

A Systematic Review: The costs of diagnosing and treating sexually transmitted infections & links to HIV

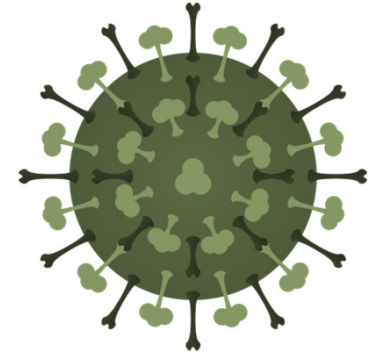
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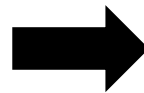


Control of STIs is a global priority addressed in the Sustainable Development Goals.

- STIs can cause significant morbidity and are co-factors for HIV (itself an STI).
- STI management is challenging especially in low- and middle-income countries (LMICs) with poorly developed health infrastructure.
- In 2016, WHO changed recommendations for low-resource settings:



Syndromic
management



Etiological
management

Aim: Update prior systematic review

In 2006, Terris-Prestholt et al published a systematic review summarizing the costs and cost drivers of treating curable STIs in LMICs from 1980-2005.

Our objectives:

1

To summarize recent literature on the costs of diagnosing and treating STIs in LMICs

2

To explore cost drivers and discussions of HIV in the STI cost literature

Methods: Update of prior review's methods

Citation eligibility:

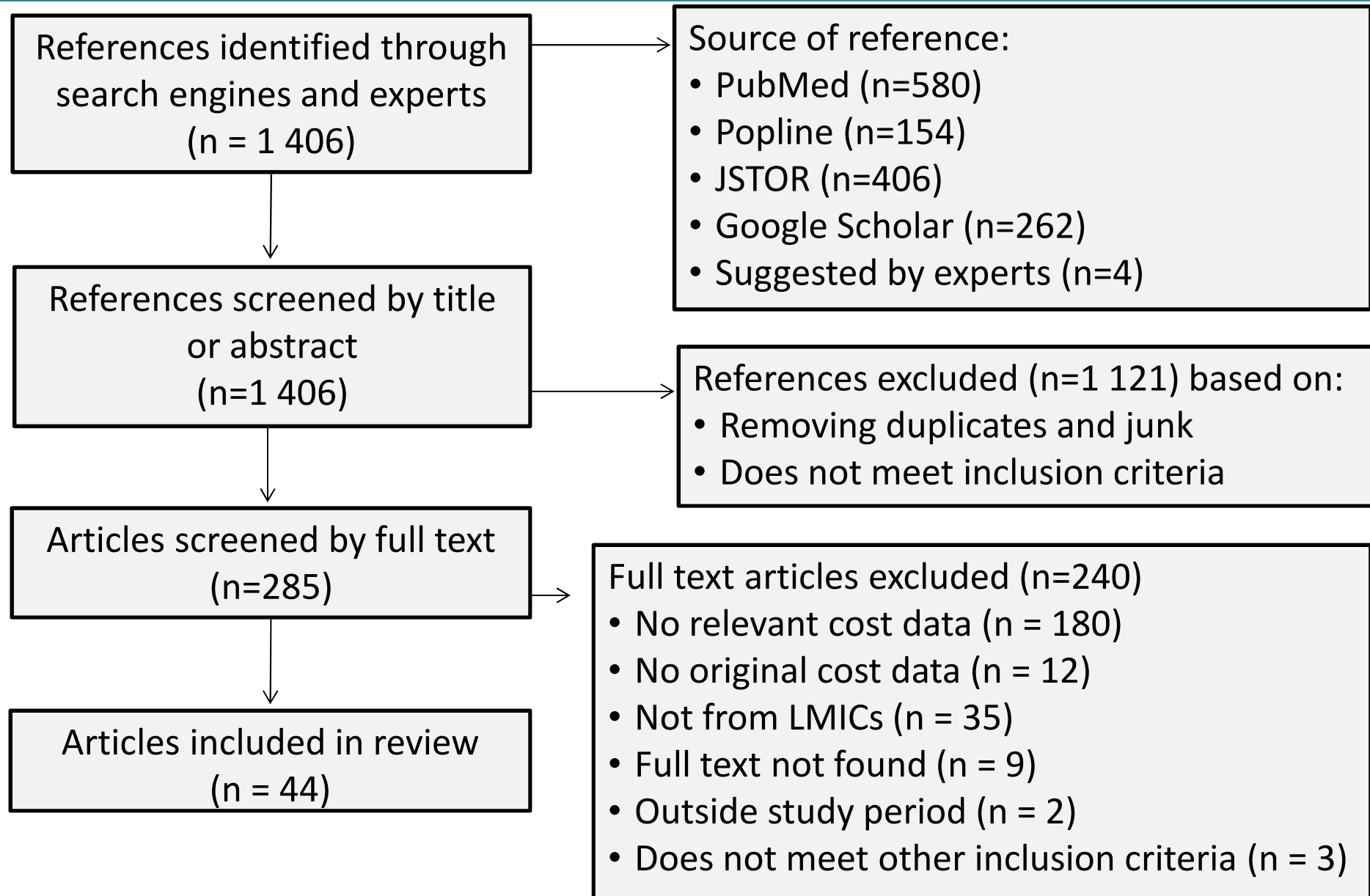
- Published 1 January 2006 - 31 December 2014
- Contains provider-perspective costs of STI-related service provision
- Costs pertain to LMICs
- Included costs of diagnosis and/or treatment of:

