Latent Tuberculosis Infection Diagnosis and Treatment: An Analysis of the Cascade of Care from the Academic Primary Care Clinic to the TB Referral Practice.

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Background: A third of the world's population has latent tuberculosis infection (LTBI) based on immunological tests such as QuantiFeron-TB Gold Plus (QFT-Plus). In high-income countries, reactivation of LTBI accounts for most incident cases of TB disease. Multiple treatment options are available for LTBI; however, its completion is suboptimal. Different steps have been identified throughout the LTBI continuum of care to improve this underperformance. We analyzed this process in our Ambulatory Care Center (ACC) considering our affiliation with the Lattimore Practice at the Global Tuberculosis Institute at Rutgers.

Methods: Descriptive study from secondary data obtained through retrospective chart review. Epidemiological and clinical information were collected from patients who were ordered a QFT-Plus at the ACC from January 2018 to December 2019. Percentages and time length means between each step of the cascade were calculated.

Results: Of a total of 2,155 QFT-Plus tests ordered, 1,530 (70.9%) were completed and 356 (23.3%) positive tests were identified. A total of 270 (75.8%) patients with positive tests were referred to the Lattimore practice and 162 (60%) cases completed medical evaluation. Treatment was initiated in 140 (86.4%) patients, with completion achieved in 104 (74.3%) cases. Three cases of active TB were identified. The average time between the date of QFT-Plus order to the end of treatment was 387 days. Steps in the cascade associated with greater losses included completion of medical evaluation after referral (40%), completion of initial screening (29.1%), and completion of LTBI treatment (25.7%). The first two also accounted for the longest length to completion with a mean of 160 and 155 days, respectively. Factors associated with losses during cascade of care were insurance status for treatment initiation, and year of screening for completion of screening and Lattimore referral. The most frequent LTBI regimen prescribed was rifampin for 4 months.

Conclusion: Strategies to improve the LTBI management in our center should focus on the completion of workup which includes chest X-ray execution and referral to the Lattimore practice. A subsequent analysis of the years 2020 and 2021 should be performed since we propose that most of the losses in the year 2019 were related to the COVID-19 pandemic.

Figure 1. Cascade of care for LTBI

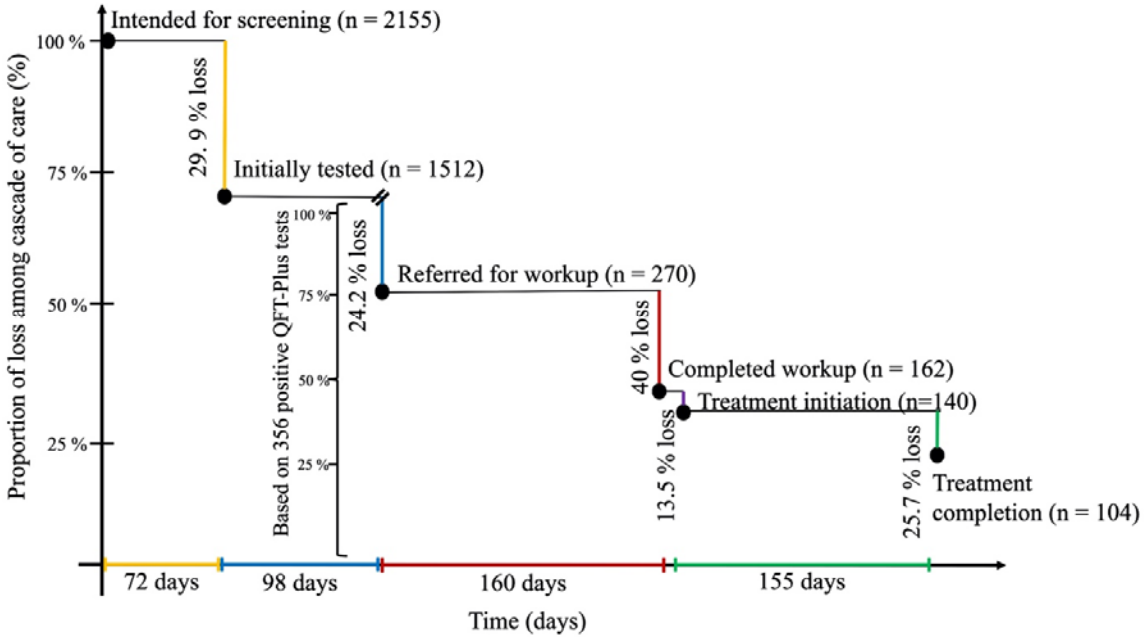

Table 1. Characteristics of positive QFT-Plus (n= 356)

Characteristic	Amount (%)	P value*
Gender • Female • Male	 211 (59.2) 145 (40.8)	0.321
Race • White • Black / African American • Asian • Other • Unknown	 1 (0.3) 106 (29.8) 2 (0.5) 246 (69.1) 1 (0.3)	0.006
Region/country of origin • United States of America • Latin America & Caribbean • Africa • Asia • Europe	 9 (2.8) 240 (73.6) 69 (21.2) 4 (1.2) 4 (1.2)	
Preferred language • English • Spanish • Portuguese • Haitian-Creole • Other	 109 (30.6) 201 (56.4) 19 (5.3) 14 (3.9) 13 (3.6)	

Concordance of preferred language during visit • Yes • No	 252 (70.8) 104 (29.2)	
Type of visit • New patient • Follow-up	 193 (54.2) 163 (45.8)	
Insurance • None • Government (i.e., Charity Care) • Other	 192 (53.9) 55 (15.4) 109 (30.6)	
Year of diagnosis • 2018 • 2019	 271 (76.1) 85 (23.9)	0.004
Reason for screening • Country with high incidence • Congregate setting • Contact with TB case • Other	 315 (88.5) 6 (1.7) 3 (0.8) 32 (9)	
Presence of comorbidities** • Yes • No	 97 (27.3) 259 (72.7)	

*P-value when compared to participants with a negative QFT-Plus

**Comorbidities were defined as: Diabetes mellitus, substance abuse, silicosis, low body weight, recipient of organ transplantation, positive HIV status, chronic kidney disease, head and neck cancer, on treatment for rheumatoid arthritis or Crohn's disease.

Table 2. Follow-up of participants with a positive QFT-Plus (n= 356)

	Amount (%)
Chest X-ray ordered • Yes • No	 279 (78.4) 77 (21.6)
Chest X-ray done • Yes • No	 239 (85.6) 40 (14.4)
Referred to Lattimore practice • Yes • No	 285 (80.1) 71 (19.9)

Appointment with Lattimore practice	
• Yes	162 (56.8)
• No	123 (43.2)
Started on LTBI treatment	
• Yes	140 (86.4)
• No	22 (13.6)
LTBI treatment regimen	
• Isoniazid + Rifapentine for 3 months (3HP)	26 (18.6)
• Rifampicin for 4 months (4R)	93 (66.4)
• Isoniazid + Rifampicin for 3 months (3HR)	3 (2.1)
• Isoniazid for 6 months (6H)	1 (0.7)
• Isoniazid for 9 months (9H)	9 (6.6)
• Isoniazid + Rifabutin (INH+Rfb)	1 (0.7)
• Rifabutin (Rfb)	2 (1.4)
• Pyrazinamide + Ethambutol (PZD+ETB)	1 (0.7)
• Levofloxacin	1 (0.7)
• Started on RIPE therapy	3 (2.1)
LTIB treatment completion	
• Yes	104 (76)
• No	33 (24)