

Improve TB Diagnostics for Early Diagnoses and Appropriate Treatment

**Newer Diagnostics: major advance but still room to
improve**

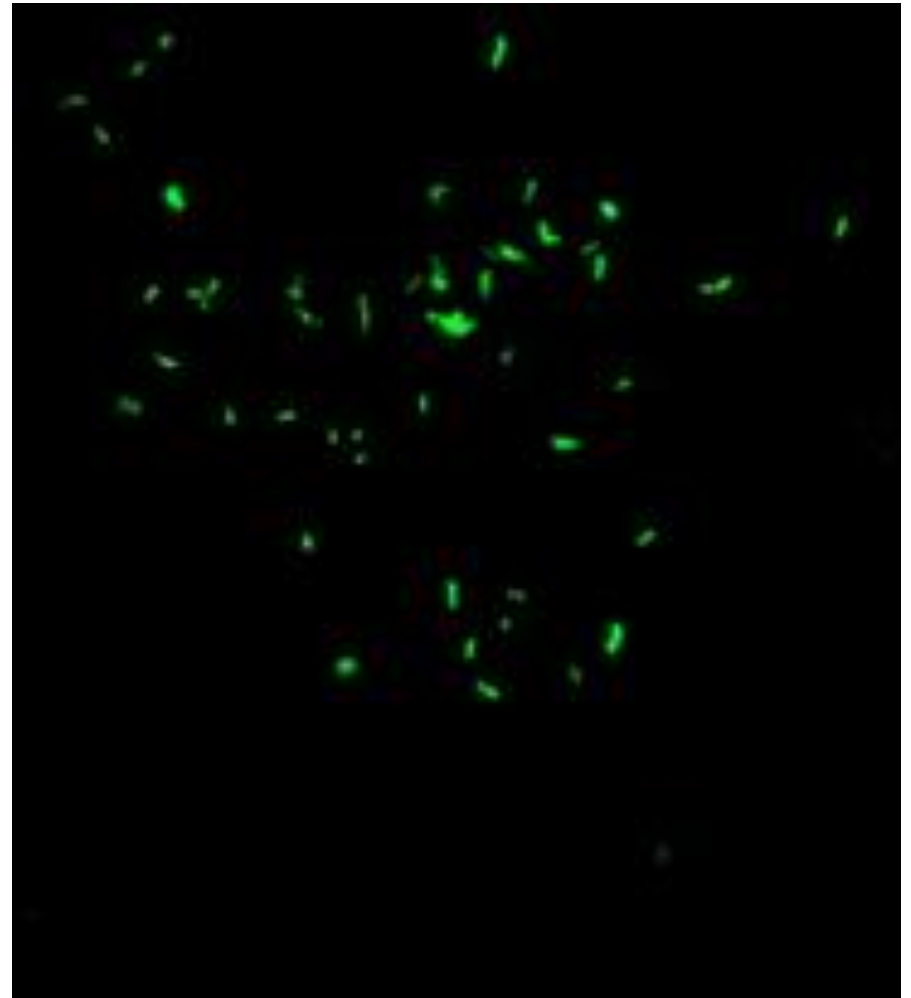
