

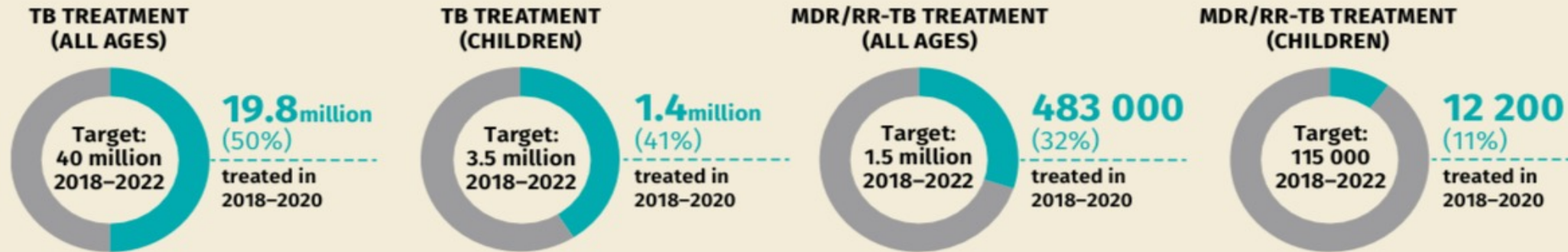


# TB Innovations & Uptake

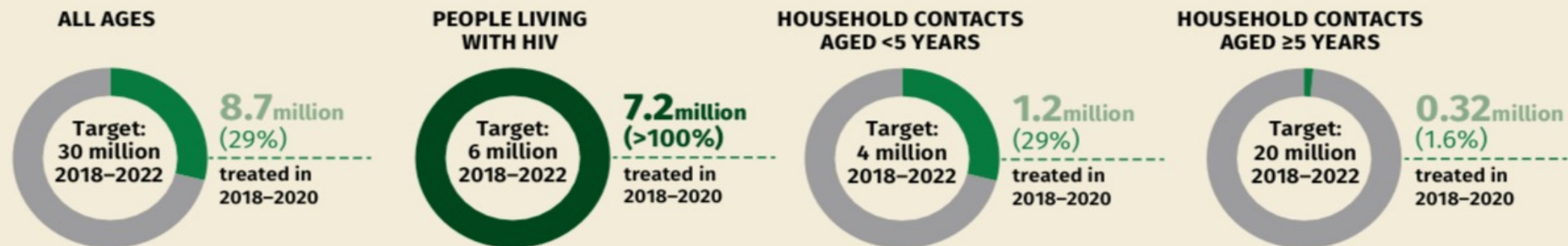
Lalaine L. Mortera, MD, FPCCP



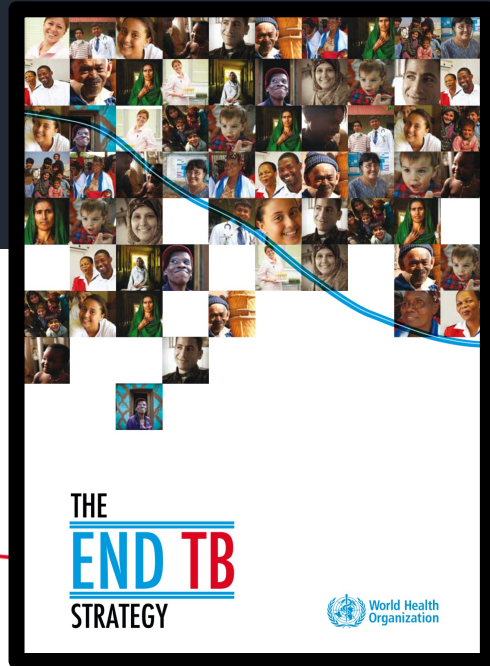
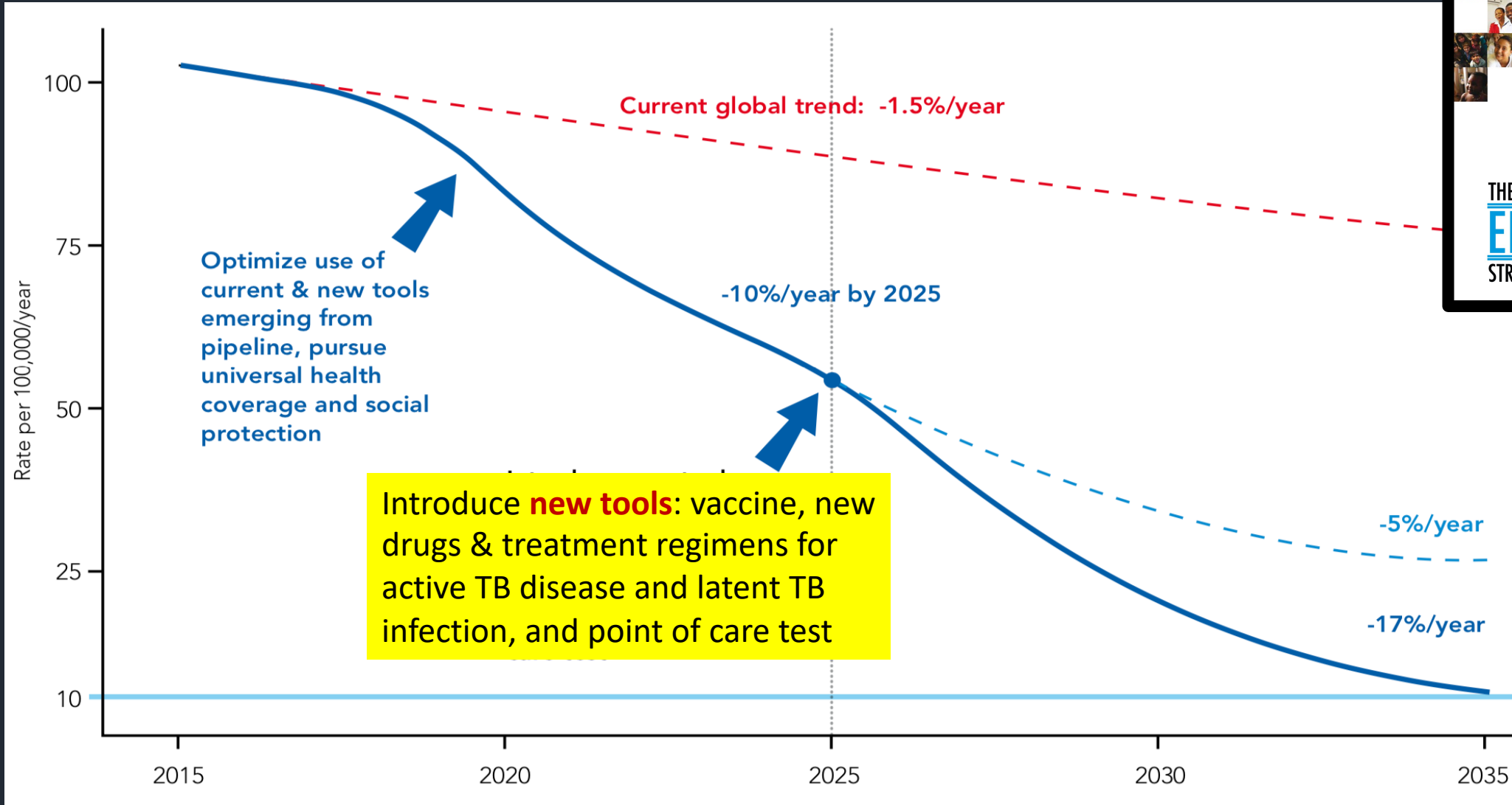
## UN high-level meeting on TB: Treatment targets



