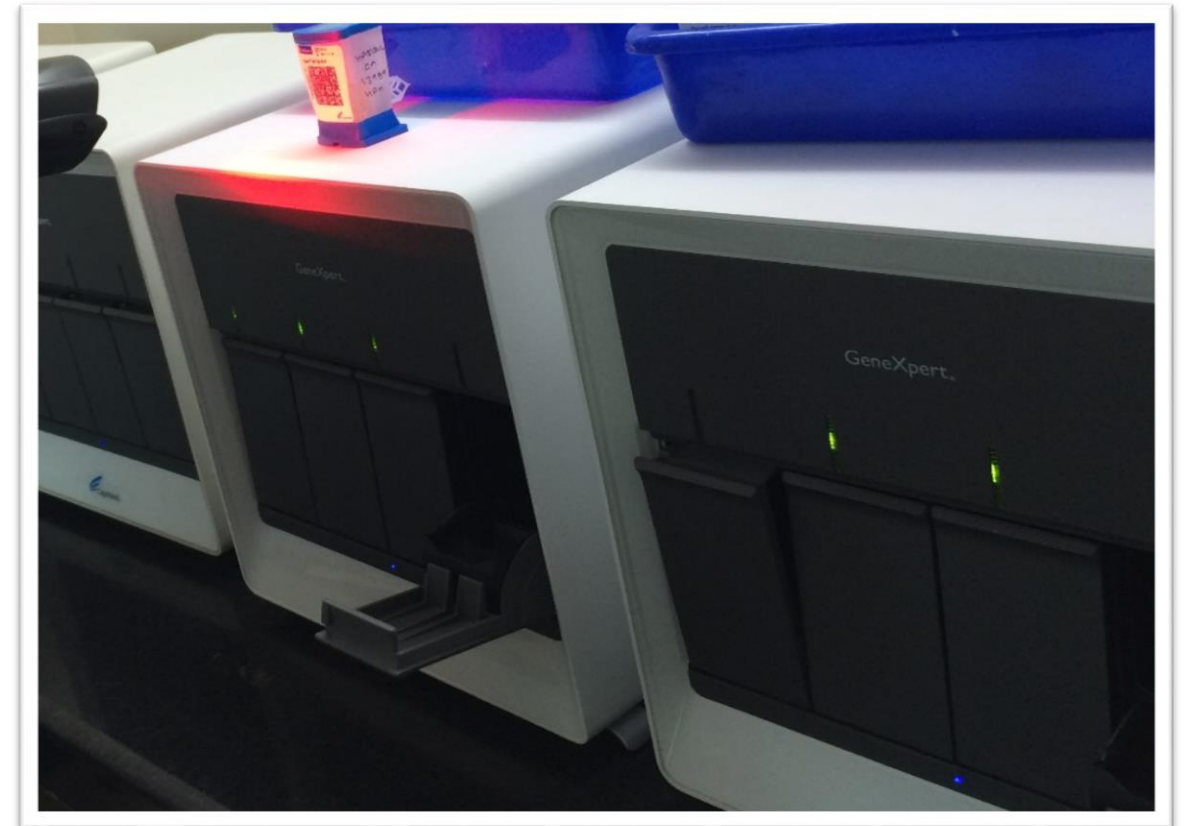




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**CHALLENGE**  **TB**

**Accelerating access to  
quality TB care for  
presumptive paediatric  
TB patients through  
improved diagnostic  
strategies**



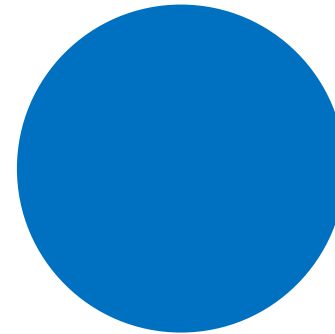
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# Current **progress** = Too **Slow** to reach 2035 target?

WHO Strategy Target  
For 2035

2013 Global TB incidence

It would take  
until 2180



target  
10 / 100k

global  
125 / 100k

1990

2000

2010

2020

2030

# Background

- Burden of childhood TB is not well understood
  - TB in children not upfront suspected
- Challenges in diagnosis of TB in children
  - Difficulty in obtaining quality specimen
  - Low sensitivity of widely available low costs tools (smear microscopy)
  - Affordability challenges wrt. high sensitivity tools in the private sector
- Diagnosis based on clinical criteria &/or triad of:
  - History of contact with TB case
  - CXR
  - TST
- >80% of Pediatric TB cases- Clinically diagnosed
- No scope of diagnosing Rif resistant TB, which is laboratory diagnosis

## Diagnostic algorithm for Pediatric Pulmonary TB

- Persistent Fever  $\geq 2$ wk, without a known cause and/or
- Unremitting Cough for  $\geq 2$ w and/or
- Wt loss of 5% in 3m or no wt gain in past 3 months

CBNAAT\* (on sputum)

