DIAGNOSIS OF LATENT TUBERCULOSIS INFECTION AMONG US-BORN PEOPLE LIVING WITH HIV

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BACKGROUND

- People living with HIV (PLWH) are a priority for latent tuberculosis infection (LTBI) screening because they are at high risk for progression to active tuberculosis (TB)[1]
- Studies of LTBI diagnostic test characteristics are conflicting and limited by the lack of a gold standard[2].

METHODS

Patient population: Multicenter prospective cohort study to evaluate the performance of the tuberculin skin test (TST), QuantiFERON Gold In-Tube (QFT) and T-SPOT.TB (TSPOT). US-born PLWH ≥5 years old from 18 sites who had valid results for all three tests during September 2012- April 2017 were included.

Statistical analysis: Bayesian latent class analysis models with varying cutpoints were used to estimate LTBI prevalence and test characteristics. Sensitivity (Sn) and specificity (Sp) were used to quantify the under- and overdiagnosis of LTBI per 1000 persons screened.

RESULTS

Table 1. Demographic Characteristics of Study Population

Characteristic	Total N=1510
Gender	
Cisgender male	1073 (71%)
Cisgender female	420 (28%)
Transgender	17 (1%)
Race/Ethnicity	
Black	1057 (70%)
White	361 (24%)
Hispanic	92 (6%)
Other	92 (6%)
Age (median, IQR)	49 (42-55)
Self-reported CD4+ (median, IQR)	532 (355-764)

RESULTS (Continued)

Estimated overall LTBI prevalence =5.1% (95% credible interval [95Crl] 3.4 to 7.0%), range 0.8-14.5% by site.

Table 2. Diagnostic Test Performance Using Standard US Cutoffs*

	Sensitivity (95% CrI)	Specificity (95% CrI)	PPV (95% CrI)
TST (5mm)*	53.7% (44.7-63.8)	96.8% (95.8-97.8)	47.4% (34.9-60.6)
QFT (0.35 IU/mL)*	69.7% (56.4-83.3)	96.5% (95.3-97.7)	51.6% (37.9-66.3)
TSPOT (≥6 spots)*	54.3% (41.5-68.8)	99.5% (98.9-99.9)	84.5% (69.6-96.1)

Table 3. Difference in Diagnostic Test Characteristics Between Tests Using Standard US Cutoffs

Test combination	Difference (95% CrI)
Sensitivity:	
TST v. QFT	-16.0% (-30.0 to -2.3)
TST v. TSPOT	-0.6% (-14.6 to 12.6)
QFT v. TSPOT	15.4% (0 to 30.8)
Specificity:	
TST v. QFT	0.3% (-1.2 to 1.7)
TST v. TSPOT	-2.6% (-3.8 to -1.6)
QFT v. TSPOT	-2.9% (-4.2 to -1.7)
PPV:	
TST v. QFT	-4.2% (-7.8 to 9.0)
TST v. TSPOT	-37.1% (-52.3 to -20.8)
QFT v. TSPOT	-32.9% (-49.2 to -15.4)

RESULTS (Continued)

Table 4. Frequency of Under/overdiagnosis of LTBI with Varying LTBI Prev and Test Cutoffs

	1%		5%		10%	
	Over	Under	Over	Under	Over	Under
TST						
5mm	29	5	28	25	25	75
10mm	22	6	21	28	19	85
15mm	5	7	5	37	5	110
QFT						
0.35	33	3	31	13	28	38
0.70	19	4	18	22	16	67
1.00	15	5	15	25	13	76
TSPOT						
5	8	4	8	21	7	64
6	4	5	4	23	3	69
7	4	5	3	25	3	74
8	2	5	2	26	2	77

CONCLUSIONS

- Sensitivity was highest for QFT; specificity and PPV were highest for TSPOT using standard US cutpoints and 5.1% LTBI prevalence.
- Both the international (≥6 spots) and US (≥8 spots) TSPOT cutoffs resulted in more LTBI under- than overdiagnosis, regardless of LTBI prevalence.
- For TST and QFT, US cutoffs resulted in more LTBI over- than underdiagnosis at 5% LTBI prevalence; however, the optimal cutoff of the TST and QFT varied depending on LTBI prevalence.

REFERENCES

1. Selwyn PA, Hartel D, Lewis VA, et. al. NEJM 1989; 320(9): 545-50..
2. Rangaka MX, et. al. Lancet Infect Dis 2012; 12(1): 45-55.