

Characterizing Factors Associated with Pediatric Latent Tuberculosis Infection in an Urban Health System to Improve Screening Practices

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Objectives

The epidemiology and risk factors informing current American Academy of Pediatrics (AAP) guidelines on screening for pediatric latent tuberculosis infection (LTBI) have evolved over the past decade. To improve pediatric LTBI screening efficiency, we sought to reevaluate characteristics associated with positive QuantiFERON-TB Gold Plus (QFT-Plus) at Denver Health (DH), an urban health system that includes a network of primary care clinics, a refugee clinic and tuberculosis clinic.

Methods

We retrospectively analyzed all QFT-Plus tests performed on children aged 2-18 years from 1/2019 to 9/2019. To obtain additional variables we conducted chart review on all positive and indeterminate results, and a random 10% sample of those with negative tests.

Characteristics (age range, sex, region of birth, clinic setting, primary language) of patients with positive and negative QFT-Plus were compared using Chi² or Fisher's exact tests (Table 1). Using the 10% negative controls, we calculated odds ratios for each variable and included important or significant variables in a multivariable logistic regression model.

Results

Table 1: Denver Health QFT-Plus Test Results, Jan.-Sept. 2019

Positive	29 (27.3%)
Indeterminate	12 (11.3%)
Negative	1022 (96.1%)
Total	1063

Table 2: Characteristics of Denver Health Patients with Positive and Negative QFT-Plus, Jan.-Sept. 2019

Variable	QFT-Plus Result (n (column %))		p-value*	
Birth Region (n=1008)	Negative	Positive	0.58	
	Africa	109 (11.1)		4 (13.8)
	Asia/Pacific	101 (10.3)		1 (3.4)
	Latin America	242 (24.7)		9 (31.0)
	USA/Europe	527 (53.8)		15 (51.7)
Clinic Type (n=1051)	Primary Care	658 (64.3)	18 (62.1)	0.45
	Refugee	199 (19.5)	4 (13.8)	
	Tuberculosis	165 (16.1)	7 (24.1)	
	Age category (n=1051)	2-4	160 (15.7)	
5-9	198 (19.4)	4 (13.8)		
10-14	301 (29.5)	10 (34.5)		
15-18	363 (35.5)	12 (41.4)		
Sex (n=130)	Female	54 (53.5)	14 (48.3)	0.622
	Male	47 (46.5)	15 (51.7)	
Language (n=130)	English	46 (45.5)	4 (13.8)	0.007
	Spanish	46 (45.5)	20 (69.0)	
	Non-English/Non-Spanish	9 (8.9)	5 (17.2)	
	Screening Reason (n=130)	Immigration/Refugee	40 (39.6)	
Contact		17 (16.8)	4 (13.8)	
Travel		9 (8.9)	2 (6.9)	
Job/School		16 (15.8)	4 (13.8)	
Other		19 (18.8)	2 (6.9)	

* Chi-square or Fisher's exact test

Results

- Of 1063 QFT-Plus tests, 29 (2.7%) were positive
- 76% of all positive tests and 83% in primary care occurred in patients age ≥10.
- 51.7% of all positive patients were born in the US.
- Among factors analyzed by logistic regression including birth region, reason for screening, sex, age, ordering location, insurance status, and language, only **Spanish language compared to English (OR 5.0, CI 1.6-15.8)** and **non-English, non-Spanish language compared to English (OR 6.4, CI 1.4-28.5)** were significant odds ratios associated with positive testing.

Discussion

Language was the only predictor of LTBI in this study, and may be a proxy for high risk travel and family exposure. Region of birth was not predictive, as half of positive tests occurred in US-born children. The majority of positive tests occurred in older children, suggesting they should be prioritized in screening programs, though occasional detection among younger children reinforces the importance of LTBI detection in ages where risk of progression to active TB is higher. Further studies are needed to better elucidate the details behind positive testing, including more detailed characterization of travel and potential family exposures.