\*If CBNAAT is not readily available, smear microscopy should be performed

MTB not detected OR Sputum not available

MTB detected

Microbiologically confirmed TB Case

X-Ray and TST

XRC highly suggestive

CXR NS shadows  
TST -ve

CXR Normal  
TST +ve

CXR Normal  
TST -ve

Gastric Aspirate/  
Induced Sputum for CBNAAT

Give course of  
Antibiotics

Evaluate for EPTB  
Refer to expert

+ve

-ve

Persistent shadow  
and symptoms

Look for  
alternate cause

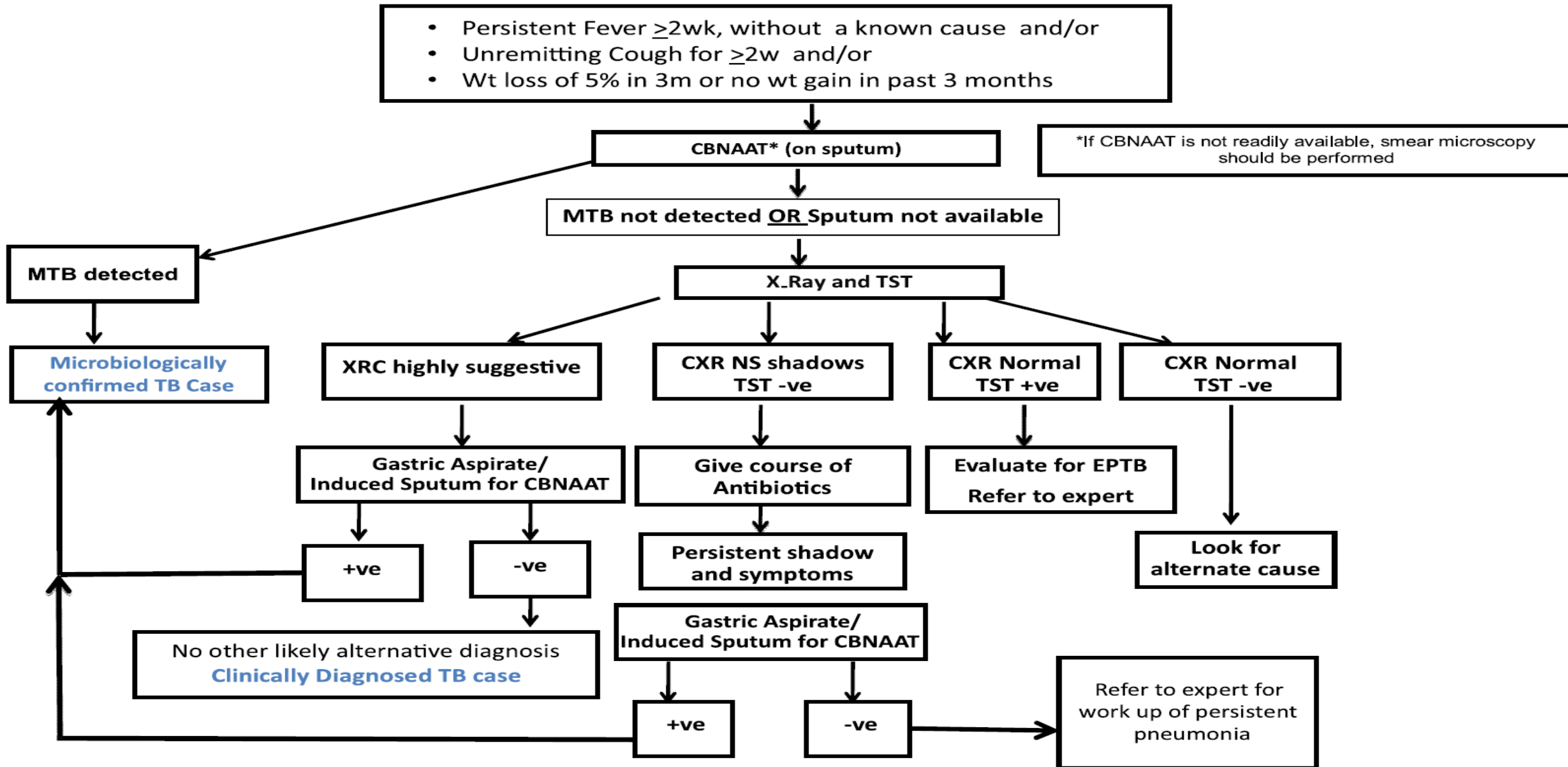
No other likely alternative diagnosis  
Clinically Diagnosed TB case

