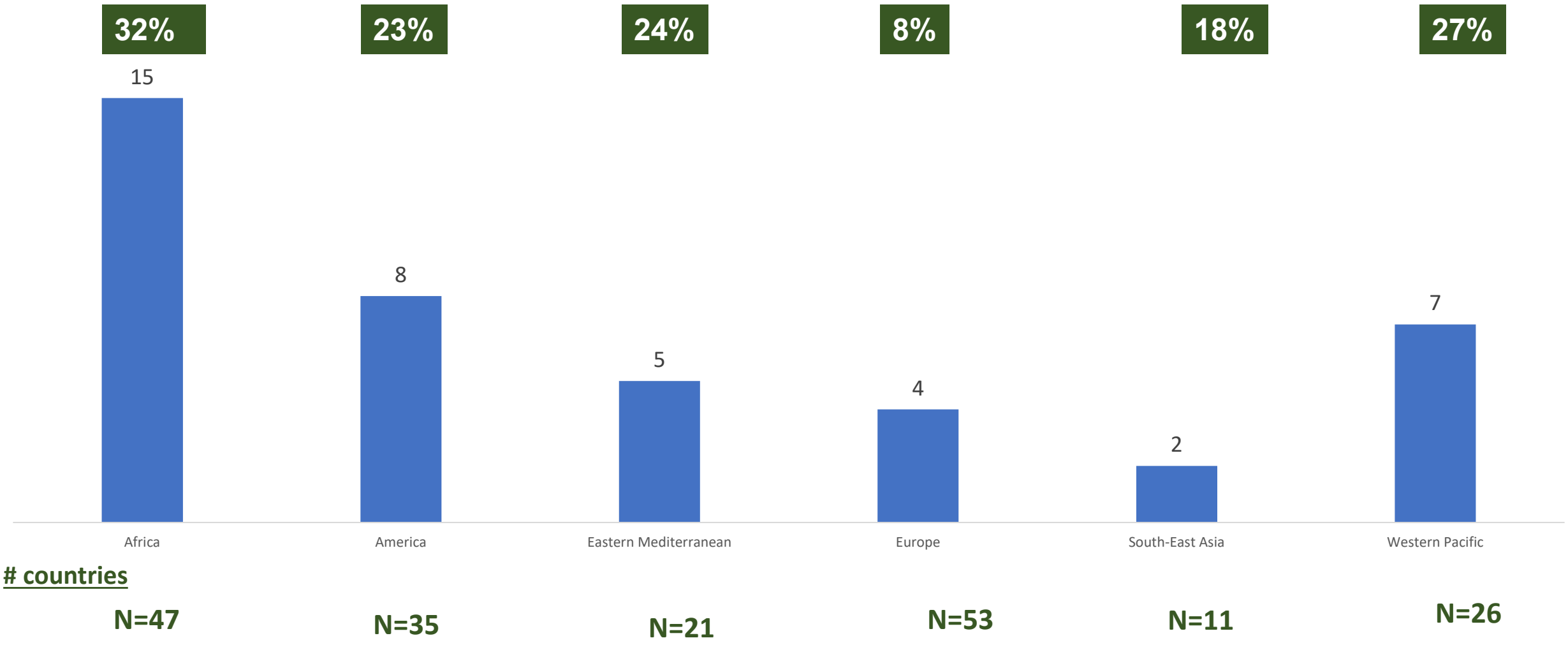
33% (63/194) of reporting countries have reported adoption of dual HIV/syphilis test for pregnant women ANC



Source: Global AIDS Monitoring (UNAIDS/WHO/UNICEF) and Global HIV, Hepatitis and STIs Programmes (HSS), WHO, 2022

Adoption of dual HIV/syphilis test in key populations policies or plans, 2022 status by WHO region

