

Collection, Packaging and Shipping of QuantiFERON- TB Gold Plus (QFT-Plus)

Training for Local Health Departments

Background

Virginia has historically used the T.Spot test from Oxford/Quest to meet the needs for IGRA testing in local health departments.

LabCorp has the state lab contract and offers the QuantiFERON-TB Gold Plus, which can now be drawn in a single tube.

This option offers some logistic advantages over the T.Spot test.

The cost per test \$45.00

Process for Implementation

Health Districts will have an option to implement the QFT-Plus in 2021, if they desire.



- Receive training from Qiagen and LabCorp
- Reach out with questions or for clarification

- Discuss internally
- Determine how to best implement in your District

- Reach out to LabCorp Representative to determine next steps

- Begin using QFT-Plus
- Remember some tests may meet the criteria for VDH payment or reimbursement

Testing Costs Covered by VDH

VDH will pay for certain QFT tests, either via limited journal or payment of the full invoice on behalf of the District.

Inclusion criteria:

- Contacts to presumptive or confirmed pulmonary cases of tuberculosis, smear negative or smear positive (large scale investigations of >100 contacts please call TB control)
- TB Classified Immigrants A (TB waiver (rare), B0, B1 (Both pulmonary and extrapulmonary), B2 (LTBI), and B3 (contacts))

Exclusion criteria:

- All clients covered by another funding source (eg. Newcomer Health)
- All persons needing a test for TB infection who are NOT included in the categories above (work, school, attempts to confirm a positive TST)

Presenters

Qiagen

- Joy Albrycht, RN,CNOR, CICBP - Customer Solutions Manager, Immune Responses, Clinical Science Consultant

LabCorp

- Adria Dickens - Regional Manager, Business Development, Atlantic Division

QFT GOLD PLUS

A close-up photograph of a laboratory setting. A glass pipette is positioned above a petri dish, dispensing a single drop of a bright yellow liquid. The petri dish contains a larger pool of the same yellow liquid. The background is a soft-focus blue and white, suggesting a clean laboratory environment. The overall lighting is bright and clinical.

INFORMATION & WORKFLOW



GUIDELINES & GUIDANCE

- CDC guidance addresses when and where to use IGRAs, such as QFT
 - IGRAs, like QFT, can be used in any situation in which the TST is traditionally used
 - IGRA recommendations have been expanded beyond BCG-vaccinated persons and those unlikely to return to now include all individuals at low to moderate risk of disease progression
 - IGRA recommendations for pediatric populations continue to expand
- QFT is a laboratory test that eliminates manual subjectivity and many obstacles associated with the TST
- QFT is reimbursed in most settings by major public and private payers
- The accuracy of IGRA testing and the use of new short-course preventive treatments raise the possibility of complete TB elimination in the US (1)

COMPARISON OF TST TO QFT

Tuberculin skin test (TST)

- Manual placement, reading and data entry
- Two patient visits required, high no-show rate
- Significant inter-reader variability (Subjective test)
- Poor surveillance tool
- In vivo test – causes boosting

QuantiFERON-TB Plus (QFT-Plus)

- Highly specific, not affected by BCG
- Results with one patient visit
- No inter-reader variability (Objective test)
- Electronic results (straight to EMR)
- No two-step testing

TST & QFT WORKFLOW

Observation	TST	QFT-Plus
New employee visits	4 visits or more	1 visit
EMR entry	<u>Manual entry of requisition; manual entry of test results in EMR necessary</u>	<u>Direct entry into EMR; test results are automatically received in EMR</u>
Testing/results variability	<u>TST is a subjective test with high inter/intra-observer variability and a higher margin for error</u>	<u>QFT-Plus is an objective laboratory test with low variability</u>
Waiting for next step in the process	<u>8 days or more</u>	<u>1-2 days</u>
Risk of no shows	New hires who do not return within the correct timeframe may have to reschedule placement of new TST and restart TB screening, creating additional work for EH staff and nursing staff (repeated TST placements)	Not applicable
Risk of false-positive results	86% specificity ¹ 14 out of 100 are false positive and may receive unnecessary X-ray follow-up	>97% specificity ² Very few false positives

SPECIFICITY CHART QFT & TST

Tuberculosis complex	QFT-Plus TB-specific antigens		TST antigens
	ESAT-6	CFP-10	PPD
<i>M. tuberculosis</i>	+	+	+
<i>M. africanum</i>	+	+	+
<i>M. bovis</i>	+	+	+

BCG sub-strains	QFT-Plus TB-specific antigens		TST antigens
	ESAT-6	CFP-10	PPD
Gothenberg	-	-	+
Moreau	-	-	+
Tice	-	-	+
Tokyo	-	-	+
Danish	-	-	+
Glaxo	-	-	+
Montréal	-	-	+
Pasteur	-	-	+

