

ONLINE DATA SUPPLEMENT

Title: Latent Tuberculosis Infection Test Agreement in the National Health and Nutrition Examination Survey

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METHODS:

Testing procedures:

NHANES offered a tuberculin skin test (TST) to all participants without a history of severe reaction to a prior TST. Subjects who agreed to undergo testing and did not meet exclusion criteria (previous severe reaction to TST, active severe skin disease over both arms, or an inability to return for test reading) were administered the test. For subjects who underwent testing, a trained phlebotomist or physician administered 0.1 mL (5 international units) of Tubersol® Purified Protein Derivative (PPD) using the Mantoux method, and at least one trained technician measured the degree of resulting induration 46-76 hours later (E1).

NHANES participants were offered a QuantiFERON®–TB Gold In-Tube (QFT) on the same day as TST administration. Participant had 1 mL of whole blood drawn into three separate QFT tubes according to manufacturer instructions (E2). Tubes were incubated for 16-24 hours, then shipped to a central lab for processing (E2, E3).

Variable definition:

Personal histories of active TB and household exposure to TB were ascertained by asking subjects, “Were you ever told that you had active tuberculosis or TB” and “Have you ever lived in the same household with someone while that person was sick with tuberculosis or TB,”

respectively. We combined the answers from these questions to identify subjects with either a personal and/or household contact history of tuberculosis disease.

For subjects age 13 or older, we defined current smokers as participant who reported smoking cigarettes in the previous 5 days, or who had a serum cotinine level greater than 3 ng/ml (E4).

As NHANES did not ask subjects under age 13 about smoking, only serum cotinine levels were used for this age group to define smoking status.

For subjects age 13 or older, we defined diabetics as any participant who self-reported diabetes, or who had a serum hemoglobin A1C level >6.5% (E5). As NHANES did not obtain serum hemoglobin A1C assays on subjects under age 13, only self-reported diabetes was used for this age group to define diabetes status.

RESULTS:

Table 1: Univariate odds ratios (ORs) for positive test results by TST/QFT category at standard cut-offs of tuberculin skin test (TST) 10 mm and QuantiFERON®–TB Gold In-Tube test (QFT) 0.35 IU/mL among the U.S.-born population ≥ 6 years old.

	Unadjusted OR (95% confidence interval)		
	TST+/QFT+	TST+/QFT-	TST-/QFT+
Age			
6-14	Reference	Reference	Reference
15-24	9.24 (0.86-100.0)	1.55 (0.88-2.72)	2.19 (0.83-5.74)
25-44	6.80 (0.72-64.4)	4.54 (2.04-10.1)³	2.41 (0.85-6.79)
45-64	11.9 (1.19-119.0)¹	6.10 (1.81-20.6)²	4.77 (1.72-13.3)²
≥65	20.9 (2.6-166.8)²	2.07 (0.61-6.98)	6.68 (2.32-19.3)³
Male	1.33 (0.64-2.74)	1.50 (0.82-2.76)	1.56 (0.90-2.69)
Race/ethnicity			
White	Reference	Reference	Reference
Black	13.7 (3.9-47.7)³	7.65 (2.62-22.3)³	0.99 (0.57-1.72)
Asian	8.09 (1.19-55.2)¹	2.52 (0.42-15.3)	0.66 (0.23-1.91)
Mexican-American	5.03 (1.28-19.8)¹	6.13 (1.34-28.0)¹	1.40 (0.59-3.36)
Other Hispanic	8.84 (1.97-39.7)²	2.47 (0.22-27.6)	0.49 (0.11-2.18)
Income ≤ Poverty Line	3.19 (1.32-7.73)¹	1.10 (0.52-2.33)	0.97 (0.56-1.71)
Diabetic	1.45 (0.63-3.33)	1.27 (0.55-2.95)	2.76 (1.26-6.05)¹
Current Smoker	3.05 (1.26-7.36)¹	3.70 (1.60-8.51)²	1.59 (0.94-2.70)
Body Mass Index			