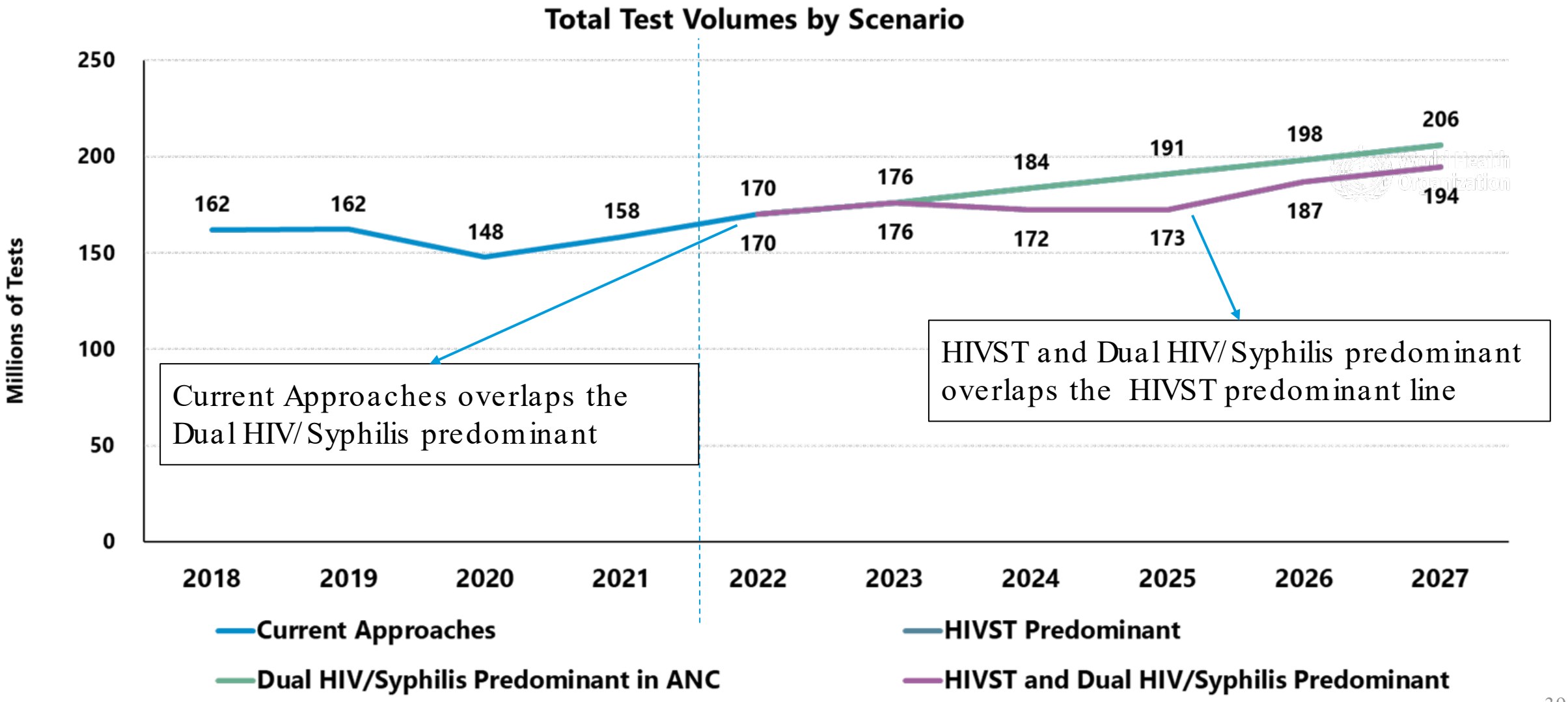
21% (41/194) of countries have reported policy adoption of dual HIV/syphilis test for key populations



Source: Global AIDS Monitoring (UNAIDS/WHO/UNICEF) and Global HIV, Hepatitis and STIs Programmes (HSS), WHO, 2022

HIV RDT market in LMICs is forecast to be between 194m to 206m by 2027

World Health Organization



*104 LMICs; China excluded; India test volumes excluded; Brazil test volumes excluded.

