Trend and Implications

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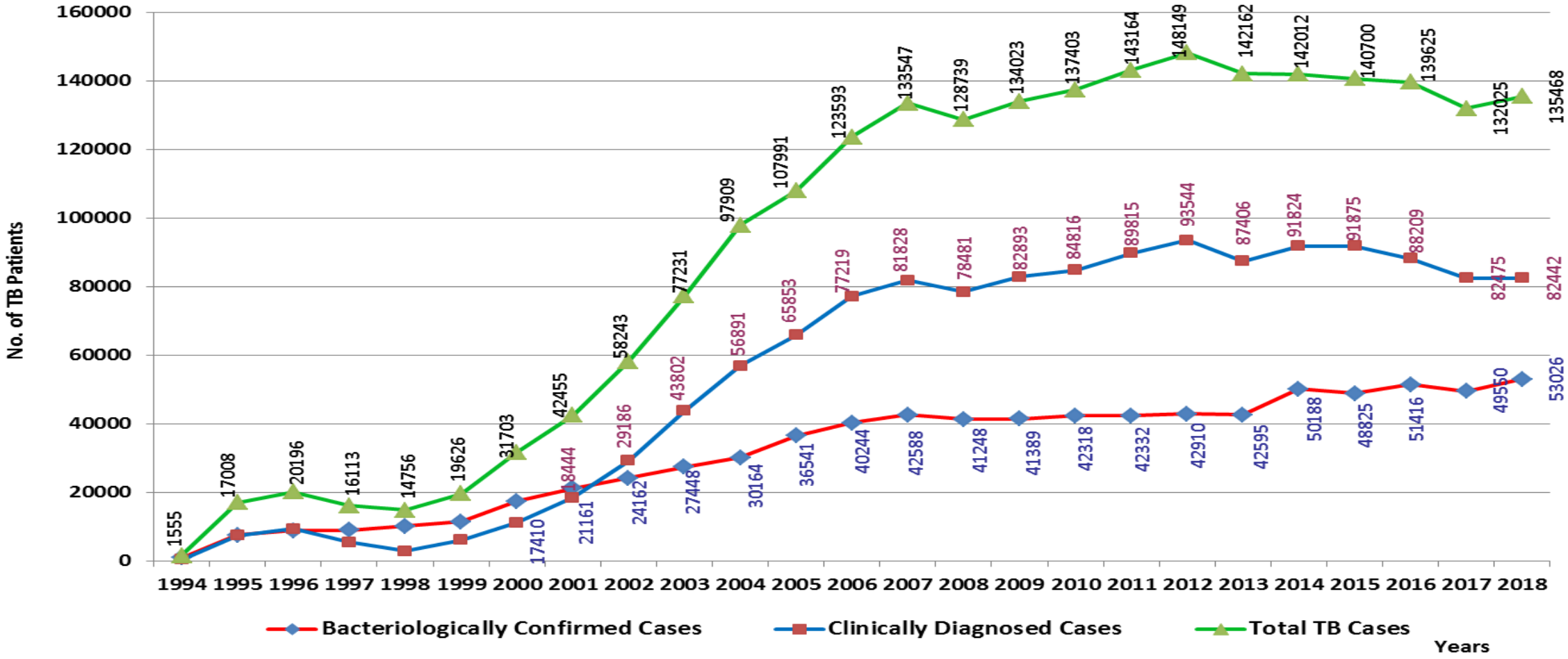
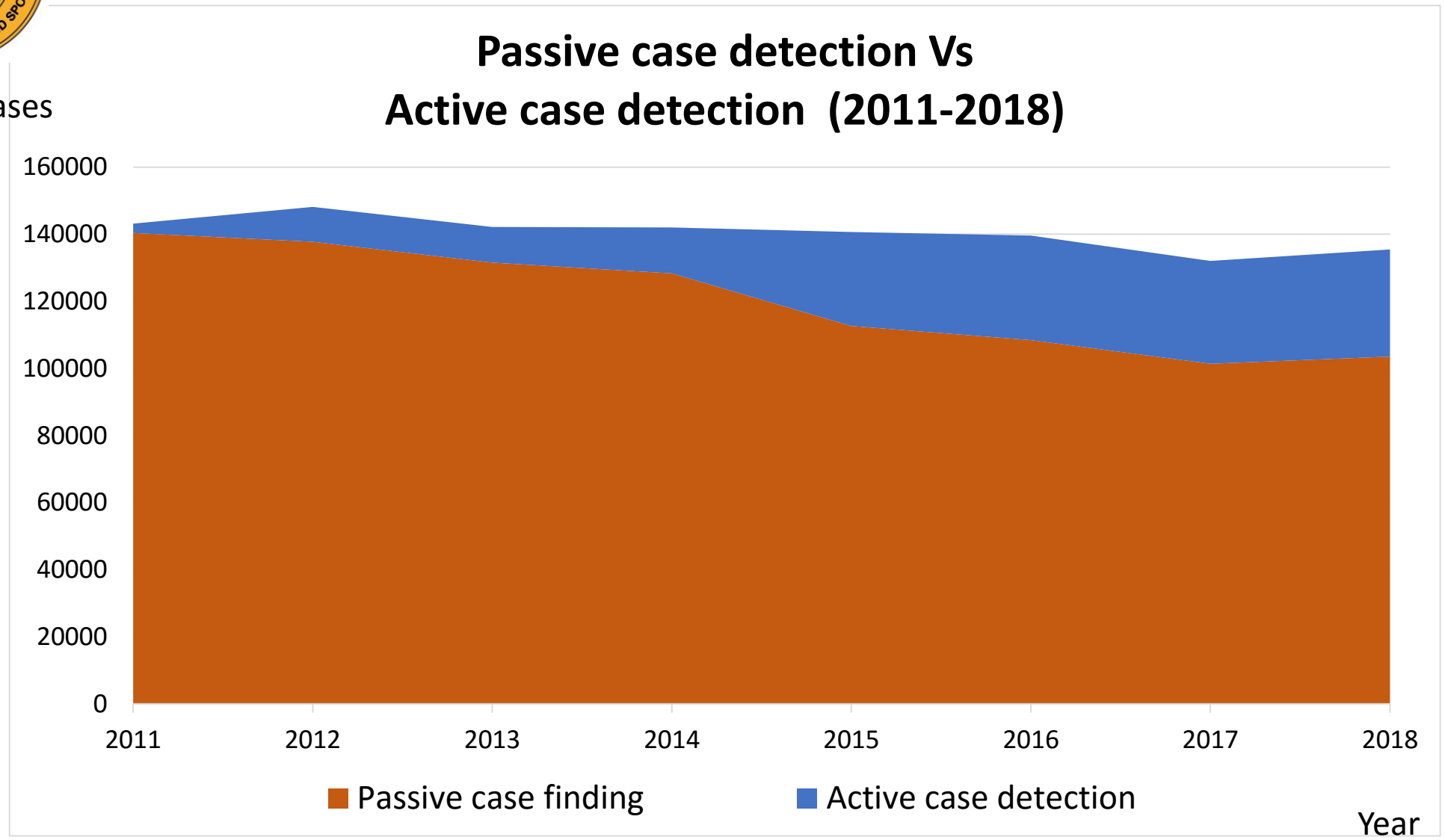
Background (Survey Result 2009-2010)