Underweight	2.26 (0.60-8.52)	0.30 (0.03-2.68)	1.77 (0.40-7.89)
Normal	Reference	Reference	Reference
Overweight	1.06 (0.38-2.97)	0.60 (0.28-1.30)	0.90 (0.39-2.10)
Obese	1.11 (0.51-2.38)	1.42 (0.53-3.77)	0.91 (0.40-2.11)
TB Exposure⁴	12.5 (4.37-35.5)³	8.91 (3.09-25.7)³	3.84 (1.32-11.1)¹
Previous TST testing	3.17 (1.31-7.64)¹	2.39 (1.04-5.52)¹	1.47 (0.89-2.41)
Past LTBI treatment	87.3 (27.2-280.2)³	57.0 (23.6-137.5)³	7.33 (1.21-44.5)¹
Lymphocyte count⁵	0.74 (0.30-1.81)	2.13 (0.98-4.60)	1.41 (0.76-2.59)
Monocyte count⁵	0.70 (0.32-1.53)	1.21 (0.46-3.22)	1.46 (0.83-2.58)

Note that each column represents results from separate regression analyses. Bolded values are statistically significant at $\alpha = 0.05$. ¹P value < 0.05. ²P value ≤ 0.01 . ³P value ≤ 0.001 . ⁴Includes personal or household contact history of TB disease. ⁵OR is per doubling of lab value.

Table 2: Univariate odds ratios (ORs) for positive test results by TST/QFT category at standard cut-offs of tuberculin skin test (TST) 10 mm and QuantiFERON®–TB Gold In-Tube test (QFT) 0.35 IU/mL among the foreign-born U.S. population ≥ 6 years old.

	Unadjusted OR (95% confidence interval)		
	TST+/QFT+	TST+/QFT-	TST-/QFT+
Age			
6-14	Reference	Reference	Reference
15-24	1.90 (0.40-8.93)	1.48 (0.40-5.49)	4.75 (0.32-70.3)
25-44	4.72 (0.51-43.9)	2.05 (0.54-7.79)	7.03 (0.87-57.0)
45-64	13.6 (1.59-115.5)¹	2.36 (0.72-7.69)	12.5 (1.83-85.3)¹
≥65	13.7 (1.66-112.8)¹	1.33 (0.40-4.47)	26.0 (3.44-196.9)²
Male	1.15 (0.79-1.68) ³	1.10 (0.83-1.46)	1.74 (1.21-2.50)²
Race/ethnicity			
White	Reference	Reference	Reference
Black	4.14 (1.41-12.1)¹	2.87 (0.76-10.8)	1.07 (0.27-4.24)
Asian	6.10 (2.23-16.6)¹	3.23 (1.02-10.2)¹	1.96 (0.54-7.05)
Mexican-American	3.60 (1.12-11.5)¹	1.80 (0.41-7.87)	1.08 (0.31-3.83)
Other Hispanic	3.87 (1.68-8.96)²	1.90 (0.46-7.85)	1.19 (0.33-4.32)
Income ≤ Poverty Line	0.95 (0.55-1.65)	1.09 (0.73-1.63)	1.04 (0.57-1.88)
Diabetic	2.98 (1.33-6.64)¹	1.11 (0.64-1.91)	2.67 (1.57-4.55)³
Current Smoker	0.92 (0.62-1.37)	1.52 (0.77-3.03)	0.85 (0.43-1.68)
Body Mass Index			
Underweight	0.63 (0.12-3.16)	1.22 (0.32-4.58)	0.75 (0.12-4.71)

Normal	Reference	Reference	Reference
Overweight	1.07 (0.67-1.69)	0.84 (0.51-1.39)	1.32 (0.77-2.29)
Obese	1.41 (0.72-2.75)	1.20 (0.70-2.04)	1.38 (0.78-2.42)
TB Exposure⁴	2.67 (1.01-7.05)¹	2.16 (1.03-4.53)¹	3.71 (1.09-12.6)¹
Previous TST testing	1.49 (0.88-2.53)	1.59 (0.95-2.67)	1.08 (0.63-1.86)
Past LTBI treatment	5.64 (2.53-12.6)³	3.57 (1.74-7.30)²	2.95 (1.50-5.81)²
Lymphocyte count⁵	1.25 (0.83-1.89)	1.62 (1.02-2.58)¹	1.17 (0.71-1.93)
Monocyte count⁵	0.72 (0.44-1.20)	0.77 (0.48-1.21)	1.52 (1.01-2.30)¹

Note that each column represents results from separate regression analyses. Bolded values are statistically significant at $\alpha = 0.05$. ¹P value < 0.05. ²P value ≤ 0.01 . ³P value ≤ 0.001 . ⁴Includes personal or household contact history of TB disease. ⁵OR is per doubling of lab value.

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