Role of network optimisation to achieve 95-90-0 for MTB disease elimination: Scaling up testing

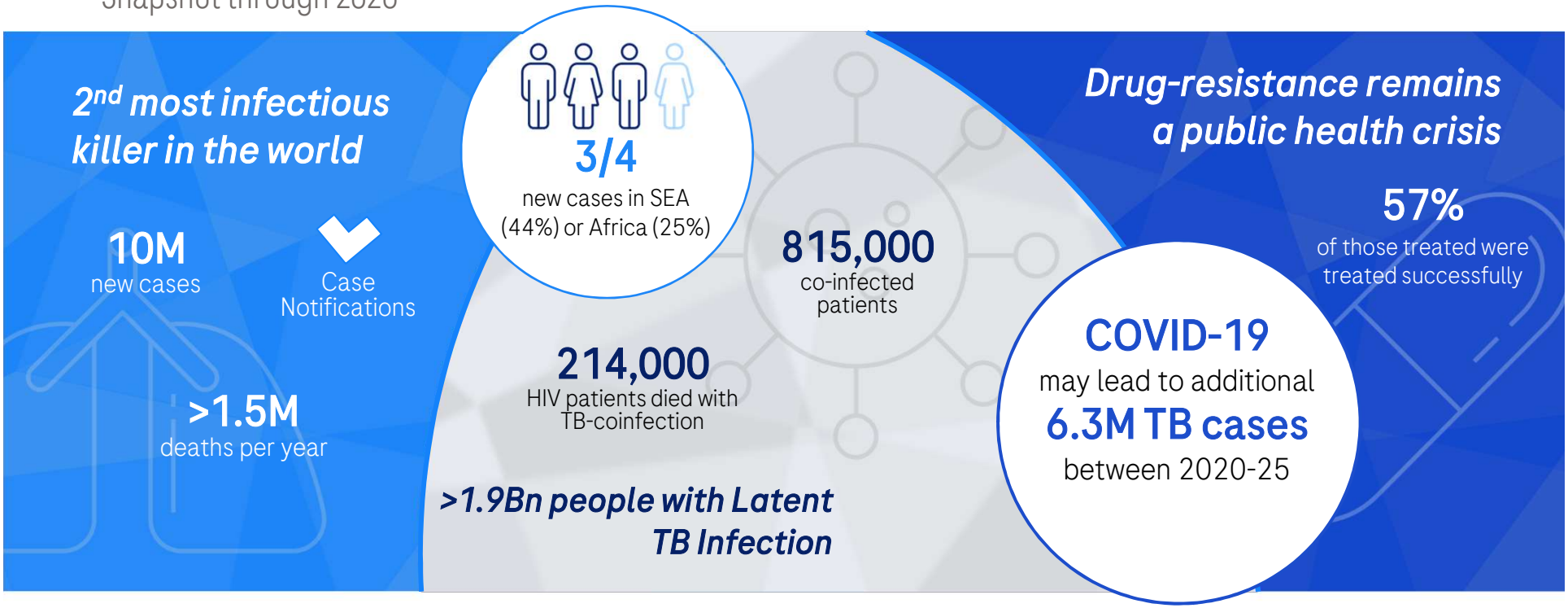
Mehan Barathlall, Marketing Lead of the Molecular Solutions
Roche Diagnostics South Africa

Edwin Muiruri, Product Manager, TB and Hepatitis
Roche Diagnostics South Africa (located in Nairobi)

7 April 2022 |

Tuberculosis

Snapshot through 2020



World Health Organization. Global tuberculosis report 2021. Geneva: World Health Organization; 2021. Licence: CC BY-NC-SA 3.0 IGO.

Impact of COVID on TB services

Programmes are re-thinking the diagnostic future post-pandemic

59%

Advocates from global fund eligible countries reported **resources for people with TB being diverted** to respond to COVID-19

73%

Reported people with TB to be facing **significant challenges accessing treatment** and care

>18%

Newly diagnosed patients fell from 7.1 million in 2019 to 5.8 million in 2020

>65%

Policy and program officers reported healthcare facilities to be **reducing TB services** during the pandemic

Africa and Asia

Diagnosis and screening FELL OVER **40%** due to Covid-19 Disruptions

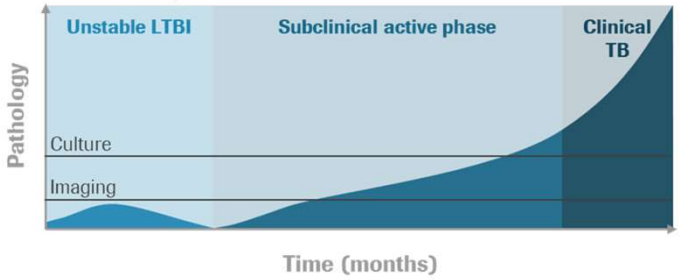
Stop TB Partnership, et al. The impact of COVID-19 on the TB epidemic: A community perspective; 2020.