WHO prequalified rapid dual HIV/syphilis tests

- As of May 2021, three dual HIV/syphilis rapid tests have been WHO prequalified
- Prices for these products range now as low as $0.95 per test through WHO, Global Fund, PEPFAR/USAID (opportunities for pooled procurement)
- Now procured in 27 countries and policy/implementation expanding globally as of mid- 2022

Year PQed	Product Name	Manufacturer	Product Code	No. of tests per kit	WHO evaluation Final sensitivity	WHO evaluation Final specificity
Oct 2015	Bioline HIV/Syphilis Duo	Abbott Diagnostics Korea Inc (Republic of Korea)	06FK30 06FK35	25 T/kit 25 T/kit	HIV: 100% Syphilis: 87%	HIV: 99.5% Syphilis: 99.5%
June 2019	First Response HIV 1+2/Syphilis Combo Card Test	Premier Medical Corporation Pvt Ltd (Gujarat, India)	I20FR25 I20FR30 I20FR50 I20FR60 I20FR100	25 T/kit 30 T/kit 50 T/kit 60 T/kit 100 T/kit	HIV: 100% Syphilis: 99%	HIV: 99.5% Syphilis: 100%
May 2020	Standard Q HIV/Syphilis Combo Test	SD Biosensor Inc (Republic of Korea)	09HIV20D	25 T/kit	HIV: 100% Syphilis: 95.5%	HIV: 99.5% Syphilis: 99.5%

Source: https://www.who.int/diagnostics_laboratory/evaluations/pq-list/hiv_syphilis/en/

WHO PQ Syphilis RDT

Year PQed	Product Name	Manufacturer	Product Code	No. of tests per kit	WHO evaluation Final sensitivity	WHO evaluation Final specificity
2021	Syphilis RDT First Response Syphilis Anti-TP Card Test	Premier Medical Corporation (India)	PI08FRC25, PI08FRC50 PI08FRC100	**25 T/kit** **50 T/kit** **100 T/kit**	Syphilis: 99.6%	Syphilis: 100%

Product & Procurement status

- 1 WHO PQ syphilis RDT, with ~2 additional products in pipeline
- No RPR, TPHA, VDRL PQ – gap in countries still seeking to procure
- Small donor procurement – demand expected to grow with addition of dual test scale-up
  - Donor budget allocations remain low and spread across few countries, for some under < $1m in allocation globally
  - Demand and need growing – particularly in ANC/PPC, PrEP and KP-focused services

WHO updates

Trep/Non-Trep syphilis RDTs

- TSS online since 2018 – includes trep/non-trep single or dual syphilis tests
- WHO review and forthcoming guidance for implementation 2022-23

Syphilis self-testing

- Adapted TSS planned (draw from HIV/HCV ST work)
- Innovations include single and/or dual HIV/syphilis RDTs
- WHO review planned and guidance in development (2022-23)

Additional multiplex coming

- ANC panel under WHO PQ review (HIV,HBV, Syph)
- Other triple elimination multiplex in pipeline for ANC & PrEP

Source: https://extranet.who.int/pqweb/sites/default/files/PQDx_0471-010-00_FirstResponse_SyphilisAnti-TP_CardTest_v1.pdf

