ECONOMIC EVALUATION OF SYPHILIS POINT OF CARE

Denis Ako-Arrey., Dr. Mira Johri., Yalda Jafari., Dr. Nitika Pai
• Economic Evaluation is a sensible way to identify which Point of Care screening provides the most efficient and effective use of limited resources.

• Compares the cost and the associated outcomes for the syphilis POC screening strategies.

• Allocation of scarce resources and defining health priorities.
**Background (2)**

- Few women at ANC receive screening (less than 40% in SSA)
- Problems associated with delayed treatment.
- Low return rates & false positive results.
- Difficulties in interpreting serological tests in high prevalence area.
- Need for cheap, reliable screening tests which could be used under field conditions.
Background (3)

• Rapid POC tests require no equipment, stable at room temperature, are minimally invasive and require minimal training.

• Screening, diagnosis & treatment are done on-site.

• Costs, health outcomes, and cost-effectiveness.
Systematic review of economic evaluation of healthcare interventions;

1. To inform development of a decision model.

2. To identify the most relevant economic evaluation to inform a particular question.

3. To identify the key economic trade-offs implicit in a particular treatment choice.
Methodology (Inclusion/Exclusion)

• Original Research

• All valid economic designs (partial & full)

• Five study types: Cost minimization, cost benefit, cost effectiveness and cost utility and cost-outcome description.

• Time period: 2005 to present

• English Language.
Methodology (Extraction)

- Initial screening of titles and abstracts.
- Full text screening.
- Disagreements (by consensus or referral to senior reviewer).
- Data extraction form adapted from those used in previous cost-effectiveness reviews.
Methodology (Data)

• Principal extraction measures (Overview, cost, effectiveness & cost-effectiveness data).

• Cost per correct diagnosis, cost per case detected, cost per case averted, cost per life year gained and cost per disability adjusted life year (DALY).

• Narrative approach to data synthesis.
Results (Study characteristics)

• Seven studies.
• 2006-2008.
• One partial and six full evaluations.
• Low, lower-middle, upper-middle and high income.
• Urban and Rural (onsite and offsite lab).
• Congenital syphilis prevalence (3.6 - 17%).
• Economic model approach and software.
• Study population.
Results (Interventions)

1. No intervention.
2. On site RPR.
3. Off-site RPR with TPHA.
4. On site ICS.
5. Rapid tests (Bioline, Determine, Visitec, Syphchek)
6. ELISA
7. Non treponemal VDRL.
Results

• Studies considered POC syphilis screening in two distinct patient populations;

1. Pregnant women attending routine antenatal care.

2. High risk populations consisting of adult sexually transmitted infections (STI) clinic attendees.
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<td>Income</td>
<td>Tanzania</td>
<td>South Africa</td>
<td>Haiti</td>
<td>Bolivia &amp; Mozambique</td>
<td>South Africa</td>
<td>Italy</td>
<td>Brazil</td>
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<td>Perspective</td>
<td>Public payer</td>
<td>Public payer</td>
<td>Societal</td>
<td>Public payer</td>
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<td>Provider</td>
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<td>Discount rate</td>
<td>3%</td>
<td>n/a</td>
<td>n/a</td>
<td>3%</td>
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<td>Sensitivity analysis</td>
<td>Threshold analysis</td>
<td>one and two way</td>
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<td>n/a</td>
<td>one and two way</td>
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<td>Study design</td>
<td>Cost Utility</td>
<td>Cost effectiveness</td>
<td>Cost utility</td>
<td>Cost comparison</td>
<td>Cost effectiveness</td>
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<td>Strategies</td>
<td>0) No intervention</td>
<td>0) RPR</td>
<td>0) No intervention</td>
<td>0) Syndromic</td>
<td>RPR versus</td>
<td>0) ELISA</td>
<td>0) Non-treponemal</td>
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<td></td>
<td>1) On site RPR</td>
<td>1) Bioline</td>
<td>1) Off-site RPR/TPHA.</td>
<td>surveillance</td>
<td>rapid ICS (with</td>
<td>1) Rapid POC</td>
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<td></td>
<td></td>
<td>2) Determine</td>
<td>(current practice)</td>
<td>RPR</td>
<td>labs)</td>
<td>treponomal ICS</td>
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<td>3) Visitect</td>
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<td>1) Three rapid</td>
<td>rapid ICS versus</td>
<td>(Determine</td>
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<td>4) Syphcheck</td>
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<td>tests (Determine;</td>
<td>no syphilis</td>
<td>syphilis TP)</td>
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<td>BIOLINE;</td>
<td>screening (no</td>
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<td>VisiTect)</td>
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<td>Incremental costs for: startup, training, tests, drugs, supplies, equipment, labs, personnel.</td>
<td>Incremental costs for: tests, drugs, supplies, personnel.</td>
<td>Incremental costs for: tests, drugs, supplies, personnel, patient time/travel costs</td>
<td>Incremental costs for: startup, tests, drugs, supplies, personnel.</td>
<td>Incremental costs for: startup, tests, drugs, supplies, personnel.</td>
<td>Incremental costs for: testing and diagnosis, labor, admin &amp; overhead.</td>
<td>Incremental costs for: testing, diagnosis, drugs, labour.</td>
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<td>Cost-effectiveness</td>
<td>POC tests are less cost-effective than RPR except for Bioline, which is similar in CE to RPR.</td>
<td>The ICS strategy is most effective. Both off site RPR and ICS strategies are cost-effective.</td>
<td>Addition of rapid syphilis testing to an existing HIV pMTCT programme is very cost effective.</td>
<td>Not applicable</td>
<td>Strategies were all cost effective relative to no screening. Screening in a single visit was highly beneficial. ICS dominated.</td>
<td>Rapid test (Determine syphilis TP) more cost effective than ELISA. Rapid test (VisiTect) was less cost effective than VDRL.</td>
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Discussion (Benchmarks)

1) Interventions costing less than US$100 per life year saved are cost effective for middle-income countries.

2) Interventions costing US$50 per life-year gained for low-income countries.

3) Interventions costing less than GDP per capita as very cost-effective, those under two times GDP as cost-effective, and those costing three or more times GDP per capita as cost-ineffective.
Discussion (2)

• Cost per life year or DALY suggest that interventions to add syphilis screening to routine antenatal care are very cost effective in a wide variety of LMIC settings.

• Rapid tests were identified as equally or more cost effective than standard RPR tests in all studies evaluating them.

• Potential of rapid POC syphilis testing to reach a wider population than standard screening methods.
Conclusions can be substantially influenced by selection of parameter values as well as methodological and modelling choices.

• Uncertainty with respect to the natural history of syphilis.

• Models differed considerably in terms of the number and kind of adverse events considered.

• Models also differed in terms of analytic time horizon and to whom benefits accrued.

• Analytic perspective also influenced cost-effectiveness findings.
Conclusion

- Although the POC tests are treponemal tests and lead to overtreatment due to identification of individuals with inactive syphilis antibodies as well as active syphilis, treatment with penicillin is inexpensive and this does not greatly reduce cost-effectiveness.
Conclusion

• The methodological choices highlighted above can be expected to have a profound effect on the estimated cost-effectiveness of rapid POC syphilis screening, affecting results by at least an order of magnitude. This highlights the need for greater transparency in the conduct and reporting of economic evaluations and greater methodological standardisation.
"I did a study today, and cooking dinner just isn't cost-effective."

QUESTIONS ??
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