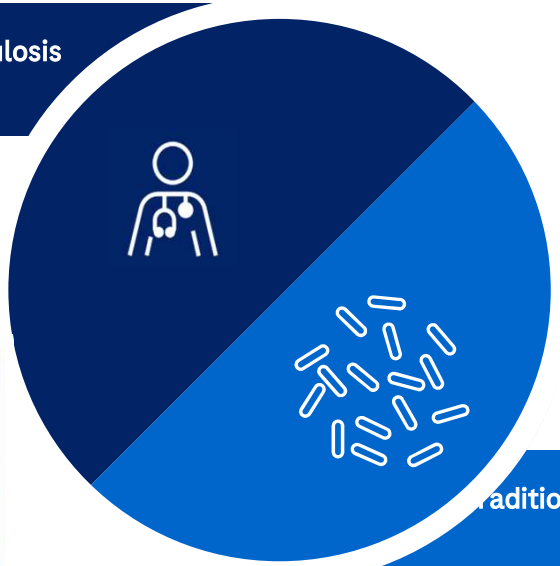
Diagnosing tuberculosis is multi-faceted and complex

Managing respiratory diagnosis

Multiple progression pathways make tuberculosis challenging to diagnosis

- Clinical phases influenced by predisposing factors and access to care
- Imaging, smear, culture and PCR commonly used in combination physician diagnosis





- Swab studies to evaluate alternative sample types ongoing
- Goal to reach more patients with an easier to collect, transport and process sample

raditional raw sputum sample collection is challenging for some patients

Esmail et al Philos Transact Royal Soc 2014

WHO Guidelines to Support Scale-Up

From treatment algorithms to diagnostic products

Expanding Testing Options Can Support Eradication Efforts

Cross-Program testing can make all programmes more resilient to disruptions

Investing in alternative sample types to reach more people

Installation base already exists in urban areas for high volume testing

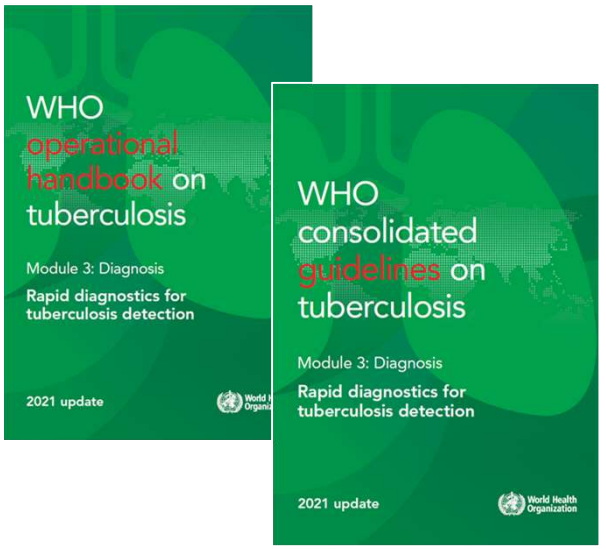
WHO operational hand book on Tuberculosis: Rapid diagnostics for TB detection

WHO Operational Handbook on Tuberculosis updated

New test options in the guidance

Table 2.1. New classes of technologies recommended and associated products evaluated