Prevalence of TB among aged 15 or more

	Smear Positive case			Bacteriologically confirmed case		
	n	/100,000	95% CI	n	/100,000	95% CI
All participants	123	242.3	(186.1–315.3)	311	612.8	(502.2–747.6)
Strata						
Division	70	191.6	(137.4–267.3)	192	522.8	(420.9–649.1)
State	53	369.0	(235.6–577.5)	119	838.0	(560.3–1251.5)
Urban/Rural						
Urban	38	330.7	(216.2-505.7)	103	903.2	(661.8-1231.5)
Rural	85	216.1	(153.6-304.0)	208	526.8	(410.1-676.5)

Trend of TB Case Notification (1995-2018)




Passive case detection Vs
Active case detection (2011-2018)
cases
160000
140000
120000
100000
80000
60000
40000
20000
0
2011
2012
2013
2014
2015
2016
2017
2018
Passive case finding
Active case detection
Year

Comparison of the prevalence survey methodology in 2009/2010 and 2017/2018

	2009/2010 survey	2017/2018 Survey
Data Collection	June 2009- April 2010	Oct 2017- Sep 2018
Sample size	51,367	66,479
Clusters	70 clusters/Planed size: 710	138 clusters/Planed size: 500
Expected main result	National prevalence estimate of bacteriologically positive TB	National and subnational prevalence estimates of bacteriologically positive TB
Screening tool	Symptom (cough≥3w) Chest X-ray abnormality by film CXR	Symptom (cough≥2w) Chest X-ray abnormality by direct digital CXR
Sputum sample	2 samples: Spot and overnight morning	3 samples: Spot, overnight morning, and morning spot
Primary diagnostic tests	2 smear and **2 culture**	2 Xpert Ultra 1 smear for Xpert Ultra positive 1 culture for Xpert Ultra positive

Sensitivity of diagnostic tools

cfu/ml				
10,000	Light Microscope			
	FM microscope			
5000	Line Probe			
1,000				
	Soild Culture		LAMP-TB	
	GeneXpert MTB/Rif			
100				
	Xpert Ultra			
	MGIT (Liquid Culture)			
10				