Environmental strains (NTMs)	QFT-Plus TB-specific antigens		TST antigens
	ESAT-6	CFP-10	PPD
<i>M. abscessus</i>	-	-	+
<i>M. avium</i>	-	-	+
<i>M. branderi</i>	-	-	+
<i>M. celatum</i>	-	-	+
<i>M. chelonae</i>	-	-	+
<i>M. fortuitum</i>	-	-	+
<i>M. goodii</i>	-	-	+
<i>M. intracellulare</i>	-	-	+
<i>M. kansasii</i>	+	+	+
<i>M. malmoense</i>	-	-	+
<i>M. marinum</i>	+	+	+
<i>M. genavense</i>	-	-	+
<i>M. scrofulaceum</i>	-	-	+
<i>M. smegmatis</i>	-	-	+
<i>M. szulgai</i>	+	+	+
<i>M. terra</i>	-	-	+
<i>M. vaccae</i>	-	-	+
<i>M. xenopi</i>	-	-	+



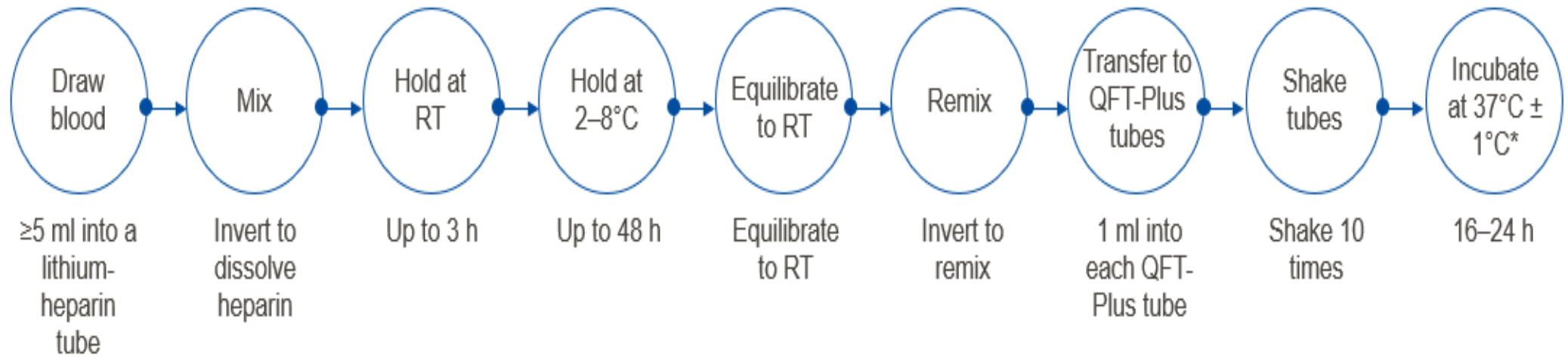
WHY AN IGRA?

- IGRAs are more specific and sensitive than the TST for TB screening (1)
- IGRAs measure secretion of the cytokine interferon-gamma (IFN- γ) as a marker of cell-mediated immune response to TB
- IFN- γ is produced by T cells stimulated in vitro with TB-specific antigens
- IFN- γ is:
 - Measurable, stable
 - Absent from normal circulation

QFT UNIQUE CD8 TECHNOLOGY

- MTB-specific CD8 T cells secrete IFN- γ and other soluble factors to¹⁻³:
 - Suppress MTB growth
 - Kill infected cells
 - Directly lyse intracellular MTB
- TB-specific CD8 T cells that produce IFN- γ have been:
 - More frequently detected in those with active TB disease vs. latent infection^{4,5}
 - Associated with recent exposure to TB⁶
 - Detectable in active TB subjects with HIV co-infection and young children^{7,8}
 - Observed to decline when patients are exposed to anti-tuberculosis treatment⁹

SINGLE LITHIUM/HEPARIN DRAW



The total time from blood draw in lithium-heparin tube to 37°C incubation must not exceed 53 hours.

IMPORTANT TIPS FR LITHIUM /HEPARIN DRAW

- 1) Tubes should be at room temperature (17-25* C) before the draw.
- 2) If drawing the specimen with a butterfly - 21G is best size due to lumen size, and it allows for little to no resistance / lysis of blood cells.
- 3) **Very Important:** to de-air the butterfly tubing before drawing the sample for QFT+, it is recommended to use a waste tube to eliminate any flush solution and air in the line.
- 4) **Very Important:** to make sure when filling the Lit/Hep single tube that you get a minimum of 5 ml of blood.
 - Short draws (less than 5 ml of blood) will result in an insufficient sample and require redraw.
- 5) **Very Important:** after the blood is drawn into the tube, gently invert / rock 10 times to mix the heparin into the blood completely. Mixing is key!
- 6) Tubes should be sent to lab immediately. If not please place in a cooler and keep sample cool.
 - Specimens at room temperature longer than 3 hours are compromised and result in redraw .