By
Jean Gratz
Happiness Kumburu

OUTLINE

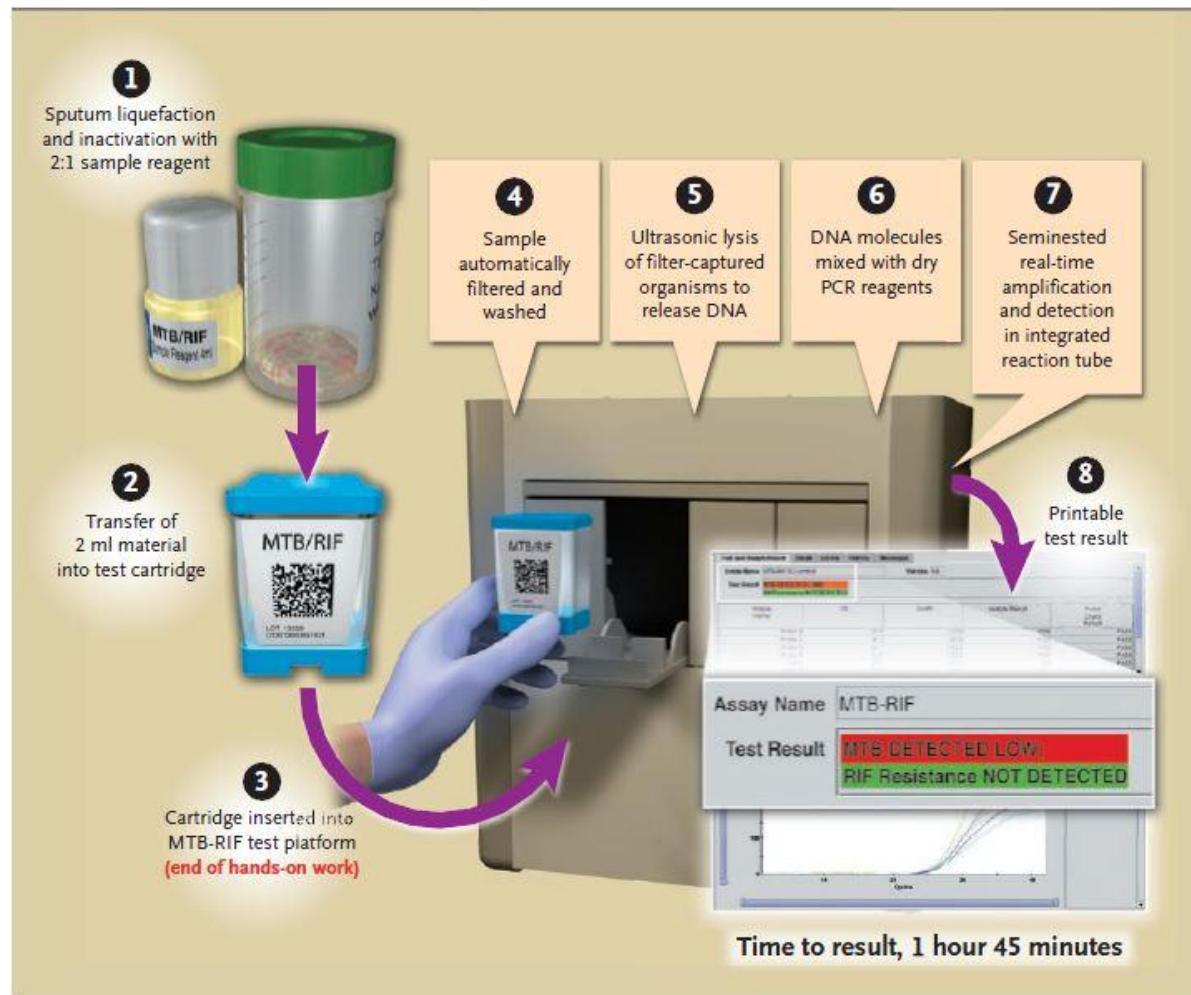
- Smear Microscopy
 - LED fluorescence
- MTB/RIF GeneXpert
- LPA
- MGIT Liquid Culture and DST

