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Tuberculosis Screening among HIV-Infected Patients: Tuberculin Skin Test vs. Interferon-Gamma Release Assay

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INTRODUCTION

- Globally, tuberculosis (TB) is the leading cause of death for persons living with HIV/AIDS[1]
- In 2015, among the 9,563 active cases of TB reported in the United States, approximately 5% were co-infected with HIV[2]
- National guidelines call for the screening and treatment of latent TB (LTBI) in HIV-infected patients[3]
- Two LTBI screening methods are commonly used: the tuberculin skin test (TST) and interferon-gamma release assay (IGRA)
- Currently, there is no established optimal method for LTBI screening HIV-infected patients

STUDY OBJECTIVES

1) To measure adherence to national guidelines regarding LTBI screening for patients entering an HIV primary care practice;
2) Identify clinical and sociodemographic characteristics associated with adherence; and
3) Determine whether a transition from TST to IGRA-based screening improved adherence

METHODS

- Retrospective cohort study using medical chart review
- Included patients were entering HIV care for the first time or transferring care from another clinic with laboratory-confirmed HIV infection (**Figure 1**)
- Outcome was adherence to LTBI screening guidelines at the study clinic at or within 12 months of the first clinic visit
- Successful adherence endpoints included documentation of any of the following:
  1. Results of a negative TST or IGRA since HIV diagnosis;
  2. Results of a positive TST or previous LTBI treatment;
  3. TST or IGRA performed during follow-up and noted as negative; or
  4. TST or IGRA performed during follow-up and noted as positive, with subsequent chest radiography
- Modified Poisson regression models used for analyses

Figure 1. Diagram of Design of Observational, Retrospective Study among New Patients Entering an HIV Clinic in Philadelphia, PA.

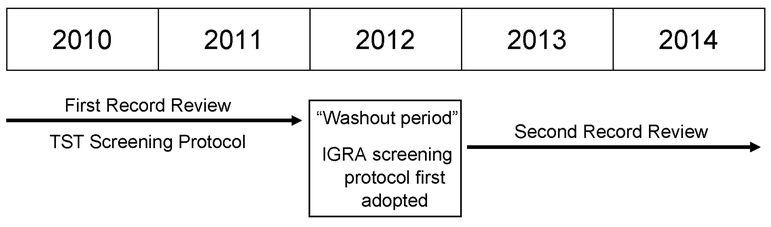

Figure 2. Flowchart of Patient Identification and LTBI Screening Outcomes for HIV-infected Patients (N=372).

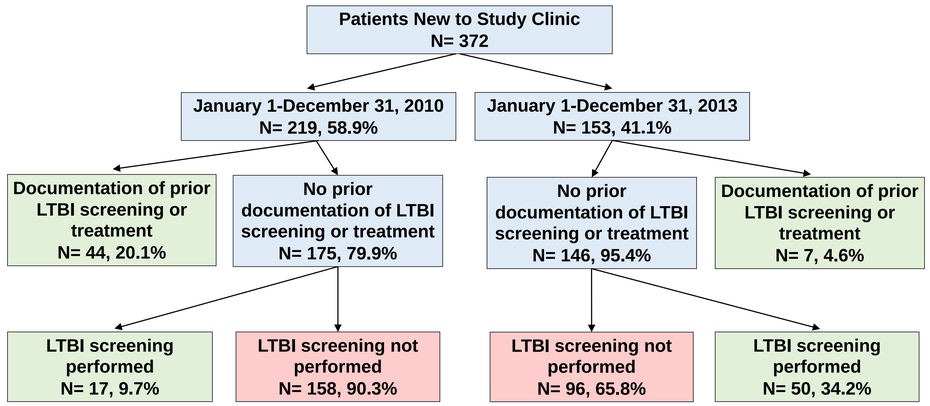

Table 1. Unadjusted and Adjusted Prevalence Ratios for Adherence to LTBI Screening Guidelines by Latent Tuberculosis Screening Method.

