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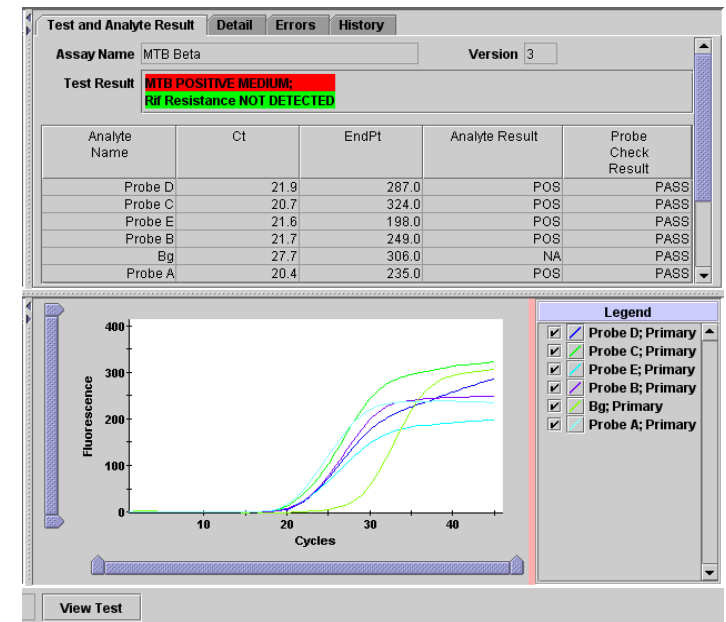
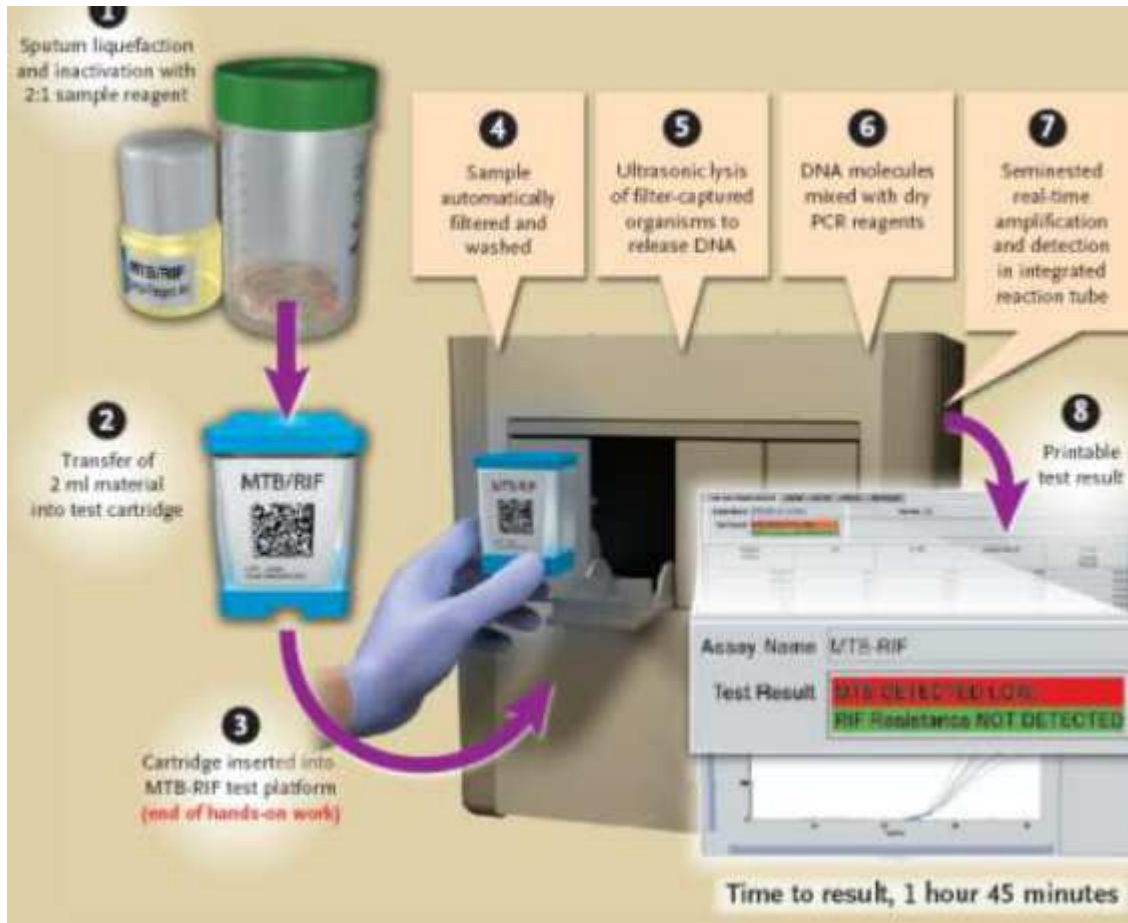
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Rapid Molecular Detection of Tuberculosis
and Rifampin Resistance