Syphilis ST increases uptake at lower cost

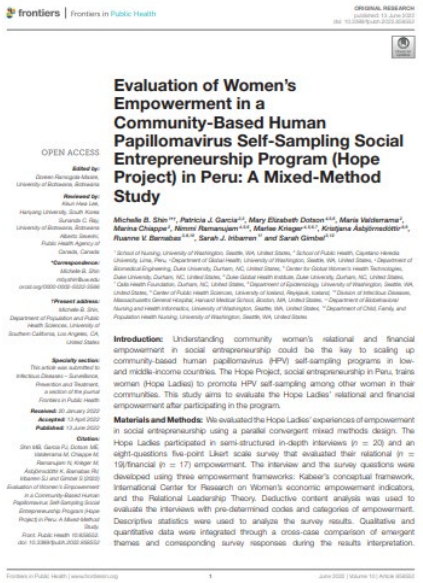
- MSM in China testing increased using ST compared to standard testing (risk difference: 48.7%; 95%CI: 37.8-58.4%, p < 0.001)
- ST reached many 1st time testers (78.5%; 95% CI: 72.7% to 84.4%, p < 0.001)
- Cost per person tested was US $26.55 (ST) vs US$66.19 for the standard testing.
- ST acceptable and feasible
- WHO systematic review ongoing for guideline development process
- WHO PQ pathway and TSS update planned

Source: Wang 2022,PloS Med, forthcoming WHO guidance

STI self-collection & self-sampling

- Across HPV, syphilis, gonorrhea and chlamydia found increases in uptake of testing and STI services
- Highly acceptable and feasible
- Variable impact on case finding
- Limited information on cost, needs for connectivity and ability to send and receive results from lab
- Evidence from community-based programming shows impact on both empowerment and feasibility of programming using SMS
- Challenges remain with quality assured products, ERPD & WHO PQ pathways need support

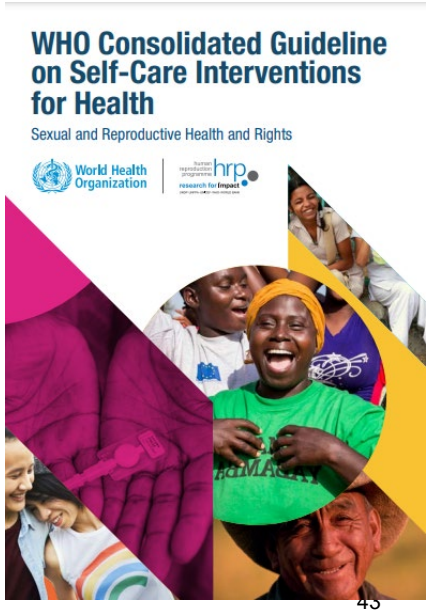
Source: Garcia 2019, Shin 2022, WHO 2022, https://app.magicapp.org/#/guideline/Lr21gL


frontiers | Frontiers in Public Health

ORIGINAL RESEARCH

Evaluation of Women's Empowerment in a Community-Based Human Papillomavirus Self-Sampling Social Entrepreneurship Program (Hope Project) in Peru: A Mixed-Method Study

OPEN ACCESS



Future developments on rapid STI tests?

Some manufacturers starting to enter this space as single RDT or multiplex

FIND has developed a 20 minute, easy to run, POC assay for detection of *N. gonorrhoeae* for **female vaginal swabs** and **male urine**

Antigen target: outer membrane protein

Analytical sensitivity (LOD): $1x10^3 – 5x10^3$ CFU/mL
depending upon NG strain and preparation

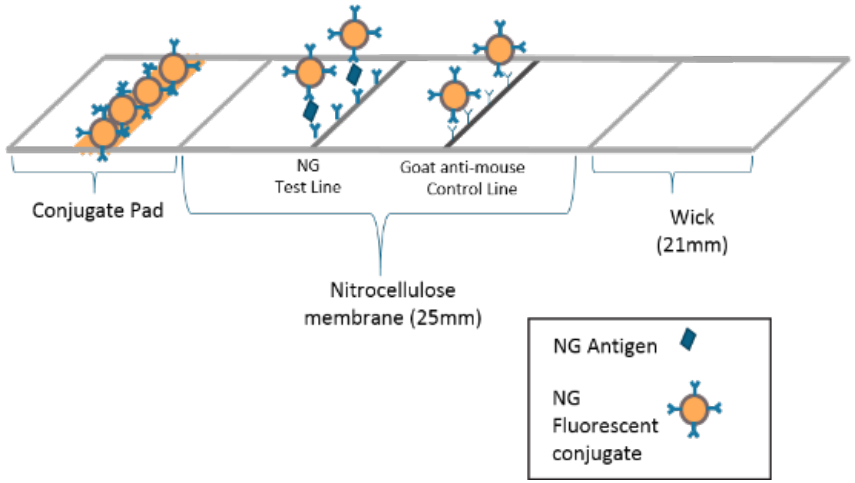
Inclusivity: 32 NG strains (ATCC, NCTC, WHO, ZeptoMetrix)
All NG strains detected at LOD