Exposure	Adhered to Guidelines [a] n=118, 31.7%	Failure to Adhere to Guidelines [a] n=254, 68.3%	Unadjusted Prevalence Ratio (95% CL)	Adjusted Prevalence Ratio [b] (95% CL)
Year of entry into care				
2010 TST screening	61 (27.9)	158 (72.2)	ref	ref
2013 IGRA screening	57 (37.3)	96 (62.8)	1.34 (0.99, 1.80)	**1.45 (1.07, 1.96)**
Sex				
Male	88 (34.8)	165 (65.2)	1.38 (0.97, 1.96)	**1.47 (1.05, 2.07)**
Female	30 (25.2)	89 (74.8)	ref	ref
CD4 closest to initial visit				
0-200 cells/uL	28 (31.1)	62 (68.9)	0.99 (0.66, 1.47)	0.94 (0.63, 1.41)
201-350 cells/uL	24 (36.9)	41 (63.1)	1.17 (0.78, 1.76)	1.20 (0.81, 1.78)
351-500 cells/uL	25 (28.7)	62 (71.3)	0.91 (0.60, 1.38)	1.06 (0.70, 1.59)
500-2,558 cells/uL	41 (31.5)	89 (68.5)	ref	ref
Current smoker				
Yes	63 (33.2)	127 (66.8)	1.09 (0.81, 1.48)	1.09 (0.81, 1.46)
No	55 (30.2)	127 (69.8)	ref	ref
Current illicit substance use				
Yes	28 (33.3)	56 (66.7)	1.07 (0.75, 1.51)	1.06 (0.77, 1.46)
No	90 (31.3)	198 (68.8)	ref	ref
Living situation				
Independent	81 (28.9)	199 (71.1)	ref	ref
Transient	14 (43.8)	18 (56.3)	1.14 (0.69, 1.89)	1.05 (0.64, 1.71)
In patient/long term care	23 (38.3)	37 (61.7)	0.75 (0.52, 1.09)	0.68 (0.45, 1.00)
Transfer patient				
Yes	92 (34.5)	175 (65.5)	1.39 (0.96, 2.02)	**1.51 (1.05, 2.18)**
No	26 (24.8)	79 (75.2)	ref	ref
Receipt of HAART by end of follow-up				
Yes	108 (32.7)	222 (67.3)	1.37 (0.78, 2.41)	**1.26 (0.70, 2.29)**
No	10 (23.8)	32 (76.2)	ref	ref
Clinic attendance for more than one year				
Yes	96 (35.3)	176 (64.7)	1.60 (1.07, 2.39)	**1.62 (1.06, 2.48)**
No	22 (22.0)	78 (78.0)	ref	ref

[a] Count and row percentages presented as n (%). Counts and percentages add across rows to obtain total sample size and 100%.
[b] Adjusted for all variables in table as well as age and race/ethnicity.

RESULTS

- Patients entering the study clinic were mostly male, non-Hispanic Black or White, transferring HIV care, and had an initial CD4 count >350 cells/uL
- Overall, 32% of HIV-infected patients received care adhering to national LTBI screening guidelines
- Transitioning to IGRA-based screening improved adherence (28% to 37%) but adherence remained poor
- In multivariable analysis (**Table 1**)**,** successful adherence was independently associated with:
  - IGRA screening [adjusted prevalence ratio: 1.45, 95% confidence limits: (1.07, 1.96)],
  - Male sex [1.47 (1.05, 2.07)],
  - Transfer patient status [1.51 (1.05, 2.18)], and
  - Greater than one year of clinic attendance [1.62 (1.06, 2.48)]
- Among patients without prior LTBI screening or treatment (**Figure 2**)**,** patients entering under the IGRA screening protocol were more likely to be screened for LTBI compared to patients entering under the TST screening protocol (34.2% vs. 9.7%, p<0.001)

LIMITATIONS

- Limitations include use of medical records and reliance on the completeness and validity of these records as well as the inability to disentangle impact of screening method and period effects

CONCLUSIONS

- Transitioning from TST to IGRA-based screening improved adherence to screening guidelines
- Further work on improving adherence to LTBI screening guidelines among HIV-infected patients is needed

REFERENCES

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[3] Force USPST, Bibbins-Domingo K, Grossman DC, Curry SJ, Bauman L, Davidson KW, et al. Screening for Latent Tuberculosis Infection in Adults: US Preventive Services Task Force Recommendation Statement. JAMA. 2016;316(9):962-9.

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