

This is a simplified version of the cost-effectiveness analysis. Explicit calculations are in the "CEA" tab.		
	Zambia	Cameroon
Costs		
Years over which we're modeling impact	10	10
Average annual cost to GW over 10 years	\$704,625	\$810,687
Average annual cost to all actors over 10 years	\$1,416,491	\$1,629,696
Increase in screening and treatment over counterfactual		
Number of pregnant women targeted annually	647,958	626,501
Prevalence of active syphilis among ANC attendees	3.00%	4.55%
<i>Intervention scenario</i>		
Average screening rate over 10 years	58%	58%
Treatment rate among women screened	70%	60%
<i>Counterfactual scenario</i>		
Average screening rate over 10 years	51%	49%
Treatment rate among women screened	45%	44%
<i>Number screened and treated</i>		
Average annual number of women screened in counterfactual scenario	329,332	308,696
Average annual increase in number of women screened	48,274	55,481
Average annual increase in number of women treated	3,484	3,720
Benefits of increased treatment		
<i>Pregnancy outcomes</i>		
Benefits of subsequent pregnancies as proportion of current pregnancies	0.33	0.33
Stillbirths and miscarriages averted	1,026	1,096
Neonatal deaths averted	481	514
Congenital syphilis averted	1,208	1,290
Low birth weight averted	379	404
<i>Moral weights</i>		
Units of value - averting stillbirth or miscarriage	21	21
Units of value - averting neonatal death	84	84
Units of value - averting congenital syphilis	10	10
Units of value - averting low birth weight	3	3
Total value generated, before leverage	75,183	80,277
<i>Leverage/funding</i>		
Total counterfactual value of spending from partners (including Global Fund, go	-3,722	-4,282

Impact of grant		
Total units of value generated	71,461	75,996
Cost-effectiveness of grant	30.3	28.0
Annual lives saved (including miscarriages, stillbirths, and neonatal deaths)	1,507	1,610
Cost per life saved	\$940	\$1,013
Overall impact		
Cost-effectiveness of overall grant	29	

