



Clinical Practice Change: Clinical Microbiology

Date: February 12, 2013

To: All Infectious Disease, and Respiratory Medicine specialists in MB, as well as all Infection Prevention and Control Practitioners in MB

From: Dr. Michelle Alfa, Medical Director and Shirley Hoban, Technical Director, Clinical Microbiology, DSM

Re: Rapid PCR Testing for *Mycobacterium tuberculosis* in Respiratory Specimens

Take Home Message:

Effective Feb 25, 2013, ALL index patients with respiratory specimens that are AFB smear positive will automatically get PCR testing for *M. tuberculosis*.

NEW TEST: TB PCR

Currently, all specimens submitted for culture for mycobacteria have microscopy done to determine if there are Acid Fast Bacilli (AFB) detectable in the direct specimen. Although this is helpful, it does not allow for differentiation of *M. tuberculosis* from other AFB. It may take many additional weeks before the culture results are known.

Recently, the Clinical Microbiology Discipline, Diagnostic Services of Manitoba has validated a PCR test that can reliably determine if *M. tuberculosis* is present in AFB smear positive respiratory specimens. The tuberculosis (TB) PCR test sensitivity and specificity for AFB smear positive respiratory specimens from index patients (i.e. not known to previously have TB) was 100% and 100%, respectively. As part of our Provincial TB program initiative, we plan to perform this TB PCR test automatically on any respiratory specimen from an index patient who is AFB smear positive.

The TB PCR test sensitivity and specificity for AFB smear negative index patients was 78.6% and 100%, respectively. Through consultation with the microbiologist-on-call, testing of smear negative specimens can be requested by the Infectious Diseases or Respiratory Medicine Services but only for high-risk index patients.

In 2012, approximately 30% of all index TB patients were AFB smear positive and on average it took 10.3 days for *M. tuberculosis* to grow (range of 4 to 21 days). The PCR test will allow practitioners to know more quickly if the AFB positive smear is due to respiratory TB or not. Once the AFB smear has been read, the TB PCR test will be done within 24 hours (except for weekends when there are no TB services available). This TB PCR test is **in addition to culture** as we still need to grow the *M. tuberculosis* strain in order to do susceptibility testing and MIRU typing.

Ideally, we want to provide direct TB PCR on one specimen for ALL index patients regardless of AFB smear result but this requires additional provincial funding as there are approximately 3,000 index patients each year who have respiratory specimens submitted for culture for mycobacteria. A "New Health Initiative" has been submitted to Manitoba Health to address this broader need for TB PCR; however, at this time, we do not have the funding or staffing required to complete TB PCR testing on ALL index patients.

Airborne Precautions:

Although this TB PCR assay was validated on >50 smear positive specimens, we recommend that Airborne Precautions be maintained for any index patient in whom there is a strong clinical suspicion of TB but who tests negative by the TB PCR test until such time as we have adequate experience to conclude that the TB PCR result alone is sufficient evidence to discontinue Airborne Precautions on such patients. Decisions regarding the need for Airborne Precautions for any patient should always be made in consultation with Infection Prevention and Control.



Reporting of TB PCR results:

The following comments will be used on **smear positive specimens** to report the results of the TB PCR test:

1. **Positive result:**

"Positive for: Mycobacterium tuberculosis complex DNA by Real-time PCR"

"This test was performed using a commercial Mycobacterium tuberculosis complex real-time PCR assay not cleared by Health Canada. In-house validation for AFB smear positive specimens demonstrated a sensitivity and specificity of 100%. Always correlate TB PCR results with the patient's clinical picture."

2. **Negative result:**

"Negative for: Mycobacterium tuberculosis complex DNA by Real-time PCR"

"This test was performed using a commercial Mycobacterium tuberculosis complex real-time PCR assay not cleared by Health Canada. In-house validation for AFB smear positive specimens demonstrated a sensitivity and specificity of 100%. Always correlate TB PCR results with the patient's clinical picture."

3. **Inconclusive result:**

"Inconclusive: Real-time PCR for Mycobacterium tuberculosis complex DNA not reported due to presence of PCR inhibitors in sample. Refer to AFB culture results."

The following comments will be on **smear negative specimens**, which have been tested after consultation with the microbiologist-on-call, to report the results of the TB PCR test:

1. **Positive result:**

"Positive for: Mycobacterium tuberculosis complex DNA by Real-time PCR"

"This test was performed using a commercial Mycobacterium tuberculosis complex real-time PCR assay not cleared by Health Canada. In-house validation for AFB smear negative specimens demonstrated a sensitivity of 78.6% and specificity of 100%. Always correlate TB PCR results with the patient's clinical picture."

2. **Negative result:**

"Negative for: Mycobacterium tuberculosis complex DNA by Real-time PCR"

"This test was performed using a commercial Mycobacterium tuberculosis complex real-time PCR assay not cleared by Health Canada. In-house validation for AFB smear negative specimens demonstrated a sensitivity of 78.6% and specificity of 100%. Always correlate TB PCR results with the patient's clinical picture."

3. **Inconclusive result:**

"Inconclusive: Real-time PCR for Mycobacterium tuberculosis complex DNA not reported due to presence of PCR inhibitors in sample. Refer to AFB culture results."

If you have any questions or require further information, please contact Dr. Michelle Alfa or Shirley Hoban at 237-2484.