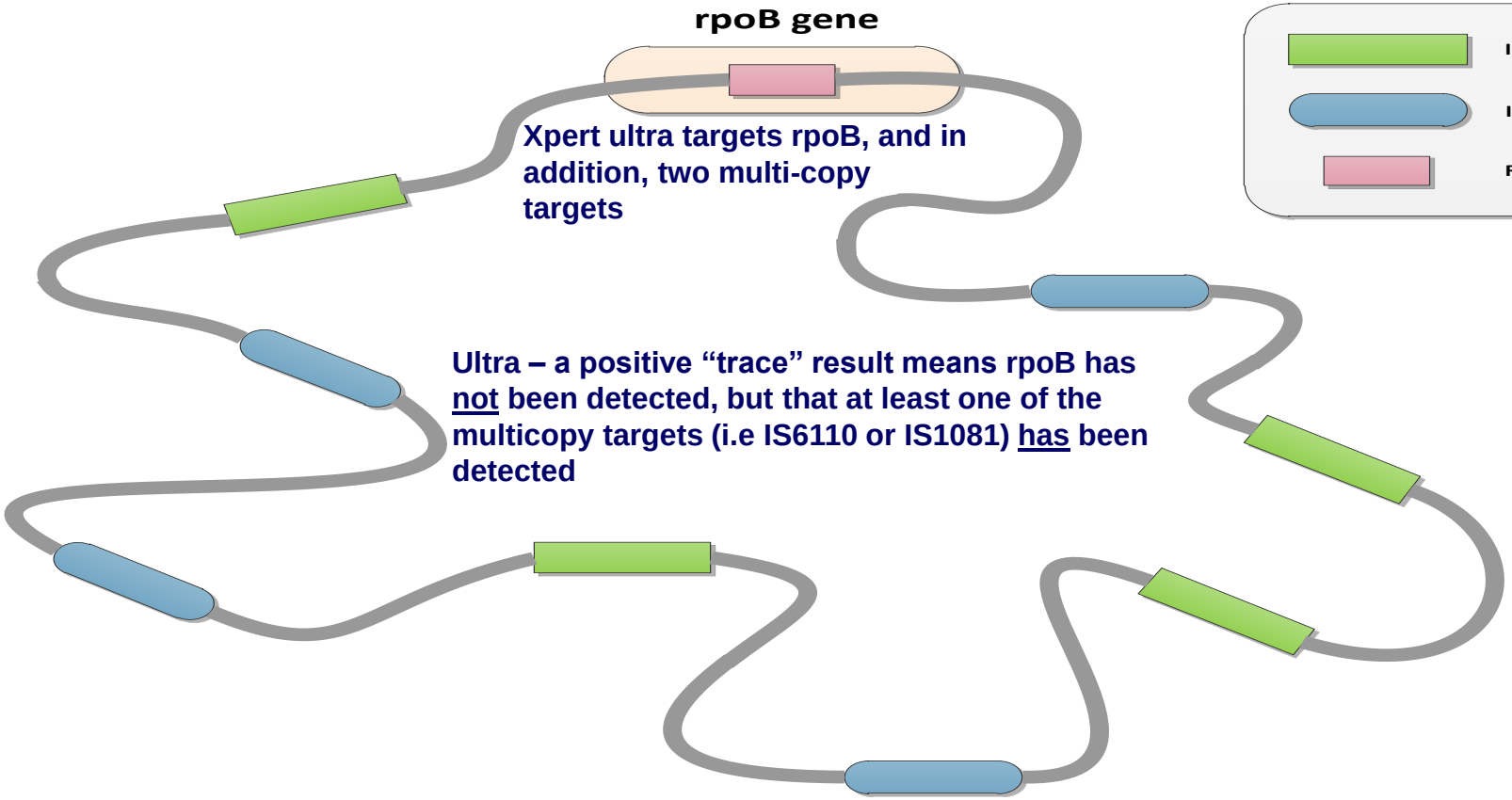
What do Xpert (MTB/RIF and Ultra) tests detect?

Xpert MTB/RIF and Ultra both detect MTB-specific DNA

They cannot differentiate between viable and non-viable organisms (live and dead bacilli)

Xpert MTB/RIF vs Ultra

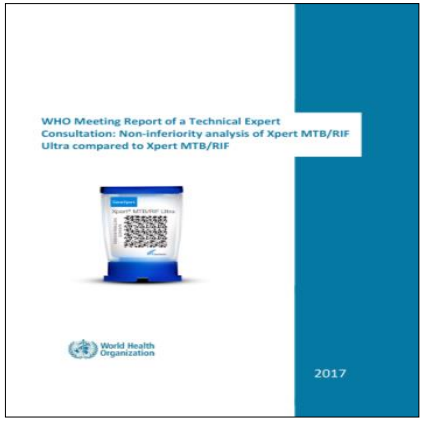
Sole target of Xpert MTB/RIF



RRDR is where 95% of mutations associated with RIF resistance occur

- **Increased sensitivity: 16 CFU/ml for Ultra vs 114 CFU/ml for Xpert**
- **All Ultra trace results are rifampicin indeterminate**