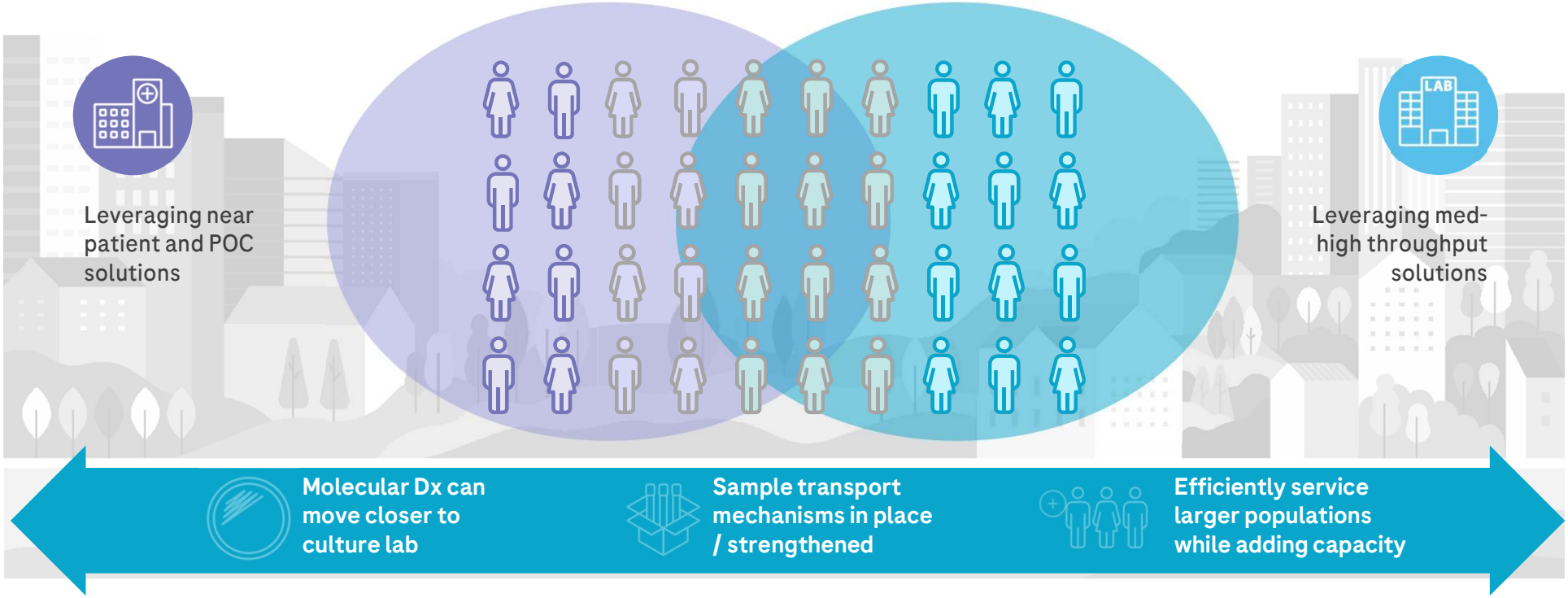
Technology class	Products included in evaluation
Moderate complexity automated NAATs for detection of TB and resistance to rifampicin and isoniazid	Abbott RealTime MTB and Abbott RealTime MTB RIF/INH (Abbott) BD MAX MDR-TB (Becton Dickinson) cobas MTB and cobas MTB-RIF/INH (Roche) FluoroType MTBDR and FluoroType MTB (Bruker/Hain Lifescience)
Low complexity automated NAATs for detection of resistance to isoniazid and second-line anti-TB agents	Xpert MTB/XDR (Cepheid)
High complexity reverse hybridization-based NAATs for detection of resistance to pyrazinamide	Genoscholar PZA-TB II (Nipro)



WHO operational hand book on Tuberculosis: Rapid diagnostics for TB detection

Lab ecosystems include a testing continuum

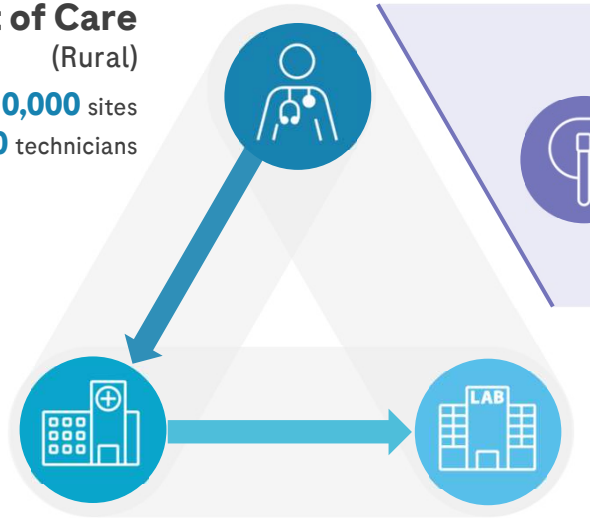
Network optimisation around systems built for specific environments creates service delivery efficiencies