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David Alland, M.D., and Mark D. Perkins, M.D.

« At sites performing alternatives nucleic acid-
amplification testing, the sensitivity of the MTB/RIF
test performed directly on sputum was higher than that
of Amplicor and similar to that of ProbeTec »

New England Journal of Medicine Study Reports Xpert MTB/RIF a Faster, More Sensitive & Specific Test for Tuberculosis (TB) Than Current World Standards



Résultat en 2 heures !

Xpert MTB/RIF Ultra for detection of *Mycobacterium tuberculosis* and rifampicin resistance: a prospective multicentre diagnostic accuracy study

Lancet Infect Dis 2018;
18: 76–84

Susan E Dorman*, Samuel G Schumacher*, David Alland, Pamela Nabeta, Derek T Armstrong, Bonnie King, Sandra L Hall, Soumitesh Chakravorty, Daniela M Cirillo, Nestani Tukvadze, Nino Bablishvili, Wendy Stevens, Lesley Scott, Camilla Rodrigues, Mubin I Kazi, Moses Joloba, Lydia Nakiyingi, Mark P Nicol, Yonas Ghebrekristos, Irene Anyango, Wilfred Murithi, Reynaldo Dietze, Renata Lyrio Peres, Alena Skrahina, Vera Auchynka, Kamal Kishore Chopra, Mahmud Hanif, Xin Liu, Xing Yuan, Catharina C Boehme, Jerrold J Ellner, Claudia M Denkinge, on behalf of the study team†

	Sensitivity		Specificity		
	All culture-positive (95% CI; n/N)	Smear-negative, culture-positive (95% CI; n/N)	All culture-negative (95% CI; n/N)	No history of tuberculosis (95% CI; n/N)	Any history of tuberculosis (95% CI; n/N)
Xpert	83% (79–86; 383/462)	46% (37–55; 63/137)	98% (97–99; 960/977)	98% (97–99; 715/727)	98% (95–99; 244/249)
Xpert Ultra	88% (85–91; 408/462)	63% (54–71; 86/137)	96% (94–97; 934/977)	96% (95–98; 701/727)	93% (89–96; 232/249)
Xpert Ultra, no trace*	86% (82–89; 395/462)	54% (45–63; 74/137)	98% (96–98; 953/977)	98% (96–99; 709/727)	98% (95–99; 243/249)
Xpert Ultra, conditional trace†	88% (85–91; 406/462)	61% (53–70; 84/137)	97% (95–98; 945/977)	96% (95–98; 701/727)	98% (95–99; 243/249)
Xpert Ultra, trace-repeat‡	87% (84–90; 404/462)	61% (52–69; 83/137)	97% (95–98; 944/977)	97% (96–98; 707/727)	95% (91–97; 236/249)

« For tuberculosis case detection, sensitivity of Xpert Ultra was superior to that of Xpert in patients with paucibacillary disease »

Rapid Molecular Detection of Tuberculosis and Rifampin Resistance

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Table 2. Overall Sensitivity and Specificity of the MTB/RIF Test, According to the Number of Tests per Patient, as Compared with Three Smears and Four Cultures.*