Cross-reactivity: 21 non-Neisseria pathogens/microorganisms negative
38 Neisseria species: cross-reactive with *N. meningitidis, N. lactamica, N. polysaccharea*

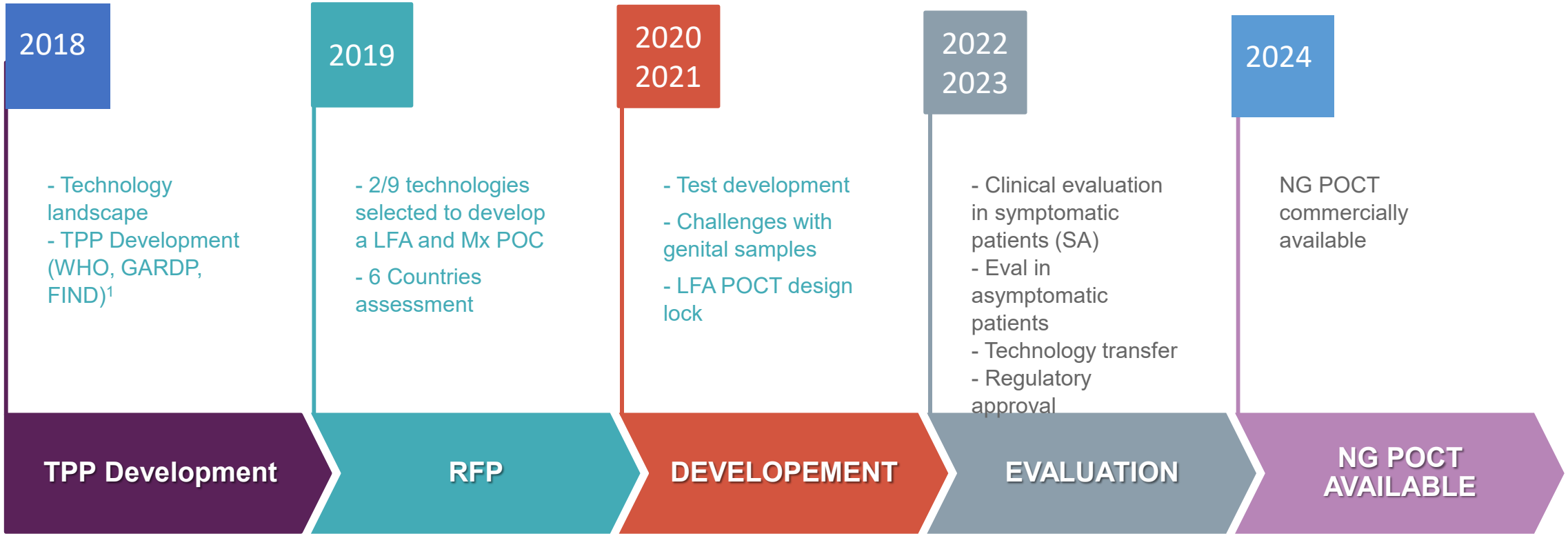
Stability: Shelf-life min. 1 year @ 40C/70%RH

Source: Cecilia, FIND

Lateral flow design:

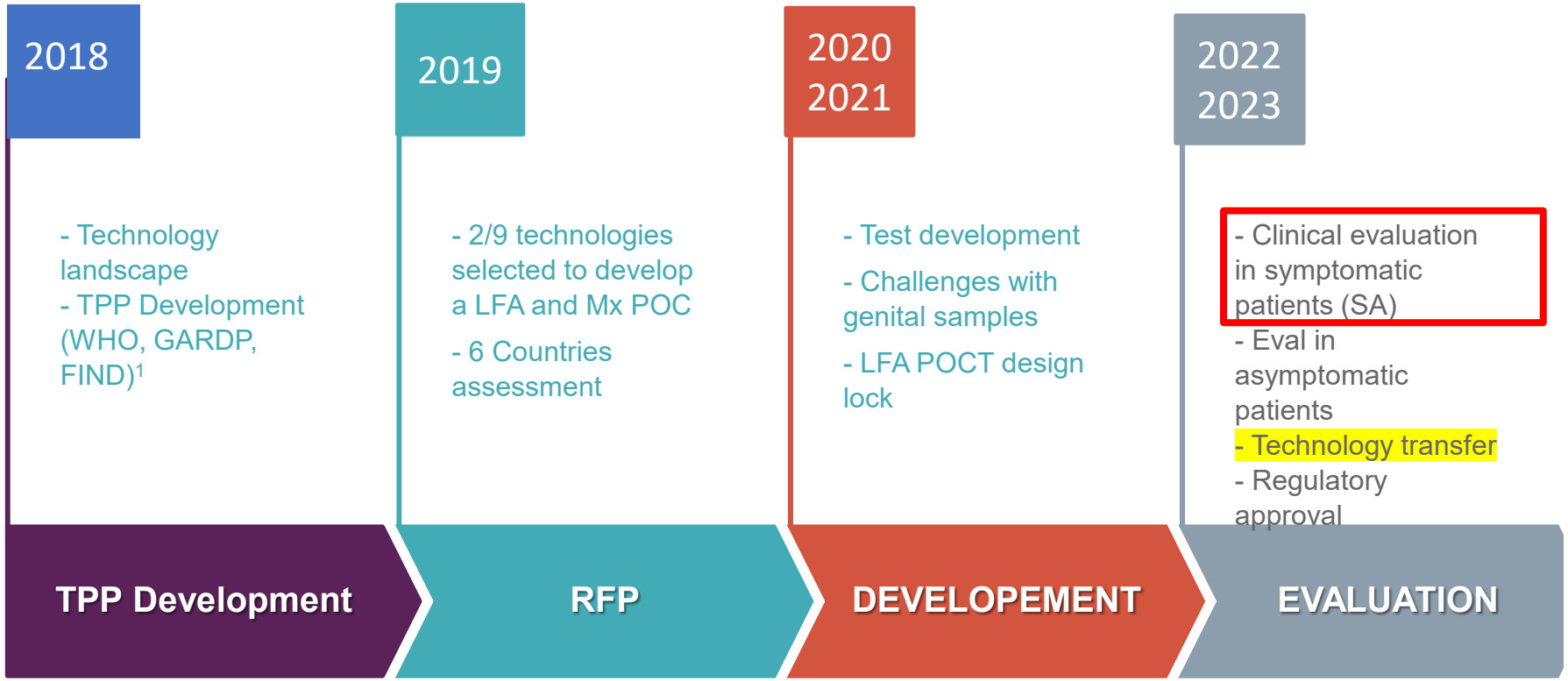


THE ROADMAP TOWARDS A LOW COST POCT FOR NG



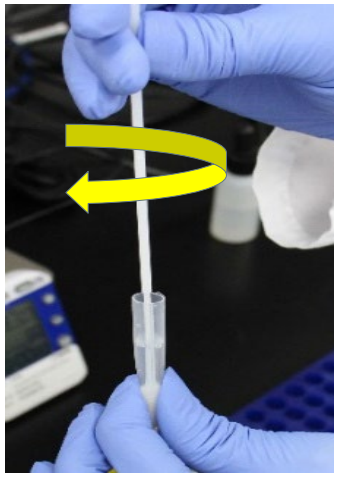
1. Ferreyra C et al. PLoS One 2020

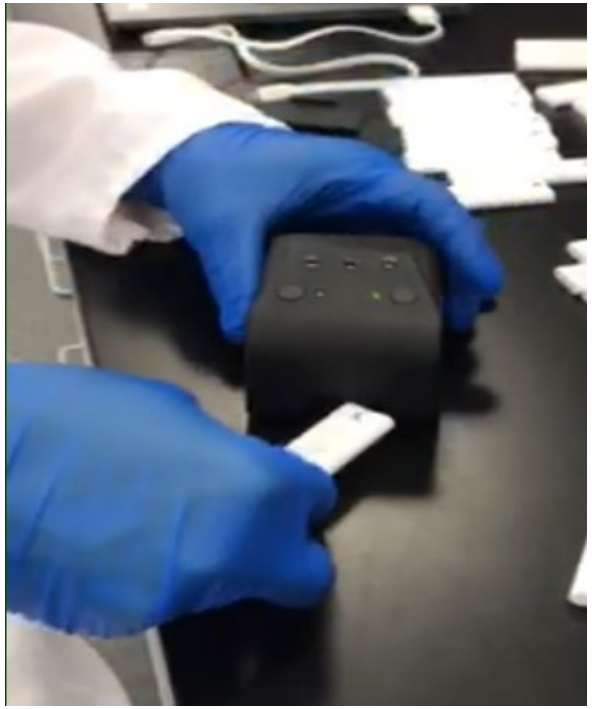
THE PROGRESS

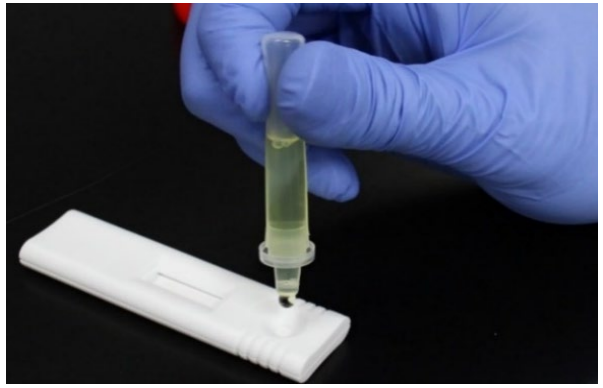


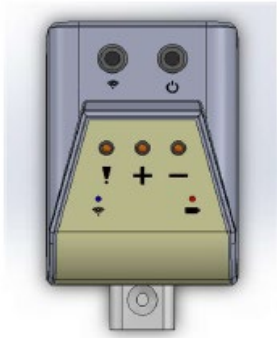
1. Ferreyra C et al. PLoS One 2020

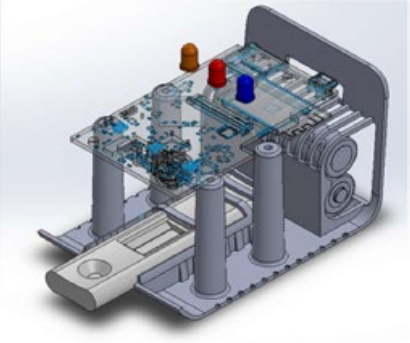
CLINICAL EVALUATION IN SYMPTOMATIC PATIENTS IN SOUTH AFRICA











Source: Cecilia, FIND

Symptomatic Men

Performance

Sensitivity	95% (92% – 99%)
Specificity	97% (93% – 100%)

Symptomatic Women

Performance

Sensitivity	92% (83% – 100%)
Specificity	96% (93% – 99%)

	Minimal requirement	Optimal requirement
Sensitivity	>80%	>90%
Specificity	>95%	>98%
Time to result	≤ 30 minutes	≤ 10 minutes