Gastric Aspirate/  
Induced Sputum for CBNAAT

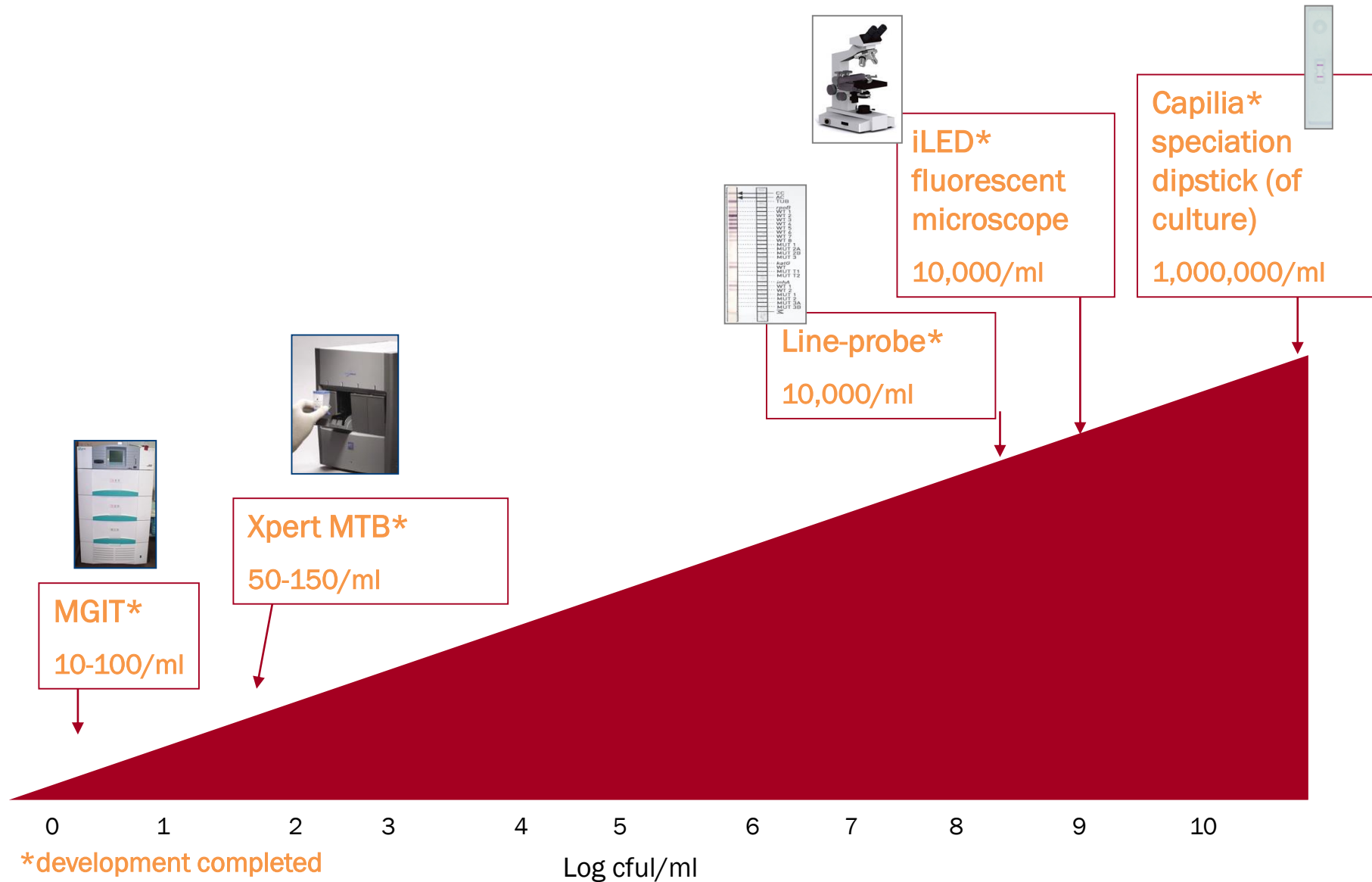
+ve

-ve

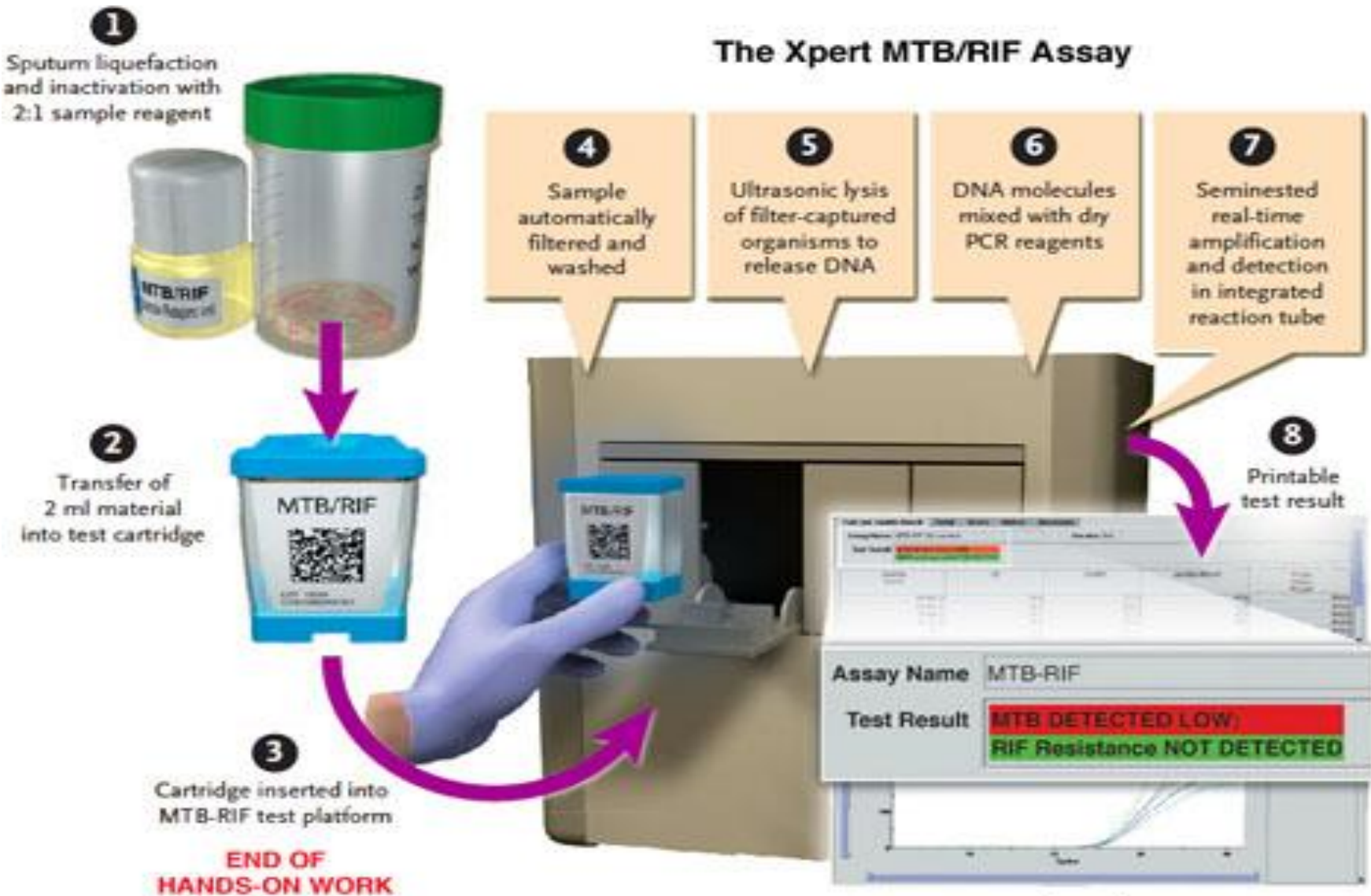
Refer to expert for  
work up of persistent  
pneumonia



# Analytical sensitivity of diagnostic tests



# The Xpert MTB/RIF Assay



Time to result: 1 hour 45 minutes



# WHO recommendations - 2013

- 16 studies, 12 published and 4 unpublished, all studies were performed at higher levels of care, and the children included were mainly inpatients.
- Pulmonary TB was evaluated in 13 studies including 2603 participants. The overall pooled sensitivity
  - Xpert MTB/RIF against culture (10 studies) in children presumed to have TB was 66% in 10 studies where expectorated sputum (ES) or induced sputum (IS) was used (pooled 95% CrI 52% - 77%),
  - 66% in seven studies where gastric lavage aspirates (GLA) were used (pooled 95% CrI 51% - 81%).
- Pooled specificity of Xpert MTB/RIF against culture as the reference standard was  $\geq 98\%$  with narrow confidence intervals.
- The sensitivity of Xpert MTB/RIF to detect rifampicin resistance in pediatric specimens was 86% (95%CI 53% - 98%).