.....Newer Methods in development

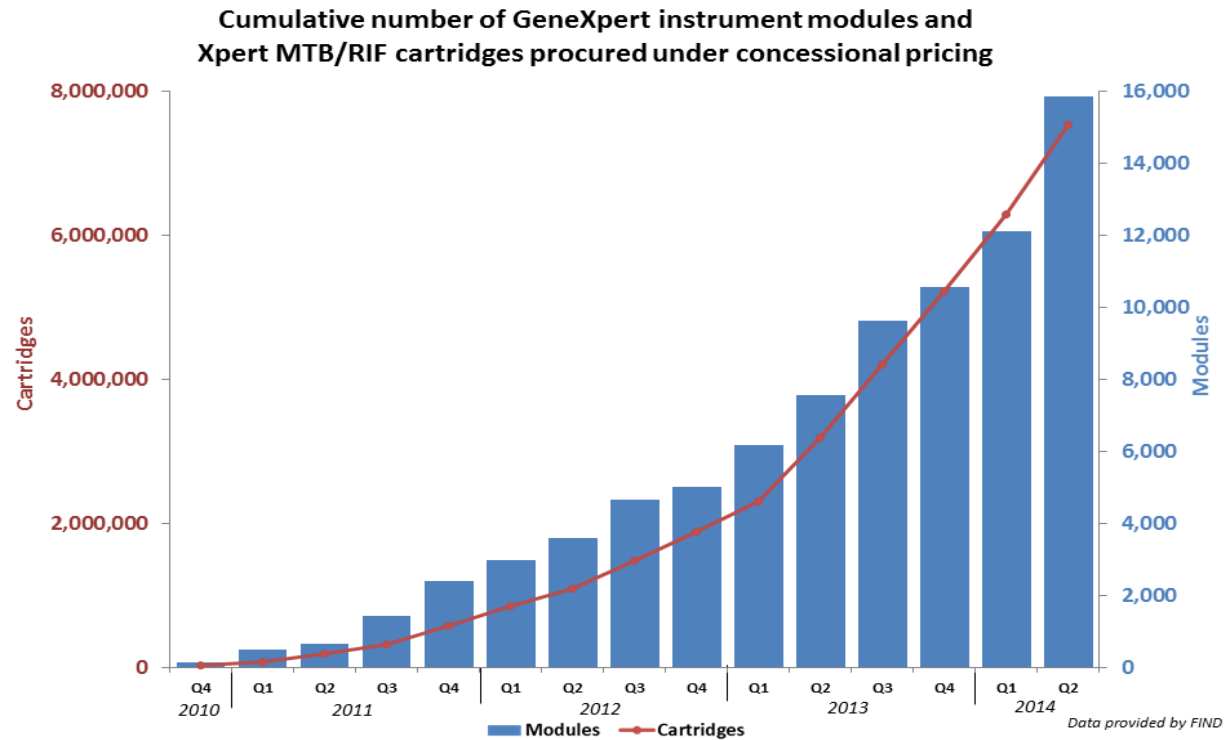
**LED Microscopy is more sensitive than ZN AFB smears
and is being rolled out in the small hospitals**



