SOA-06-D2 Defining the TB Epidemic in Children to Inform Action
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High Prevalence of Tuberculosis Infection in Children Living in Households of MDR-TB Patients

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CONFLICT OF INTEREST DISCLOSURE

✓ I have no Conflict of Interest to report.

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BACKGROUND

- Young children acquire MDR-TB infection mainly through transmission from close contact with an infectious MDR-TB index case and are at high risk of progression to active TB disease.
- Globally, MDR-TB contact investigation is poorly implemented and most young household contacts (HHC) do not access TB investigation or preventive therapy.
- The PHOENIx Feasibility study (A5300/I2003) was a cross-sectional study conducted in 8 high TB-burden countries from Oct 2015-April 2016 by the ACTG and IMPAACT networks, which are NIH-funded AIDS clinical trial networks for adults, children and pregnant women.
  - Adult pulmonary TB (PTB) patients with MDR-TB and all their HHCs were investigated in preparation for a randomized controlled trial of preventive therapy with delamanid.
  - Six countries (14 sites) (Botswana (1), Haiti (1), India (2), Peru (2), South Africa (7), Thailand (1)) enrolled children (defined as <15 years of age).

OBJECTIVES OF PRESENT WORK

Among child HHCs <15 years of age:

- To describe the prevalence of TB infection
- To describe predictors of prevalent TB infection

METHODS

Outcome

- Prevalent TB infection as defined by Interferon Gamma Release Assay (IGRA) using QuantiFERON Gold or QuantiFERON Gold-in-Tube (QIAGEN)

Predictors

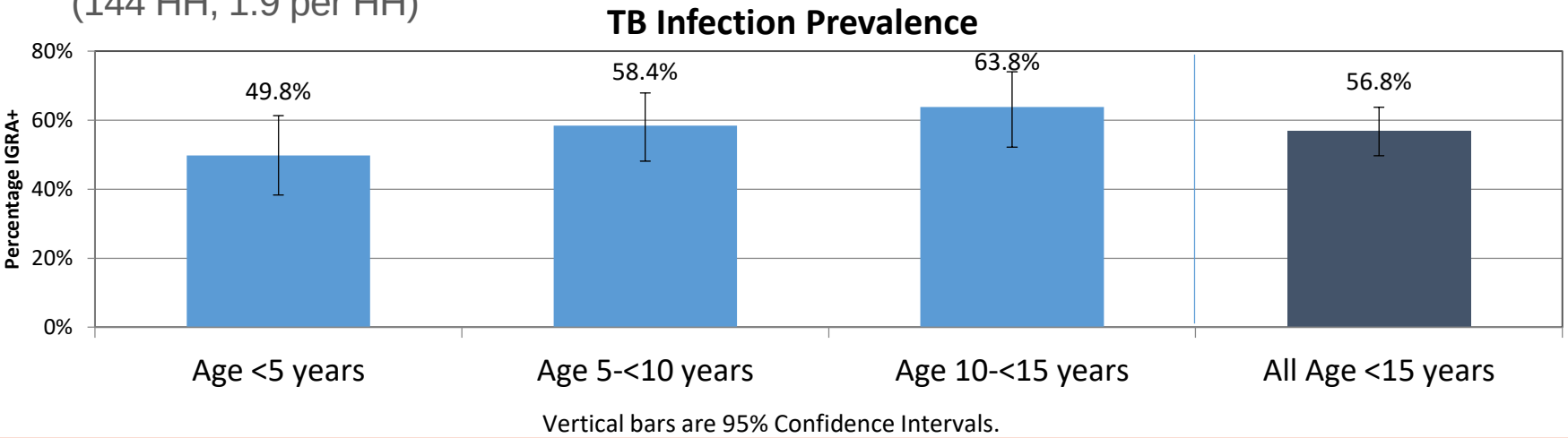
- Adult Index Case characteristics
- HHC characteristics
- Characteristics describing exposure of HHC to the MDR-TB Index Case
- Household (HH) characteristics

Statistical Analysis

- Logistic Regression using a generalized estimating equation (GEE) approach with exchangeable working correlation to account for correlation within a household

RESULTS

- 305 adult MDR-TB Index Cases with PTB
- 1016 HHCs of all ages were enrolled (mean of 3.3 per HH)
- 304 (30%) HHCs from 153 HH were aged <15 years, 1 had a TB diagnosis
- 283 (93%) had IGRA testing: 4 (1.4%) indeterminate and 279 with determinate results (144 HH, 1.9 per HH)



Vertical bars are 95% Confidence Intervals.

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LOGISTIC REGRESSION MODELS

Characteristic	n/N (%)* 160/279 (57%)	Univariable Odds Ratio (95% CI†)	Univariable P‡	Multivariable Odds Ratio (95% CI†)	Multivariable P‡
Index Case Age			0.09		0.049
<25 years	46/78 (59%)	1.0 ref		1.0 ref	
25-<35	33/74 (45%)	0.5 (0.2, 1.0)		0.3 (0.1, 0.8)	
35-<50	63/95 (66%)	1.2 (0.6, 2.7)		0.8 (0.3, 1.9)	
50+	18/32 (56%)	0.7 (0.3, 1.8)		0.6 (0.2, 1.8)	
Index Case Smoking Status			0.07		0.034
Current	41/58 (71%)	1.9 (0.95, 3.9)		2.3 (1.02, 5.0)	
Previous/never	119/221 (54%)	1.0 ref		1.0 ref	
HHC Age and School Attendance			0.033		0.013
Age <5 years	43/88 (49%)	1.0 ref		1.0 ref	
Age 5-<15, never in school	6/14 (43%)	0.9 (0.3, 2.3)		0.9 (0.3, 2.6)	
Age 5-<15, currently or ever in school	111/177 (63%)	2.0 (1.2, 3.5)		2.4 (1.4, 4.2)	
IC-HHC Relationship and Sleeping Arrangement			0.024		0.002
Mother/father, sleeps in same room	41/59 (69%)	2.8 (1.5, 5.5)		5.1 (2.4, 10.8)	
Mother/father, sleeps in different room	20/32 (63%)	2.2 (1.0, 4.9)		2.4 (1.1, 5.6)	
Other relationship, sleeps in same room	35/57 (61%)	2.1 (1.0, 4.3)		2.6 (1.1, 5.7)	
Other relationship, sleeps in different room	64/131 (49%)	1.0 ref		1.0 ref	

*n/N (%), number of IGRA+/total determinate IGRA results (percentage IGRA+); †CI, confidence interval; ‡P, p-value from score test.

CONCLUSIONS

- More than half of children <15 years of age living in households of adult infectious MDR-TB cases were infected with *M.tuberculosis*
- Measures of TB exposure based on the relationship of the child contact to the adult MDR-TB Index Case, sleeping arrangements, Index Case age and smoking status, and the HHC age and school attendance were independently associated with TB infection in child contacts
- Investigating children in households of MDR-TB patients for TB infection and disease is critical to global TB control efforts, particularly in children with higher degree of exposure to Index Cases

Acknowledgments

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IMPAACT International Maternal Pediatric Adolescent AIDS Clinical Trials Network

ACTG AIDS CLINICAL TRIALS GROUP