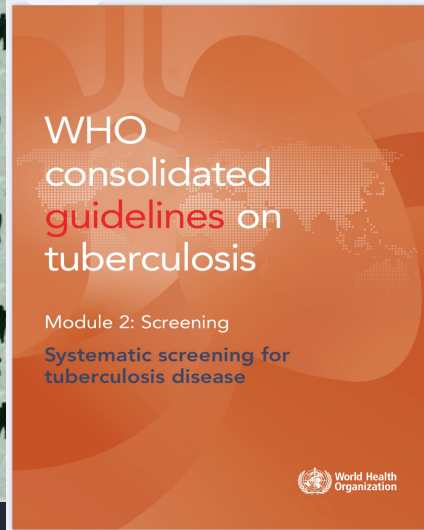
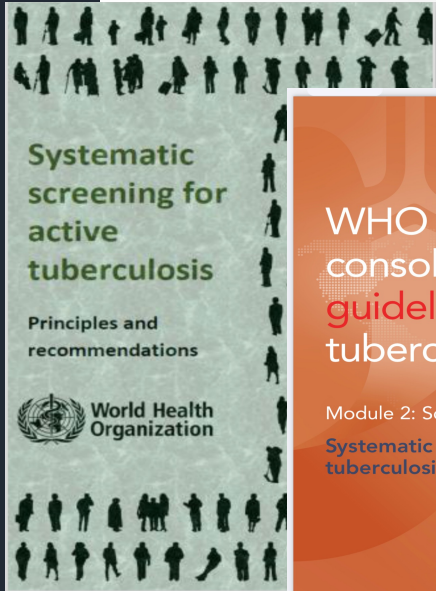
## UN high-level meeting on TB: TB preventive treatment targets



# New tools and regimens needed to reach 2035 targets in global TB incidence rates



# 1 Innovations in Screening



## Learnings from the National TB Prevalence Survey, 2016:

Among the bacteriologically confirmed TB:

- 2/3 **missed** by symptom screen alone
- 98.3% had abnormal chest x-ray findings
- 10% had no risk factors and had no 2-weeks cough and/or hemoptysis

Triggered a major shift in screening approaches:

- From passive to *active, intensified, enhanced* case finding
- More sensitive screening tools (chest x-ray) to triage and identify presumptive TB early
- Use of rapid molecular tests (not sputum microscopy) in active case finding



# WHO consolidated guidelines on tuberculosis

Module 2: Screening

Systematic screening for  
tuberculosis disease



## Screening for TB in Targeted Populations

### Strong Recommendation:

- Persons living with HIV (PLHIV) (*NNS 10, 74 studies*)
- Household/close contacts of TB (*NNS 17, 89 studies*)
- Prisons and penitentiary institutions
- Works with silica exposure (*NNS 36, 18 studies*)

