





Xpert[®]
MTB/RIF

Two-hour detection of MTB
and resistance to rifampicin.



Xpert[®] MTB/RIF

Go from test and wait
to test and treat.

  In Vitro Diagnostic Medical Device

**Cepheid[®]**
A better way.

“It’s basically a development that the world has been waiting for, for literally decades. It’s something that has the potential of truly revolutionizing the way we deal with TB today.”



Dr. Mario Raviglione

Director, Stop TB Department, WHO

As stated in the TB diagnostics conference call hosted by Advocacy to Control TB Internationally on December 7, 2010

The Need^{1,2,3}

Current Testing Methodologies Are Too Slow

According to the World Health Organization (WHO), *Mycobacterium tuberculosis* (MTB) is considered to be vastly under diagnosed today, despite approximately 500,000 new active cases reported in the WHO European region during 2007. This is a direct result of current MTB testing methods requiring weeks to deliver a definitive result, which can lead to patients being left untreated or placed on ineffective therapies. These patients may continue to spread MTB to others in the community, increasing the disease burden.

Drug Resistant Strains

With the worldwide re-emergence of TB, multi-drug resistant (MDR) and extensively drug resistant (XDR) strains have become an even greater threat. According to the WHO Global Tuberculosis Control Report 2009, there may be more than 500,000 cases of MDR-TB worldwide. Current testing for drug resistance can take more than 4 weeks, leading to higher mortality and the further spread of MDR strains.

The Solution

Xpert® MTB/RIF

- Simultaneous detection of both MTB and rifampicin resistance, a surrogate marker for MDR strains
- Unprecedented sensitivity for detecting MTB — even in smear negative, culture positive specimens
- Results in two hours; requires no instrumentation other than the GeneXpert® System
- On-demand results enable physicians to treat rapidly and effectively

WHO’s endorsement of the Xpert MTB/RIF test, which is a fully automated NAAT (nucleic acid amplification test) follows 18 months of rigorous assessment of its field effectiveness in the early diagnosis of TB, as well as multidrug-resistant TB (MDR-TB) and TB complicated by HIV infection, which are more difficult to diagnose.

As printed in the December 8, 2010 FIND and WHO joint press release⁴

Sensitive

- Hemi-nested PCR increases sensitivity
- Highly sensitive for confirmation of both smear positive and smear negative samples
- Robust sonication/mechanical DNA extraction procedure
- Internal extraction control assures extraction performance

XPERT® MTB/RIF ASSAY VERSUS AFB AND CULTURE STATUS – SINGLE SPUTUM PER PATIENT

		AFB-		AFB+
		Culture POSITIVE	Culture NEGATIVE	Culture POSITIVE
Xpert MTB/RIF	MTB DETECTED	122	6	545
	MTB NOT DETECTED	45	605	12

OVERALL SENSITIVITY CULTURE POSITIVE: 92.1%
 SENSITIVITY AFB+/CULTURE+: 97.9%
 SENSITIVITY AFB-/CULTURE+: 73.1%
SPECIFICITY: 99.0%

XPERT® MTB/RIF ASSAY VERSUS AFB AND CULTURE STATUS – THREE SPUTUMS PER PATIENT

		AFB-		AFB+
		Culture POSITIVE	Culture NEGATIVE	Culture POSITIVE
Xpert MTB/RIF	MTB DETECTED	153	3	605
	MTB NOT DETECTED	17	560	13

OVERALL SENSITIVITY CULTURE POSITIVE: 96.2%
 SENSITIVITY AFB+/CULTURE+: 97.9%
 SENSITIVITY AFB-/CULTURE+: 90.0%
SPECIFICITY: 99.5%

Specific

- The Xpert MTB/RIF assay uses 3 specific primers and 5 unique molecular probes to ensure a high degree of specificity
- Assay targets the *rpoB* gene, which is critical for identifying mutations associated with rifampicin resistance
- No cross reactions were observed with many other bacterial species tested, including a comprehensive panel of Mycobacteria