Cost-effectiveness as multiple of GD	Overall 29	Zambia 30	Cameroon 28	Notes
Budgets				
Overall budget (in USD)	\$15,153,119	\$7,046,249	\$8,106,870	Budgets from Evidence Action
Annual budget (in USD)	\$3,030,624	\$1,409,250	\$1,621,374	Annual budget over period of grant
Assumptions				
Attendance and baseline screening rates				
Number of pregnant women annually	786,691 [1]	943,796 [2]		
Antenatal care (ANC) attendance rate - at least one visit	87% [3]	87% [4]		
Among those who attend at least 1 ANC visit, % of pregnant women who attend before the 3rd trimester	80% [5]	70% [6]		
Current syphilis screening rate	53% [7]	50% [8]		
HIV screening rate	82% [9]	86% [10]		
Number of syphilis screenings as percentage of projected HIV screenings once program is fully rolled out	95%	92%		Guess. Because program is replacing HIV tests that women receive during ANC with dual HIV/syphilis tests, we expect syphilis screening rate to reach similar or slightly lower levels as HIV screening rates among ANC goes. We guess a lower percentage in Nigeria because we think the implementation barriers are higher in Nigeria, 2
Target screening rates				
Number of pregnant women targeted annually	647,658	626,501		
Syphilis screening rate of full scale if dual test is adopted	77.52%	82.08%		
Average screening rate over scale-up period - intervention	65.09%	65.94%		Assume screening rate is increased linearly over grant period as more health workers are trained in the use of dual HIV/syphilis tests
Average screening rate over scale-up period - counterfactual	65.09%	65.94%		Assume same screening rate with and without NGO support, conditional on scale-up. Main benefits to NGO support come from increasing likelihood of scale-up happening (and thus expected screening rates), and increasing treatment rates.
Treatment rates				
Treatment rate among those who test positive - intervention	70%	60%		Guess. Assume immediate increase in treatment rate due to NGO support. Because of various implementation barriers (in particular, supply chain challenges), we guess that the increase will be relatively modest.
Treatment rate among those who test positive - counterfactual	45%	44% [11]		Guess based on current treatment rate estimates from Cameroon (see cell note for Cameroon estimate), which I think are the best available treatment rate estimates among these countries.
Prevalence				
Prevalence of active syphilis among ANC attendees [12]	3.00% [13]	4.55% [14]		We expect benefits to be concentrated in cases where the syphilis infection is active. In "Treatment effects," we have adjusted the treatment effects found in the literature by the accuracy of the tests used in the literature in identifying active syphilis cases.
Percent of reactive (seropositive) tests that are "probable active syphilis"	53.6%	53.6%		Proportion of pregnant women reactive in one syphilis test type that were likely reactive in a second confirmatory test. [15]
Total prevalence of active and latent maternal syphilis among women attending ANC	5.60%	8.49%		Calculation. This is to estimate the number of women who will test positive and thus be given treatment, whether or not they have active infections. Only factors into costs. Right now not used because costs are based on headline budget estimates rather than calculated per test and treatment performed.
Assumptions about intervention and counterfactual scenarios				
Percent chance that dual test is successfully adopted in intervention scenario	80%	70%		Successful scale-up in each country depends on dual tests being integrated into national (or state, in the case of Nigeria) policy guidelines, all key county stakeholders being bought in, and capacity on the part of the MoH to conduct the dual test trainings. There's also some chance of partial scale-up but very low screening or treat
Percent chance that dual test would have been adopted by government in counterfactual	50%	40%		There appears to be fairly strong interest from key stakeholders in those geographies to integrate dual testing into routine antenatal care; for example, the Nigeria federal government has procured ~2.4 million dual tests, but without much of a plan or coordinated effort to distribute them where they need to go and provide training for sta
Percent chance that program is sustained after scale-up, conditional on successful dual test adoption	70%	70%		Our guess is that dual tests are a relatively simple program to maintain, since it will be leveraging existing HIV investments/infrastructure, and HIV testing has remained consistently fairly high in these contexts. However, there's some chance that dual tests won't be properly integrated into the routine health system (e.g. if the Global Fi
Number of years later that program would have been scaled up in counterfactual, conditional on successful dual test adoption	1	1		See note in previous row. These geographies have demonstrated interest in dual tests, and if the governments were to successfully scale-up the program without NGO support, Evidence Action may only be speeding up the program by a relatively short period of time.
Number of years beyond grant period that we're modeling impact	5	5		Assumption. Consistent with other technical assistance USAID (PIT) maternal syphilis in Liberia
Number screened and treated - intervention scenario				
Number of women screened and treated over grant period	5	5		Assume same as Liberia grant for now. Grant period may differ across countries.
Duration of scale-up grant period in years	5	5		
Total number of women screened over scale-up period, conditional on successful dual test adoption	2,108,887	2,065,575		
