# Comparison of the QuantiFERON-TB Gold Plus and QuantiFERON-TB Gold In-Tube Interferon Gamma Release Assays in Patients at Risk for Tuberculosis and in Health Care Workers

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# Objective of the study

The QuantiFERON-TB Gold Plus (QFT-Plus; Qiagen, Germantown, MD) interferon gamma release assay (IGRA) received FDA clearance in 2017 and will replace the prior version of the assay, the QFT-Gold In-Tube (QFT-GIT). The objective of the prospective study was to compare performances of the QFT-Plus assay and the QFT-GIT version in a diverse patient population, including patients undergoing evaluation for or follow-up of latent tuberculosis infection (LTBI; n = 39) or active TB infection (n = 3), and in health care workers (HCWs; n = 119) at Mayo Clinic (Rochester, MN) both performed on the Agility® (Dynex Technologies, Chantilly, VA) automated ELISA processor.

# Material and Methods

- Study population
  - Adult refugee or immigrant status patients from countries endemic for TB, who presented to the Olmsted County Public Health Services (OCPHS) TB clinic for initial evaluation of or follow-up care for suspected latent TB infection (LTBI) or active TB (n = 42)
  - Consenting healthcare workers (HCW) that were either positive or negative for the tuberculin skin test (TST) at Mayo Clinic (Rochester, MN)
  - The QFT-GIT and QFT-Plus IFN$\gamma$ ELISAs were both performed on the Agility (Dynex Technologies, Chantilly, VA) automated ELISA processor, which also performed all calculations on board to determine the nil, mitogen minus nil, and TB antigen minus nil IFN

# Results

## Comparison

- The QFT-Plus assay showed agreement with the QFT-GIT in 31/34 (91.2%) positive tests and 124/126 (98.4%) negative tests, and had an overall agreement of 156/161 (96.6%) among all subjects, with a Cohen's kappa value of 0.91

Qualitative comparison of QFT-Plus and QFT-GIT assays in HCWs and patients presenting to the OCPHS TB Clinic

| QFT-Plus result | QFT-GIT result | | | % agreement (95% CI) | | | Kappa value |
|---|---|---|---|---|---|---|---|
| | Positive | Negative | Indet. | Positive | Negative | Overall | |
| Positive | 31 | 2 | 0 | 91.2 | 98.4 | 96.9 | 0.91 |
| Negative | 3 | 124 | 0 | (76.3–97.7) | (94–99.9) | (92.7–98.9) | (0.83–0.98) |
| Indet. | 0 | 0 | 1 | | | | |

[a]Total $n$ = 161. Indet., indeterminate; CI, confidence interval.

# Discussion

- Among the 161 subjects enrolled in our study, the QFT-GIT and QFT-Plus assays were qualitatively discordant in five (3.1%) individuals, and in all five cases, the QFT-GIT and QFT-Plus IFNγ levels bordered the cutoff value for assay positivity (0.35 IU/ml)
- Given the borderline IFNγ levels among the discordant samples, alongside effort to minimize processing variables via side-by-side specimen collection, transport, pre-analytical processing, and testing using the Dynex AGILITY automated ELISA platform, the disparate results for these five patients may be a consequence of the intrinsic variability associated with the IFNγ ELISA
- IFNγ levels cannot be used as a measure of treatment response as patients who were receiving LTBI treatment and LTBI patients who had completed treatment at the time of enrollment were all positive by both QFT- interferon gamma release assays

# Conclusion

- This study documented a high degree of correlation (R = 0.95) between the quantitative IFNγ values from the QFT-GIT TB antigen tube and both the TB1 and TB2 QFT-Plus antigen tubes; this correlation is notably higher than those in previous studies performed in low-risk HCWs (R = 0.74 to 0.75)
- A strong correlation was also observed between the QFT-Plus TB1 and TB2 antigen tubes, which may in part be explained by the higher level of precision reported for the QFT-Plus assay
- The QFT-GIT and QFT-Plus IFNγ ELISAs were both performed on the Agility (Dynex Technologies, Chantilly, VA) automated ELISA processor, which also performed all calculations on board to determine the nil, mitogen minus nil, and TB antigen minus nil IFN


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