WISCONSIN DEPARTMENT of HEALTH SERVICES

Tuberculosis Disease:
Laboratory Results for Nurses

Andrea Liptack, MSN, RN
TB Nurse Consultant
Wisconsin TB Program

Agenda

- Definitions, resources, background
- Most common active TB disease labs:
  - AFB smear microscopy
  - TB PCR/ NAAT
  - Culture
  - Susceptibility
- Other related labs you may see:
  - NTM cultures
  - IGRAs
- Practice Examples

Definitions of Abbreviations Used in This Presentation

AFB
Acid Fact Bacillus

MTBC
Mycobacterium tuberculosis complex

DST
Drug Susceptibility Testing

NTM
Non-tuberculous Mycobacteria

MAC
Mycobacterium avium complex

WSLH
Wisconsin State Laboratory of Hygiene

PCR and NAAT
Polymerase Chain Reaction

Nucleic Acid Amplification Testing

IGRA
Interferon Gamma Release Assay

Resources

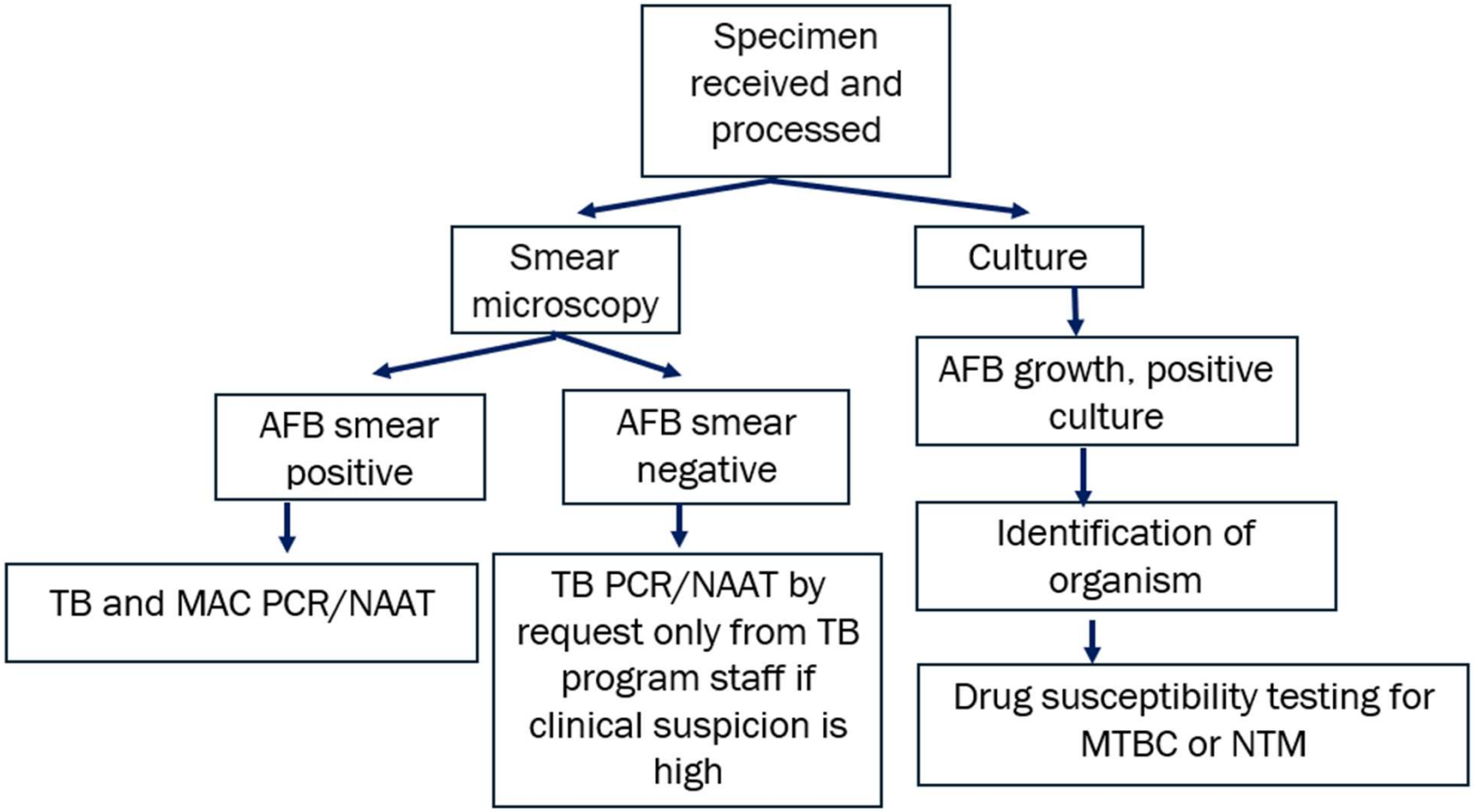
- TB Laboratory, Webinar Series, video recording and PDF slide set
- TB Lab Results Reference for Nurses
- WSLH Test Reference Manual
- Sputum collection instructions (video by PHMDC)
- Sputum collection instructions (PDF publication)
- Understanding TB Laboratory Testing for Public Health Nurses, APHL

Mycobacterium tuberculosis Complex

- Rod shaped, acid-fast, aerobic, slow-growing, intracellular pathogenic bacteria
- MTBC includes:

  M. tuberculosis, M. bovis, M. africanum, M. microti, M. caprae, M.pinnipedii, M. canettii.

Testing Algorithm for WSLH



Smear Microscopy

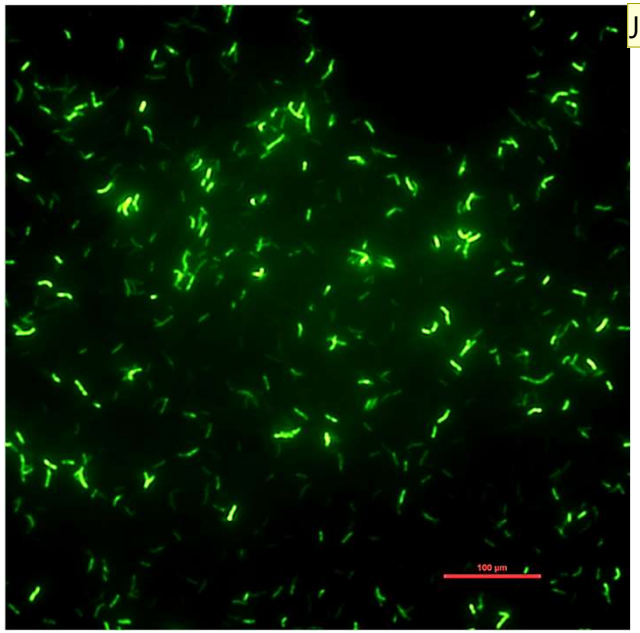
AFB Smear

Smear Microscopy

Positive AFB Smear

This tells us the laboratorian saw AFB through the microscope. The waxy coating prevents the destaining agent from washing the stain off the TB.

What you might see through the microscope



Laboratory photos used with permission from Nate Simon, WSLH

Slide 8

JM0 We will just want to make sure we have an email or other documentation from the person who took this picture giving us permission to use it. You can learn more about this on the workweb page: https://dhsworkweb.wisconsin.gov/communications/images.htm
McCarroll, Julia R - DHS, 2025-06-02T16:07:23.353

AL0 0 Yes, he gave written permission to include images supplied via email communication, which I have a copy of.
Liptack, Andrea R - DHS, 2025-06-09T15:01:37.532

Smear Microscopy

- You can remember this by thinking that the lab worker is "smearing" the specimen onto a glass slide to look at in their microscope.
- Because of this type of bacteria's thick waxy coating, other organisms besides *Mycobacterium tuberculosis* may make an AFB smear positive.
- All this test type tells us is that there are bacteria in the specimen on this slide on the microscope that look like they may be TB.