- | | | |
|------------------------------|--------------------------------------|--|
| – <i>Bacterial vaginosis</i> | – <i>Genital ulcers</i> | – <i>Pubic lice</i> |
| – <i>Candida</i> | – <i>Genital warts</i> | – <i>Reproductive tract infections</i> |
| – <i>Chancroid</i> | – <i>Gonorrhoeae</i> | – <i>Treponema Pallidum</i> |
| – <i>Chlamydia</i> | – <i>Herpes</i> | – <i>Trichomoniasis</i> |
| – <i>Donovanosis</i> | – <i>Lower abdominal pain</i> | – <i>Urethritis</i> |
| – <i>Epididymitis</i> | – <i>Lymphogranuloma venereum</i> | – <i>Urethral discharge</i> |
| – <i>Epididymo-orchitis</i> | – <i>Pelvic Inflammatory Disease</i> | – <i>Vaginal discharge</i> |
| – <i>General STI</i> | | |
| – <i>Genital scabies</i> | | |

Analysis

1. Extraction of **all** unit costs and cost effectiveness measures
2. Costs converted to 2015 USD
 - Converted into local currency
 - Inflated to 2015 prices
 - Converted to 2015 USD
3. Cost drivers analysed thematically
4. Regression analysis
 - *Intervention type*
 - *Region*
 - *Cost types*
 - *Publication year*
 - *GDP/capita*
 - *No. sites*

Search results

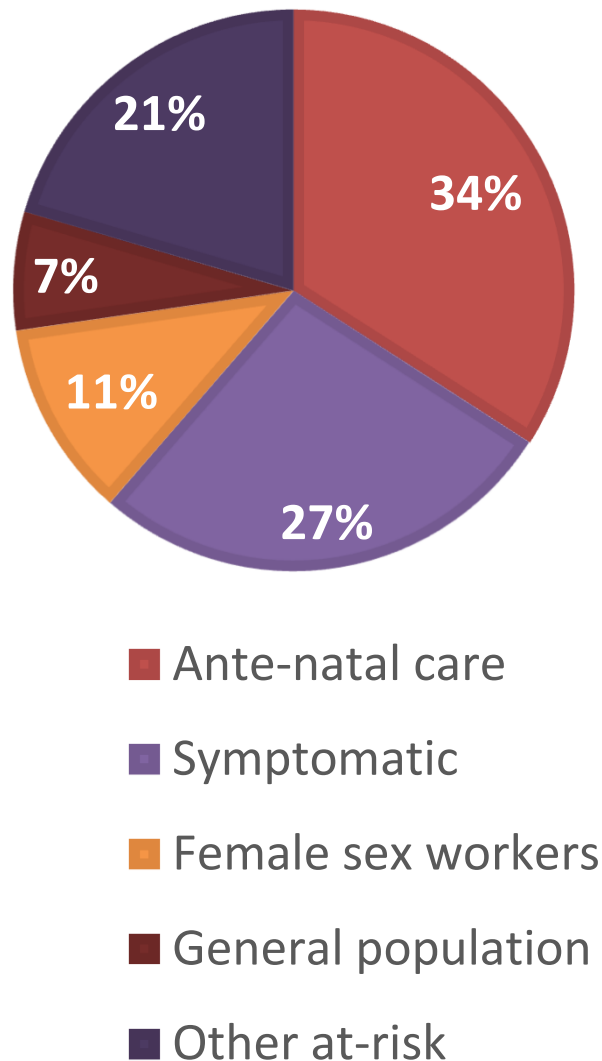


Most (n=25) of the articles reported costs from African settings (N=44).



