Screening for active TB in children: a systematic review

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BACKGROUND

- Globally, ~225,000 children <15 years died from TB in 2019
- Given challenges in case finding, the large majority of children that die from TB are never even diagnosed
- Effective screening could enhance case finding to improve:
  - Outcomes for individuals
  - TB control in populations

CONCLUSIONS

- Symptom screens:
  - One or more of cough, fever, or poor weight gain in TB contacts had the highest sensitivity, though specificity was low
  - The WHO four-symptom screen in children living w/ HIV had the highest specificity
  - CXR screening against the composite reference standard had high accuracy, though there was strong concern for incorporation bias
  - Xpert MTB/RIF demonstrated high specificity; estimation of sensitivity was limited by few cases
- Accurate and feasible screening tests for active TB in children are lacking and urgently needed

METHODS

Objective: Estimate accuracy of screening tests for pulmonary tuberculosis (TB) in high-risk groups of children and those accessing healthcare

Study Design: Systematic review & meta-analysis

Study Selection Criteria:
- Cross-sectional and cohort studies
- >75% of children under 15 years of age
- Index tests done for screening rather than diagnosis
- Included index tests:
  - Symptom(s) screening,
  - Chest radiography (CXR), or
  - Xpert MTB/RIF or Ultra
- Included reference standards:
  - Composite—clinical or microbiologic diagnosis
  - Microbiologic diagnosis

Data Collection and Analysis:
- At least two review authors—
  - Independently selected studies for inclusion
  - Independently extracted data
  - Assessed study quality using QUADAS-2
- Consolidated symptom screens into groups that used similar combinations of symptoms
- Performed analyses separately by reference standard
- Estimated pooled sensitivity and specificity with 95% confidence intervals using a bivariate model
- Assessed certainty of evidence using GRADE

RESULTS

Overall, there is a striking lack of quality evidence describing strategies to screen for TB in high-risk populations of children.

Limited evidence demonstrates symptom screening & CXR may be useful in high-risk children (TB contacts & those living w/ HIV).