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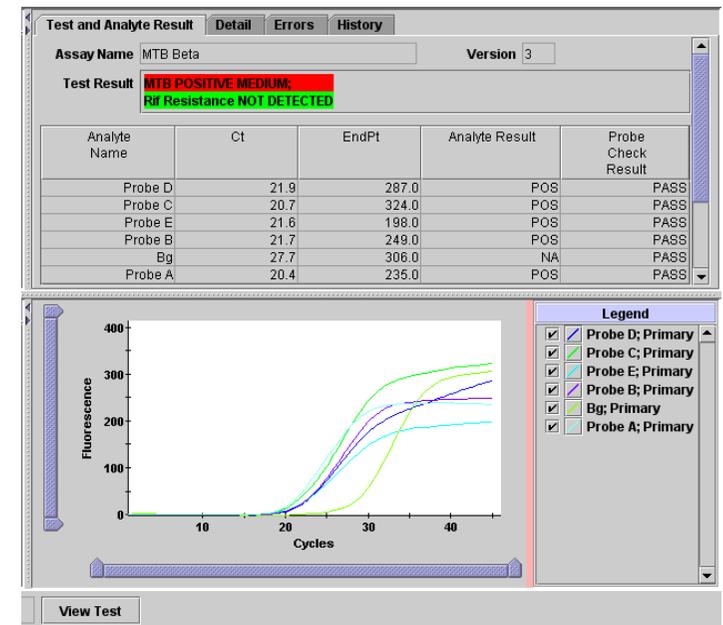
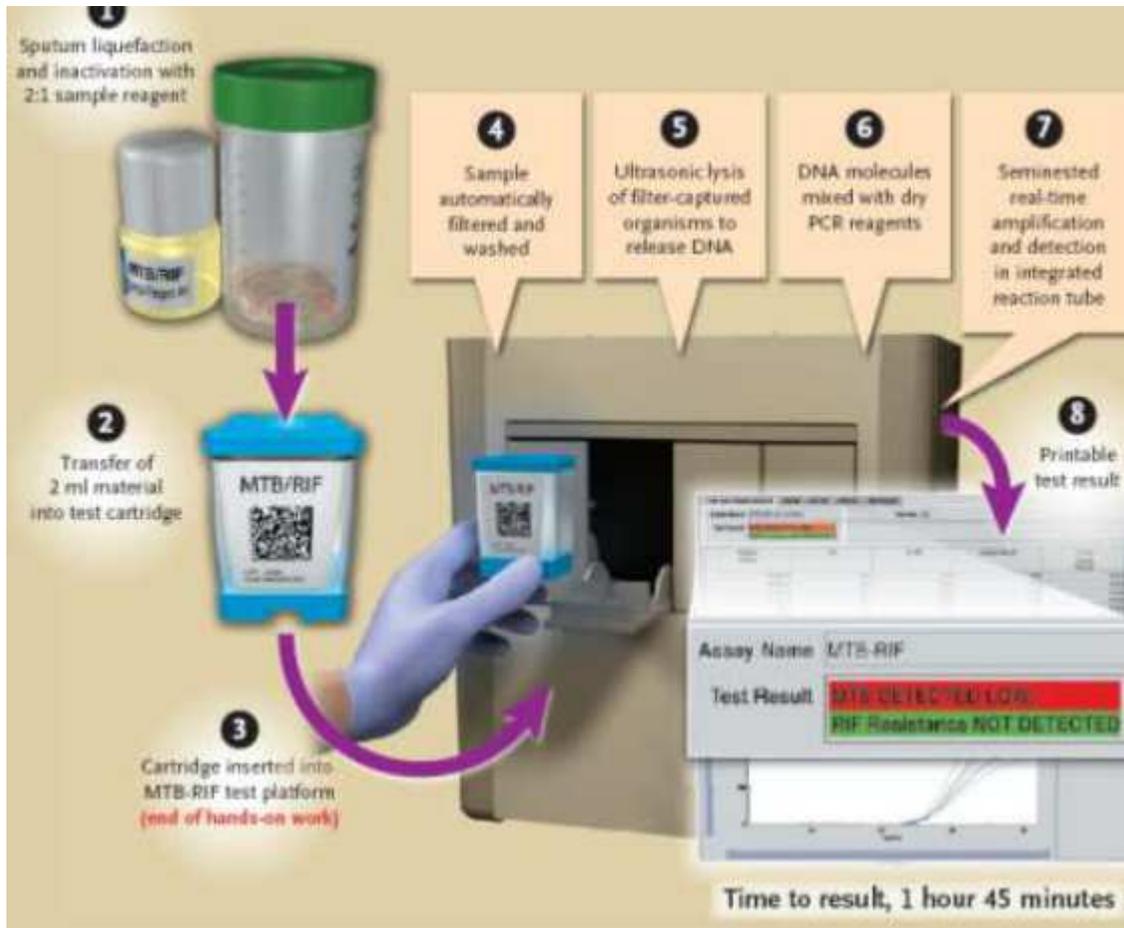
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Rapid Molecular Detection of Tuberculosis
and Rifampin Resistance

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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