Source: Cecilia, FIND

Self-testing policy timeline and way forward

1st HIVST kit discussed

1986

2005

First HIVST kit under review by FDA

2008

2011

WHO review on HIVST in health workers

2012

2013

1st International Meeting on HIVST

HIVST comes to Europe: 2 products CE marked and on sale in UK and France

Unitaid STAR project kick-off Zimbabwe November 2015

2014

2015 – 3 countries with policies and 1 HIVST product

2015

2016

WHO recommends HIVST

2017

1st WHO PQed kit & real world implementation

2018

WHO HIVST Scale-up guide

2019

WHO Self-Care and Updated HIVST guidelines on optimized service delivery

2020

HIVST as a key COVID adaptation

93 countries with policies.
4 PQ HIVST kits
Price $1.50-3.09
Market size: >10 million;
21 million confirmed in 2021-23 procurement + new Global Fund Strategic Initiatives

Unitaid approves 3ACP – C19 ST Proposal Brazil, India, Malawi, South Africa, Zimbabwe

2021

Self-care studies for HCV (WHO & FIND)
WHO HCVST guidance July 2021

Scale-up of self-testing for broader self-care across HIV, STI, HCV, COVID-19 and beyond

World Health Organization

World Health Organization

Key takeaways: HIV

- **Status neutral HIV testing**
  - Several countries with declining HTS volumes started pre-COVID so efforts need to address suboptimal targeted testing efforts to maximize absolute number of PLHIV diagnosed in key entry points
  - Focus on ways to get back on track and be more resilient, e.g. critical facilities and geographies, KP services, Index/SNA, HIVST

- **Many countries have adopted WHO recommended HIV testing strategy and are now optimizing testing algorithms**
  - Concerted efforts still needed to transition countries fully
  - Critical to prepare for 95-95-95 needs
  - Integration important
- **Self-testing keeps growing and expanding – greater uptake and uses during COVID-19 have accelerated implementation**
  - New uses of HIVST expanding during COVID-19 and future use in PrEP programmes, facilities and virtual interventions
  - Branching out to new use cases and will continue to grow

World Health Organization

Key takeaways: STIs

Dual test is being taken up but gaps remain, market opportunity remains large

- Greater uptake stimulating growing needs in syphilis testing (especially RDT) – needs in RPR, TPHA, VDRL emerging as well
- Price and costs remain high – hopes that pooled procurement and increased volumes in ANC can increase affordability
- EMTCT agenda remains critical to driving priorities for syphilis
- New guidelines coming for syphilis & STI partner services!

Innovations on the way

- Tests detecting active syphilis (e.g. Trep/non-Trep), syphilis self-testing and multiplex (e.g. HIV, HBV, Syph) important to watch and new guidance coming – affordable products needed
- Linking with virtual interventions and making most of broader transition to self-care essential to growth in this diagnostic space
- Rapid tests and self-tests to support scale-up of STI testing – priority area for expansion to increase access

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Acknowledgements

WHO: Rachel Baggaley, Muhammad Jamil, Maggie Barr-DiChiara, Céline Lastrucci, Anne Bekelynck, Emmanuel Fajardo, Peter Cherutich, Purvi Shah, David Maman, Niklas Luhman, Funmi Lesi, Teodora Wi, Maeve de Mello, Belen Dinku, Anita Sands, Michel Beusenberg, Rio Sitorus, Robin Schaeffer, Heather Marie Schmidt, Michelle Rodolph

UNAIDS: Victoria Benaud and colleagues supporting GAM

Special thanks to all participating Ministries of Health, Academic Partners, Community Groups, UN agencies, and members of WHO Guideline Development Groups on self-testing and self-care

Funders: WHO receives grants supporting on testing services from Unitaid, the Bill and Melinda Gates Foundation, Global Fund and USAID

World Health Organization