### Conditional recommendation:

- Among people with risk factor for TB **seeking care other than TB symptoms** in areas with TB prevalence 100/100,000 in the general population
- Untreated fibrotic CXR lesion
- Subpopulations with structural risk factors for TB (homeless, remote or isolated, indigenous, migrants)

# WHO consolidated guidelines on tuberculosis

Module 2: Screening

**Systematic screening for  
tuberculosis disease**



## Risk Factors for TB for Priority Screening

1. Fibrotic CXR lesion
2. Diabetes Mellitus (1.5-2 to 3.1x)
3. Previous TB
4. Chronic lung diseases (2.5 to 3x)
5. Smoking (1.5-2 to 3.3x)
6. Alcohol use disorder (1.35-1.9x to 3-3.33x)
7. Substance use disorder
8. Malnutrition
9. Pregnancy
10. Immunocompromised - organ transplant, renal failure (100x), chronic dialysis (10-25x)
11. Healthcare workers (2.94x)



# WHO consolidated guidelines on tuberculosis

Module 2: Screening

Systematic screening for  
tuberculosis disease



## Screening Tools for TB

### Strong Recommendation:

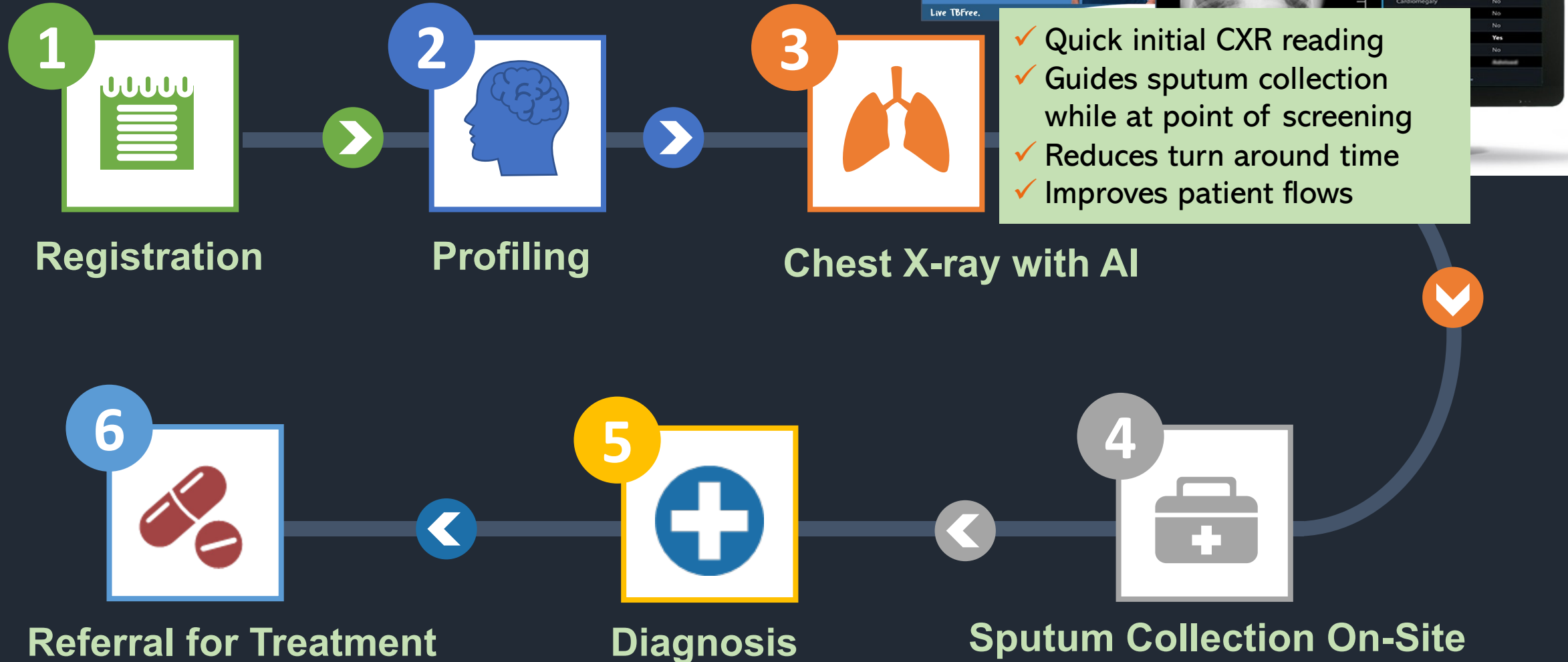
- Any of the 4-symptom screen (cough, fever, weight loss, night sweats)  $\pm$  CXR among PLHIV, close contacts

### Conditional recommendation:

- Computer-aided detection software in place of human readers for interpreting CXR and triage for TB ( $\geq 15$ yo)
- C-reactive protein ( $>5\text{mg/L}$ ), CXR or WHO recommended rapid diagnostic tests among PLHIV

# Step-by-Step Patient Flow/Process

Walk-through in 10-15 minutes







## Sites:

- Batangas Medical Center, Batangas City, Batangas
- Jose B. Lingad Memorial Regional Hospital, San Fernando City, Pampanga
- Amang Rodriguez Memorial Medical Center, Marikina City, Metro Manila