# WHO recommendations - 2013

Specimen type	Comparison (No. of studies, No. of samples)	Median (%) pooled sensitivity (pooled 95% CrI)	Median (%) pooled specificity (pooled 95% CrI)
Lymph node tissue and aspirate	Xpert MTB/RIF compared against culture (14 studies, 849 samples)	84.9 (72–92)	92.5 (80–97)
	Xpert MTB/RIF compared against a composite reference standard (5 studies, 1 unpublished)	83.7 (74–90)	99.2 (88–100)
Cerebrospinal fluid	Xpert MTB/RIF compared against culture (16 studies, 709 samples)	79.5 (62–90)	98.6 (96–100)
	Xpert MTB/RIF compared against a composite reference standard (6 studies, 512 samples)	55.5 (51–81)	98.8 (95–100)
Pleural fluid	Xpert MTB/RIF compared against culture (17 studies, 1385 samples)	43.7 (25–65)	98.1 (95–99)
	Xpert MTB/RIF compared against a composite reference standard (7 studies, 698 samples)	17 (8–34)	99.9 (94–100)
Gastric lavage and aspirate	Xpert MTB/RIF compared against culture (12 studies, 1258 samples)	83.8 (66–93)	98.1 (92–100)
Other tissue samples	Xpert MTB/RIF compared against culture (12 studies, 699 samples)	81.2 (68–90)	98.1 (87–100)





# Recommendations Continue

- For CSF specimens, Xpert MTB/RIF should be preferentially used over culture if the sample volume is low or additional specimens cannot be obtained, in order to reach quick diagnosis.
  - If sufficient volume of material is available, concentration methods should be used to increase yield
- Pleural fluid is a suboptimal sample for the bacterial confirmation of pleural TB, using any method.
  - A pleural biopsy is the preferred sample.
  - Sensitivity of Xpert MTB/RIF in pleural fluid is very low.
  - Nevertheless, any positive Xpert MTB/RIF result on pleural fluid should be treated for pleural TB, while those with a negative Xpert MTB/RIF result should be followed by other tests;
- Children presumed to have pulmonary TB but with a single Xpert MTB/RIF -negative result should undergo further diagnostic testing, and a child with high clinical suspicion for TB should be treated even if an Xpert MTB/RIF result is negative or if the test is not available
- These recommendations do not apply to stool, urine or blood, given the lack of data on the utility of Xpert MTB/RIF on these specimens.