Scaling testing with a multiple partner approach

Supporting the creation of program dynamics with broader diagnostic options

True Point of Care
(Rural)
10,000 sites
2 x 10,000 technicians



Samples can be reallocated to high volume laboratories during spikes in demand as well

Near Patient
(Hub & Spoke)
200 sites
3 x 200 technicians

Urban/Peri-urban
(More populated areas)
10 sites
5 x 10 technicians

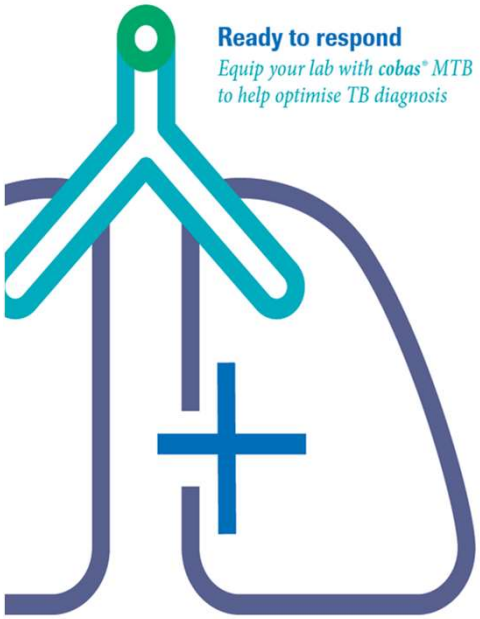
Dynamic flexibility for the program

Reduced risk of sole supplier

Benefit to patients in all settings

| Values are representative.

Optimised Diagnosis - Three TB tests in the portfolio



cobas® MTB	Detects *M. tuberculosis* in raw and processed sputum using two selective sets of primers and two probes uniquely targeting separated regions (**dual-target** – 16S rRNA gene and esx genes esxJ, esxK, esxM, esxP, and esxW) with 86.6% smear-negative sensitivity.
cobas® RIF/INH	Designed as a reflex test together with cobas® MTB to detect Rifampicin-resistance associated mutations of the rpoB gene and Isoniazid-resistance associated mutations in the katG and inhA genes, of *M. tuberculosis* to enable rapid treatment optimization
cobas® MAI	Duplex test designed to detect and differentiate *M.avium* and *M.intracellulare* DNA directly in respiratory specimens. Targets two prevalent species of the Mycobacterium avium complex (MAC) that are commonly associated with pulmonary nontuberculous mycobacterial disease

Flexibility with three sample types

Raw Sputum

Un-processed sputum. Sometimes used for direct AFB smear.

Sputum Sediment

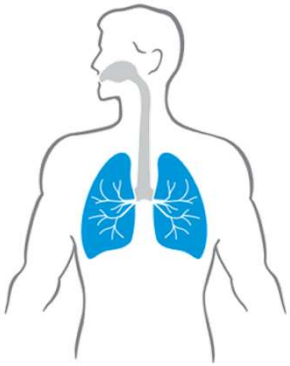
Sputum pre-treated by the NALC-NaOH method, which kills accompanying bacterial flora while keeping mycobacteria alive.

Typically used for routine testing including AFB smear, culture verification and PCR..

Bronchoalveolar Lavage (BAL) Sediment

BAL pre-treated by the NALC-NaOH method, which kills accompanying bacterial flora while keeping mycobacteria alive.

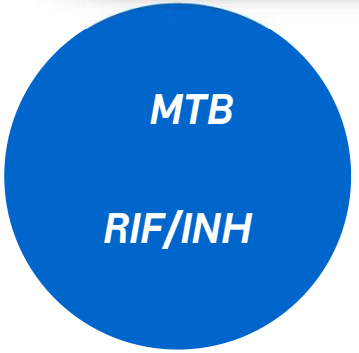
One Patient sample, 1 pre-analytic treatment, 2 results