Technical Expert Group on Xpert MTB/RIF Ultra Assay (2017)



- Ultra has higher sensitivity than Xpert MTB/RIF particularly in smear-negative culture-positive specimens and in specimens from HIV-infected patients, with at least as good accuracy for rifampicin resistance detection

- Much of the increase in sensitivity for MTB detection with the Ultra assay was attributed to "trace calls"
  - sensitivity increase among smear-negative culture-positive specimens using Ultra with the "trace call" was 17% compared with Xpert MTB/RIF, and this increase was reduced to around 8% when not using the "trace call".

- The group recognized that increased sensitivity resulted in decreased specificity for TB detection (95% overall for Ultra, 98% for Xpert MTB/RIF) and that there is a trade-off between increased diagnosis and overtreatment

What does a positive Xpert (MTB/RIF and Ultra) result mean?

1. **Someone has active TB disease (live bacilli)**

or

2. **Someone had TB in the past and received treatment but does not have it now**

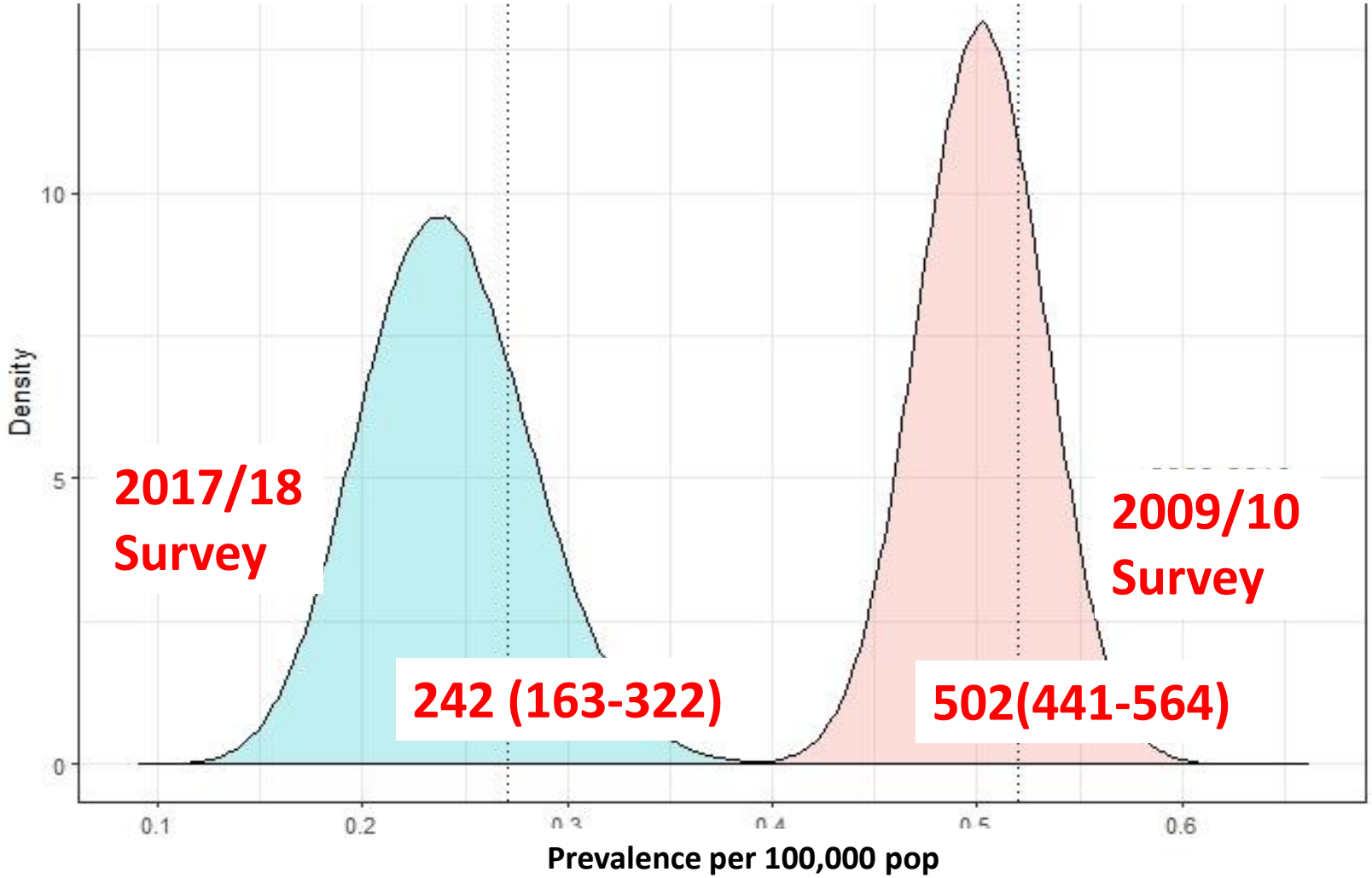
or

3. **Someone had incipient TB that resolved (self-cured) without TB treatment, and does not have active TB disease now**