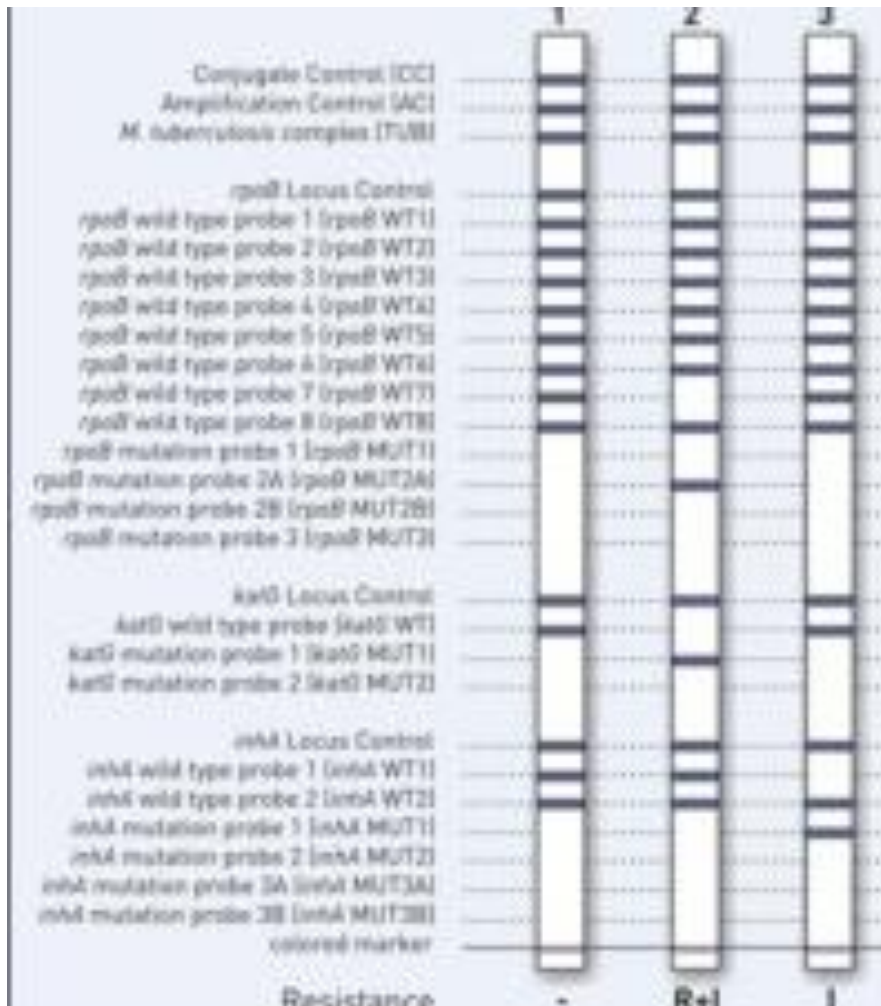
GeneXpert MTB/RIF



As of June 2014, 7.53 million Xpert® MTB/RIF cartridges had been procured



Line Probe Assay



- LPA
- Line Probe Assays-“Hain”
- Can be done on sputum directly or growth
- Can be challenging to read all bands