Total number of women screened over scale-up period, if dual test adoption fails	1,706,200	1,559,988		
Expected number of women screened over scale-up period	2,028,368	1,913,859		
Expected number of women treated over scale-up period	42,596	52,249		
Benefits in the five years after the grant period				
Annual total number of women screened once dual test is adopted	502,297	514,232		
Annual total number of women screened, if dual test isn't adopted	341,258	311,998		
Expected number of women screened beyond grant period (years 6-10)	1,747,690	1,727,855		
Expected number of women treated beyond grant period (years 6-10)	36,701	47,171		Assume that even if dual test fails to be adopted, Evidence Action's support will lead to an increase in the treatment rate among women who are still screened, and that that increase in treatment rate lasts beyond the period of the grant.
Total expected number of women screened in intervention scenario	3,776,058	3,641,764		
Total expected number of women treated in intervention scenario	79,297	99,420		
Number screened and treated - counterfactual scenario				
Number of women screened and treated over scale-up period	5	5		Assume same speed of scale-up as in intervention scenario
Duration of counterfactual scale-up period	5	5		
Total number of women screened over scale-up period, conditional on successful dual test adoption	2,108,887	2,065,575		
Total number of women screened over scale-up period, if dual test isn't adopted in counterfactual	1,706,200	1,559,988		
Expected number of women screened over scale-up period	1,907,588	1,762,229		
Expected number of women treated over scale-up period	29,792	36,520		
Benefits beyond scale-up period				
Number of years of benefits beyond scale-up period	4	4		The more years it would take to scale the program in the counterfactual scenario relative to the intervention scenario, the fewer years of benefits in the counterfactual we model here
Annual total number of women screened once dual test is adopted	502,297	514,232		
Annual total number of women screened beyond scale-up period, if dual test adoption fails	341,258	311,998		
Expected number of women screened beyond scale-up period	1,385,732	1,324,734		
Expected number of women treated beyond scale-up period	18,707	26,702		
Total expected number of women screened in counterfactual scenario	3,293,320	3,086,957		
Total expected number of women treated in counterfactual scenario	44,480	62,222		
Additional women screened and treated due to grant				
Increase in total number of women screened in intervention scenario relative to counterfactual	482,737	554,807		
Increase in total number of women treated in intervention scenario relative to counterfactual	34,837	37,198		
Increase in number of women screened due to intervention as a proportion of all initial check - increase in number of women treated due to intervention as a proportion of all initial check - increase in number of women treated due to intervention as a proportion of all	0.8	0.8		
	1.5	0.9		
Benefits of increased treatment				
Pregnancy outcomes				
Benefits of subsequent pregnancies as proportion of current pregnancies [18]	0.33	0.33		
Stillbirths and miscarriages averted	10,283	10,959		
Neonatal deaths averted	4,811	5,137		
Congenital syphilis averted	12,083	12,902		
Low birth weight averted	3,786	4,043		
Mother weights				
Units of value - averting stillbirth or miscarriage	21	21		
Units of value - averting neonatal death	84	84		
Units of value - averting congenital syphilis	10	10		
Units of value - averting low birth weight	3	3		
Total value generated, before leverage	751,832	802,775		
Costs				
Costs of medical commodities				
Cost of HIV test (US Dollars) [19]	\$0.80	\$0.80		
Cost of dual rapid test (US Dollars) [20]	\$0.95	\$0.95		
Cost of dual rapid test attributable to syphilis (US Dollars)	\$0.15	\$0.15		
Costs to all actors over entire grant				
Costs to Evidence Action	\$7,046,249	\$8,106,870		
Cost to Evidence Action per additional woman tested	\$14.60	\$14.61		
Additional costs to Global Fund/PEPFAR [21]	\$72,411	\$83,221		
Additional costs to other partners (guess)	\$7,046,249	\$8,106,870		Assume additional costs to partners are similar to costs to Evidence Action over grant period.
Value generated				
Counterfactual units of value of Global Fund/PEPFAR spending per \$100k	1,770	1,770		We assume the counterfactual value of PEPFAR spending is the same as the Global Fund.
Counterfactual value of spending of government per \$100k	910	910		We assume the same counterfactual value of government spending as we do with malaria, vitamin A supplementation, and immunization programs.
Total counterfactual value of spending from the Global Fund/PEPFAR	-1,282	-1,473		
Total counterfactual value of spending from other partners	35,638	-41,345		Assume same counterfactual value of spending of other partners (including govt, local NGOs) as govt
Total value generated, after leverage	714,614	759,957		
Cost-effectiveness				
GiveDirectly units of value per 100k	335	335		From GiveDirectly top charities cost-effectiveness analysis
Evidence Action units of value per 100k	10,142	9,274		
Cost-effectiveness as multiple of unconditional cash transfers	30	28		
Total lives saved (including miscarriages, stillbirths, and neonatal deaths)	31,169	15,074	16,095	
Total cost to all actors	\$30,461,870	\$14,164,909	\$16,296,951	
Cost per life saved	\$977	\$940	\$1,013	
For reference:				
Percentage of benefits coming from averting:				
Stillbirths	29%			
Neonatal deaths	64%			
Congenital syphilis	16%			
Low birth weight	2%			