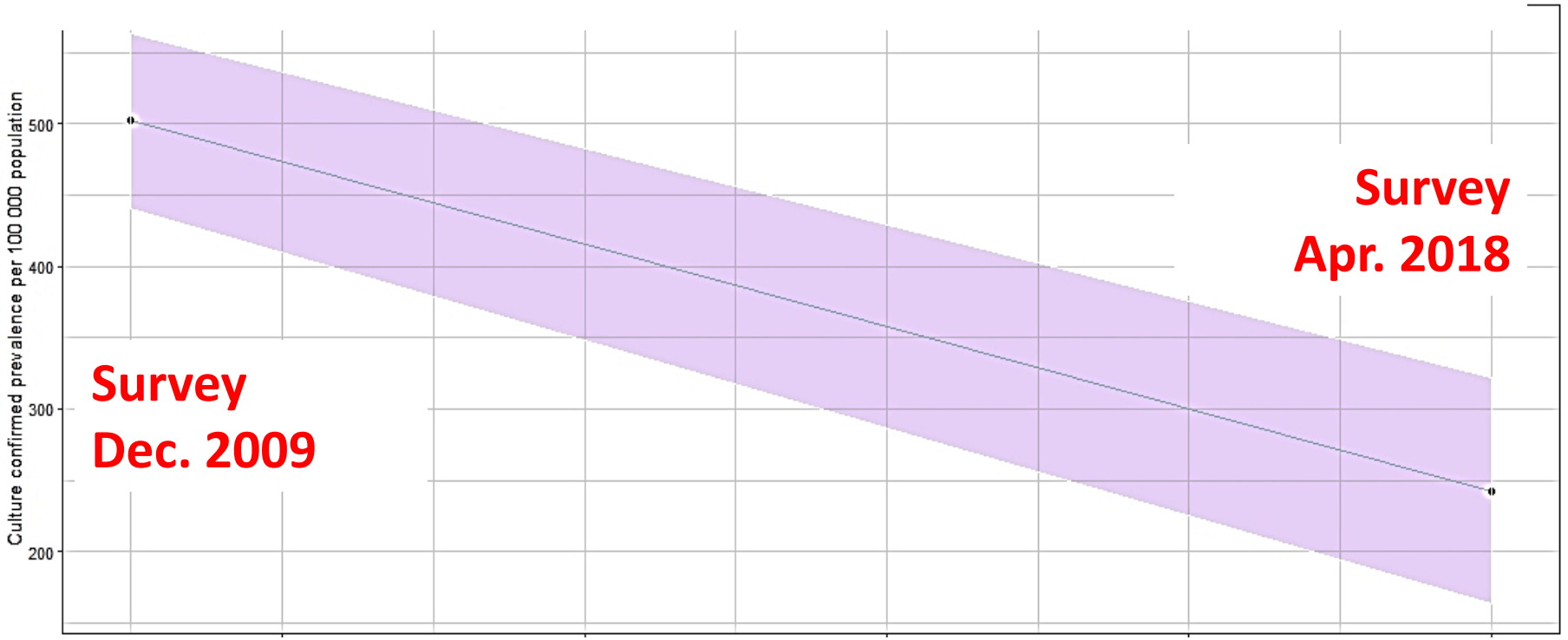
Comparison of the prevalence survey methodology in 2009/2010 and 2017/2018

	2009/2010 survey	2017/2018 Survey
Comparison condition	Study case with culture MTB confirmed using one morning specimen n=258	Culture MTB confirmed in 70 culture cluster n=80

Distribution of Culture positive TB prevalence by one morning sample in 2009/10 and 2017/18