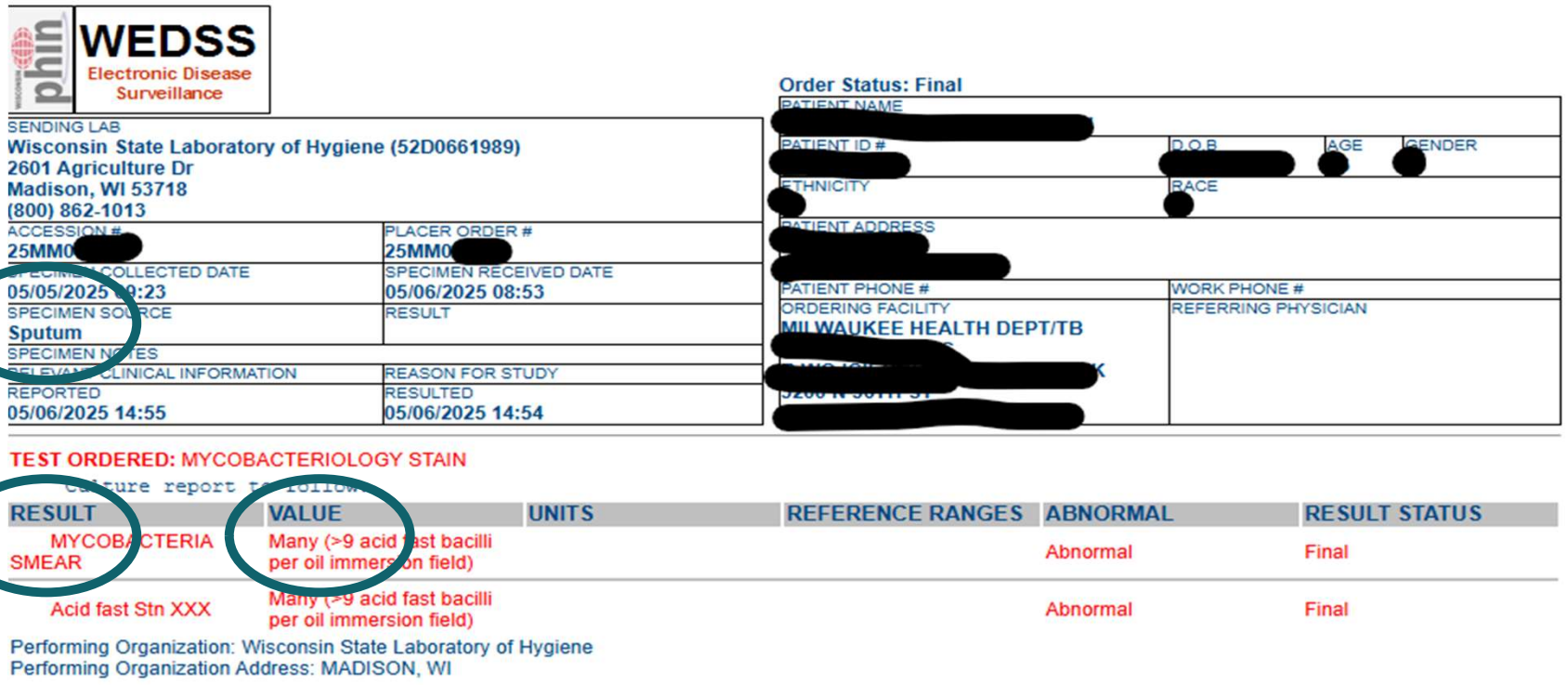
Smear Microscopy

- This test is rapid and inexpensive for fast *indication* of TB disease but **is not confirmatory.**
- Most AFB smear positive test results in Wisconsin are for people with an NTM infection or with non-pathogenic (aren't causing illness) NTM in their respiratory tract.

Smear Microscopy, Result Grading

WSLH Result	Graded Scale	Qualitative Scale	Interpretation, *if infectious MTBC*
Negative	Negative	Negative	Potentially infectious
Rare (1-9 AFB per 100 fields)	1+	Positive	Likely low-level infectiousness
Few (1-9 AFB per 10 fields)	2+	Positive	Likely moderately infectious
Few (1-9 AFB per field)	3+	Positive	Likely moderately infectious
Many (>9 AFB per field)	4+	Positive	Likely highly infectious

Smear Microscopy Example



WEDSS
Electronic Disease Surveillance

Order Status: Final

SENDING LAB
Wisconsin State Laboratory of Hygiene (52D0661989)
2601 Agriculture Dr
Madison, WI 53718
(800) 862-1013

PATIENT NAME [redacted]
PATIENT ID # [redacted]
D.O.B [redacted]
AGE [redacted]
GENDER [redacted]
ETHNICITY [redacted]
RACE [redacted]
PATIENT ADDRESS [redacted]
PATIENT PHONE #
WORK PHONE #

ACCESSION # 25MM0[redacted]
PLACER ORDER # 25MM0[redacted]
SPECIMEN COLLECTED DATE 05/05/2025 [redacted]:23
SPECIMEN RECEIVED DATE 05/06/2025 08:53
SPECIMEN SOURCE Sputum
RESULT
SPECIMEN NOTES
RELEVANT CLINICAL INFORMATION
REASON FOR STUDY
ORDERING FACILITY MILWAUKEE HEALTH DEPT/TB [redacted]
REFERRING PHYSICIAN
REPORTED 05/06/2025 14:55
RESULTED 05/06/2025 14:54

TEST ORDERED: MYCOBACTERIOLOGY STAIN

Culture report to follow.

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
MYCOBACTERIA SMEAR	Many (>9 acid fast bacilli per oil immersion field)			Abnormal	Final
Acid fast Stn XXX	Many (>9 acid fast bacilli per oil immersion field)			Abnormal	Final

Performing Organization: Wisconsin State Laboratory of Hygiene
Performing Organization Address: MADISON, WI

CL0

Smear Microscopy, Limitations

Is this TB?

Maybe. Could be another fluorescing bacilli such as NTM (most common cause of an AFB smear positive test) and some legionella species (limited specificity).

Slide 13

CL0 might want to break it into multiple slides to cut back on words per slide (channeling WWJD... what would Jenna do)
Leback, Claire C - DHS, 2025-05-14T13:58:39.374

AL0 0 Ya, I see how it's a lot of words. I want to keep each of the main questions in one spot as its repeated for each test type as a major learning point. Cut out some of the wording on the slide an dput in speaker notes? But I also want the info available for people without having ot watch the presentation at least a slightly more brief version of these words.
Liptack, Andrea R - DHS, 2025-05-14T16:52:39.025

JR0 1 Claire's comment made me laugh. One option could be to "storyboard" it. Make three slides. On the first only have the "Is it TB" question. On the second add "is it alive" and on the third have all three questions
Romanowski, Jenna E - DHS, 2025-05-16T18:59:34.532

Smear Microscopy, Limitations

Is this TB?

Maybe. Could be another fluorescing bacilli such as NTM (most common cause of an AFB smear positive test) and some legionella species (limited specificity).

Is the TB alive?

Maybe. Could be nonviable TB or NTM. This is increasingly likely if the person has been on TB therapy for some time.

Smear Microscopy, Limitations

Is it TB?

Maybe. Could be another fluorescing bacilli such as NTM (most common cause of an AFB smear positive test) and some legionella species (limited specificity).

Is the TB alive?

Maybe. Could be nonviable TB or NTM. This is increasingly likely if the person has been on TB therapy for some time.

Is TB in there?

Maybe. Sputum specimen collection is one small sample of one small part of the lung during one moment in time. The person may still have TB, but no TB bacteria were seen on the AFB smear (limited sensitivity).