1 Patient Sample

1 MIS treatment

1 Sonication



2 results

cobas MIS = microbial inactivation solution

Differential diagnosis to support clinical decisions

If patient presents with TB symptoms

cobas® MTB

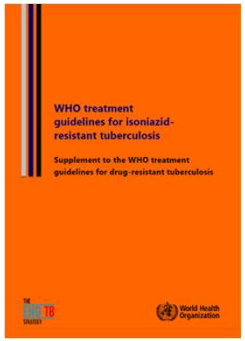
If positive

Evaluate for drug resistance

Reflex MDR testing

cobas® RIF/INH

Integrated RIF/INH testing to help identify MDR-TB



2018.World Health Organization. ISBN 978-92-4-155007-9

Global surveillance on MDR TB based on RIF resistance

About 8% of TB patients worldwide are estimated to have rifampicin susceptible, isoniazid-resistant TB (Hr-TB)

Globally, Hr-TB is more prevalent than MDR-TB. Efforts need to be made by all countries to move towards universal testing of both isoniazid and rifampicin at the start of TB treatment

cobas® RIF/INH

No extra sample
Same sample from **cobas®** MTB

No extra cost.
Included in the **USD 9.90** Cobas MTB, reagents and consumables pricing model.*

*Pre-analytic instrument (sonicator) also included

cobas® MTB test performance

Dual target MTB tests typically have approximately 85% smear-negative sensitivity

		High sensitivity		
Firm	Optimal Capacity per Run	MTB Smear Negative	LoD	Resistance
Roche cobas® MTB	**94**	**86.6%** (IFU)	**7.6 – 8.8 CFU/mL** (IFU)	**MDR** Same collection
Abbott m2000 MTB	**94**	**81%** (IFU)	**17 CFU/mL** (IFU)	**MDR** Depends
BD MAX MTB/XDR	**24**	**81.5-85.1%** (IFU)	**20 CFU/mL** (IFU)	**MDR** Same collection
Cepheid MTB/RIF Ultra	**4 – 16**	**84%** (+17%) (WHO publication)	**16 CFU/mL** (WHO publication)	**MDR, XDR** Depends

Note: Performance data is for information purposes only and cannot be directly compared because a head-to-head study was not done.

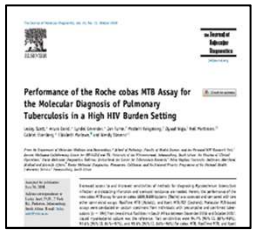
Instructions for Use. Roche cobas MTB. Doc. Rev. 1.0. Jun, 2018. | Instructions for Use. Abbott RealTime MTB. REF 08N15. June 2015. | World Health Organization. WHO Meeting Report of a Technical Expert Consultation: Non-inferiority analysis of GeneXpert MTB/RIF Ultra compared to GeneXpert MTB/RIF. Geneva: World Health Organization; 2017 (WHO/HTM/TB/2017.04). Licence: CC BY-NCSA 3.0 IGO. | Obasanya J, et al. FluoroType MTB system for the detection of pulmonary tuberculosis. ERJ Open Res 2017; 3: 00113-2016 [https://doi.org/10.1183/ 23120541.00113-2016].

External publications for cobas® MTB

Demonstrated performance in sensitivity and accuracy in various context

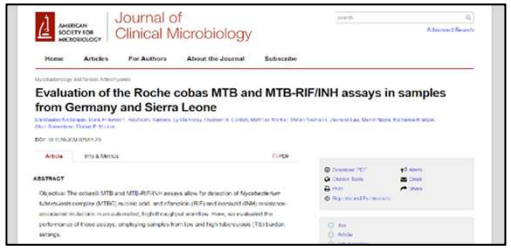
Margaretha de Vos et al.

- FIND study assessed 4 platforms
- Roche has similar or lower LoD for MTBC compared to Xpert MTB/RIF



Lesley Scott et al.

- Performance of MTB assay in high HIV burden settings (South Africa)
- cobas MTB sensitivity was unaffected by HIV coinfection



Nadarajan et al.

- Performance evaluation
- Accurate detection of MTBC DNA and resistance-associated mutations in respiratory samples