Most of the articles represented care for ante-natal or STI clinic attendees.

Target populations



- **Number of intervention locations**
 - 36.4% (n=16) of the studies based on 1-2 locations
 - Ranged between 0-61 sites
- **Population sample sizes**
 - Ranged between 50-100 000
 - Modelling papers tended to have largest sample sizes

202 cost values were extracted from the 44 papers.

- Missing information was common.

Variable	Value	n	%
Cost type	Cost effectiveness	68	33.7%
STI management	Syndromic	72	26.3%
Fixed/mobile	Mobile outreach	57	28.2%
STI type	General STI	56	27.7%
	Syphilis	70	34.6%
Cost collection method	Bottom up	103	51.0%
	Ingredients	96	47.5%
	Top down	3	1.5%
Costing method	Modelling	78	38.6%
Cost inclusion	Full	27	13.5%

Median cost varied by cost type.

Prior review

- Terris-Prestholt et al identified 53 original studies over 25 years.
- “Venereal disease” was most common STI in review.
- Median treatment cost was \$17.80 (2004 USD).

This review

- We identified 44 studies over a period of 8 years.
- HIV was mentioned in 32 of the 38 papers; 8 included evaluations of services which provided integrated, HIV and STI services.

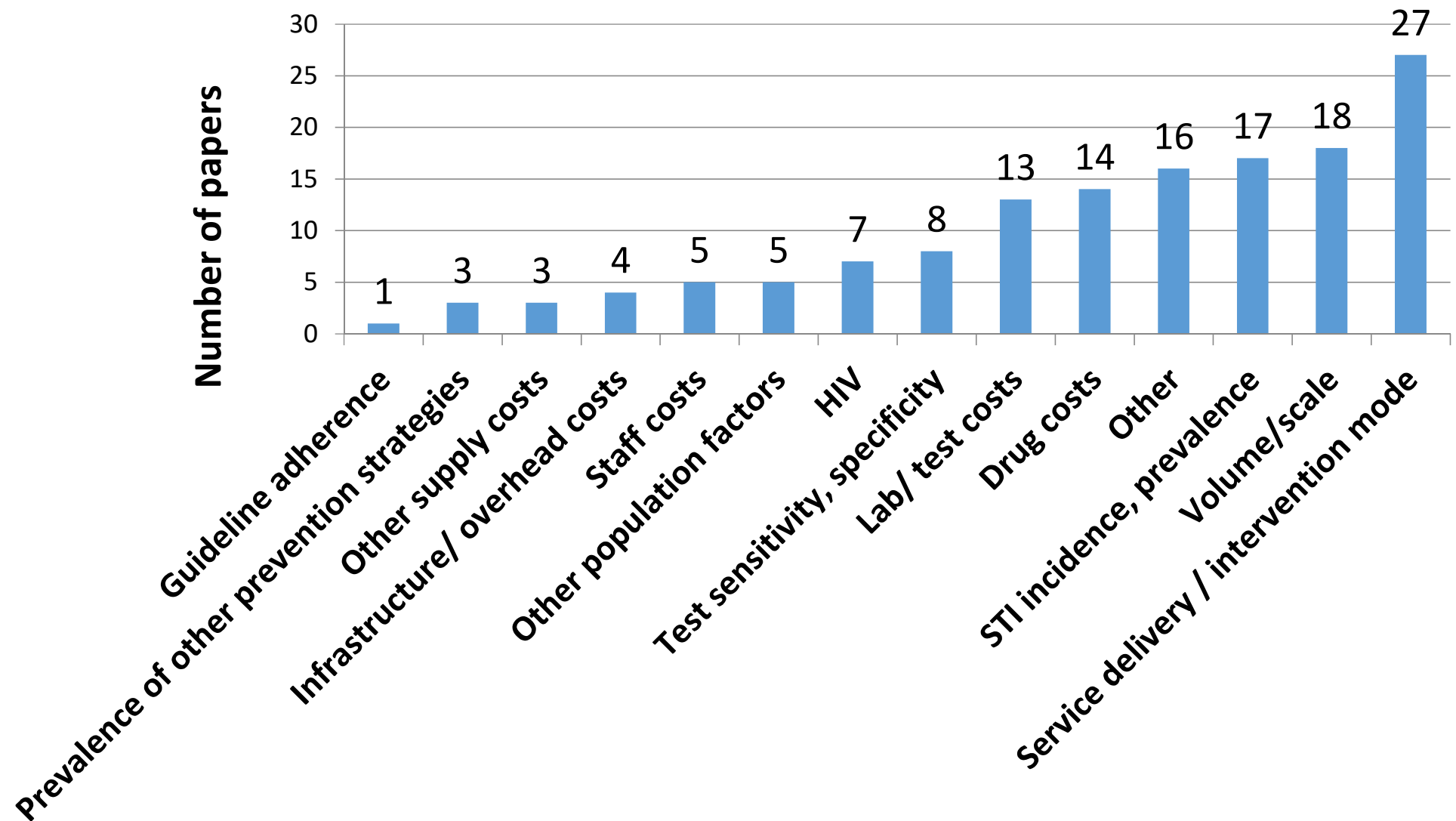
	Median (IQR) (2015 USD)
All cost values (n=202)	10.90 (2.21-70.47)
Cost effectiveness only (n=68)	113.58 (15.4-426.48)
Unit costs only (n=134)	4.13 (1.70-23.25)