TB PCR/ NAAT

Rapid Diagnosis

WSLH PCR

Detects MTBC and Mycobacterium Avium Complex (MAC)

- Rapid identification of TB and MAC DNA
- Is confirmatory that TB DNA is present in the tested sample
- Not performed serially (once only for rapid diagnosis)

WSLH PCR

Detects MTBC and Mycobacterium Avium Complex (MAC)

Sensitivity for TB:

- GJM0ater than 95% for AFB smear positive, culture confirmed
- 55–75% for AFB smear negative, culture confirmed

Slide 18

JM0 Should spell out greater or less than rather than use symbols per the DHS style guide
McCarroll, Julia R - DHS, 2025-06-02T16:10:51.896

WSLH PCR

Detects MTBC and Mycobacterium Avium Complex (MAC)

- WSLH performs both tests (TB and MAC PCR) on all newly smear positive respiratory specimens.

  Newly smear positive: no positive AFB smears or cultures in the last 12 months.

- Wisconsin TB Program needs to "approve" TB PCR on smear negative specimens for high-risk individuals.

Slide 19

JM0 We should avoid using italics per the DHS style guide. Use bold for emphasis instead
McCarroll, Julia R - DHS, 2025-06-02T16:11:28.541

CL0

WSLH PCR Result Interpretations

WSLH Lab Result	Interpretation
"*Mycobacterium tuberculosis* complex DNA detected"	Positive, TB identified
"*Mycobacterium avium* complex DNA detected"	Positive, MAC identified
"No *Mycobacterium tuberculosis* complex DNA detected"	Negative, TB not identified
"No *Mycobacterium avium* complex DNA detected"	Negative, MAC not identified
"Inhibitory substances that prevent nucleic acid amplification were detected"	Testing of no diagnostic help

Slide 20

CL0 Helpful to say Person may still have TB if PCR is negative, especially if smear was negative
Leback, Claire C - DHS, 2025-05-14T14:09:57.950

AL0 0 Emphasized on limitations of PCR slide
Liptack, Andrea R - DHS, 2025-05-14T19:32:12.274

JR1

TB PCR, Limitations

Is this TB?

Yes! We have identified the DNA of the organism that is causing the positive smear as being present in the tested sample. TB is confirmed.

Slide 21

CL0 Would add how to evaluate negative results in context of smear
Leback, Claire C - DHS, 2025-05-14T14:35:45.012

AL0 0 On limitations/ sensitivity specificity sllide before this, mostly in speaker comments under sen and sp
Liptack, Andrea R - DHS, 2025-05-14T16:58:13.903

JR1 Same comment for an idea as slide 13
Romanowski, Jenna E - DHS, 2025-05-16T19:00:37.516

AL1 0 See next slide for alternate option
Liptack, Andrea R - DHS, 2025-05-19T20:26:05.049

TB PCR, Limitations

Is this TB?

Yes! We have identified the DNA of the organism that is causing the positive smear as being present in the tested sample. TB is **confirmed**.

Is the TB alive?

Maybe. Could be nonviable TB. This is increasingly likely if the person has been on TB therapy for some time. This still confirms a TB diagnosis, and treatment is initiated while the culture grows.

TB PCR, Limitations

Is this TB?

Yes! We have identified the DNA of the organism that is causing the positive smear as being present in the tested sample. TB is **confirmed**.

Is the TB alive?

Maybe. Could be nonviable TB. This is increasingly likely if the person has been on TB therapy for some time. This still confirms a TB diagnosis, and treatment is initiated while the culture grows.

Is TB in there?

If **positive, yes**; if **negative, maybe**. We are reliant on capturing a good specimen with lots of TB bacteria, and for this test, TB DNA must also be in the specimen at the time it was collected.

Culture

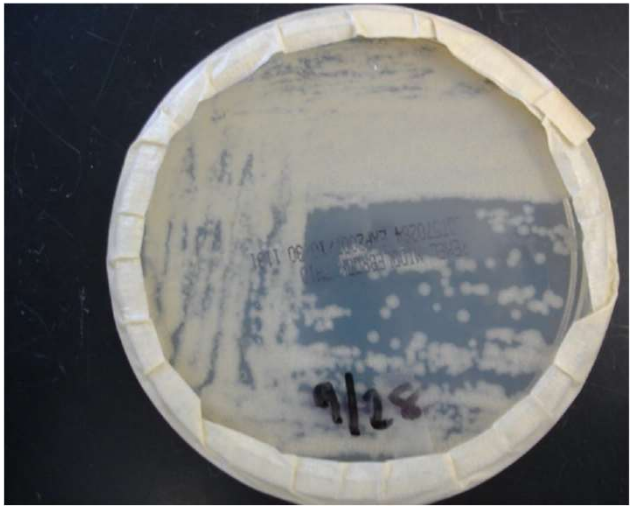
The Gold Standard of Diagnosis

Culture

Positive MTBC Culture

This tells us that TB is alive and dividing in the growth media. Both solid and liquid growth media are used at WSLH. This is the most sensitive method of detection.

What you would see



Laboratory photos from Nate Simon, WSLH

Culture

Either liquid (broth) or solid growth media are used for the incubation period.

- **Liquid broth:** Mycobacteria Growth Indicator Tube (MGIT) is used, it is an automated instrument, it detects oxygen consumption through a florescent pad (glows and alerts lab tech if positive).
- **Solid media:** Middlebrook 7H11 plates are used for non-respiratory and specimens from people with known TB. These are visually inspected at lease once per week for 6 weeks.

Culture, Example

Specimen Details

	Collected	Type	Source	Submitter ID
25MM00[redacted]	4/20/2025 0620	Sputum		

Mycobacteria Culture (Final result)

ID: 25MM00[redacted] Type/Src: Sputum

Mycobacteria Culture Result

Mycobacterium tuberculosis complex (A)

Comments:

The M. tuberculosis complex includes the species M. tuberculosis, M. bovis, M. bovis BCG, M. africanum and M. microti. 98% of the isolates in the M. tuberculosis complex identified at the State Laboratory of Hygiene are M. tuberculosis.

WSLH automatically performs culture-based drug susceptibility testing on an initial isolate from each TB patient.

A laboratory developed real-time PCR assay was used for identification from culture growth. This test was developed and its performance characteristics determined by the Wisconsin State Laboratory of Hygiene, a Clinical Laboratory Improvement Amendments (CLIA) certified, high complexity clinical laboratory. It has not been cleared or approved by the U.S. Food and Drug Administration.

Cultures are incubated for a total of six weeks. Further reports will be issued if additional Mycobacteria species are detected.

Resulting Lab: WSLH

Culture, Limitations 

Is this TB?

Yes! We have identified the organism growing and diving in the growth media is MTBC. TB is confirmed. Isolation of MTBC *almost always* signifies disease.

Culture, Limitations

Is this TB?

Yes! We have identified the organism growing and diving in the growth media is MTBC. TB is **confirmed**. Isolation of MTBC *almost always* signifies disease.

Is the TB alive?

Yes! Since TB grew in culture, it is alive and viable. If the TB has been exposed to TB drugs for more than a few days, it is likely already experiencing changes that make it harder to grow and less infectious.

Culture, Limitations

Is this TB?

Yes! We have identified the organism growing and diving in the growth media is MTBC. TB is **confirmed**. Isolation of MTBC *almost always* signifies disease.

Is the TB alive?

Yes! Since TB grew in culture, it is alive and viable. If the TB has been exposed to TB drugs for more than a few days, it is likely already experiencing changes that make it harder to grow and less infectious.

Is TB in there?

Yes! Culture is the *gold standard* for TB diagnosis. It is the **slowest** method. It can take up to 42 days to wait to see if it is growing and dividing in the liquid and solid media (not good for rapid diagnosis).