Site and No. of Tests	Sensitivity			Specificity
	All Culture-Positive	Smear-Positive and Culture-Positive	Smear-Negative and Culture-Positive	No Tuberculosis
Site				
Lima, Peru				
Correct — no./total no. (%)	209/211 (99.1)	199/199 (100)	10/12 (83.3)	102/102 (100)
95% CI	96.6–99.7	98.1–100.0	55.2–95.3	96.4–100.0
Baku, Azerbaijan				
Correct — no./total no. (%)	144/149 (96.6)	80/80 (100.0)	64/69 (92.8)	68/70 (97.1)
95% CI	92.4–98.6	95.4–100.0	84.1–96.9	90.2–99.2
Cape Town, South Africa				
Correct — no./total no. (%)	142/148 (95.9)	95/96 (99.0)	47/52 (90.4)	186/189 (98.4)
95% CI	91.4–98.1	94.3–99.8	79.4–95.8	95.4–99.5
Durban, South Africa				
Correct — no./total no. (%)	43/45 (95.6)	30/30 (100.0)	13/15 (86.7)	213/219 (97.3)
95% CI	85.2–98.8	88.6–100.0	62.1–96.3	94.2–98.7
Mumbai, India				
Correct — no./total no. (%)	185/188 (98.4)	162/162 (100.0)	23/26 (88.5)	35/36 (97.2)
95% CI	95.4–99.5	99.7–100.0	71.0–96.0	85.8–99.5
No. of MTB/RIF tests				
3 Samples (2 pellet and 1 direct)				
Correct — no./total no. (%)	723/741 (97.6)	566/567 (99.8)	157/174 (90.2)	604/616 (98.1)
95% CI	96.2–98.5	99.0–100.0	84.9–93.8	96.6–98.9
2 Samples (1 pellet and 1 direct)				
Correct — no./total no. (%)†	1423/1482 (96.0)	1127/1134 (99.4)	296/348 (85.1)	1215/1232 (98.6)
95% CI	94.6–97.1	98.6–99.7	79.7–89.2	97.5–99.2
1 Sample (direct)				
Correct — no./total no. (%)	675/732 (92.2)	551/561 (98.2)	124/171 (72.5)	604/609 (99.2)
95% CI	90.0–93.9	96.8–99.0	65.4–78.7	98.1–99.6

