

Estimations of Testing for Latent TB Infection in the United States in 2013

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BACKGROUND

- Estimating the annual number of tests for latent TB infection (LTBI) can help define the scope of current efforts and resources used for testing, which can then be evaluated over time
- Recent publications provide data for estimation and comparison

OBJECTIVES

- To estimate the number of LTBI tests and their cost in the United States in 2013

METHODS

- We identified national estimates for:
 - Private sector LTBI testing by type of test from analysis of the MarketScan 2013 database (Owusu-Edusei 2017),
 - Military LTBI testing in 2013 (Armed Forces Health Surveillance 2014), and
 - Public sector LTBI treatment from a survey of 244 clinics that treated at least 10 patients in 2002 (including: public health, HIV, pediatric, refugee, jail/prison, homeless, drug/alcohol) within the catchment area of 19 TB Epidemiologic Studies Consortium US sites (Sterling 2006).
- We back-calculated public sector testing, and added it to other estimates.
- For comparison, we present estimates of LTBI testing:
 - Using similar assumptions, from LTBI treatment initiation in a mathematical TB model (Hill 2012).
- We applied Medicare allowable fees by test type to estimate costs of LTBI testing in the year 2013 (Centers for Medicare and Medicaid [CMS])
 - Tuberculin skin test (TST): \$8.64
 - QuantIFERON-TB Gold-In-Tube (QFT-GIT): \$85.20
 - T-spot: \$102.99

RESULTS

- Estimated 11.6 to 15.8 million (average 13.7 million) people tested for LTBI
 - This compares with 11.1 million based on Hill 2012 model
- Estimated 10–14 million were by TST and 2 million by interferon gamma release assay (IGRA): QFT-GIT or T-spot
- Over three-fourths (78%) of testing took place in the public sector
- Estimated LTBI testing cost \$224 million to \$304 million in 2013 dollars

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Aggregate Reports for Program Evaluation (ARPE), 2017. Appendix A. Table 3. Contact Investigation Evaluation Indices, among Smear Positive Cases.

Estimated Number of Persons Tested for LTBI in the United States, 2013

	n	% by test	US Low	US Average	US High	
Private Sector LTBI testing*						
TST	578,846	86%		2,315,384		
QFT-GIT	86,727	13%		346,908		
T-spot	5,339	1%		21,356		
Total Private Sector Tested	670,912	100%		2,683,648		
Public Sector LTBI testing						
			US Low	US Average+	US High	US Model (both public and private)^
Start LTBI treatment& Excluding 2.1% estimated private sector& Tested positive#			291,000	362,000	433,000	370,692
			284,889	354,398	423,907	
			401,252	499,152	597,052	522,101
Total Public Sector Tested@			8,537,279	10,620,258	12,703,236	
Plus private sector			2,683,648	2,683,648	2,683,648	
Plus military!			367,371	367,371	367,371	
Total Public and Private Sector Tested			11,588,298	13,671,277	15,754,255	11,108,541
By TST*			9,998,092	11,795,234	13,592,375	
By QFT-GIT*			1,497,988	1,767,249	2,036,510	
By T-Spot*			92,218	108,794	125,370	
IGRA subtotal			1,590,206	1,876,043	2,161,880	

Estimated Costs, 2013 US Dollars~

TST	\$ 86,383,515	\$ 101,910,819	\$ 117,438,123
QFT-GIT	\$ 127,628,602	\$ 150,569,647	\$ 173,510,692
T-spot	\$ 9,497,495	\$ 11,204,655	\$ 12,911,815
IGRA subtotal	\$ 137,126,097	\$ 161,774,302	\$ 186,422,507
Total Test Costs	\$ 223,509,613	\$ 263,685,122	\$ 303,860,630

FOOTNOTES

*From Owusu-Edusei 2017, private sector testing in MarketScan 2013, estimated at 25% of US private sector testing, was 86% by TST, 13% by QFT-GIT, and 1% by T-spot; numbers for the US estimated by multiplying by 4

+Average of low and high estimates

&Low and high estimates from Sterling 2006; included an estimate of 2.1% for the private sector

^Estimates from Andrew Hill obtained from his model (Hill 2012) for the year 2013

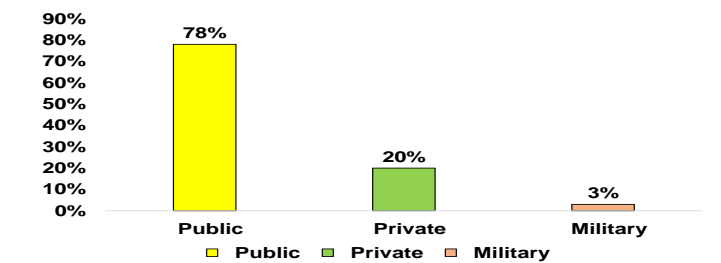
#Assumed 71% start treatment, estimate for 2013 from ARPE 2017

@Applied the Miramontes 2015 estimate from NHANES of 4.7% of those tested are newly test positive

!US Armed Forces Medical Surveillance 2014

~Applied CMS allowable fees for TST of \$8.64, for QFT-GIT of \$85.20, and for T-spot of \$102.99

Percentage of Testing by Sector



LIMITATIONS

- We chose 2013 as a common year because several estimates were available. Our estimates might not reflect recent increases in IGRA testing.
- We assumed relatively high LTBI treatment initiation (71%), resulting in conservative testing estimates
- We only estimated direct medical costs for LTBI testing (test antigen/assay, lab processing, value of staff time). This excludes costs for clinic visits, travel, patient time, and TB disease testing.

CONCLUSIONS

- The public sector is estimated to conduct three-quarters of LTBI testing
- An estimated 12 to 16 million tests for LTBI were conducted in 2013 at a cost of at least \$224 million to \$304 million

IMPLICATIONS

- With future increases in IGRA testing, which results in fewer false-positive tests than TST, we might expect to see LTBI testing costs increase, but the number treated to decline
- Tracking trends in LTBI testing by test type, LTBI treatment by regimen, and costs can help us track progress towards TB elimination

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