Susceptibility

Phenotypic and Molecular DST

DST, Phenotypic and Molecular

- Performed for all newly culture-confirmed specimens
- Guides treatment plan and regimen such as medication changes and duration of therapy
- Allows for appropriate treatment of contacts with appropriate regimens (susceptible to TB drugs)

Phenotypic vs. Molecular DST

Phenotypic

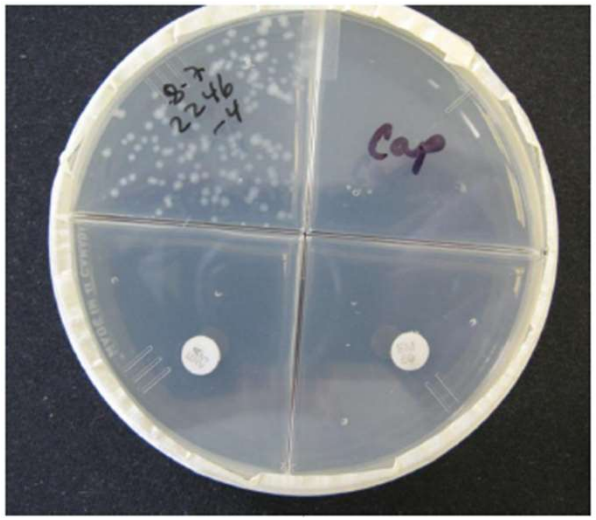
Incubates a known concentration of MTBC in a known concentration of drug to observe if it grows or is inhibited from growing.

Molecular (or genotypic)

Uses DNA amplification and detection to identify gene mutations that are known to confer resistance to TB drugs.

Phenotypic vs. Molecular DST

Phenotypic DST, Agar



Laboratory photos used with permission from Nate Simon, WSLH

Molecular DST, GeneXpert ®

Type/Src:	Aspirate/Neck	
Result		**Units**
MTB complex DNA detected.	**(A)**	
Rifampin gene mutation detected.	**(A)**	
Possible rifampin resistance.		

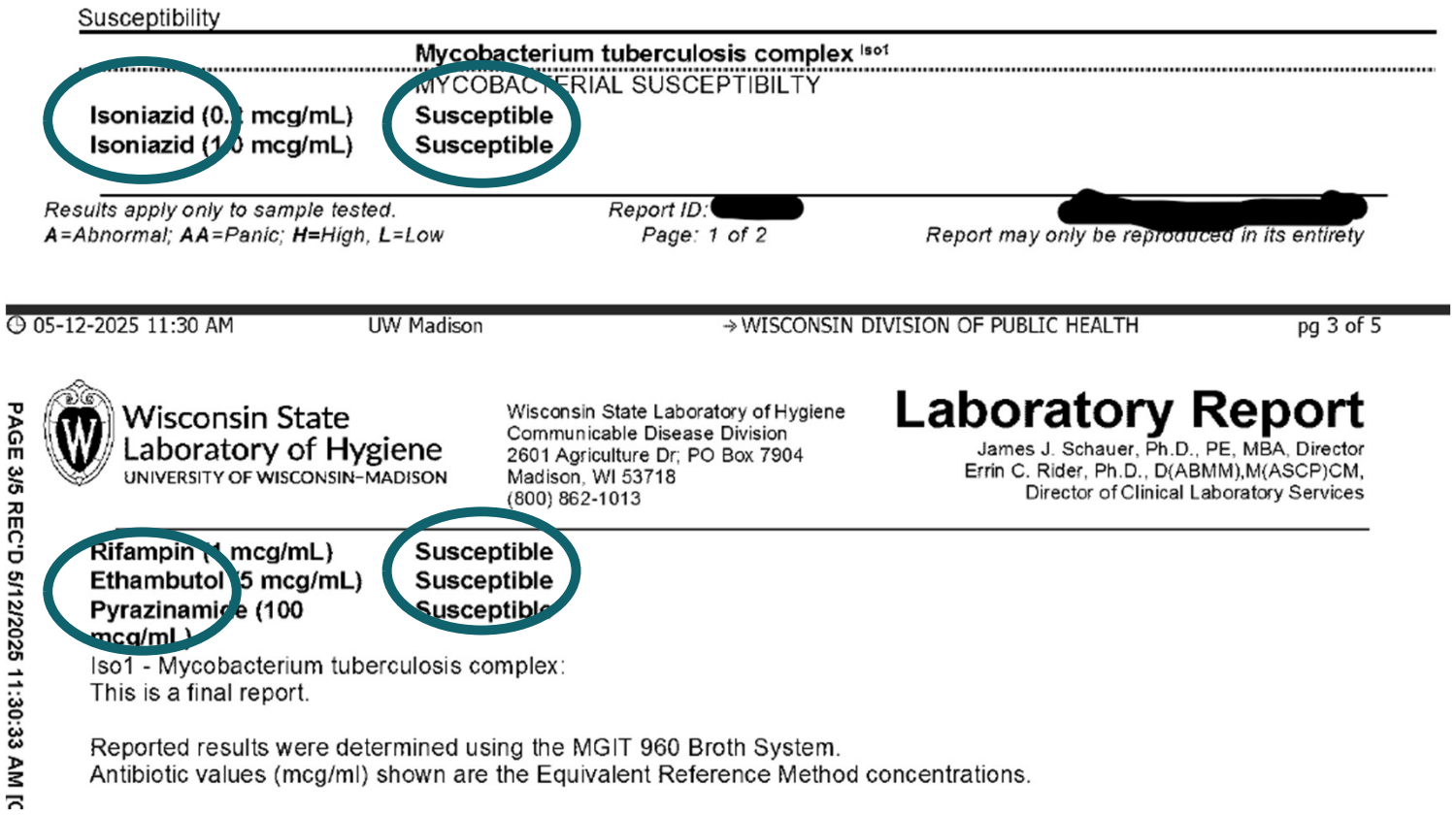
DST, Phenotypic

- Usually takes 2–4 weeks after a positive culture
- Phenotypic DST provides results for first line TB drugs: isoniazid (INH), rifampin (RIF), ethambutol (EMB,) and pyrazinamide (PZA)

DST, Phenotypic Result Interpretation

Result	Interpretation
Susceptible	TB strain is likely to show responsiveness to drug (TB will not grow and divide well or at all).
Resistant	TB strain is unlikely to show responsiveness to drug (TB will probably continue to grow and divide, evading the effect of the drug).

DST, Phenotypic Example



Susceptibility

Mycobacterium tuberculosis complex [Iso1]

MYCOBACTERIAL SUSCEPTIBILTY

Isoniazid (0.[illegible] mcg/mL)	**Susceptible**
Isoniazid (1[illegible]0 mcg/mL)	**Susceptible**

Results apply only to sample tested.
***A**=Abnormal; **AA**=Panic; **H**=High, **L**=Low*

Report ID: [redacted]
Page: 1 of 2

Report may only be reproduced in its entirety

05-12-2025 11:30 AM UW Madison → WISCONSIN DIVISION OF PUBLIC HEALTH pg 3 of 5

PAGE 3/5 REC'D 5/12/2025 11:30:33 AM [C

Wisconsin State Laboratory of Hygiene
UNIVERSITY OF WISCONSIN-MADISON

Wisconsin State Laboratory of Hygiene
Communicable Disease Division
2601 Agriculture Dr; PO Box 7904
Madison, WI 53718
(800) 862-1013

Laboratory Report

James J. Schauer, Ph.D., PE, MBA, Director
Errin C. Rider, Ph.D., D(ABMM),M(ASCP)CM,
Director of Clinical Laboratory Services

Rifampin ([illegible] mcg/mL)	**Susceptible**
Ethambutol ([illegible]5 mcg/mL)	**Susceptible**
Pyrazinamide (100 mcg/mL)	**Susceptible**

Iso1 - Mycobacterium tuberculosis complex:
This is a final report.