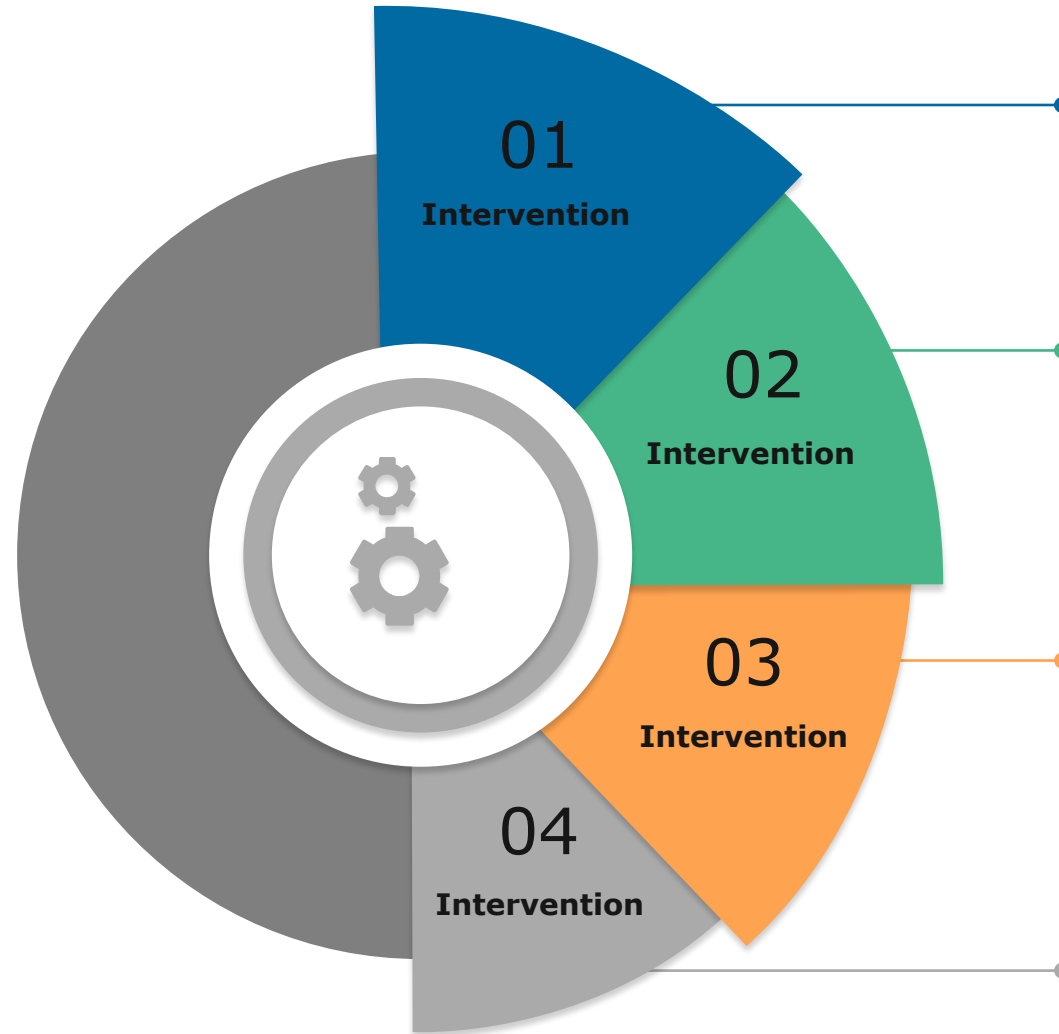
# Geographic Area

- Initially launched in the 4 cities of Delhi, Chennai, Hyderabad and Kolkata
- Subsequently, 5 more cities were added – Vizag, Surat, Bangalore, Nagpur and Guwahati
- Intervention was added in one more city in 2017- Indore
- The initial 4 sites were transitioned to the RNTCP by 31<sup>st</sup> March 2017
- Currently, the project is operational in six cities covering a total population of >53 million (Census 2011)

# Project overview

Additional -

- Rif detection
- Prompt linkage to treatment
- Providing collection tubes to providers
- Culture/DST for Rif cases



**FOC testing through High throughput Xpert lab established within NTP IRLs**

**Rapid specimen transportation linkages with public & private health facilities**

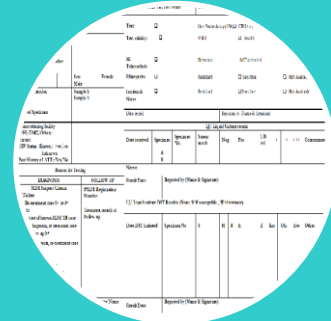
**Both pulmonary & EPTB samples subjected to Xpert testing**

**Rapid reporting (within 24 hours) via SMS and email**

# How to Engage in the Project ?



Specimen of paediatric TB suspect can be sent to the project lab by any provider from public / private sector



Fill the form- Annex-1 and send the sample for FOC testing



Samples are tested and results transmitted electronically within 24 working hours



Specimen transportation costs are covered by the project



Diagnosed TB cases can opt for free of cost Rx under RNTCP or seek treatment in the private sector

**Simplified Engagement**



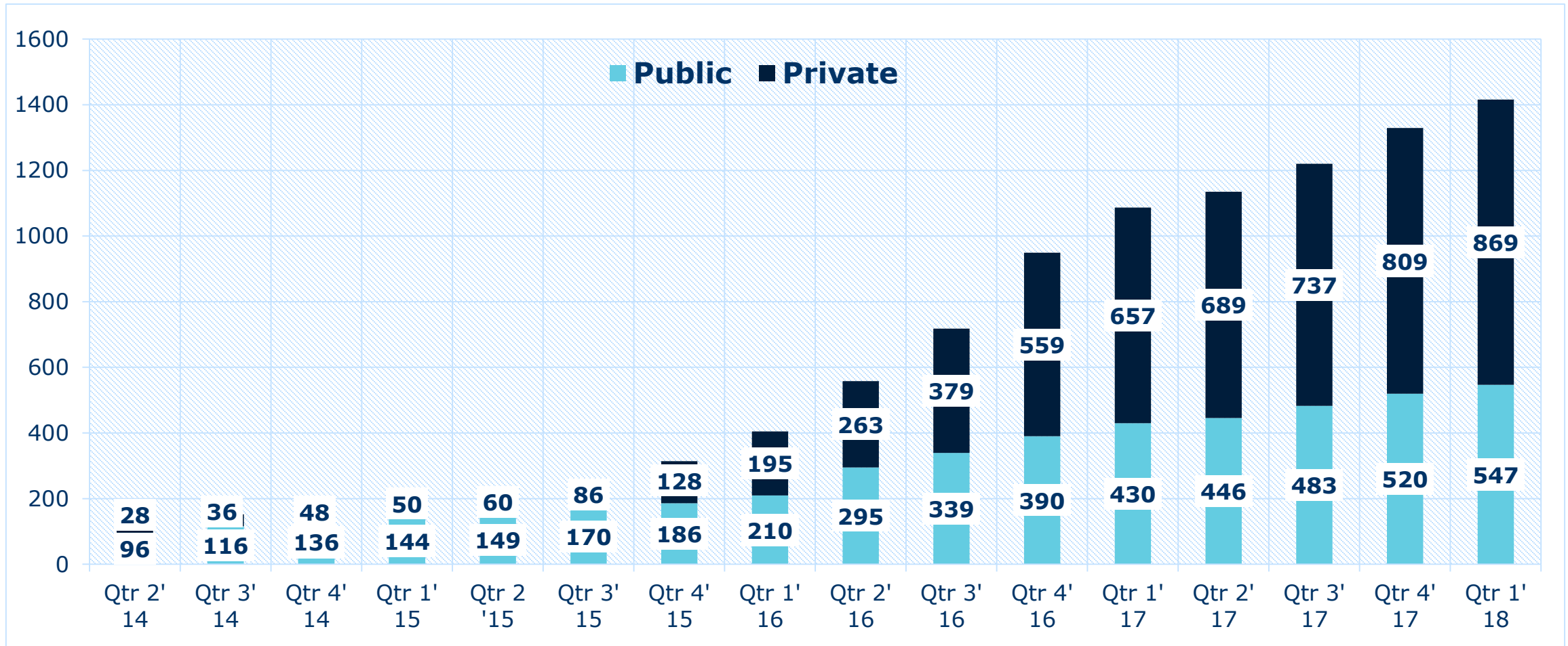
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**CHALLENGE** TB