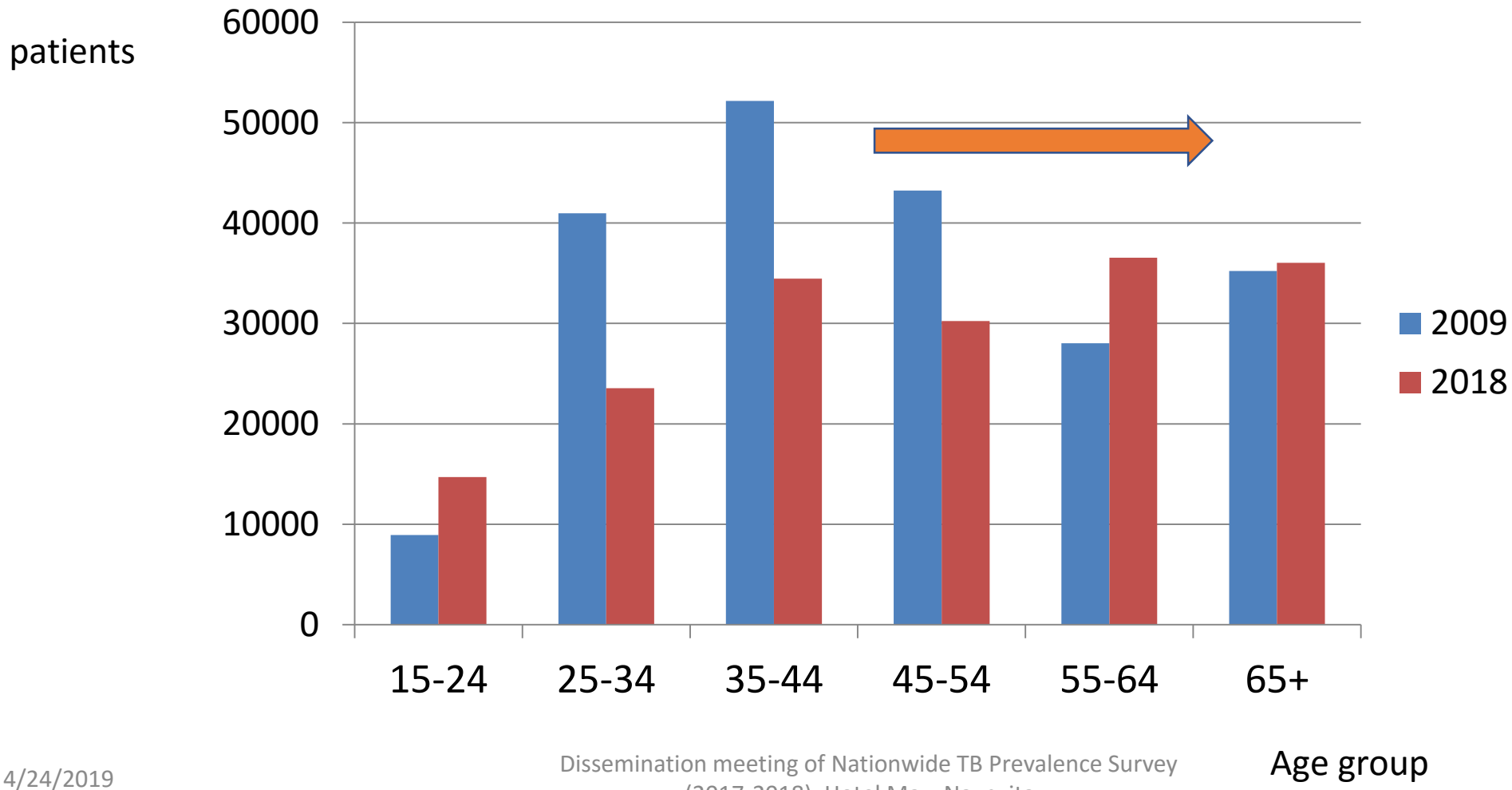


Distribution of Culture positive TB prevalence in 2009/10 and 2017/18



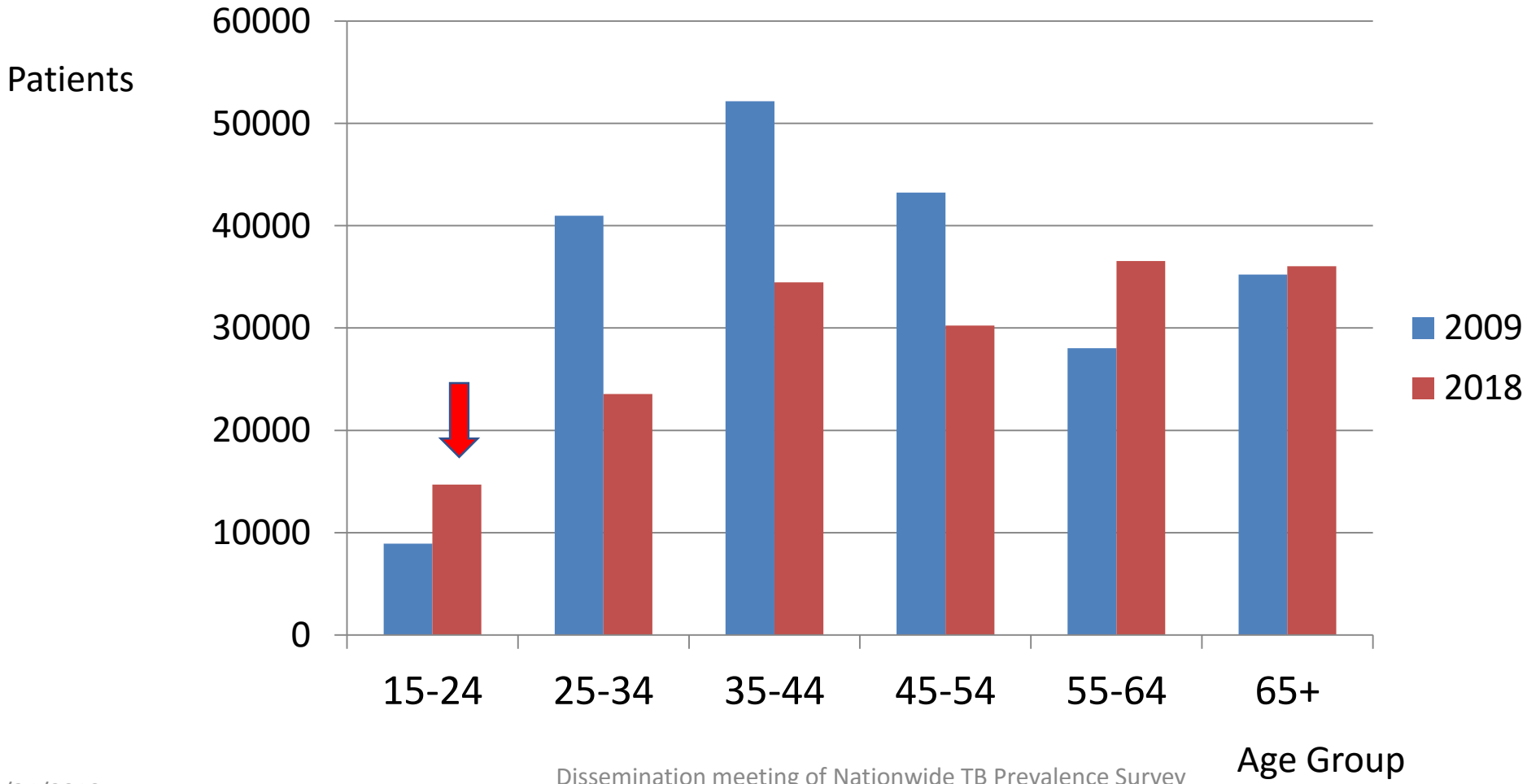
Direct Comparisons by one morning culture with Ogawa media among Screen Positive: As 2nd culture gave 20% yields, the prevalence