BACKGROUND

- Poor tuberculosis (TB) diagnostic in peripheral health clinics of high HIV prevalence countries
  - Smear microscopy too insensitive and no access to M tuberculosis culture
  - No sensitive test expected to replace smear microscopy in a short time
- Overnight bleach sedimentation: simple and affordable method to optimise smear microscopy
  - Meta-analysis: average of 23% increase of smear positive detection
  - 20-23% increase in a peripheral health clinic in Mathare (Nairobi) Kenya
- How to introduce the bleach sedimentation in current practices?
  - Replacement / combination with direct smear microscopy
  - Impact on laboratory workload for setting with human resource crisis?
  - Limitations of the method: fragility of smears, poor stability of bleach, delay of results by 1 day

METHODS

- Cost effectiveness analysis (CEA): Decision analytical model
  - Health service provider perspective
  - Including all potential smear microscopy approaches combining direct and/or bleach smear sedimentation on 2 sputum specimens examination
  - After exclusion of approaches exclusively based on use of bleach sedimentation

OBJECTIVES

To measure and compare the incremental cost per smear positive (SP) detected case of different approaches combining direct (D) and/or bleach (B) smear to diagnose TB among suspects in a peripheral health clinic of a high HIV prevalence country

DATA SOURCE

- Field evaluation (diagnostic yield and feasibility) of smear microscopy after overnight sodium hypochlorite (NaOCl) sedimentation in Mathare, Nairobi, Kenya
- Sites and population: Urban health clinic of Mathare, Nairobi (Kenya)
- 644 consecutive TB suspects presenting cough for more than 2 weeks
- 50% HIV co-infection

Standardised NaOCl sedimentation method:
- Same quantity of 3.5% local NaOCl to the specimen in 15ml conical tube
- Mixture homogenized using a vortex
- Overnight sedimentation on the bench at room temperature
- 2 sputum specimens examination
  - 1st on spot on the 1st day of consultation
  - 2nd morning on 2nd day

SP case definition:
- ≥1 smear positive result on ≥1AFB/100HPF

RESULTS

<table>
<thead>
<tr>
<th>Approach Description</th>
<th>Base-case analysis</th>
<th>Sensitivity analysis</th>
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<tbody>
<tr>
<td></td>
<td>Labour Reagents &amp; transport Total</td>
<td>Labour Total Total Cost</td>
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<tr>
<td>D1+D2</td>
<td>2.48 1.51 3.96 2.79</td>
<td>0.59 0.93 2.33 5.84</td>
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<tr>
<td>B1+D2</td>
<td>2.54 1.72 4.00 2.77</td>
<td>0.61 1.25 5.55 5.58</td>
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<tr>
<td>D1+B1+B2</td>
<td>2.52 1.75 4.25 2.77</td>
<td>0.83 2.56 5.65 5.58</td>
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<tr>
<td>B1+D2+B2</td>
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<thead>
<tr>
<th>Scenario Possibility to use Program Access to health Best Cost Indifferent</th>
<th>B1</th>
<th>B1+B2</th>
<th>D1</th>
<th>D1+B1</th>
<th>D1+D2</th>
<th>D1+B2</th>
<th>D1+D2+B2</th>
<th>Not Dominated</th>
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<tbody>
<tr>
<td>All approaches: B1 and B1+B2 most cost-effective approaches</td>
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<tr>
<td>Exclusion of B1 and B1+B2: variation of results according to transport costs</td>
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DISCUSSION

- A simple decision analytical model can give informative programmatic information
- Robust model
  - Using observed and published data collected in a peripheral health clinic in a high HIV prevalence country
  - Use of micro costing approach
  - Not sensitive to variation of labour cost
  - B1 and B1+B2 best approaches based on our model
  - Variability of bleach quality and fragility of smears: CEA after exclusion of B1 and B1+B2
  - B1+B2 best option - But most patients will only get results on 3rd day
  - D1+B1 good alternative - Would require a good specimen collection (7 specimen)

LIMITATIONS

- Absence of patient’s cost perspective despite the estimates of transport costs
- Improvement of the model using routine program data

CONCLUSIONS

- Choice of approach based on different criteria
  - Laboratory experiences in using bleach microscopy
  - TB program priority between detection and cost
  - Impact of the risk of patient’s drop out during smear microscopy
  - 4 possible scenarios (see table note)
- Improvement of the model using routine program data

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