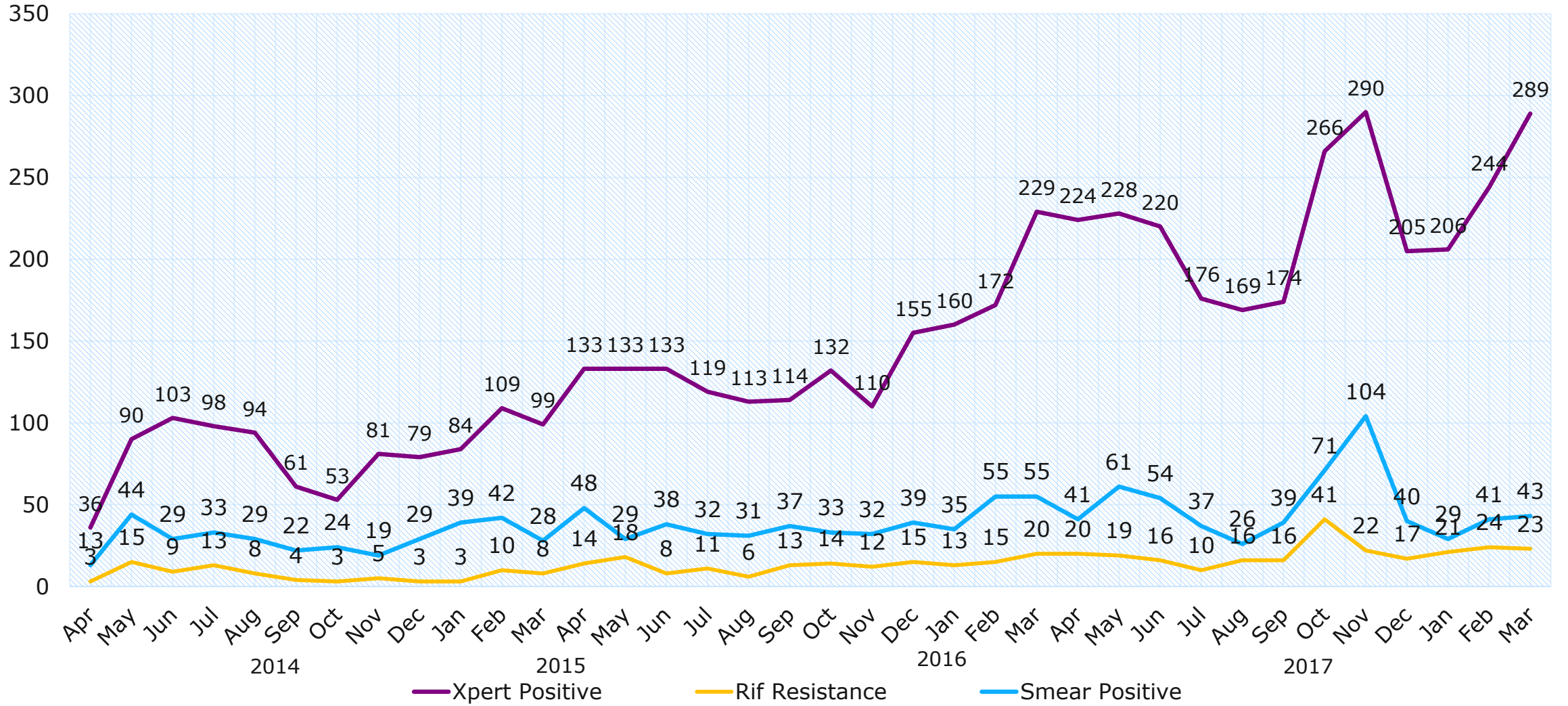
# Provider engagement: Providers/facilities engaged

Overall 94,415 presumptive cases have been tested of which 6270 (6.6%) TB cases detected with 545 (8.7%) Rif resistant