Flush, fill to capacity, mix gently!



TUBES FOR THE QFT GOLD PLUS TEST

- Nil (grey cap)
 - Negative control
 - Adjusts for background noise or non-specific IFN- γ in blood samples
- TB1 Antigen (green cap)
 - Contains highly specific TB antigens that primarily stimulate CD4 T cells
- TB2 Antigen (yellow cap)
 - Contains highly specific TB antigens optimized to stimulate both CD4 and CD8 T cells
- Mitogen (purple cap)
 - Positive control
 - May indicate:
 - Decreased patient immune status
 - Incorrect blood handling & incubation



TEST RESULTS QFT GOLD PLUS QUALITATIVE RESULTS

Overview – TB1 and TB2 tubes

QFT-Plus result	TB1	TB2
Positive	+	—
Positive	—	+
Positive	+	+
Negative	—	—

Indeterminate results may relate to the immune status of the individual being tested, or may be related to technical factors (e.g., incomplete ELISA plate washing)

Detail

Nil (IU/ml)	TB1 minus Nil (IU/ml)	TB2 minus Nil (IU/ml)	Mitogen minus Nil (IU/ml)	QFT-Plus Result	Report/ interpretation
≤8.0	≥0.35 and ≥25% of Nil	Any	Any	Positive	<i>M. tuberculosis</i> infection likely
	Any	≥0.35 and ≥25% of Nil			
	<0.35 or ≥0.35 and <25% of Nil	<0.35 or ≥0.35 and <25% of Nil	≥0.50	Negative	<i>M. tuberculosis</i> infection not likely
>8.0	<0.35 or ≥0.35 and <25% of Nil	<0.35 or ≥0.35 and <25% of Nil	<0.50	Intermediate	Likelihood of <i>M. tuberculosis</i> infection cannot be determined
	Any				

Important: Diagnosing or excluding tuberculosis disease, and assessing the probability of latent TB infection, requires a combination of epidemiological, historical, medical, and diagnostic findings that should be taken into account when interpreting QFT-Plus results.

For complete instructions for use and test interpretation, consult the QFT-Plus ELISA package insert.

Specimen ID: 027-000-9000-1
Control ID:
Acct #: 90000999 **Phone:** (336) 436-8645 **Rte:** 00
 LabCorp Test Master
 Test Account
 5450 Millstream Road
 MCLEANSVILLE NC 27301

SAMPLE REPORT, 182913


Patient Details	Specimen Details	Physician Details
DOB: Age(y/m/d): 000/00/00 Gender: N Patient ID:	Date collected: 01/26/2021 0000 Local Date received: 01/26/2021 Date entered: 01/26/2021 Date reported: 01/27/2021 0000 ET	Ordering: Referring: ID: NPI:

Ordered Items

QuantiFERON-TB Gold Plus; Please note

TESTS	RESULT	FLAG	UNITS	REFERENCE	INTERVAL	LAB
QuantiFERON-TB Gold Plus						
QuantiFERON Incubation	Incubation performed.					01
QuantiFERON Criteria	The QuantiFERON-TB Gold Plus result is determined by subtracting the Nil value from either TB antigen (Ag) tube. The mitogen tube serves as a control for the test.					01
QuantiFERON TB1 Ag Value	2.00		IU/mL			01
QuantiFERON TB2 Ag Value	2.00		IU/mL			01
QuantiFERON Nil Value	0.02		IU/mL			01
QuantiFERON Mitogen Value	5.00		IU/mL			01
QuantiFERON-TB Gold Plus	Positive Abnormal			Negative		01

Please note

The date and/or time of collection was not indicated on the requisition as required by state and federal law. The date of receipt of the specimen was used as the collection date if not supplied.