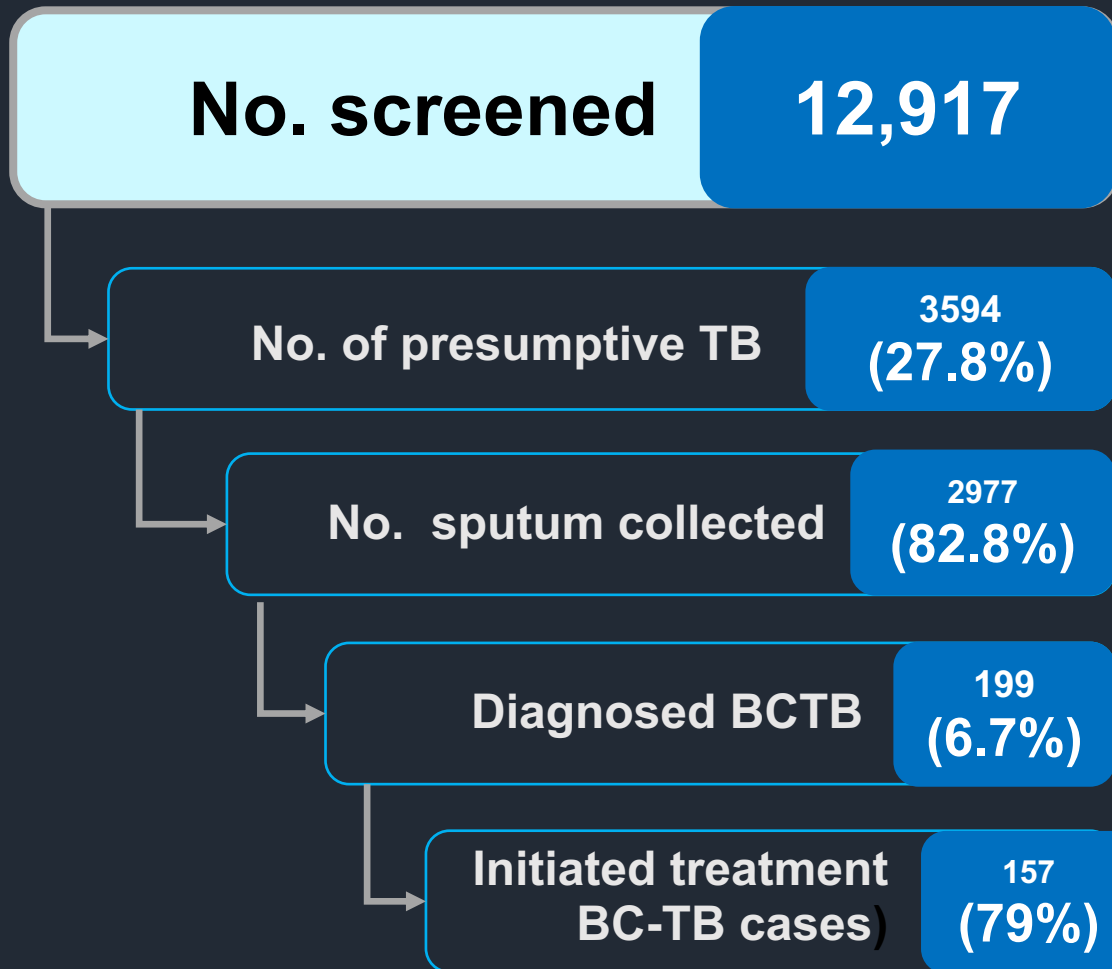
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# Artificial Intelligence (AI) Use in 3 Tertiary Government Hospitals



## Overall BCTB Yield Rate

1-2 TB cases/100 screened (1.54%)

**Number needed to Screen: 67**

## Overall BC/CDTB Yield Rate

Total=679 (5.26%)

**Number needed to screen: 19**

**49.7% of BCTB cases had no S/Sx**

99 cases would have been missed without CXR-AI



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# Implementing Partners:



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# Program Impact

ICF using  
CXR with AI  
2019

Community Mass  
Screening in 3 Big  
Regions using  
CXR alone (2018)

**BC-TB Yield Rate**

**1.6%**  
(patients and  
companions)

**1%**

**Sputum  
Submission Rate**

**84.1%**  
(2x higher)

**35% to 48%**

- Availability of CXR with AI to triage TB improved early lost-to-follow-up rate
- Overall cost analysis showed cost effectiveness
  - Cost loss of USD1,428 (cost of detecting BC case without CXR)
  - Cost loss of USD 1,308 (cost for missed or undetected TB cases)

**USAID's TBIHSS GPPI:** ICF Among Outpatients and their Companions by A.I.-Read Chest Xray for Tuberculosis Triage

# Cost-Effectiveness Study for CXR-AI in Public Facilities

- Chest x-ray
  - Reduced TB incidence by 1197 and around 55 deaths over 10 years either with AI or human reader
  - Cost of DALY due to TB averted by P43,376 with AI and P47,667 with human readers
  - Requires additional P633 for AI vs P695 for human reader per case
- Use of AI
  - Saved **8.3 hours** in waiting and travel per case screened
  - Saved P95 out-of-pocket expense per case screened
  - TB catastrophic cost reduced by at least 0.5% of average HH income
  - Averted productivity losses by P2,200 per screened person diagnosed and P283,203 per screened person treated for TB