Reported results were determined using the MGIT 960 Broth System.
Antibiotic values (mcg/ml) shown are the Equivalent Reference Method concentrations.

DST, Molecular

If TB PCR positive, rapid molecular testing can be performed

- Cepheid GeneXpert® MTB/RIF testing is performed.
- Predicts if the TB bacteria will be susceptible to **rifampin** (fastest predictor of MDR-TB).
- Detects mutations in the rpoB genetic loci in 1–2 business days. A mutation in the rpoB gene loci predicts rifampin resistance.

DST, Molecular

Other considerations

- May detect "silent" mutations or mutations of unknown significance— ones that do not confer resistance. Phenotypic DST confirms resistance.
- GeneXpert® only predicts resistance to rifampin. AL0
- Performed on primary **respiratory specimens**— you need a culture to grow to perform this testing on non-respiratory specimens.

Slide 39

AL0 PZA pncA mutation detection forthcoming at WSLH soon

Liptack, Andrea R - DHS, 2025-05-22T17:12:42.645

DST, Molecular Result Interpretation

Result	Interpretation
MTB DETECTED; Rif Resistance DETECTED	Likely TB is resistant to rifampin (rifampin likely can **not** be used as an effective drug in the regimen).
MTB DETECTED; Rif Resistance NOT DETECTED	Likely TB is susceptible to rifampin (rifampin can be used as an effective drug in the regimen).

DST, Molecular Example

TEST ORDERED: CEPHEID GENEXPERT MTB/RIF

This real-time PCR assay simultaneously detects the presence of both M. tuberculosis complex DNA and genetic mutations associated with rifampin resistance from raw (induced or expectorated) or concentrated sputum sediments.

The assay is FDA cleared only for sputum specimens from patients for whom there is clinical suspicion of tuberculosis and who have received no antituberculosis therapy, or less than three days of therapy. It has not been approved for specimens from pediatric patients or to be used as a test of cure.

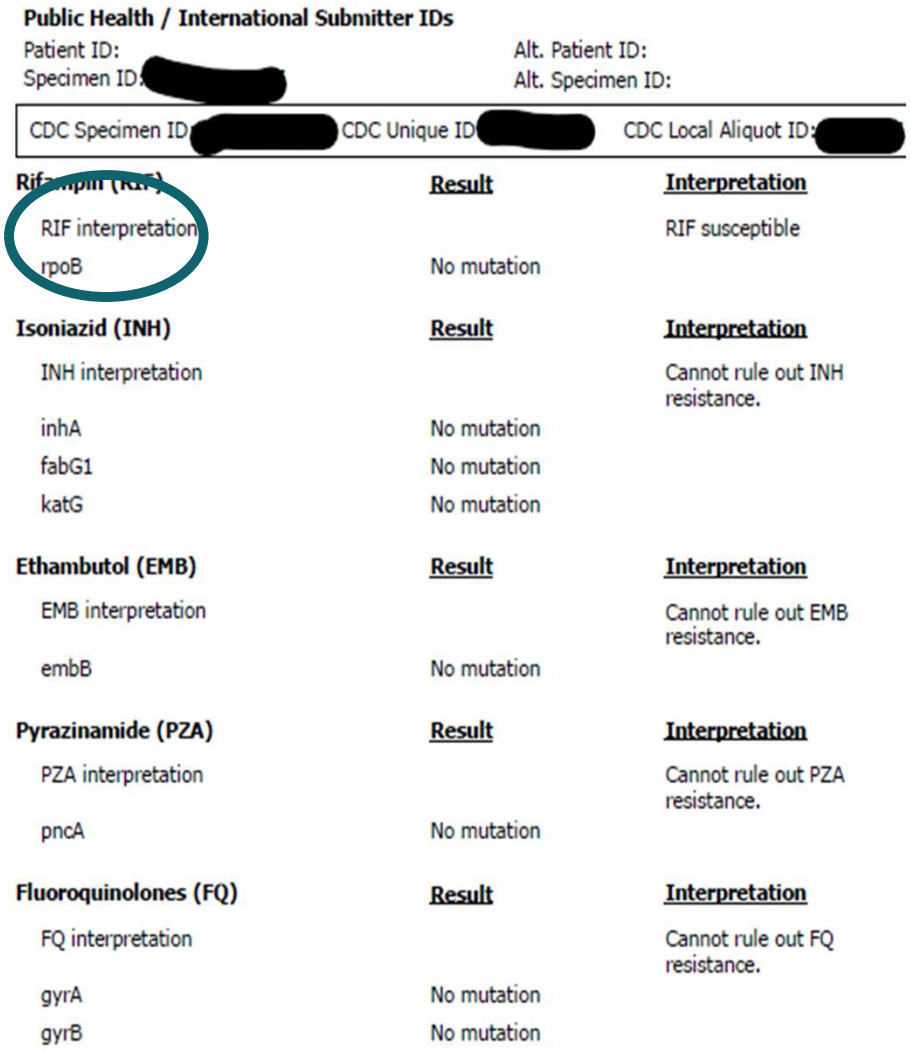
RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
MYCOBACTERIUM TUBERCULOSIS COMPLEX TARGET GENE	MTB complex DNA detected.			Abnormal	Final
M TB rpoB XXX QI PCR	MTB complex DNA detected.			Abnormal	Final

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
RPOB GENE MUTATION	No rifampin gene mutation detected				Final
M TB rpoB XXX QI PCR	No rifampin gene mutation detected.				Final

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
RIFAMPIN INTERPRETATION	Likely rifampin susceptible.				Final
M TB rpoB XXX QI PCR	Likely rifampin susceptible.				Final

Performing Organization: Wisconsin State Laboratory of Hygiene
Performing Organization Address: MADISON, WI

DST, Molecular, CDC Expanded Panel



Public Health / International Submitter IDs

Patient ID:
Specimen ID: [redacted]
Alt. Patient ID:
Alt. Specimen ID:

CDC Specimen ID: [redacted] CDC Unique ID: [redacted] CDC Local Aliquot ID: [redacted]

Rifampin (RIF)	**Result**	**Interpretation**
RIF interpretation		RIF susceptible
rpoB	No mutation	
Isoniazid (INH)	**Result**	**Interpretation**
INH interpretation		Cannot rule out INH resistance.
inhA	No mutation	
fabG1	No mutation	
katG	No mutation	
Ethambutol (EMB)	**Result**	**Interpretation**
EMB interpretation		Cannot rule out EMB resistance.
embB	No mutation	
Pyrazinamide (PZA)	**Result**	**Interpretation**
PZA interpretation		Cannot rule out PZA resistance.
pncA	No mutation	
Fluoroquinolones (FQ)	**Result**	**Interpretation**
FQ interpretation		Cannot rule out FQ resistance.
gyrA	No mutation	
gyrB	No mutation	

Molecular detection of drug resistance (MDDR) can be done at CDC. This provides an expanded result panel for first- and second-line TB drugs. This testing will be requested by the TB program or automatically sent out based on first line resistance results.

Other TB Labs

NTM and IGRA

NTM PCR and Cultures

NTM are commonly found in soil and water

Mycobacterium peregrinum (A)
Mycobacterium avium complex (A)
Comments:
SUPPLEMENTAL REPORT: 4/23/2025
Please note that M. avium complex has been isolated in addition to M. peregrinum reported on 4/22/2025.

RESULT	VALUE
MYCOBACTERIA CULTURE RESULT	MYCOBACTERIUM AVIUM COMPLEX
Mycobacterium XXX Cult	Mycobacterium, avium-intracellulare group

Mycobacterium avium complex

Can cause similar symptoms to TB disease in those with underlying lung disease or immune compromise. Are not contagious from person to person. May require treatment with antibiotics. MAC is most common NTM.