was calculated as 504 instead of published data of 613 with two samples for 2019/2010.

Case Load of Active Pulmonary TB in community 2009 (Solid Culture) and 2018 (Xpert)



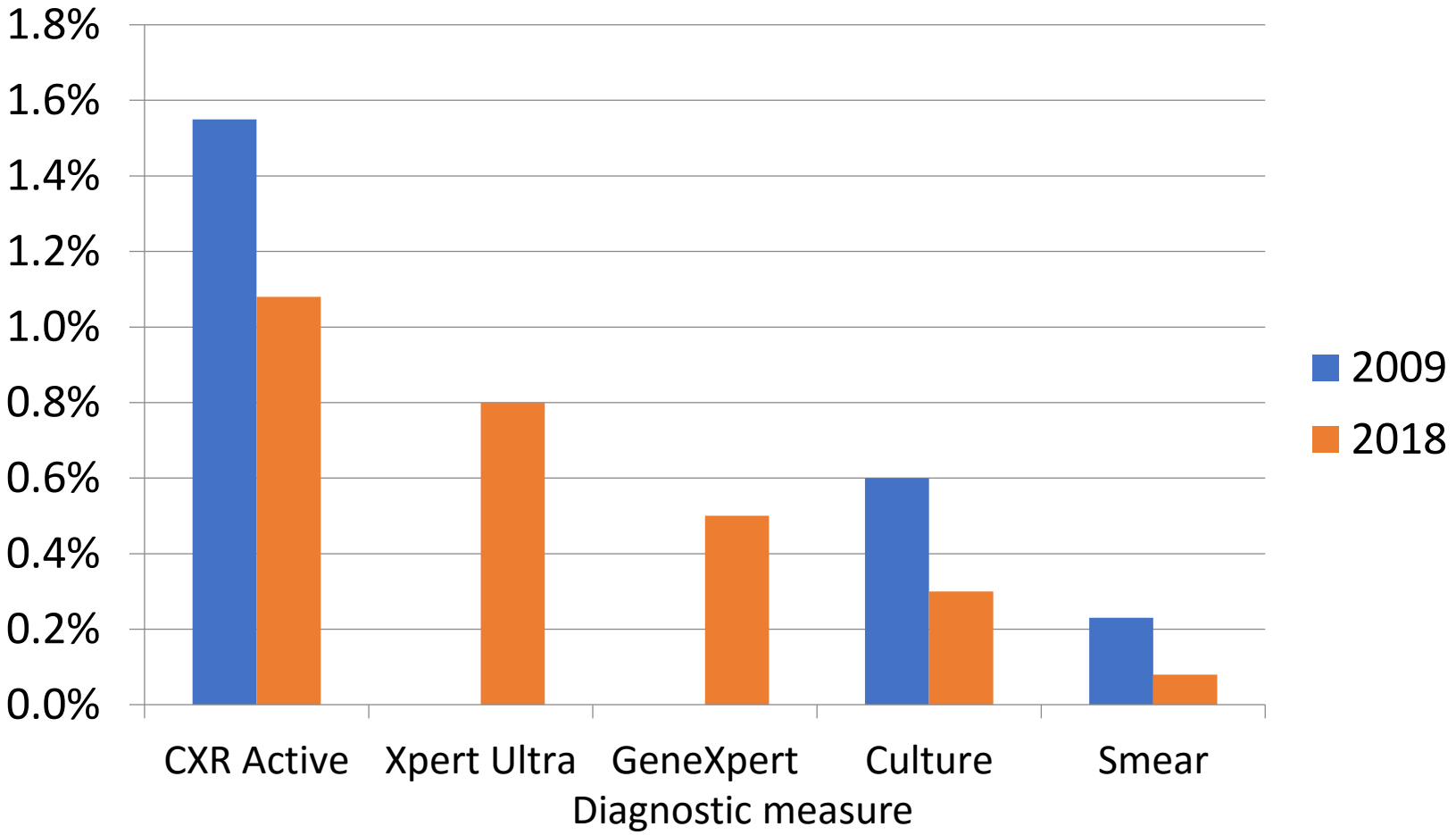
Case Load 2009 (Culture) and 2018 (Xpert) 210,000 → 175,000