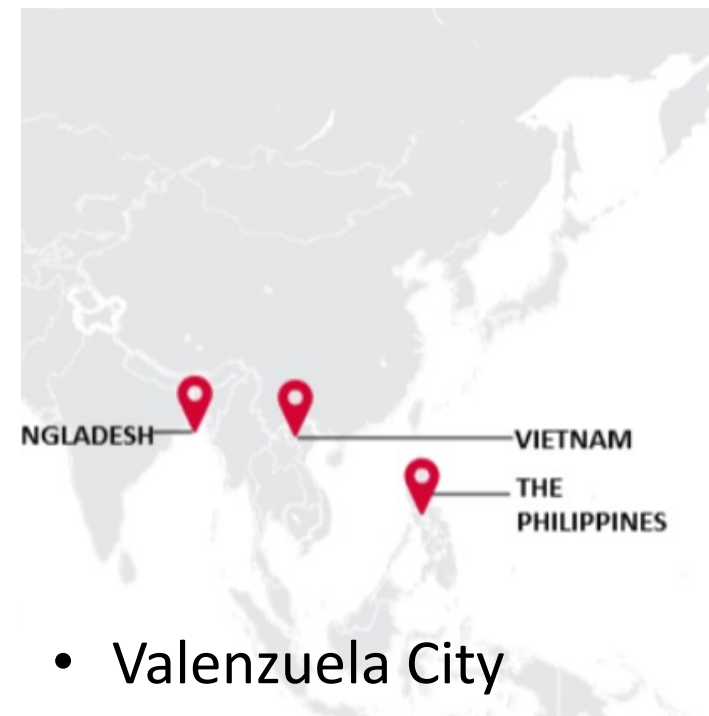
## Recommendations:

- Assess feasibility of mainstreaming
- Analyze political and operational requirements
- Study acceptability among local practitioners
- Consider financing options for LGUs



# ULTRA-PORTABLE DIGITAL X-RAY SYSTEMS

The Introducing New Tools Project (iNTP)



- Valenzuela City
- Tarlac
- Bataan
- Laguna
- Cebu Province
- South Cotabato

## 2

## Innovations in Testing



Philippines  
TB LABORATORY NETWORK  
STRATEGIC PLAN 2018-2020  
A Sub-Plan of PhilSTEP1



Shift to rapid molecular testing



# — Laboratory Strengthening

- 50 GeneXpert Laboratories installed with Laboratory Connectivity (DataToCare)
- Optimized Specimen Referral System (OSRS) in Quezon Province, soon in Cebu and Quezon City
- Partnership with the Philippine Flying Labs to demonstrate use of drone technology for specimen transport in remote sites
- Operations research on the use of stool in the diagnosis of TB in children
- 38 TrueNat Machines in peripheral laboratories and point of care community screening
  - 8 are paired with ultra-portable CXR





# Community Case Finding Activities in Geographically Isolated and Depressed Areas (GIDA)





# Implementation – SOCCSKSARGEN





# Implementation (Central Visayas)



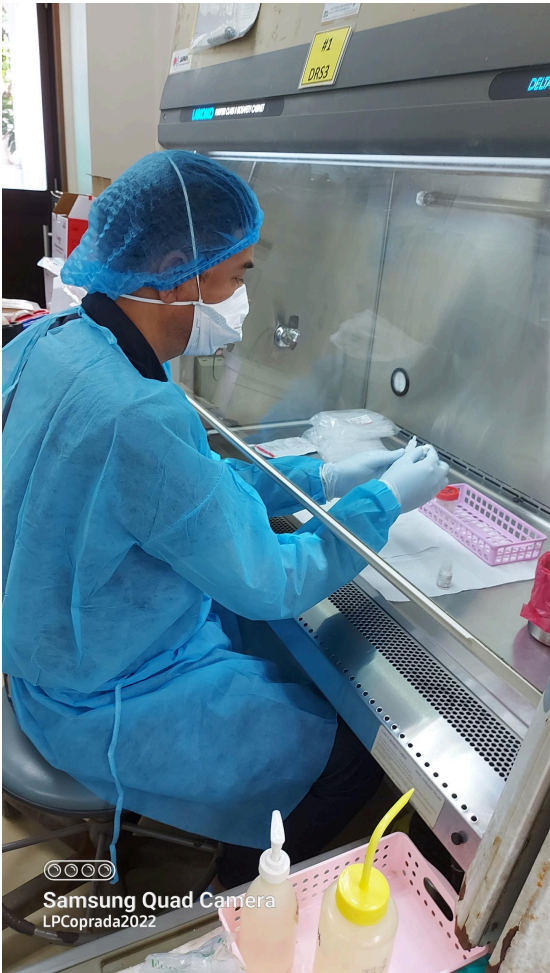


# Clustered Demo Training Series (Central Visayas & SOCCSKARGEN)





# Clustered Demo Training Series (NCR & Central Luzon)



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### 3 Private Sector Engagement in Testing