# Positivity trend

## Before Transition- Positivity Trend





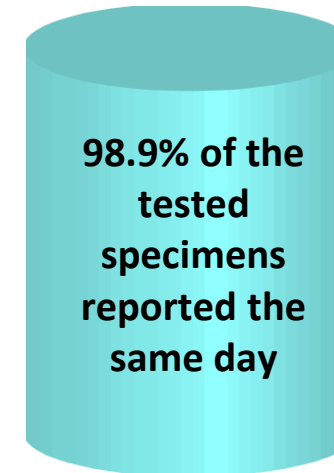
# 3 Pillars of Performance



**Transportation**



**Diagnosis**

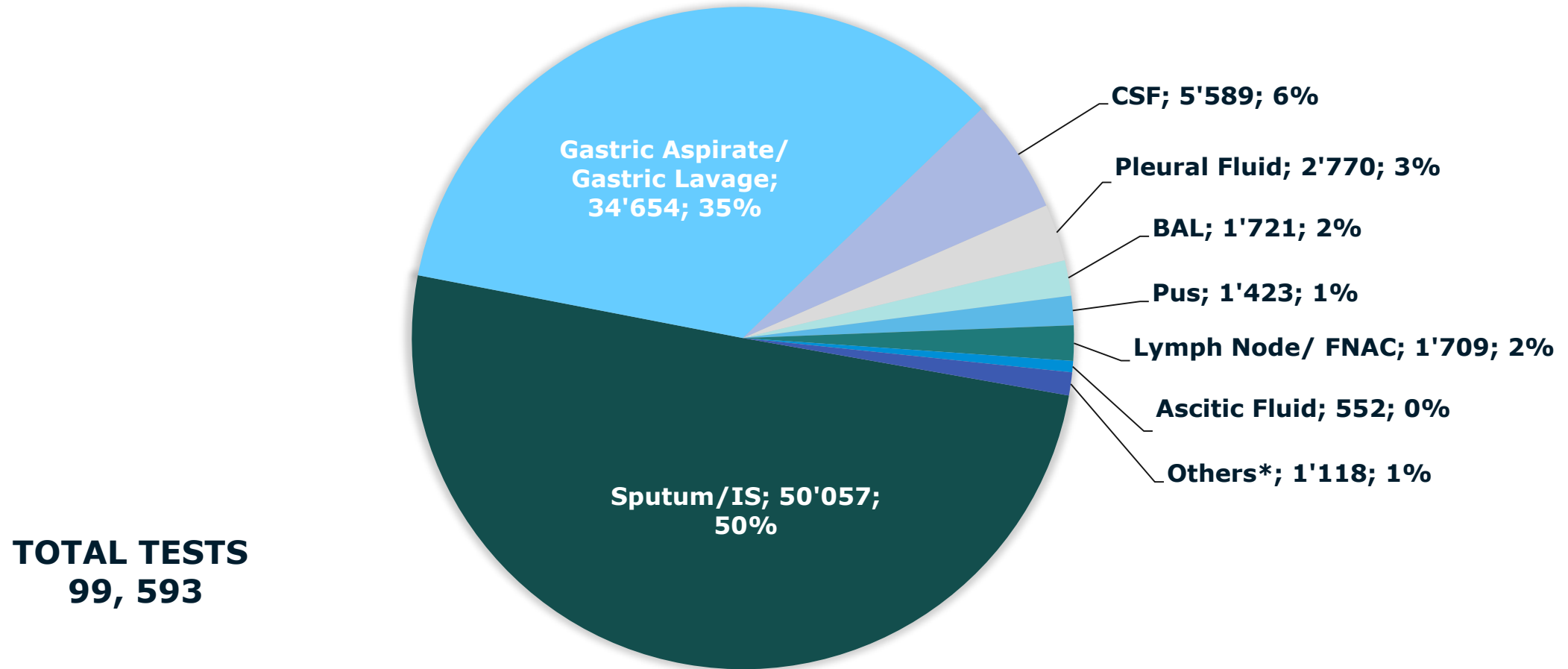


**Reporting**



Overall 89.5% of the result reported within 24 hours of collection

# Type Of Specimen Tested



\*Others: Tissue, Pericardial Fluid, Urine, Cervical Aspirate, Peritoneal Fluid, Tracheal aspirate, Abscess, Synovial Fluid, Serum Bone, Chyle fluid, Nasal Aspirate, Pleural Biopsy, Thoracic swab, etc

## Xpert MTB/RIF & Smear Microscopy Performance

Specimen Type	Specimen Tested	Xpert Positive (%)	Smear Positive (%)	Rif Resistance (%)
Sputum/IS	50,057	3176 (6.3%)	1285 (2.6%)	371 (11.7%)
Gastric Aspirate/ Gastric Lavage	34,654	1767 (5.1%)	355 (1.1%)	167 (9.5%)
CSF	5,589	353 (6.3%)	7 (0.2%)	34 (9.6%)
Pleural Fluid	2,770	112 (4.0%)	12 (0.6%)	17 (15.2%)
BAL	1,721	227 (13.2%)	36 (2.8%)	17 (7.5%)
Pus	1,423	535 (37.6%)	107 (9.0%)	72 (13.5%)
Lymph Node/ FNAC	1,709	494 (28.9%)	55 (5.4%)	63 (12.8%)
Ascitic Fluid	552	24 (4.3%)	1 (0.2%)	2 (8.3%)
Others*	1,118	121 (10.7%)	21 (2.9%)	17 (14.0%)
<b>Total</b>	<b>99,593</b>	<b>6808 (6.8%)</b>	<b>1879 (2.0%)</b>	<b>760 (11.2%)</b>

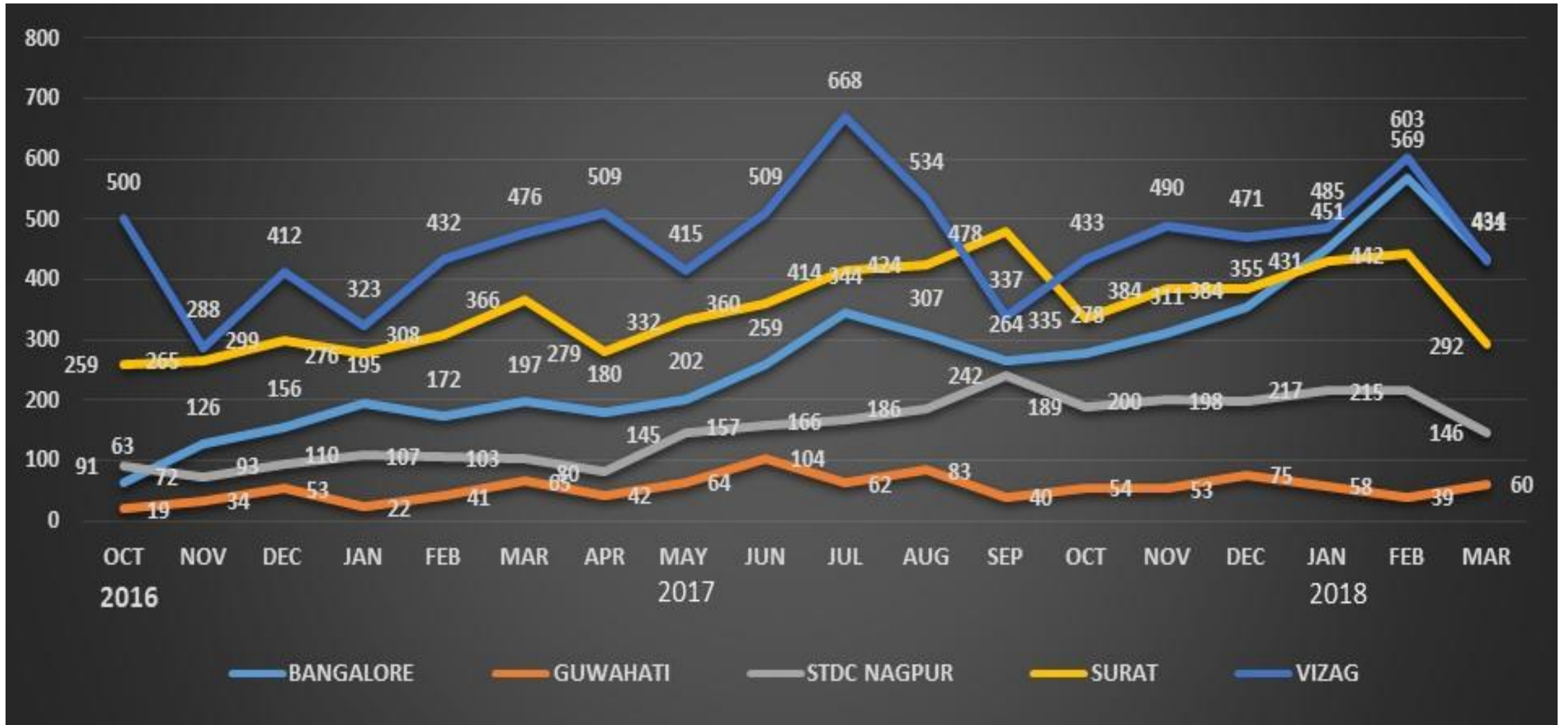
- Detection rate >3x higher over Xpert vs smear microscopy
- >50% RIF resist. detected from non-sputum samples
- High detection rates on Pus, FNAC, Lymph node specimens