Liquid Culture and DST

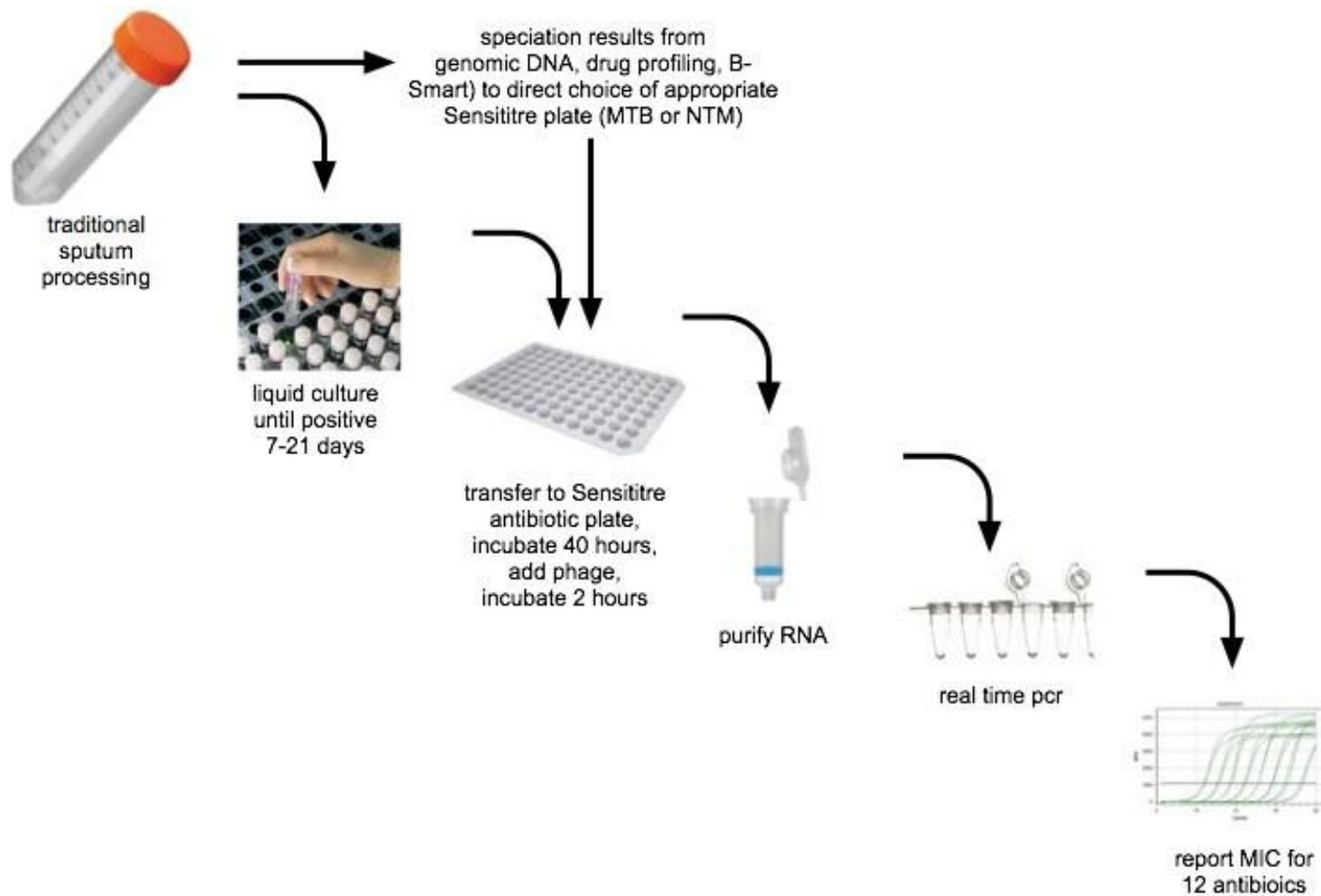
Reference and Research Labs



MGIT WHO Endorsed



DST Phenotypic MICs and Mycobacteriophage with PCR for MICs



Serodiagnostic assays for detection of MTB antigens or immune response to MTB



- MBio automated portable reader and disposable detection cartridges

Breath Tests: The Diagnostic Potential of Volatile Organic Compounds (VOCs)

- “Electronic Nose” Example:
Hand-held Aenose VOC monitor for TB diagnosis produced by the eNose Company
- Uses metal-oxide sensors.
The device measures chemical adsorption and desorption dynamics at the sensor surfaces by passing exhaled air followed by clean air over the sensors in a process that takes 10 minutes



Apopo.org

Gambia Pouched Rat is Trained to detect TB in sputum samples

- APOPO offers second-line screening to partner hospitals, which has increased new case detection rates in partner hospitals and DOT centers by over 30 percent.
- APOPO detection rats technology meets the seven top priorities required for a diagnostic method, as determined by the TB diagnostic group of the World Health Organization.
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Apopo.org

Morogoro Research Center



After about 9 month of training, APOPO's TB rats must pass an internal accreditation process before working under operational conditions.

The test is conducted under blind conditions and to pass the rat must find every positive patient.

TB TAC: Taqman Array Card for TB DST (in press)
University of Virginia Developed and with KCRI for
Evaluation and Validation