#### The Philippine Private Sector Diagnostic Consortium

A **national platform convening** influential players in private diagnostics, negotiates **concessional pricing** via pooled procurement (high volume – low price strategy), to increase **accessibility to quality, affordable** TB diagnostics in the private sector

#### Conditions:

- Provide uniform pricing to patients
- Provide quality assured diagnostic services
- Notify DOH
- Be monitored



*Providing quality diagnostics within your reach*



**For more information:**

[philcat.ppsdc@gmail.com](mailto:philcat.ppsdc@gmail.com)

<https://theconsortium.ph>

Improved Access to Rapid molecular testing in the private sector



Costs reduced *from second highest* in the world *to the third cheapest*

|                        | Current          | Consortium       | Price Reduction |
|------------------------|------------------|------------------|-----------------|
| Test Cost (to patient) | P8,394 (average) | P2,268 (uniform) | 73.0%           |

- 23 members to date (15 hospitals, 6 clinics, 1 lab network and 1 HMO) from five (5) regions (NCR, 1, 4A, 4B and 7)
- Procured **PHP 27M** worth of 18 GeneXpert systems (2-, 4-, 8- and 16-module machines) and 20,800 cartridges as of March 2022
- 12,045 tests done with 23.2% positivity rate, 6.5% had rifampicin resistance
- Savings of PHP 67M if tested in commercial non-consortium members
- Soon to offer testing for HIV viral load, SARS-COV-2, HPV and HBV



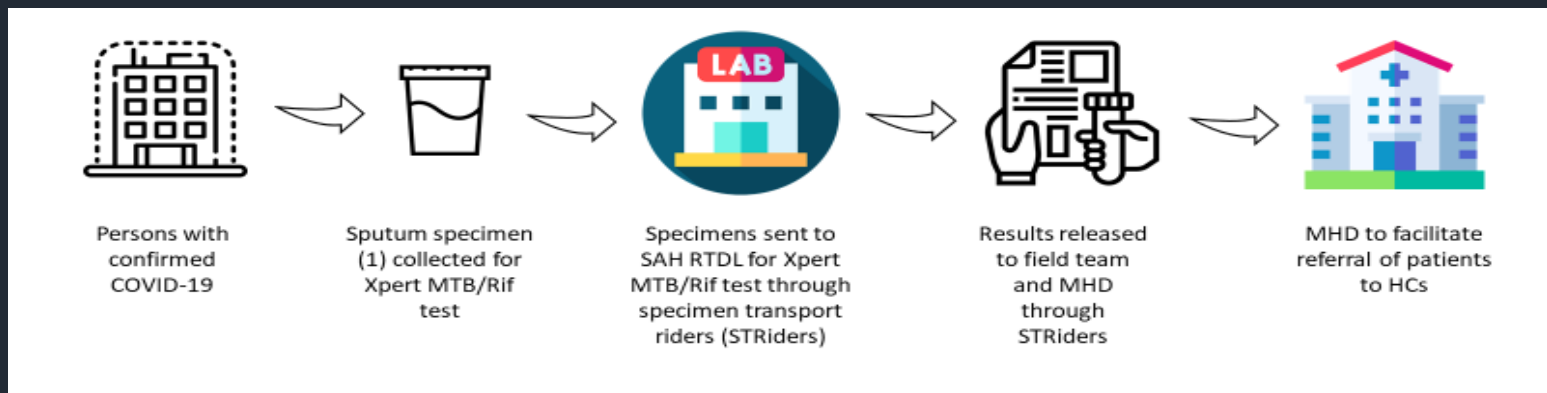
Partner for Pooled Procurement for Other Goods

With Technical Support from:

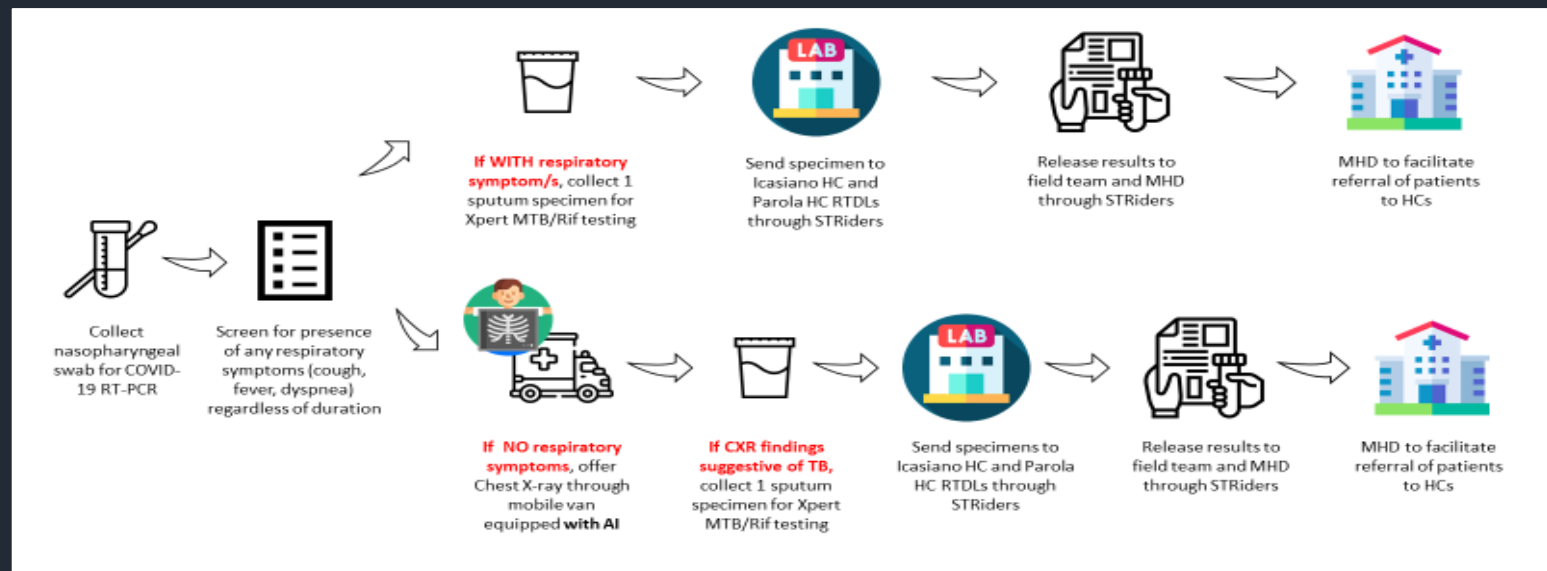


# 4 TB-COVID-19 Bidirectional Testing

## A. Algorithm in quarantine/isolation facilities



## B. Algorithm in swabbing facilities

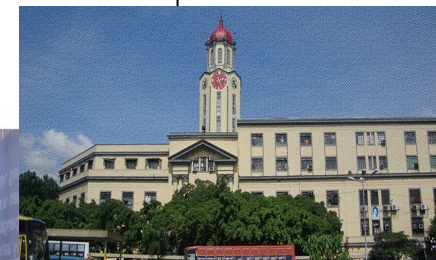


INSIDE DEVELOPMENT | GLOBAL HEALTH

## How Manila is using its COVID-19 response to find TB patients

By Jenny Lei Ravelo // 16 September 2021

Global Health Philippines



## MANILA LGU OFFERS FREE X-RAY

The Manila city government now offers free chest X-ray for residents and non-residents following the implementation of the country's first bidirectional screening and testing for coronavirus disease (COVID-19) and Tuberculosis (TB).

#BeFullyInformed

## Dual testing for TB and SARS-CoV-2 in Manila (Philippines)

Consolidated report of country success stories in mitigating the impact of the COVID-19 pandemic on TB services



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5

# Electronic TB Medical Advisory Committee (eTBMAC)

A web-based platform interfaced with a mobile health application that is interoperable with ITIS to provide effective and efficient support on challenging cases of TB from the TB MAC to the medical frontliners using digital technology



## Regional Coverage

**LUZON**

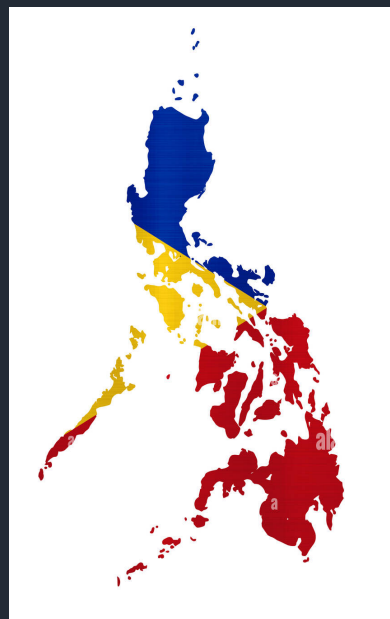
**1, 3, 5, CAR, NCR**

**VISAYAS**

**6 and 8**

**MINDANAO**

**10, 11, 13**



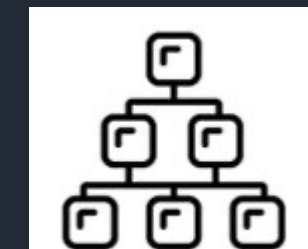
## Case Referral, 2022

|    |          |
|----|----------|
| 4  | January  |
| 25 | February |
| 47 | March    |
| 19 | April    |
| 28 | May      |



## Type of Referrals

|    |                   |
|----|-------------------|
| 45 | Enrolment         |
| 57 | Case Management   |
| 21 | Treatment Outcome |



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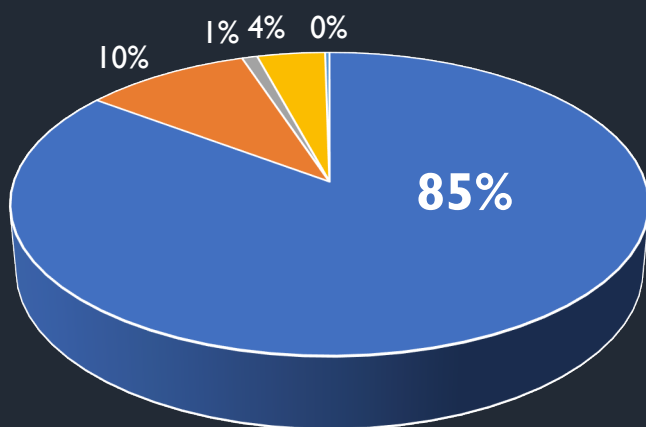
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# 6 All Oral Regimens for Drug-Resistant TB