Catharina C. Boehme, M.D., Pamela Nabeta, M.D., Doris Hillemann, Ph.D., Mark P. Nicol, Ph.D., Shubhada Shenai, Ph.D., Fiorella Krapp, M.D., Jenny Allen, B.Tech., Rasim Tahiri, M.D., Robert Blakemore, B.S., Roxana Rustomjee, M.D., Ph.D., Ana Mil David H. Persing, M.D., Ph.D., Sabine Ruesch-G David Alland, M

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-

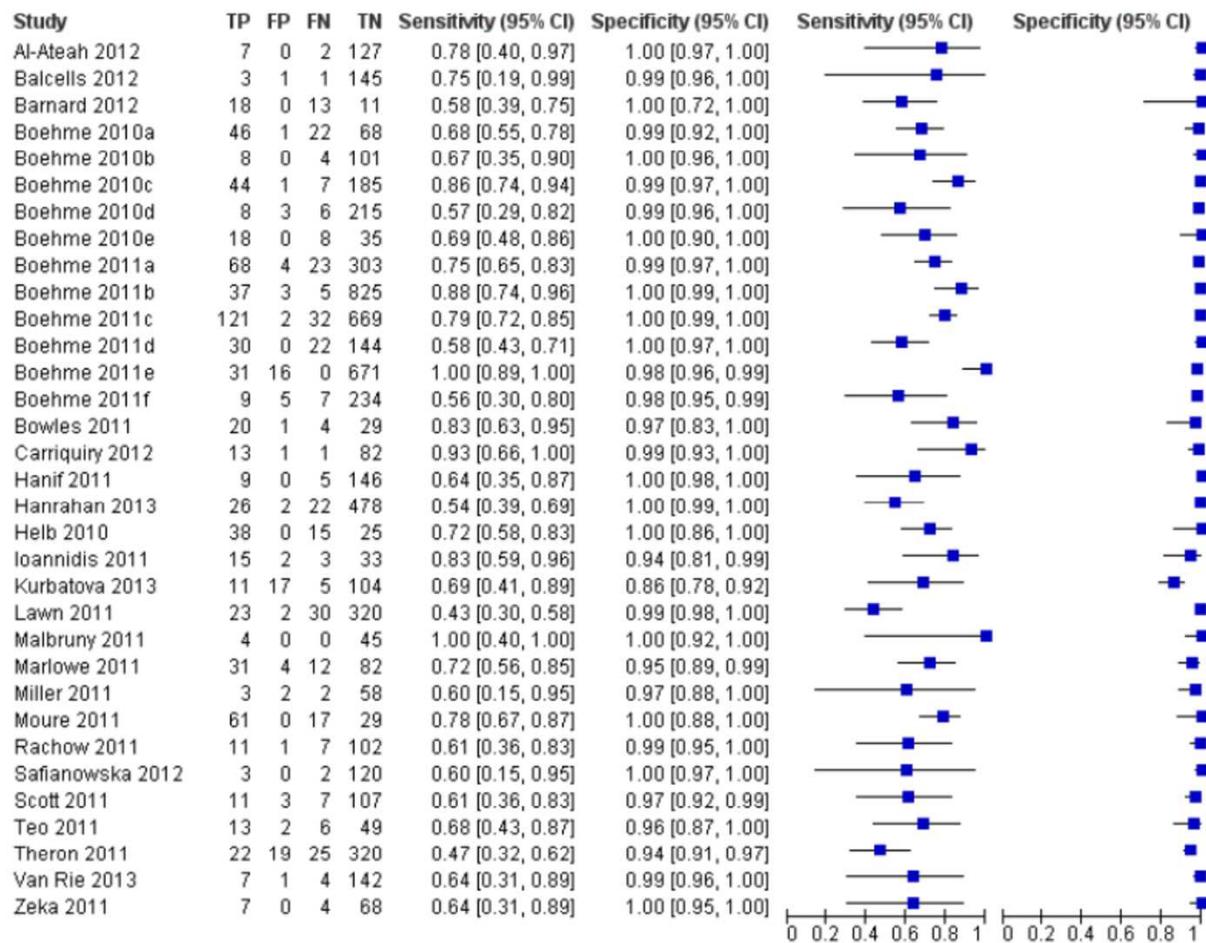
Xpert = 72%



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-

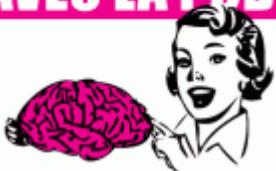
Xpert = 67%

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.

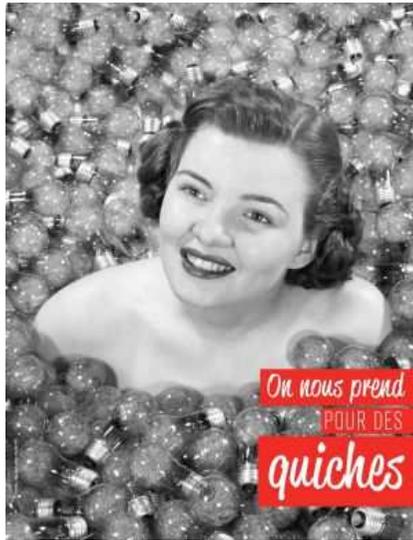
PCR : évolution des performances (synthèse - ex. Xpert)

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 »