JM0

IGRAs

QuantiFERON®-TB Gold (QFT)

Detects CD4 and CD8 T cell interferon-gamma response to MTB antigens

Four numeric results: positive, negative, indeterminate

T-SPOT ®.TB

Detects memory T cells that produce interferon-gamma in response to MTB antigens

Results as number of “spots”, positive, negative, or borderline

Slide 45

JM0 I removed some punctuation and this and a few other slides. Only complete sentences or imperative sentences should have punctuation.

McCarroll, Julia R - DHS, 2025-06-02T16:25:51.486

QFT, Numeric Vales

Mitogen	Positive Control: Ensures the sample can respond to interferon gamma (baseline immune response)
Nil	Negative control: Adjusts for background interferon gamma
TB1	Primarily detects CD4 T cell response
TB2	Optimized for CD4 and CD8 T cell detection

IGRA, Result Interpretation

IGRA Test Result	QuantiFERON	T-Spot	Notes
Positive	TB-Nil is higher than or equal to 0.35 IU/ mL	8 spots or more	Infection is likely in individuals with risk factors. Consider retesting in low- or no-risk individuals.
Negative	TB-Nil is lower than 0.35 IU/mL	4 spots or less	Infection is unlikely.
Indeterminate or invalid	High nil value or low mitogen value	High nil value or low mitogen value	Collect another specimen for retesting since these results cannot be interpreted. This occurs if controls do not perform as expected.
Borderline (not clear)	Not applicable	5, 6 or 7 spots	Uncertain likelihood of TB infection. Collect another specimen for retesting.

AL0

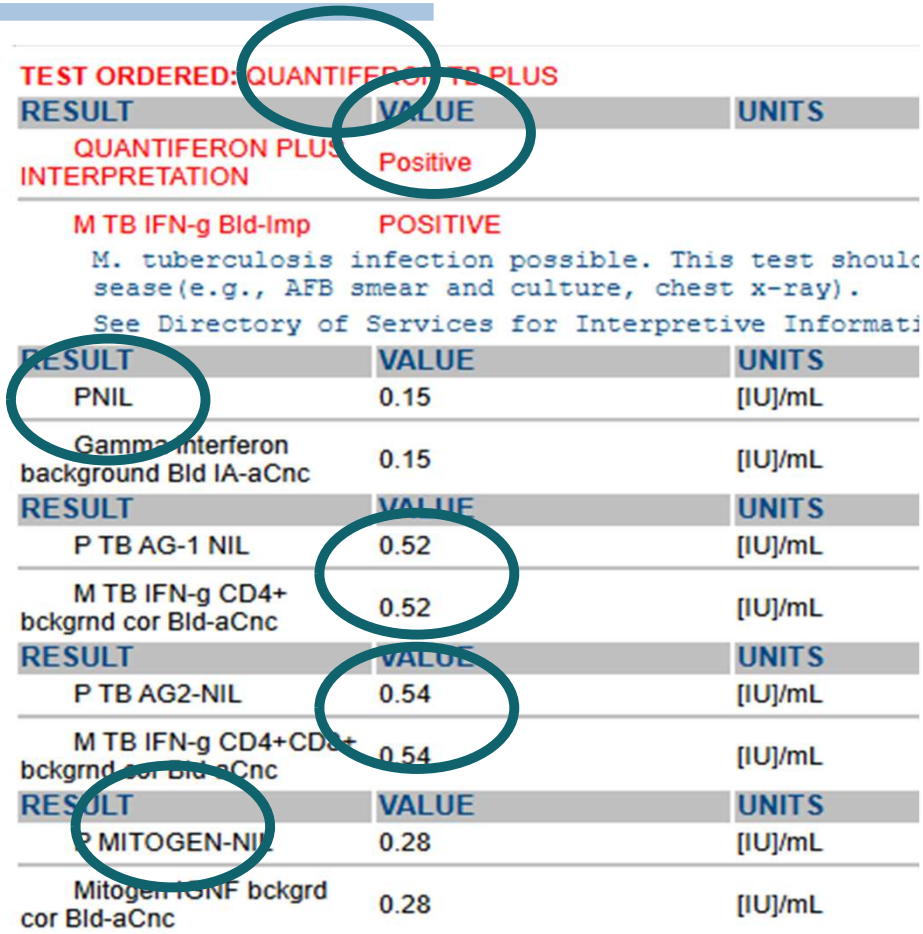
Slide 47

AL0 Image from WI TB program publication, linked in resources section
Liptack, Andrea R - DHS, 2025-05-14T19:51:30.222

AL0 0 Can redo if format difference is totally disruptive, but seems like keeping the exact image as it appears in the recommended resource will lend familiarity
Liptack, Andrea R - DHS, 2025-05-14T21:10:29.984

JM0 1 I think this is fine. It is still fairly consistent with the presentation in terms of color. I would leave it as is 😊
McCarroll, Julia R - DHS, 2025-06-02T16:27:07.491

QFT, Example



TEST ORDERED: QUANTIFERON TB PLUS

RESULT	VALUE	UNITS
QUANTIFERON PLUS INTERPRETATION	Positive	
M TB IFN-g Bld-Imp	POSITIVE	

M. tuberculosis infection possible. This test should sease(e.g., AFB smear and culture, chest x-ray).

See Directory of Services for Interpretive Informati

RESULT	VALUE	UNITS
PNIL	0.15	[IU]/mL
Gamma interferon background Bld IA-aCnc	0.15	[IU]/mL
RESULT	**VALUE**	**UNITS**
P TB AG-1 NIL	0.52	[IU]/mL
M TB IFN-g CD4+ bckgrnd cor Bld-aCnc	0.52	[IU]/mL
RESULT	**VALUE**	**UNITS**
P TB AG2-NIL	0.54	[IU]/mL
M TB IFN-g CD4+CD8+ bckgrnd cor Bld-aCnc	0.54	[IU]/mL
RESULT	**VALUE**	**UNITS**
P MITOGEN-NIL	0.28	[IU]/mL
Mitogen IGNF bckgrd cor Bld-aCnc	0.28	[IU]/mL

AL0

Resources for IGRAs

- Follow-Up for IGRA Reports: Checklist for Public Health Staff (P-02540)
- TB Blood Test: Interferon Gamma Release Assay (P-01182)
- SNTC Webinars: IGRA for Nurses, webinar recording
- MCCT: All About IGRA for Civil Surgeons, webinar recording

Slide 49

AL0 40 mins to this point without practice.
Liptack, Andrea R - DHS, 2025-06-13T14:37:40.634

Practice

What does each lab tell us?

Practice

Specimen Details

	Collected	Type	Source	Submitter ID
25MM0[redacted]	4/1/2025 1100	Mycobacterial Isolate-MGIT Broth	Sputum	[redacted]

Cepheid GeneXpt MTB/RIF (Final result)

ID: 25MM00[redacted] Type/Src: Mycobacterial Isolate-MGIT Broth/Sputum

	Result		Units
M. tuberculosis complex Target Gene	**MTB complex DNA detected.**	**(A)**	
rpoB Gene Mutation	No rifampin gene mutation detected.		
Rifampin Interpretation	Likely rifampin susceptible.		

Comments:
This real-time PCR assay simultaneously detects the presence of both M. tuberculosis complex DNA and genetic mutations associated with rifampin resistance. Its performance using mycobacteria grown in broth culture has been validated at WSLH. It is not FDA cleared or approved for this specimen type.