Regression results – interpret with caution.

Dependent var: Ln[Cost value]	Unit cost	Cost effectiveness	All costs
Africa	0.0826	-4.183***	-0.332
Full (relative to incremental)	4.268***	4.076**	3.722***
Cost effectiveness (relative to unit costs)	N/A	N/A	2.630***
Syndromic management (relative to etiologic)	-0.462	-1.333	-0.597
Mobile outreach (relative to fixed site)	-1.056**	4.125*	-1.060**
Ln(number of Sites)	0.0642	0.118	0.144
Year of publication	0.0671	-0.439*	0.0505
Historical GDP per capita	-0.00004***	N/A	- 0.00005***
Constant	-132.2	890.2*	-98.5
N, Adjusted R ²	107, 0.497	33, 0.649	136, 0.603

*** = p<.01, **=p<.05, *=p<.10

In papers that discussed cost drivers (n=35), the service delivery model was most often mentioned.



Discussion and conclusions

- Many of the articles presented partial information. Lacked detail on:
 - Intervention including number of individuals screened/treated
 - Costing methods, inputs included and excluded, how overheads were treated
 - Cost year
 - What kinds of diagnostics were used
 - Screening versus treatment
- Cost data are required for intervention planning given new guidelines.
- Planning efforts would benefit from increased availability of information on:
 - STI prevalence
 - Effective interventions to address STIs (diagnostic approaches/medications)
 - Costing methodologies/outcomes