01	BN	LabCorp Burlington 1447 York Court, Burlington, NC 27215-3361	Dir: Sanjai Nagendra, MD
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 For inquiries, the physician may contact **Branch: 800-222-7566 Lab: 800-762-4344**

Specimen ID: 027-000-9000-2
Control ID:
Acct #: 90000999 **Phone:** (336) 436-8645 **Rte:** 00
 LabCorp Test Master
 Test Account
 5450 Millstream Road
 MCLEANSVILLE NC 27301

SAMPLE REPORT, 182913


Patient Details	Specimen Details	Physician Details
DOB: Age(y/m/d): 000/00/00 Gender: N Patient ID:	Date collected: 01/26/2021 0000 Local Date received: 01/26/2021 Date entered: 01/26/2021 Date reported: 01/27/2021 0000 ET	Ordering: Referring: ID: NPI:

Ordered Items

QuantiFERON-TB Gold Plus; Please note

TESTS	RESULT	FLAG	UNITS	REFERENCE	INTERVAL	LAB
QuantiFERON-TB Gold Plus						
QuantiFERON Incubation	Incubation performed.					01
QuantiFERON Criteria	The QuantiFERON-TB Gold Plus result is determined by subtracting the Nil value from either TB antigen (Ag) tube. The mitogen tube serves as a control for the test.					01
QuantiFERON TB1 Ag Value	0.05		IU/mL			01
QuantiFERON TB2 Ag Value	0.05		IU/mL			01
QuantiFERON Nil Value	0.05		IU/mL			01
QuantiFERON Mitogen Value	0.05		IU/mL			01
QuantiFERON-TB Gold Plus	Indeterminate Abnormal			Negative		01
	Mitogen (positive control) gave low response. This may occur due to suboptimal pre-analytical handling.					
Please note	The date and/or time of collection was not indicated on the requisition as required by state and federal law. The date of receipt of the specimen was used as the collection date if not supplied.					01

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Specimen ID: 027-000-9000-0
Control ID:
Acct #: 90000999 **Phone:** (336) 436-8645 **Rte:** 00
 LabCorp Test Master
 Test Account
 5450 Millstream Road
 MCLEANSVILLE NC 27301

SAMPLE REPORT, 182913


Patient Details	Specimen Details	Physician Details
DOB: Age(y/m/d): 000/00/00 Gender: N Patient ID:	Date collected: 01/26/2021 0000 Local Date received: 01/26/2021 Date entered: 01/26/2021 Date reported: 01/27/2021 0000 ET	Ordering: Referring: ID: NPI:

Ordered Items

QuantiFERON-TB Gold Plus; Please note

TESTS	RESULT	FLAG	UNITS	REFERENCE	INTERVAL	LAB
QuantiFERON-TB Gold Plus						
QuantiFERON Incubation	Incubation performed.					01
QuantiFERON Criteria	The QuantiFERON-TB Gold Plus result is determined by subtracting the Nil value from either TB antigen (Ag) tube. The mitogen tube serves as a control for the test.					01
QuantiFERON TB1 Ag Value	0.02		IU/mL			01
QuantiFERON TB2 Ag Value	0.02		IU/mL			01
QuantiFERON Nil Value	0.02		IU/mL			01
QuantiFERON Mitogen Value	>10.00		IU/mL			01
QuantiFERON-TB Gold Plus	Negative			Negative		01

Please note

The date and/or time of collection was not indicated on the requisition as required by state and federal law. The date of receipt of the specimen was used as the collection date if not supplied.

01	BN	LabCorp Burlington 1447 York Court, Burlington, NC 27215-3361	Dir: Sanjai Nagendra, MD
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Quantiferon TB Testing - One Tube Collection

Getting Started:

Please contact your local Labcorp representative to set-up a Labcorp account, begin ordering and receiving results and/or order initial requisition forms and supplies.

Test Name: Quantiferon –TB Gold Plus

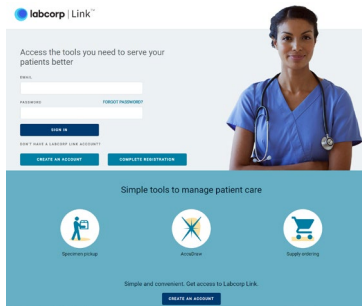
Labcorp Test Number: 182913

Expected Turn-Around Time: 2-5 Days

Collection Instructions: Fill a lithium heparin blood collection tube (minimum volume 6 mL) and gently mix by inverting the tube several times to dissolve the heparin. Transport to the lab refrigerated.

Storage Instructions: After collection blood must be refrigerated within 3 hours. Refrigerated Sample is stable up to 48 hours.

Supply Ordering: www.labcorplink.com



PeopleSoft/Part #: 39931

Name: Tube Green Top Lithium Heparin 6.0ml, 1 Tube, [367886]



PeopleSoft/Part #: 38800

Name: 4900 .Gel Propak 8 Oz



PeopleSoft/Part #: 110475

Name: Zlab-stable69 .Refrigerated Specimen Bag 6x9 3-Wall Tearzone



Customer Support: 800-762-4344 Option 2 then...

Results

Option 1

Computer Support

Option 5

Specimen Pick-Up

Option 3

Supplies

Option 6