## Treatment Outcomes of Patients under Standard All-Oral Regimens, 2019

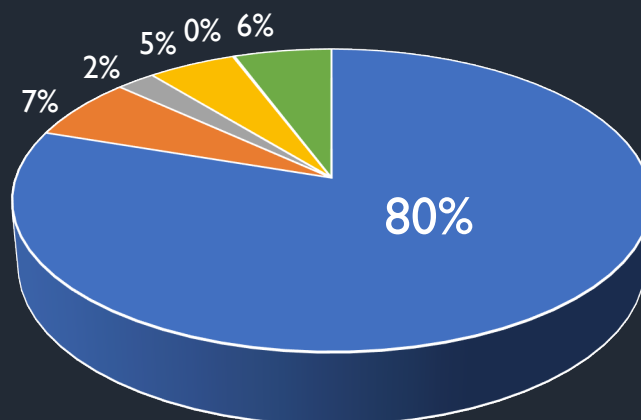
Total Number of Patients = 785  
(2 patients were excluded)



- Cured/Completed
- Failed
- On Treatment
- Died
- LTFU

## Treatment Outcomes of Patients under Standard All-Oral Regimens, 2020

Total Number of Patients = 3078  
(4 patients were excluded)



- Cured/Completed
- Failed
- Not Evaluated
- Died
- LTFU
- On Treatment

Table 18. Type of MDR-TB and RR-TB treatment regimens

| Regimen name   | Type of DR-TB   | Regimen*   | Remarks   |
|--|---|--|---|
| Regimen 3:<br>Standard Short All Oral<br>Regimen<br>(SSOR)                           | MDR-TB and RR-TB<br>eligible to SSOR  | 4-6 months:<br>Lvx-Bdq(l)-Ctz-Prs-E-Z-HdH<br>(Bdq shall always be given for 6<br>months)<br>5 months:<br>Lvx-Ctz-Z-E |   |
| Regimen 4:<br>Standard Long All<br>Oral Regimen for FQ<br>Susceptible<br>(SLOR FQ-S) | MDR-TB and RR-TB<br>eligible to SLOR<br>(no FQ resistance)                  | 6 Months:<br>Lvx-Bdq-Lzd-Ctz<br>12-14 months:<br>Lvx-Lzd-Ctz   | Request for "off-<br>label" use at TB<br>MAC if extending<br>use of Bdq beyond 6<br>months. |
| Regimen 5:<br>Standard Long All<br>Oral Regimen for FQ<br>Resistance<br>(SLOR FQ-R)  | MDR-TB and RR-TB<br>eligible to SLOR<br>(with FQ resistance)                | 6 Months:<br>Lzd-Bdq-Olm-Ctz-Cs<br>12-14 months:<br>Lzd-Ctz-Cs   | Request for<br>"off-label" use of<br>Bdq and Olm<br>combination at TB<br>MAC.               |
| Individualized treatment<br>regimen (ITR)  | Retreatment MDR-TB and<br>RR-TB cases<br>(not eligible to SSOR nor<br>SLOR) | Construct to have at least 4-5<br>likely effective drugs   | Present the case at<br>TB MAC and follow<br>their advice for the<br>regimen design          |

\* Z=Pyrazinamide, E=Ethambutol, Bdq=Bedaquiline, Olm=Odelamanid, Lvx=Levofloxacin, Ctz=Clofazimine, Lzd=Linezolid, Cs=Cycloserine, Prs=Prothionamide, HdH=high dose isoniazid



# 7

## Innovative treatment adherence tools

KNCV  
TUBERCULOSIS FOUNDATION



RESEARCH BEGINS INTO NEW  
DIGITAL TOOLS TO SUPPORT  
PATIENTS AND HEALTHCARE  
WORKERS THROUGH  
TUBERCULOSIS TREATMENT

04/08/2021



Smart Pillbox



Medication Label



Video-Observed Treatment (VOT)

## 8

# TB Reporting and Notification Platforms and Apps



## ITIS Ph Mobile Development

*Available in both iOS and Android*

- Case Management
- Laboratory Module
- Mini Reports
- Daily DOT Diary

- Available in both IOS and Android
- Individualized notification dashboard for the notifying physician
- In-app registration and profile update





# 8

## TB Reporting and Notification Platforms and Apps



### TB Data Warehouse Design and Development

- Automation of Data Cleaning Report
- KPI Analysis of RaceTB - to Go Live
- National TB Program Reports Design
- Ad-hoc Reporting Platform

### Other implementations:

- Deduplication Process
- Standard Facility ID across ITIS Platform
- Automated Notification via FHIR-based Application Program Interface (API)



### ITIS Alerts

#### Email alerts:

- No treatment Outcome
- Follow Up of Conduct of Diagnostic Test
- Initial Loss to Follow Up

#### SMS:

- Available Laboratory Results (Facility use)
- User Account Validation needed (Regional administrator)



# To ensure uptake of innovations:

- Patient-centered and responsive
- Evidence-based (health technology assessment)
- Integration-ready in the context of universal health care



**Ending TB is  
everybody's  
business**

**#TBFreePH**