***rpoB* GENE 81 bp RIF RESISTANCE DETERMINING REGION**



Efficient

- Rapid, on-demand results mean that infected patients can quickly be placed in isolation and appropriate treatment started early
- Rapid detection of rifampicin-resistance not only guides individual patient therapy but aids with infection control and public health activities as well

PERFORMANCE CHARACTERISTICS OF THE XPERT MTB/RIF ASSAY COMPARED TO DRUG SUSCEPTIBILITY TESTING FOR RIFAMPICIN (RIF)

		DST	
		RIF Resistant	RIF Sensitive
Xpert MTB/RIF	RIF Resistance DETECTED	141	7
	RIF Resistance NOT DETECTED	4	415

SENSITIVITY: **97.2%**
 SPECIFICITY: **98.3%**
 PPV: **99.0%**
 NPV: **95.3%**

Advantage: Test and Treat

Why wait? ... and potentially have to delay start of treatment or isolation of the patient? Within only 2 hours, the Xpert® MTB/RIF will help you make the right decision.

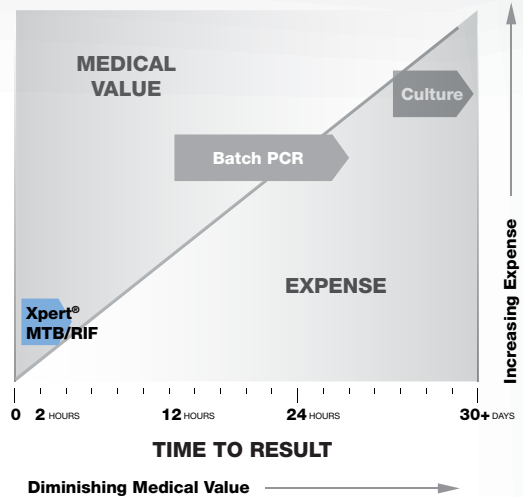
Immediate benefits:

IMPROVED MEDICAL VALUE^{5,6}:

- Better and earlier diagnosis
- Early choice of appropriate treatment
- Reduced cross-infection cases
- Decreased length of stay
- Reduced deaths

REDUCED EXPENSE^{5,6}:

- Antibiotics
- Isolation
- Blocked bed




WORKFLOW:

3 Easy Steps

Total hands-on time: 2 Minutes


1

Pour Sample Reagent into sample tube. Incubate for 15 minutes at room temperature. (Acceptable sample types: unprocessed sputum or sediment from concentrated specimen.)




2

Pipette diluted sample into cartridge.



3

Insert Cartridge and start assay.



ORDERING INFORMATION

Xpert® MTB/RIF (10 Cartridges with Sample Reagent) Catalog No. GXMTB/RIF-10

References:

1. Reducing the Global Burden of Tuberculosis: The Contribution of Improved Diagnostics. Nature 444 (2006): 49-57
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3. National Institute for Clinical Excellence (NICE) Clinical Guideline 33, 2006
4. http://www.who.int/tb/features_archive/new_rapid_test/en/index.html
5. Catharina C Boehme, Mark P Nicol, Pamela Nabeta, et al. Feasibility, diagnostic accuracy, and effectiveness of decentralised use of the Xpert MTB/RIF test for diagnosis of tuberculosis and multidrug resistance: a multicentre implementation study. www.thelancet.com Published online April 19, 2011 DOI:10.1016/S0140-6736(11)60438-8
6. Boehme CC, Nabeta P, Hillmann D, et al. Rapid molecular detection of tuberculosis and rifampin resistance. N Engl J Med. Sep 9; 363(11):1005-1015



The molecular revolution is here.

CORPORATE HEADQUARTERS

904 Caribbean Drive
Sunnyvale, CA 94089 USA

TOLL FREE +1.888.336.2743
PHONE +1.408.541.4191
FAX +1.408.541.4192

EUROPEAN HEADQUARTERS

Vira Soleih
81470 Maurens-Scopont, France

PHONE +33.563.82.53.00
FAX +33.563.82.53.01
EMAIL cepheid@cepheideurope.fr

www.Cepheidinternational.com



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