

**Table S1. One-way sensitivity analyses: threshold values at which reverse algorithm has lower cost than traditional algorithm based on CMS test costs.**

Variable	Value	Range	Traditional Algorithm		Reverse Algorithm		
			Cost (USD)	Effectiveness	Cost (USD)	Effectiveness	Cost Threshold
RPR Positivity Rate*	11.8%	9-17%	\$32-55	0.09-0.16	\$54	0.13	>16.5%
TP-PA Positivity Rate*	95.8%	90-100%	\$38-42	0.11-0.12	\$54	0.13	None
CIA Positivity Rate	12.5%	7-15%	\$40	0.11	\$38-61	0.10-0.15	<7.7%
Previous History of Syphilis	2.6%	1-5%	\$40-41	0.11-0.12	\$54	0.12-0.13	None
Cost of Follow-Up Investigation	\$273.80	\$85-\$1,316	\$19-159	0.11	\$30-184	0.13	None
Cost of RPR	\$5.99	\$5-7	\$39-41	0.11	\$54	0.13	None
Cost of TP-PA	\$18.02	\$16-24	\$40-41	0.11	\$54	0.13	None
Cost of CIA	\$18.02	\$16-24	\$40	0.11	\$39-60	0.13	<\$4.13

*Note.* Cost and effectiveness was calculated for each variable for a range of values at ten intervals. Cost and effectiveness values are listed as ranges from low (left) to high (right). Cost thresholds denote the values at which the reverse algorithm is less costly than the traditional algorithm. (\*) Denotes the test positivity rate in the Traditional Algorithm.