[1] "In 2020, there were an estimated 786,691 pregnant women across the country and 762,409 first ANC visits reported via DHIS2 (96.9% attendance rate). "

Evidence Action, Zambia scoping report, March 2022, p. 4:

[https://files.givewell.org/files/DWDA%](https://files.givewell.org/files/DWDA%202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Zambia_March_2022.pdf)

[202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Zambia_March_2022.pdf](https://files.givewell.org/files/DWDA%202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Zambia_March_2022.pdf)

[2] "More recently, there were 785,253 first ANC visits in 2020 reported via DHIS2 (out of an estimated 943,796 pregnant women in the country). Taken together, the facility reported data suggests that 83.2% of pregnant women attended at least one ANC visit."

Evidence Action, Cameroon scoping report, March 2022, p. 5

[https://files.givewell.org/files/DWDA%](https://files.givewell.org/files/DWDA%202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Cameroon_March_2022.pdf)

[202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Cameroon_March_2022.pdf](https://files.givewell.org/files/DWDA%202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Cameroon_March_2022.pdf)

[3] Table 9.1, p. 140 in Zambia DHS 2018 Report:

<https://dhsprogram.com/pubs/pdf/FR361/FR361.pdf>

[4] Table 9.1, p. 180 in Cameroon DHS 2018 Report:

<https://dhsprogram.com/pubs/pdf/FR360/FR360.pdf>

[5] We add together the percentage of women who attend their first ANC visit during the first trimester of their pregnancy and the percentage that have their first visit during the fourth or fifth month of their pregnancy.

"Over 3 in 10 women (37%) had their first ANC visit during the first trimester of their pregnancy; 48% had their first visit during the fourth or fifth month of their pregnancy, while 13% received ANC during their sixth and seventh month of pregnancy."

Zambia Demographic and Health Survey 2018, p. 132:

<https://dhsprogram.com/pubs/pdf/FR361/FR361.pdf>

[6] We add together the percentage of women who attend their first ANC visit during the first trimester of their pregnancy and the percentage that have their first visit during the fourth or fifth month of their pregnancy. Percentages come from:

Cameroon Demographic and Health Survey 2018, Table 9.2, p. 181

<https://dhsprogram.com/pubs/pdf/FR360/FR360.pdf>

[7] "According to the 2017-2020 Annual Health Statistical Report, the syphilis screening rate in ANC was 56.3% in 2018, 54.1% in 2019, and 47.6% in 2020."

Evidence Action, Zambia scoping report, March 2022, p. 5

[https://files.givewell.org/files/DWDA%](https://files.givewell.org/files/DWDA%202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Zambia_March_2022.pdf)

[202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Zambia_March_2022.pdf](https://files.givewell.org/files/DWDA%202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Zambia_March_2022.pdf)

[8] "To assess syphilis screening and treatment coverage in past years, facility-reported data from the DHIS2 was considered. The number of pregnant women screened each year for syphilis during ANC is depicted in Figure 1. Looking to 2020, there were 785,253 pregnant women who visited a health facility during the course of their pregnancy which therefore yields a syphilis screening coverage of 49.8%."

Evidence Action, Cameroon scoping report, March 2022, p. 6

https://files.givewell.org/files/DWDA%202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Cameroon_March_2022.pdf

[9] "According to the 2018 DHS report, 81.7% of women aged 15-49 who gave birth in the 2 years before the survey received counseling, were tested for HIV, and received their test results during ANC."

Evidence Action, Zambia scoping report, March 2022, p. 5
https://files.givewell.org/files/DWDA%202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Zambia_March_2022.pdf

[10] 2018 UNICEF data on "Per cent of pregnant women presenting at ANC who were tested for HIV or already knew their HIV positive status", country "Cameroon"

https://data.unicef.org/resources/data_explorer/unicef_f/?ag=UNICEF&df=GLOBAL_DATAFLOW&ver=1.0&dq=.HVA_PMTCT_STAT_CVG..&startPeriod=2015&endPeriod=2018

[11] "The available data indicates treatment coverage has been:
2018: 63.7%
2019: 51.1%
2020: 34.6%
2021 (up to Oct): 27.8%

Based on the DHIS data, it would appear syphilis treatment coverage has been declining since it was first measured in 2018. It's possible this is an artifact of the way this data is captured at the facility; syphilis testing is included in the ANC register but syphilis treatment is only recorded in the outpatient register (see below for further description)."

Evidence Action, Cameroon scoping report, March 2022, p. 7
https://files.givewell.org/files/DWDA%202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Cameroon_March_2022.pdf

[12] Prevalence estimates for Zambia are based on the ZAMPHIA survey. For Cameroon, the data is drawn from a Sentinel Survey.

[13] "Overall, Evidence Action recommends relying on the active syphilis prevalence measured via the ZAMPHIA study as the survey was nationally representative and a sequence of tests was used to directly measure active syphilis. Thus, the prevalence of active syphilis is 3.0% nationally."

Evidence Action, Zambia scoping report, March 2022, p. 3
https://files.givewell.org/files/DWDA%202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Zambia_March_2022.pdf

[14] "Overall, among the estimates available, Evidence Action recommends relying on the 2016 Sentinel Survey as it provides the most rigorous estimate of active syphilis prevalence. Thus, the prevalence of active syphilis in Cameroon is 5.63% ... Using 2015 population data from Projections Demographique, we estimate the population-weighted prevalence is 4.55%."