*Others= Tissue, Pericardial Fluid, Cervical Aspirate, Peritoneal Fluid, Tracheal aspirate, Abscess, Synovial Fluid, Serum Bone, Chyle fluid, Nasal Aspirate, Pleural Biopsy, Thoracic swab, etc*

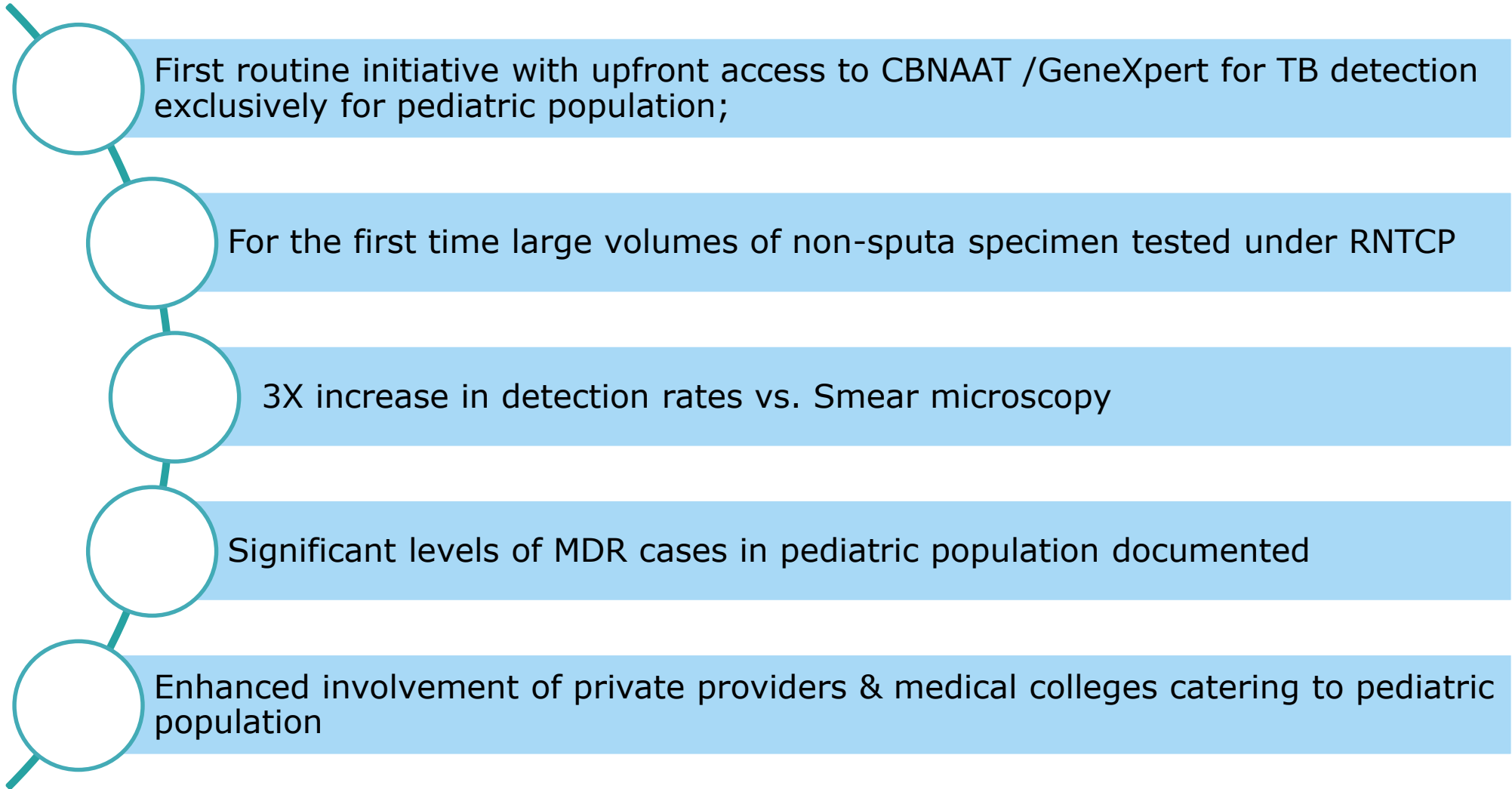
# Treatment Information

	Total Xpert Positives		Total Rif Resistant	%	Total	%
Patients diagnosed under the project	5725		545		6270	
Number initiated on treatment	5096	89.0%	467	85.7%	5563	88.7%
Died before treatment initiation	113	2.0%	28	5.1%	141	2.2%
Initial Default/Not traceable/Treatment refusal	492	8.6%	49	9.0%	541	8.6%
Referred Out	24	0.4%	1	0.2%	25	0.4%

# Site wise- uptake



# Summary







Thank You



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