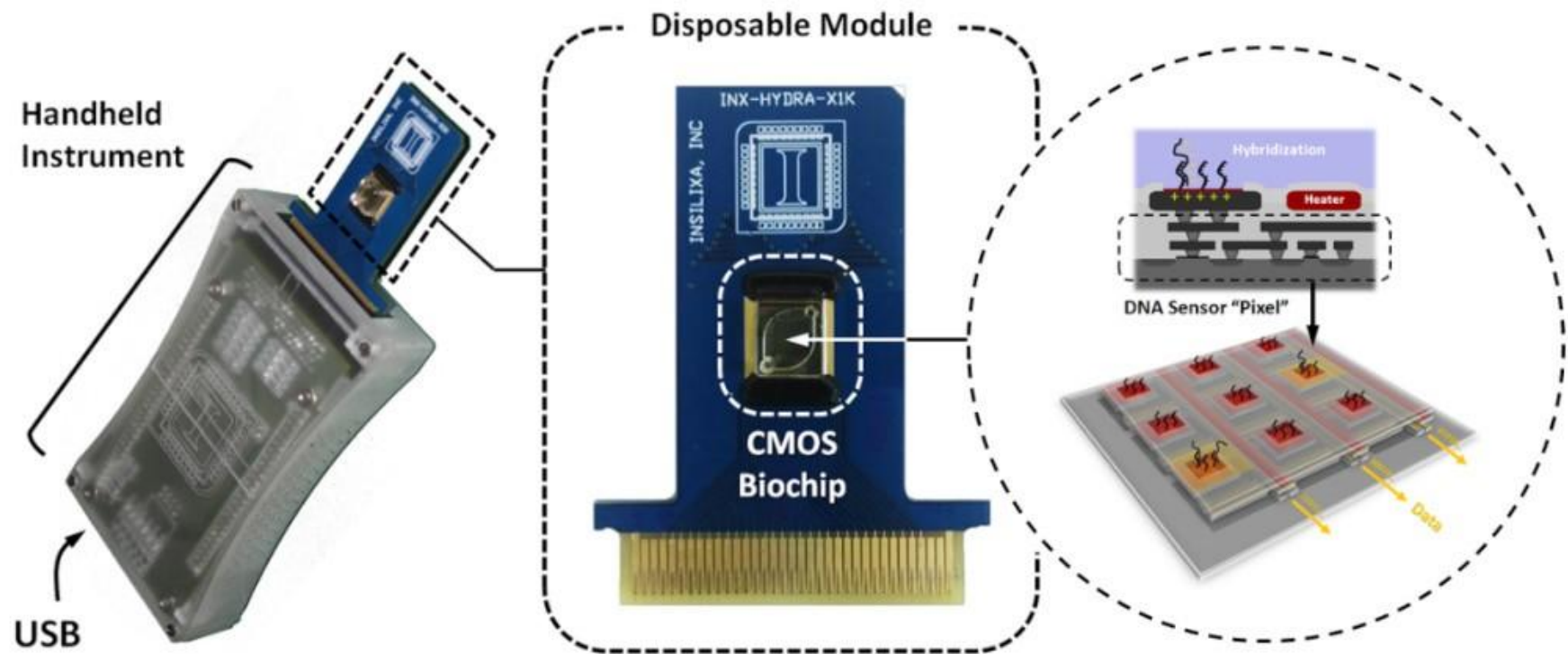
		Port			
		A	B	1	
		C	D	2	
		E	F	3	
		G	H	4	
		I	J	5	
		K	L	6	
		M	N	7	
		O	P	8	
23. rrs-A513C	47. pncA9	23	47		
22. rpsL-Lys88Met	46. pncA8	22	46		
21. rpsL-Lys88Arg	45. pncA7	21	45		
20. rpsL-Lys43Arg	44. pncA6	20	44		
19. embB-Gly406Ala	43. pncA5	19	43		
18. embB-Asp328Gly	42. pncA4-Ser65Ser	18	42		
17. embB-Asp328Tyr	41. pncA3-His57Asp	17	41		
16. embB-Met306Leu	40. pncA2	16	40		
15. embB-Met306Ile2	39. pncA1	15	39		
14. embB-Met306Ile	38. gyrB-Glu501Asp	14	38		
13. embB-Met306Val	37. gyrB-Asn499Asp	13	37		
12. rpoB-Leu533Pro	36. gyrB-Asp461His	12	36		
11. rpoB-Ser531Leu	35. gyrB-Ser447Phe	11	35		
Manufacturing control	34. 16S-M.tb	CTL	34		
10. rpoB-His526Leu	33. gyrA-Asp94Ala	10	33		
9. rpoB-His526Asp	32. gyrA-Asp94Tyr	9	32		
8. rpoB-His526Tyr	31. gyrA-Asp94Gly	8	31		
7. rpoB-Asp516Val	30. gyrA-Ala90Val	7	30		
6. rpoB-Gln513Glu	29. eis-C(-14)T	6	29		
5. rpoB-Gln513Leu	28. eis-G(-10)A	5	28		
4. rpoB-Leu511Pro	27. rrs-G1484T	4	27		
3. katG-Ser315Thr	26. rrs-A1401G	3	26		
2. inhA-C(-15)T	25. rrs-A905G	2	25		
1. inhA-T(-8)C	24. rrs-C516T	1	24		