The new cobas® 5800 System to expand reach of testing

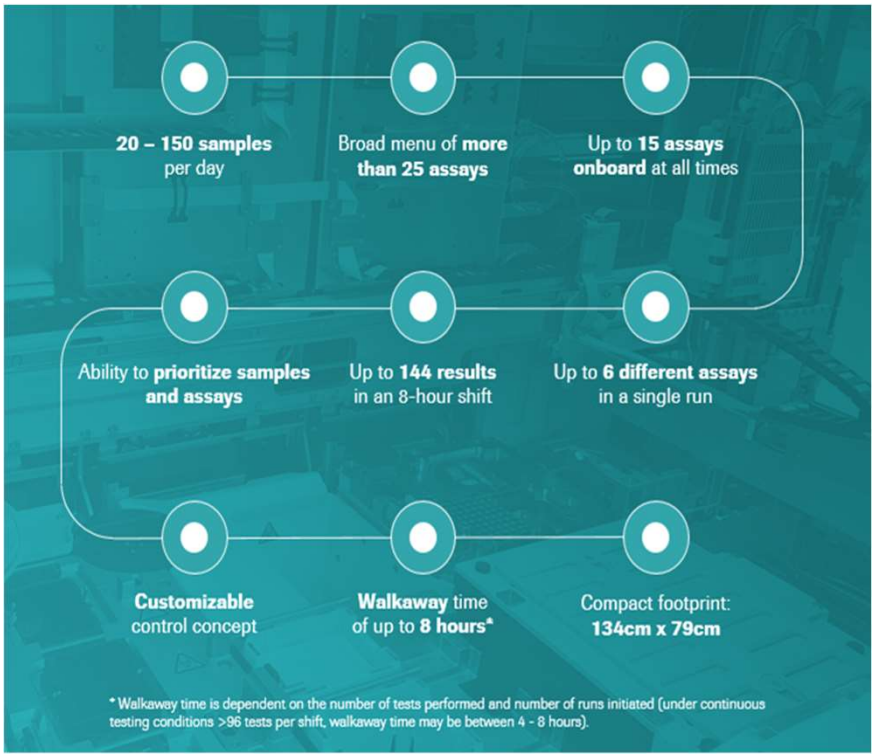
Compact footprint with flexible sample processing, integrated testing and full automation