Sensibilité détection *M. tuberculosis* complex parmi les M-

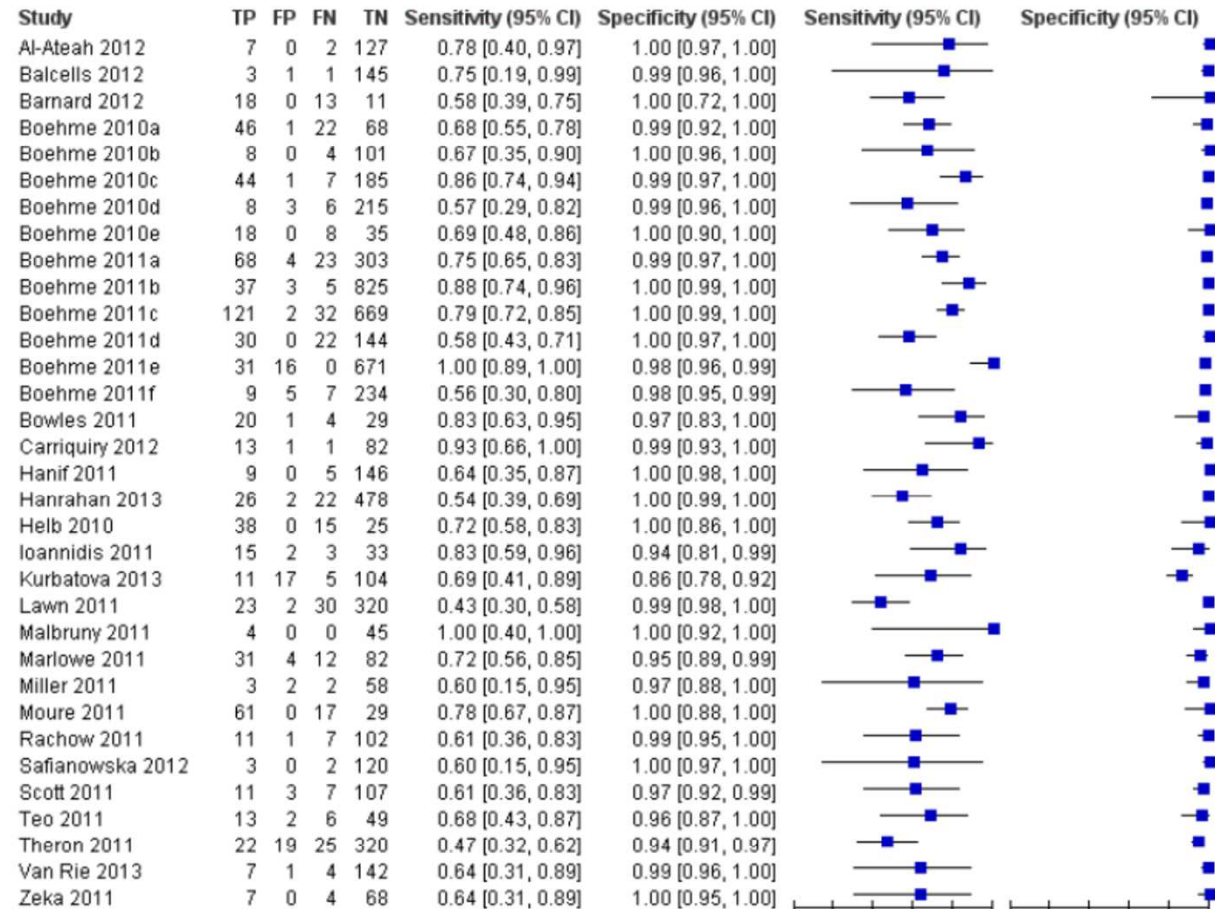
Xpert = 72%



Figure 8. Forest plots of Xpert MTB/RIF for TB detection in studies reporting data for smear-negative patients. We also used these data as a proxy for the accuracy of Xpert MTB/RIF used as an add-on test following a negative smear microscopy result. TP = True Positive; FP = False Positive; FN = False Negative; TN = True Negative. Between brackets the 95% CI of sensitivity and specificity. The figure shows the estimated sensitivity and specificity of the study (blue square) and its 95% CI (black horizontal line).

Xpert® MTB/RIF assay for pulmonary tuberculosis rifampicin resistance in adults (Review)

Steingart KR, Schiller I, Horne DJ, Pai M, Boehme CC, Dendukuri N



Sensibilité détection
M. tuberculosis
complex parmi les M-

Xpert = 67%

In the meta-analysis, the pooled sensitivity was 67% (95% CrI 60% to 74%) and the pooled specificity was 99% (95% CrI 98% to 99%); 21 studies, 6950 participants; Table 1). Therefore, 67% of smear-negative culture-confirmed TB cases were detected using Xpert MTB/RIF following smear microscopy, increasing case detection by 67% (95% CrI, 60% to 74%) in this group.

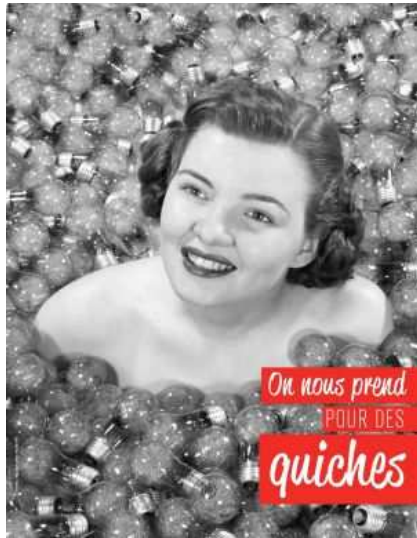
PCR : évolution des performances (synthèse - ex. Xpert)

Référence	Type d'étude	Technologie	Sensibilité M - respiratoires	Sensibilité M+et- respiratoires
Sarmiento, JCM 2003	Méta-analyse	Plusieurs	72%	
Boehme, NEJM 2010	Etude prospective	Xpert MTB/RIF	72%	92%
Steingart, Cochrane 2014	Méta-analyse	Xpert MTB/RIF	67%	
Dorman, LID 2018	Etude prospective	Xpert Ultra	63%	88%
		Xpert MTB/RIF	46%	83%

**TOUS LES JOURS
JE LAVE MON CERVEAU
AVEC LA PIIB**



Attention aux effets d'annonce !
Pas d'amélioration de la sensibilité en 15 ans



Conclusion

- Pour faire un bon diagnostic, il faut faire de bons prélèvements
- Diagnostic moléculaire à intégrer dans une stratégie diagnostique globale ⇒ pas de PCR « pêche à la ligne »