NAATs

Nucleic Acid Amplification Tests (other than Xpert)



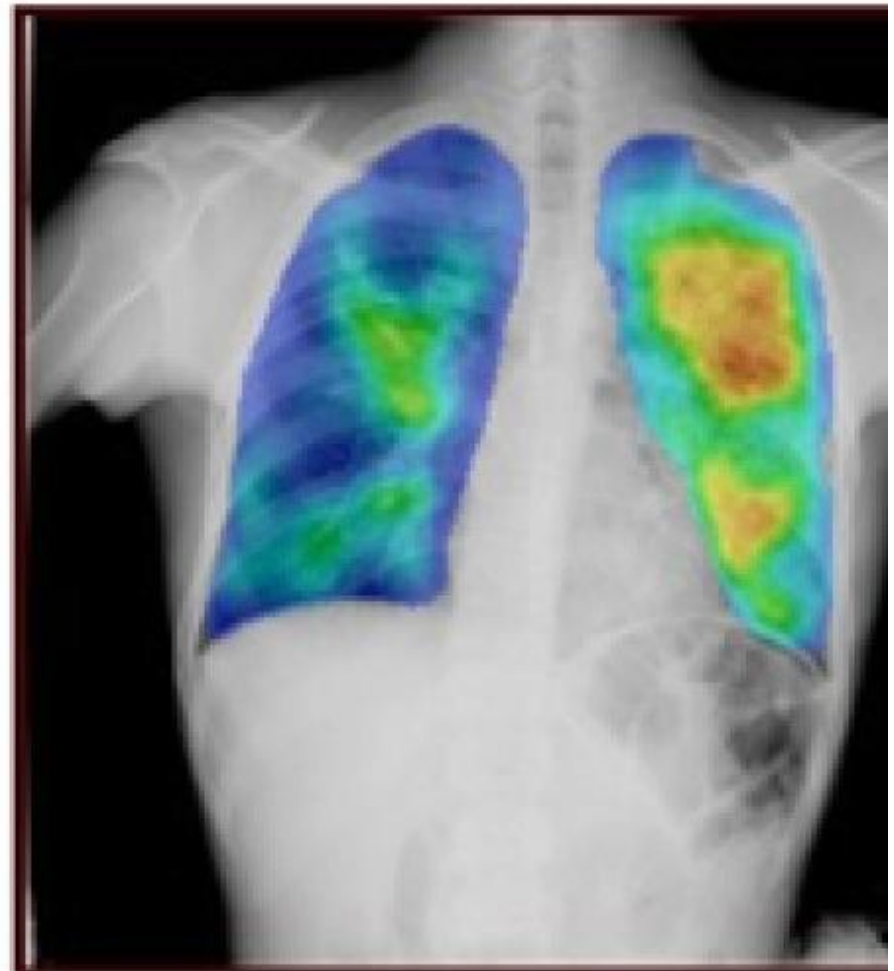
Hydra 1K hand-held platform and chip



Improving X-rays



Computer Aided Interpretation



Improve TB Diagnostics: Move to Eliminate TB

- Sensitive >90%
- Specific >90%
- Inexpensive < \$5
- Easy Implement where patients are first seen
- Drug Susceptibilities Needed for MDR
- Drug Levels : Even with the “right “ drugs some patients do not do well
- THANK YOU!