Automation

Consolidation

Integration

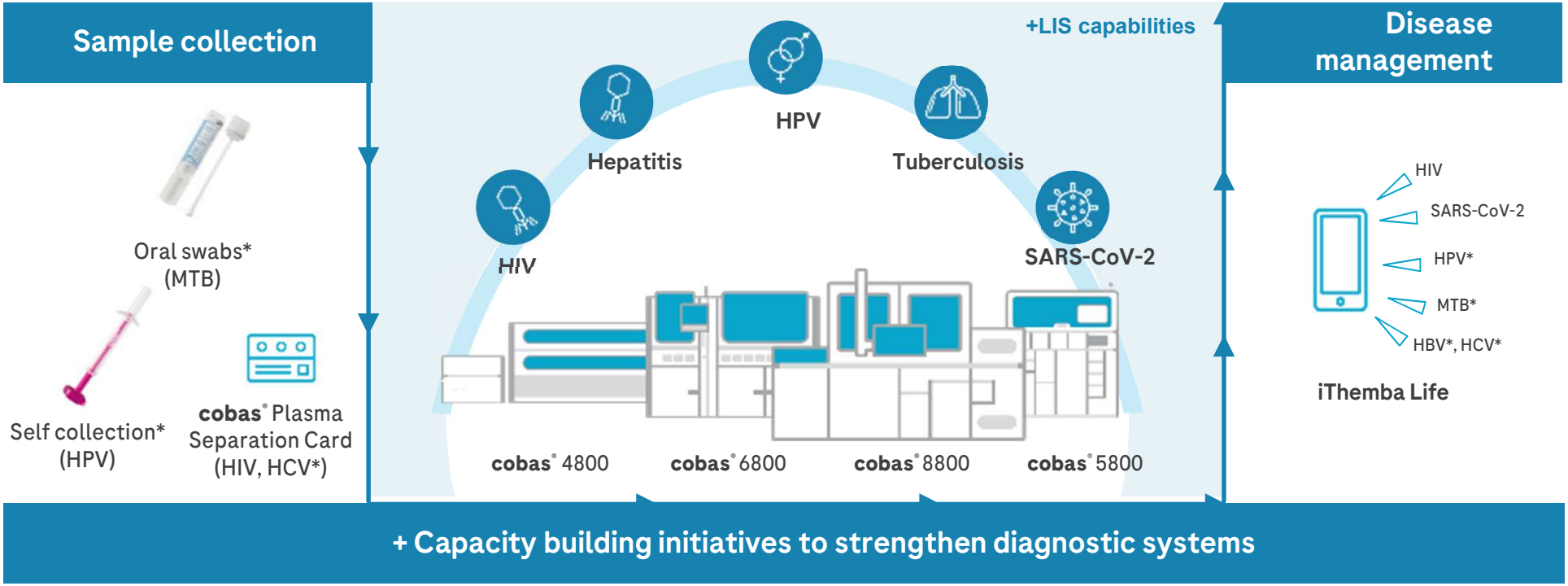
Standardization



Source:cobas® 5800 brochure

Supporting integrated testing & end to end solutions

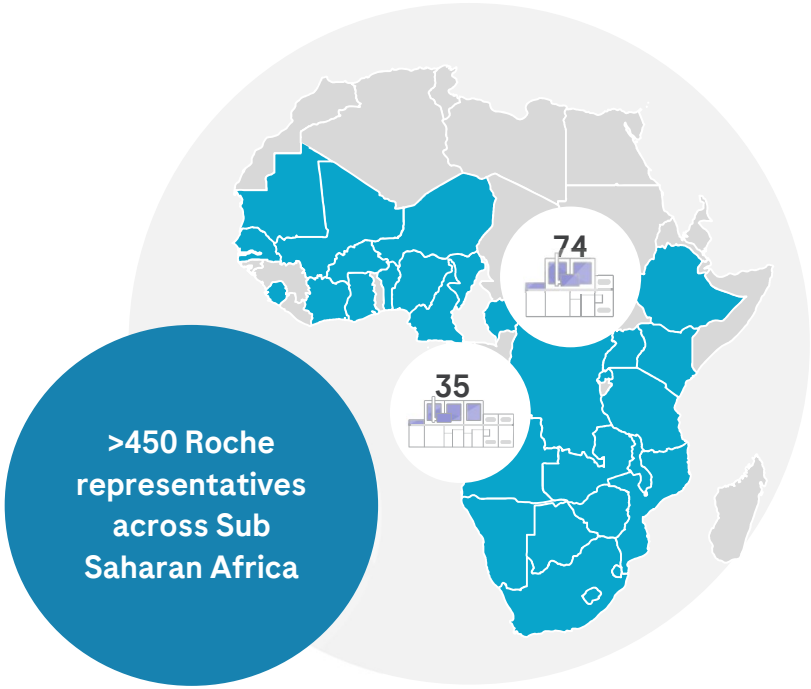
Consideration for sample collection, transport to result return approaches customised for country needs



**Under investigation and/or development; currently not part of claims*

Roche experience, presence and commitment across Africa

Decades of support in scaling up HIV VL and EID programs can be leveraged to support TB programs