However, the observed prevalence in 2009 should have been much higher if we had had Xpert at that time



Changes observed

Observed Prevalence



National TB Prevalence Survey results in Asia

		Smear	Bac Positi	Diagnostic Tool
Myanmar	2009	242	613	Solid Culture
	2018	NA	468	Xpert MTB/Rif
Bangladesh	2008	79	N.A.	Smear
	2015	113	287	Xpert MTB/Rif
Cambodia	2002	437	1597	Solid Culture
	2011	271	831	Solid Culture
China	2010	66	119	Solid Culture
Indonesia	2014	257	759	Solid culture
Lao PDR	2011	278	595	Solid Culture
Mongolia	2015	204	560	Solid Culture
Pakistan	2011	270	398	Solid Culture
Phillipine	2007	320	780	Solid Culture
	2017	434	1159	Xpert MTB/Rif
DPRK	2016	?	587	Solid Culture
Thailand	2012	104	242	Solid Culture
Viet Nam	2007	197	307	Solid Culture
	2017	TBA	TBA	Xpert MTB/Rif

Decline of TB

- 50% by culture, 30% by CXR active under almost same case notification levels in 2009 and 2018
- Right shift of age distribution of patients
- Symptomatic Smear Positive TB: Mostly detected by the programme
- Impact on mortality (severe cases are more likely to be detected and treated)
- Decline in States most probably owing to service expansions in last decade
- No clear evidence to show decline in Yangon compared with 2006

Still High TB Prevalence despite of Decline

Community we are treating 96 TB has 322 GeneXpert Positive Active Pulmonary TB: Far away to End TB

TB not equally distributed

- Rural villages with poor access to TB diagnostic/treatment centers: > 20 miles from 25% of rural cluster villages to TB treatment center → decentralization of TB service to PHC level
- Old/Older populations – Grandparents!! → integrated approaches with NCDs to prevent NCD care from TB by early TB detection
- Urban congestive areas – Yangon!! and congestive areas in big cities→ urban specific interventions
- Men!! Higher M:F ratio → TB in workplace by multi-sector approach

- Laboratory service targets (1-1.5% of population) – can't catch TB patients in community

- Not included in this analysis: Sub-clinical cases in community most probably due to poor access to TB diagnosis and treatment in past decades such as Xpert Ultra Trace only, “culture negative and CXR not active”…. Carry over, debt, from the past when case detection gap was larger

- Follow up data collection including treatment results will be completed soon. Re-estimation of TB burden including incidence is scheduled on 28-30 May 2019; and Final Report of the survey before JMM, 12-21 Aug 2019.

Other issues

- Role of CXR
- Diagnostic use of Xpert for CXR abnormal
- Role of Private sector for case detection → mandatory case notification
- Role of CBTBC
- NDRS including smear negative

etc