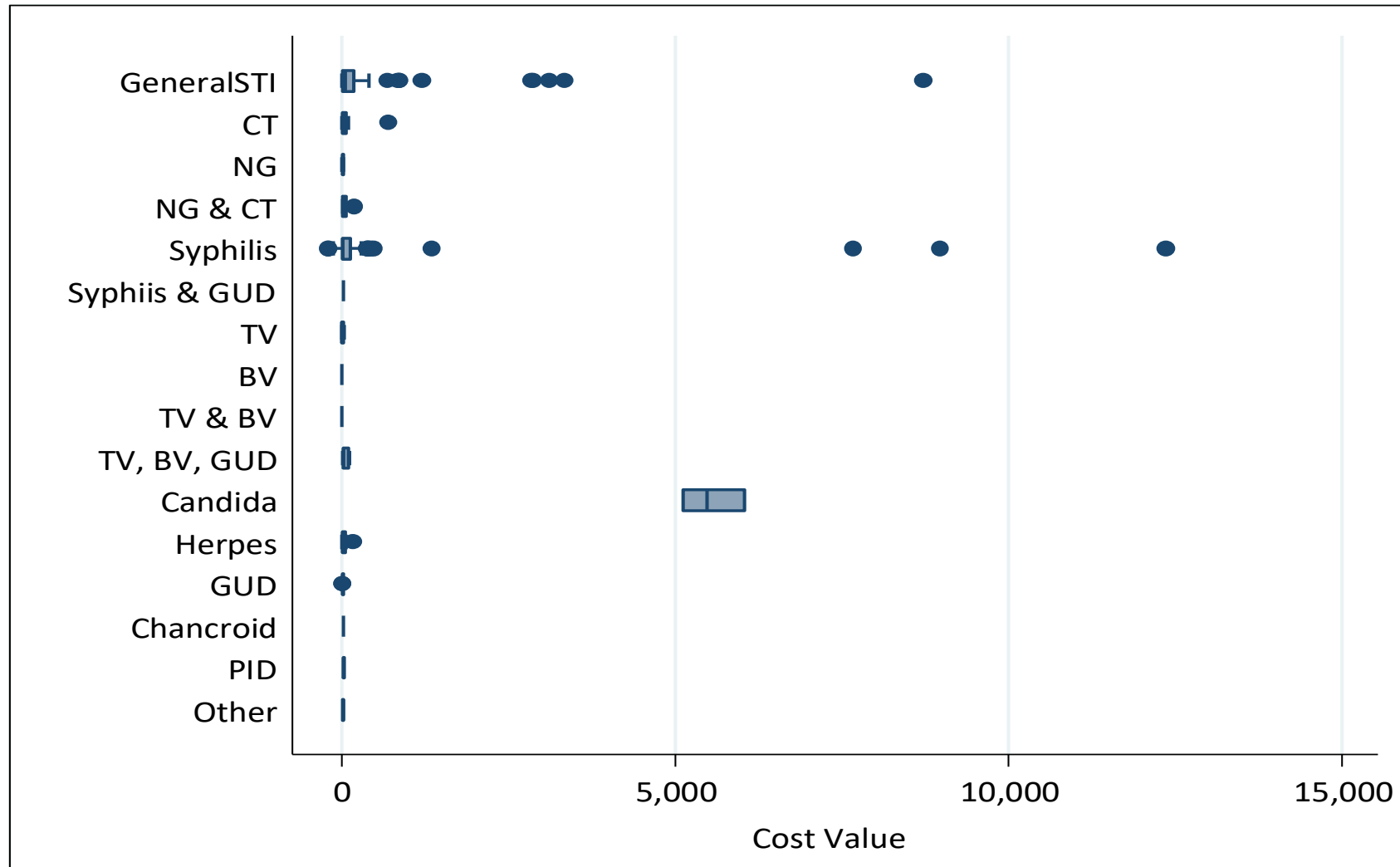
Thank you

For further information

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Most costs were low per case diagnosed/treated.



Results – Regression estimates ($e^{\text{coefficient}}$)

Ln[Cost value]	Unit cost	Cost effectiveness	All costs
Africa	1.086	0.0152***	0.718
Economic (relative to financial)	0.510	0.201	0.313**
Full (relative to incremental)	71.40***	58.88**	41.35***
Cost effectiveness (relative to unit costs)	N/A	N/A	13.88***
Syndromic management (relative to etiologic)	0.630	0.264	0.551
Mobile outreach (relative to fixed site)	0.348**	61.88*	0.347**
Ln(number of Sites)	1.066	1.125	1.155
Year of publication	1.069	0.645*	1.052
Historical GDP per capita	1.000***	N/A	1.000***
Constant	-132.2	890.2*	-98.5
N, Adjusted R ²	107, 0.497	33, 0.649	136, 0.603

Comparison

- Similarities

Terris-Presholt et al (2006) and Lince-Deroche et al (2017)

Wide range of Syphilis costs

Syndromic management cheaper than test-and-treat approaches

Full costs higher than incremental costs

Cost effectiveness measures are higher than unit costs

- Differences

Terris-Presholt et al (2006)

Venereal disease most common STI

Median treatment cost \$17.80 (2004 USD)

Unit costs of mobile facilities > fixed costs

Economic costs > financial costs

GDP/capita raises costs

Costs higher in Africa

Costs are higher the later the year of publication

Lince-Deroche et al (2017)

40.8% of cost values for Syphilis

Median unit cost \$4.13 (2015 USD)

Unit costs of mobile facilities < fixed costs

Economic costs < financial costs

Costs on average the same for different GDP/capita

Unit costs lower in Africa, cost effectiveness higher

All costs are lower the later the year of publication