Reportable Tests: **Cepheid GeneXpt MTB/RIF**

Resulting Labs

WSLH	WI STATE LAB OF HYGIENE-CDD, Madison WI

Practice

Specimen Details

	Collected	Type	Source	Submitter ID
[redacted]	5/9/2025 1639	Bronchoalveolar Lavage	BAL	[redacted]

Mycobacteria Smear (Final result)

ID: 25MM00[redacted] Type/Src: Bronchoalveolar Lavage/BAL

	Result	Units
Mycobacteria Smear	AFB smear result questionable	

Comments:
Only 1-2 AFB-like organisms seen on the entire smear. Collection of a repeat specimen is recommended.

Culture report to follow.

Reportable Tests: Mycobacteria Smear

Resulting Labs

WSLH	WI STATE LAB OF HYGIENE-CDD, Madison WI

END OF REPORT

Practice

TEST ORDERED: CEPHEID GENEXPERT MTB/RIF

This real-
time PCR assay simultaneously detects the presence of both M. tuberculosis complex DNA and genetic mutations associated with rifampin resist
ance from raw (induced or expectorated) or concentrated sputum sediments.

The assay is FDA cleared only for sputum specimens from patients for whom there is clinical suspicion of tuberculosis and who have received
no antituberculosis therapy, or less than three days of therapy. It has not been approved for specimens from pediatric patients or to be use
d as a test of cure.

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
MYCOBACTERIUM TUBERCULOSIS COMPLEX TARGET GENE	MTB complex DNA detected.			Abnormal	Final
M TB rpoB XXX QI PCR	MTB complex DNA detected.			Abnormal	Final

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
RPOB GENE MUTATION	No rifampin gene mutation detected.				Final
M TB rpoB XXX QI PCR	No rifampin gene mutation detected.				Final

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
RIFAMPIN INTERPRETATION	Likely rifampin susceptible.				Final
M TB rpoB XXX QI PCR	Likely rifampin susceptible.				Final

Performing Organization: Wisconsin State Laboratory of Hygiene
Performing Organization Address: MADISON, WI

Practice

Specimen Details

	Collected	Type	Source	Submitter ID
25MM0[redacted]	4/23/2025 1918	Aspirate	Neck	[redacted]

Cepheid GeneXpt MTB/RIF (Final result)

ID: 25MM0[redacted] Type/Src: Aspirate/Neck

	Result		Units
M. tuberculosis complex Target Gene	**MTB complex DNA detected.**	**(A)**	
rpoB Gene Mutation	**Rifampin gene mutation detected.**	**(A)**	
Rifampin Interpretation	Possible rifampin resistance.		

Comments:
Additional testing will be performed to confirm if the mutation detected is associated with rifampin resistance.

This real-time PCR assay simultaneously detects the presence of both M. tuberculosis complex DNA and genetic mutations associated with rifampin resistance. Its performance using mycobacteria grown in broth culture has been validated at WSLH. It is not FDA cleared or approved for this specimen type.

Lab Comments

Reportable Tests: **Cepheid GeneXpt MTB/RIF**

Practice

Specimen Details

	Collected	Type	Source	Submitter ID
24MM0[redacted]	9/14/2024 0315	Sputum		

Mycobacteria Smear (Final result)

ID: 24MM0[redacted] Type/Src: Sputum

	Result	Units
Mycobacteria Smear	No acid fast bacilli found.	

Comments:
Culture report to follow.

Lab Comments

Additional clinician: [redacted]

Resulting Labs

WSLH	WI STATE LAB OF HYGIENE-CDD, Madison WI

END OF REPORT

Practice

Specimen Details

	Collected	Type	Source	Submitter ID
25MM0[redacted]	4/8/2025 1315	Mycobacterial Isolate-BacT/ALERT Bottle	[redacted]	[redacted]

Mycobacteria ID (Edited)

ID: 25MM0[redacted] Type/Src: Mycobacterial Isolate-BacT/ALERT Bottle/Trachael Aspirate

Mycobacteria ID

Mycobacterium peregrinum (A)
Mycobacterium avium complex (A)
Comments:
SUPPLEMENTAL REPORT: 4/23/2025
Please note that M. avium complex has been isolated in addition to M. peregrinum reported on 4/22/2025.

Practice

TEST ORDERED: QUANTIFERON TB PLUS

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
QUANTIFERON PLUS INTERPRETATION	Positive		Negative	Abnormal	Final
M TB IFN-g Bld-Imp	POSITIVE		Negative	Abnormal	Final

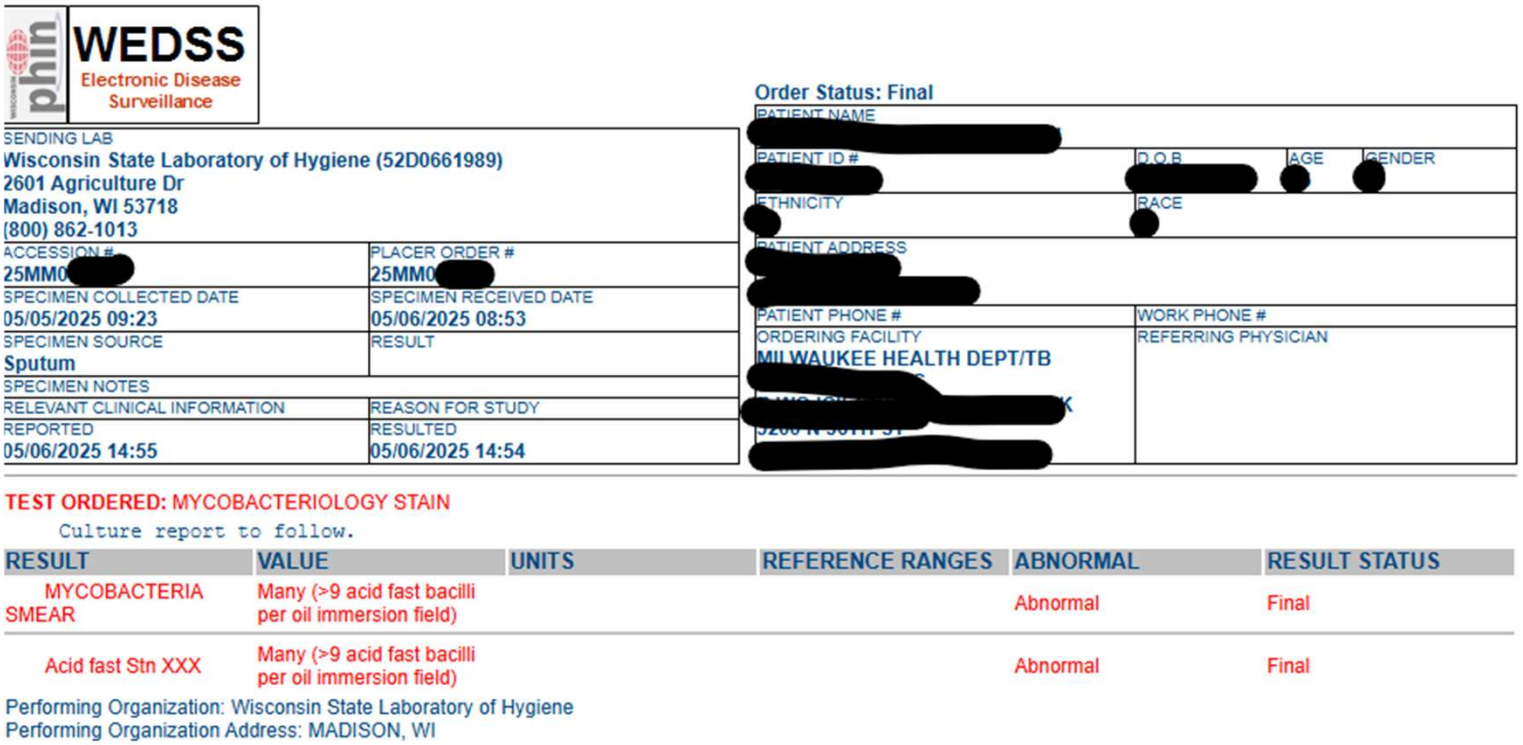
M. tuberculosis infection possible. This test should be followed by further medical and diagnostic evaluation for tuberculosis disease(e.g., AFB smear and culture, chest x-ray).