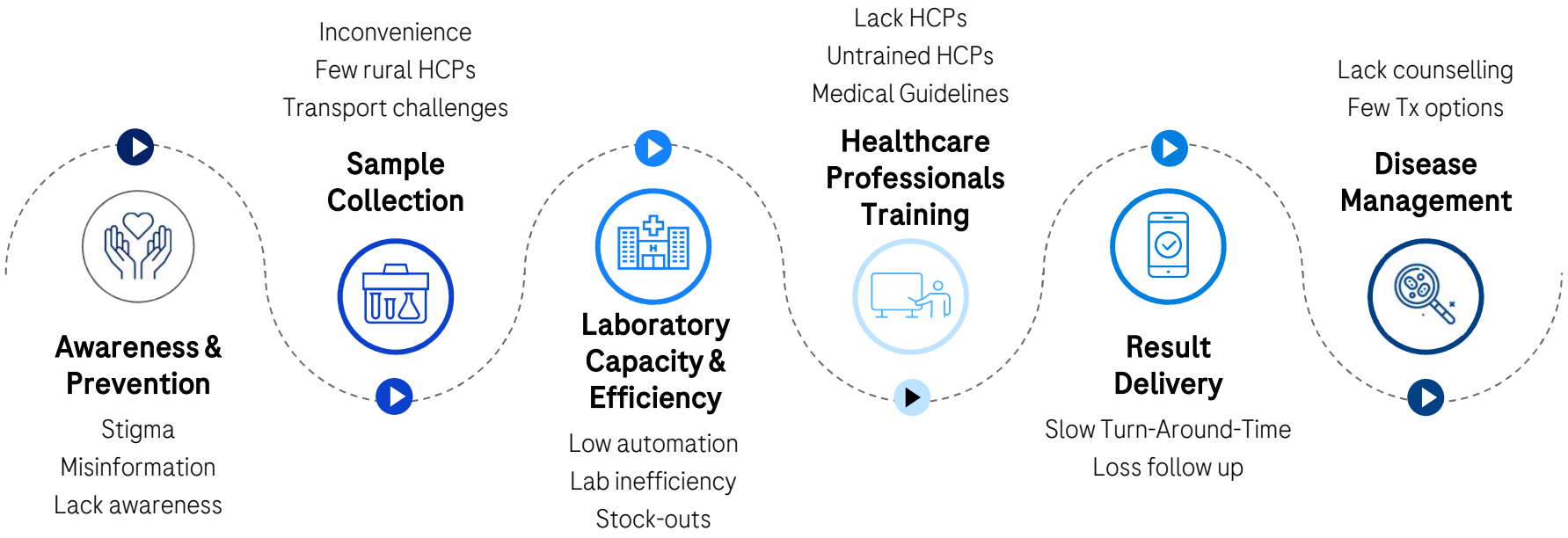


- Support **network optimisation for TB** programs to complement current approaches **building capacity, scale and reach**
- **Reduce risk** for programs and laboratories creating **more testing options** and ability to **integrate TB testing** with existing systems
- Support **patient disease management** (adherence for treatment success & MDR) with **digital solutions** (eg iThemba Life)
- Create programs that are **resilient and can scale** to focus on sustainable **TB eradication**

| Install base as of December 2021 which represents significant testing capacity

Beyond test performance to address challenges along the patient journey

End-to-end solutions to support sustainable programs and build local capacity

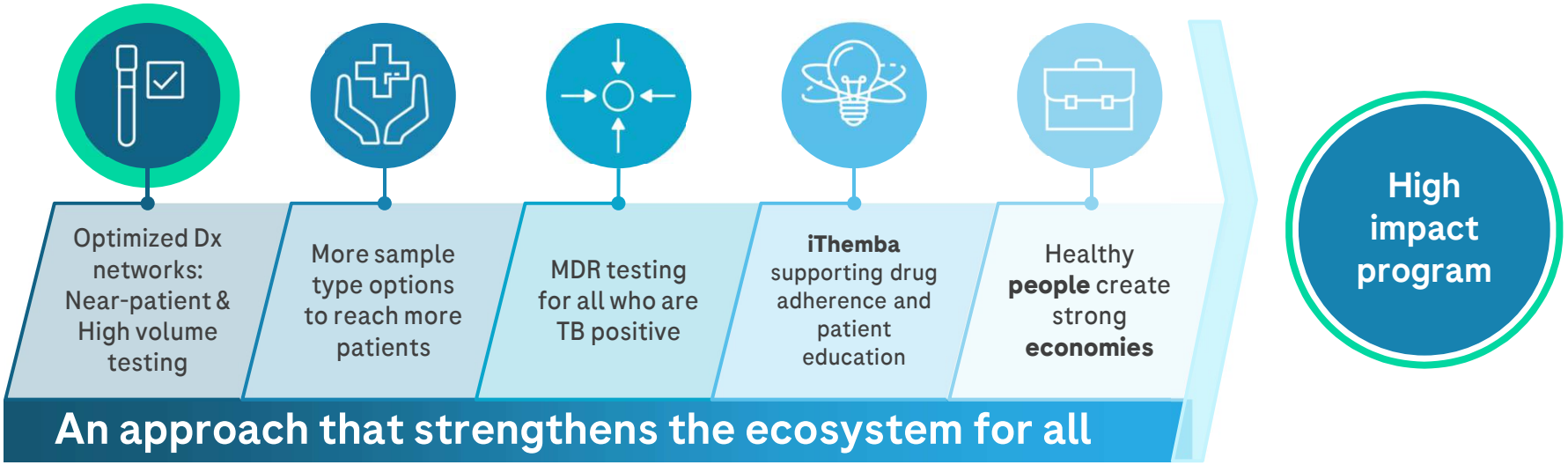


Patient centered approach to improve health outcomes

HCP: Health Care Professionals, Tx: Treatment

Partnering to support scale up of testing for TB elimination

End to end solutions and expanded diagnostic options support eradication efforts



Doing now what patients need next

Presented by:
Roche Diagnostics (Pty) Ltd
Building E, Hertford Office Park
90 Bekker Road, Vorna Valley,
Midrand
1686, South Africa
Tel: +27 11 504 4600
MC-ZA-00845