Evidence Action, Cameroon scoping report, March 2022, p. 3
https://files.givewell.org/files/DWDA%202009/Evidence_Action/Evidence_Action_Scoping_Report_for_Cameroon_March_2022.pdf

[15] See Ham et al. 2015 meta-analysis, Table 2:
<https://obgyn.onlinelibrary.wiley.com/doi/epdf/10.1016/j.ijgo.2015.04.012>

[16] Intuition: Total benefits due to the grant are equivalent to this number of years of perfect compliance

[17] Intuition: Total benefits due to the grant are equivalent to this number of years of perfect compliance

[18] See calculations in CEA for Evidence Action Liberia grant:

https://docs.google.com/spreadsheets/d/17ivGP0KATv32vfrUCLzXUuoerXAkMXKkciLv-B_WwE8/edit#gid=0&range=A48:E53

[19] "For the HIV rapid test, our best guess is that it is \$0.80. We did not obtain specific cost data on HIV rapid tests from either Zambia or Cameroon. That said, the tests tend to be around the same cost across countries because they are purchased through Global Fund or PEPFAR pooled procurement. In both countries, the HIV screening tests in use are from Band #3 of the Global Fund HIV test kit pricing reference guide which has costs falling between \$0.71 to \$0.90 per test (see here: https://www.theglobalfund.org/media/7564/psm_hivrdtreferencepricing_table_en.pdf)." Anna Konstantinova, Senior Manager, Maternal Syphilis Program, Evidence Action, email to GiveWell, January 20, 2023 (unpublished)

[20] "For the dual test, there are three WHO pre-qualified brands: Abbott SD Bioline, Premier First Response, and Standard Q SD Biosensor. The prices of the dual tests range from \$0.95 (Standard Q SD Biosensor; pricing agreement announced by MedAccess Nov 2021) up to ~\$1.50 (Abbott SD Bioline). Cameroon and Zambia are still in the midst of finalizing the brands to be used in their algorithms and we anticipate it will be either the Premier First Response or the Standard Q SD Biosensor, though final decisions are pending official guideline amendments." Anna Konstantinova, Senior Manager, Maternal Syphilis Program, Evidence Action, email to GiveWell, February 1, 2023 (unpublished)

[21] Estimated by multiplying # of pregnant women screened by marginal cost of dual vs. single HIV test (\$0.95 vs. \$0.80)

[22] Gomez et al. 2013 reported the combined outcome of LBW or prematurity. Given our impression that prematurity and low birth rate are closely related, we use this outcome as a proxy for low birth weight.

[23] We are assuming that reductions in miscarriage resulting from treatment would be similar to reductions in stillbirth resulting from treatment.

[24] "The population of interest is pregnant women with active syphilis and the intervention being reviewed is serologic detection of syphilis in pregnant women and treatment of women with active syphilis (e.g. RPR>1:4) with at least 2.4 million units penicillin given at least 28 days prior to delivery." Blencowe et al. 2011, p. 3.

[25] From Evidence Action: "Given low rates of male partner treatment, it is possible that women will get reinfected between when they've been treated and the delivery of their child. These reinfections will negate any benefit received from the initial screening and treatment. There is no data on reinfection rates but one possible proxy is the seroconversion rate. The seroconversion rate refers to the fraction of women who test negative during their first ANC visit but then test positive when they are retested at time of birth. In other words, it is the rate of women who become infected between their first ANC visit and their delivery date. According to Blencowe et al. (2011), 0.4% to 2.8% of pregnant women undergo seroconversion in high-prevalence areas... The average value was assumed for this model in high prevalence countries. The lowest estimate was assumed for Indonesia's low prevalence scenario."

[26] Half of the studies in Gomez et al. 2013 used only a non-treponemal test to diagnose syphilis, while the other half used both a non-treponemal and treponemal test to confirm probable active syphilis. I average the adjustment factors for using only a non-treponemal test and for using both tests.

[27] See Ham et al. 2015 meta-analysis, Table 2:
<https://obgyn.onlinelibrary.wiley.com/doi/epdf/10.1016/j.ijgo.2015.04.012>

[28] See Ham et al. 2015 meta-analysis, Table 2:

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[29] Half of the studies in Gomez et al. 2013 used only a non-treponemal test to diagnose syphilis, while the other half used both a non-treponemal and treponemal test to confirm probable active syphilis. I average the adjustment factors for using only a non-treponemal test and for using both tests.