See Directory of Services for Interpretive Information on Quantiferon TB Gold Plus numeric results.

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
PNIL	0.15	[IU]/mL			Final
Gamma interferon background Bld IA-aCnc	0.15	[IU]/mL			Final
RESULT	**VALUE**	**UNITS**	**REFERENCE RANGES**	**ABNORMAL**	**RESULT STATUS**
P TB AG-1 NIL	0.52	[IU]/mL			Final
M TB IFN-g CD4+ bckgrnd cor Bld-aCnc	0.52	[IU]/mL			Final
RESULT	**VALUE**	**UNITS**	**REFERENCE RANGES**	**ABNORMAL**	**RESULT STATUS**
P TB AG2-NIL	0.54	[IU]/mL			Final
M TB IFN-g CD4+CD8+ bckgrnd cor Bld-aCnc	0.54	[IU]/mL			Final
RESULT	**VALUE**	**UNITS**	**REFERENCE RANGES**	**ABNORMAL**	**RESULT STATUS**
P MITOGEN-NIL	0.28	[IU]/mL			Final
Mitogen IGNF bckgrd cor Bld-aCnc	0.28	[IU]/mL			Final

Performing Organization: AURORA WEST ALLIS MEDICAL CENTER
Performing Organization Address: 8901 WEST LINCOLN AVENUE, WEST ALLIS, WI, 53227

Practice



WEDSS
Electronic Disease Surveillance

Order Status: Final

SENDING LAB	PATIENT NAME [redacted]
Wisconsin State Laboratory of Hygiene (52D0661989) 2601 Agriculture Dr Madison, WI 53718 (800) 862-1013	PATIENT ID # [redacted] D.O.B [redacted] AGE [redacted] GENDER [redacted] ETHNICITY [redacted] RACE [redacted] PATIENT ADDRESS [redacted]
ACCESSION # 25MM0[redacted]	PLACER ORDER # 25MM0[redacted]
SPECIMEN COLLECTED DATE 05/05/2025 09:23	SPECIMEN RECEIVED DATE 05/06/2025 08:53
SPECIMEN SOURCE Sputum	RESULT
SPECIMEN NOTES	
RELEVANT CLINICAL INFORMATION	REASON FOR STUDY
REPORTED 05/06/2025 14:55	RESULTED 05/06/2025 14:54

PATIENT PHONE # | WORK PHONE #

ORDERING FACILITY: MILWAUKEE HEALTH DEPT/TB [redacted]

REFERRING PHYSICIAN

TEST ORDERED: MYCOBACTERIOLOGY STAIN

Culture report to follow.

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
MYCOBACTERIA SMEAR	Many (>9 acid fast bacilli per oil immersion field)			Abnormal	Final
Acid fast Stn XXX	Many (>9 acid fast bacilli per oil immersion field)			Abnormal	Final

Performing Organization: Wisconsin State Laboratory of Hygiene
Performing Organization Address: MADISON, WI

Practice

TEST ORDERED: MYCOBACTERIA CULTURE

The M. tuberculosis complex includes the species M. tuberculosis, M. bovis, M. bovis BCG, M. africanum and M. microti. 98% of the isolates in the M. tuberculosis complex identified at the State Laboratory of Hygiene are M. tuberculosis.

WSLH automatically performs culture-based drug susceptibility testing on an initial isolate from each TB patient.

A laboratory developed real-time PCR assay was used for identification from culture growth. This test was developed and its performance characteristics determined by the Wisconsin State Laboratory of Hygiene, a Clinical Laboratory Improvement Amendments (CLIA) certified, high complexity clinical laboratory. It has not been cleared or approved by the U.S. Food and Drug Administration.

Cultures are incubated for a total of six weeks. Further reports will be issued if additional Mycobacteria species are detected.

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
MYCOBACTERIA CULTURE RESULT	MYCOBACTERIUM TUBERCULOSIS COMPLEX			Abnormal	Final
Mycobacterium XXX Cult	Mycobacterium tuberculosis complex			Abnormal	Final

Mycobacterium tuberculosis complex

Performing Organization: Wisconsin State Laboratory of Hygiene
Performing Organization Address: MADISON, WI

Practice

Specimen Details

	Collected	Type	Source	Submitter ID
25MM0[redacted]	5/13/2025 1415	Sputum	Sputum, Expectorated	[redacted]

Mycobacteria Smear (Final result)

ID: 25MM0[redacted] Type/Src: Sputum/Sputum, Expectorated

	Result	Units
Mycobacteria Smear	**Rare (1-9 acid fast bacilli per 100 oil immersion fields)**	**(A)**

Comments:
Culture report to follow.

Practice

TEST ORDERED: Mycobacterium sp identified in Specimen by Organism specific culture~Culture Acid Fast Bacilli

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
Culture Acid Fast Bacilli	Mycobacterium species			Abnormal	Preliminary
Mycobacterium sp identified in Unspecified specimen by Organism specific culture	Mycobacterium species (organism)			Abnormal	Preliminary

Practice

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
Isoniazid (0.2 mcg/mL)				Susceptible	Final
Isoniazid Susc Islt				Susceptible	Final

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
Isoniazid (1.0 mcg/mL)				Susceptible	Final
Isoniazid Susc Islt				Susceptible	Final

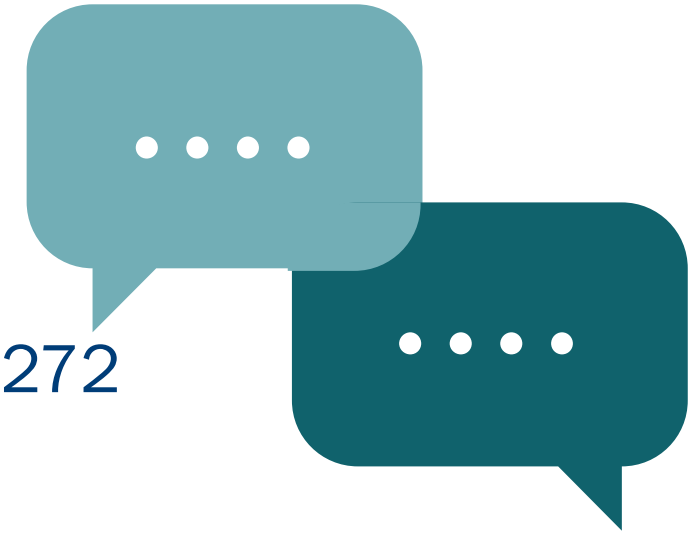
RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
Rifampin (1 mcg/mL)				Susceptible	Final
Rifampin Susc Islt				Susceptible	Final

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
Ethambutol (5 mcg/mL)				Susceptible	Final
Ethambutol Susc Islt				Susceptible	Final

RESULT	VALUE	UNITS	REFERENCE RANGES	ABNORMAL	RESULT STATUS
Pyrazinamide (100 mcg/mL)				Not Done	Final
PZA Susc Islt				Not Done	Final

Performing Organization: Wisconsin State Laboratory of Hygiene
Performing Organization Address: MADISON, WI

Contact Us



TB Program: 608-261-6319

WSLH Customer Service: 608-224-4272

dhswitbprogram@dhs.wisconsin.gov

https://www.dhs.wisconsin.gov/tb/index.htm

Thank you!

WSLH laboratory staff

Nate Simon, PhD,
TB Lab Coordinator at
WSLH for info, lab
photos, and review