

# Effects of Response to the 2014–2015 Ebola Outbreak on Deaths from Malaria, HIV/AIDS, and Tuberculosis, West Africa

## Technical Appendix

**Technical Appendix Table 1.** Parameter estimates for deaths from Malaria, HIV/AIDS, and tuberculosis in Guinea, Liberia, and Sierra Leone malaria models\*

Variable		Uniform distribution range and $\beta$ distribution values		Reference
Malaria-related parameter estimates: Guinea, Liberia, Sierra Leone				
Probability of death without treatment	Uncomplicated Malaria	0.005–0.02		(1)
	Severe Malaria	0.45–0.80		(2)
Probability of death while undergoing treatment	Uncomplicated Malaria	0.00024–0.00112		(3)
	Severe Malaria	0.05–0.2		(4)
Probability of progressing from uncomplicated to severe malaria given no treatment		0.03–0.13		(2,5)
Proportion of fever cases attributable to Malaria		0.01–0.11		(5,6)
Probability of spontaneous recovery from uncomplicated malaria		0.10–0.20		(5)
Probability of treatment for severe malaria		0.60–0.80		(7)
Guinea				
Age-specific probabilities of developing fever within 2 weeks ( $\beta$ distribution)		Cases	N	(8)
	<1 y	376	1,453	
	1–2 y	476	1,296	
	2–3 y	406	1,192	
	3–4 y	337	1,253	
Age-specific probabilities of receiving treatment for malaria before Ebola outbreak	<1 y	0.128–0.221		(8)
	1–2 y	0.194–0.334		
	2–3 y	0.159–0.260		
	3–4 y	0.198–0.309		
	4–5 y	0.163–0.271		
Liberia				
Age-specific probabilities of developing fever within 2 weeks ( $\beta$ distribution)		Cases	N	(9)
	<1 y	391	1,333	
	1–2 y	429	1,272	
	2–3 y	309	1,085	
	3–4 y	327	1,198	
Age-specific probabilities of receiving treatment for malaria before Ebola outbreak	<1 y	0.296–0.381		(9)
	1–2 y	0.461–0.603		
	2–3 y	0.393–0.538		
	3–4 y	0.449–0.618		
	4–5 y	0.521–0.624		
Sierra Leone				
Age-specific probabilities of developing fever within 2 weeks ( $\beta$ distribution)		Cases	N	(10)
	<1 y	576	2,406	
	1–2 y	706	2,169	
	2–3 y	570	2,011	
	3–4 y	493	2,237	
Age-specific probabilities of receiving treatment for malaria before Ebola outbreak	<1 y	0.301–0.395		(10)
	1–2 y	0.376–0.502		
	2–3 y	0.354–0.484		
	3–4 y	0.395–0.543		
	4–5 y	0.376–0.501		

Variable		Uniform distribution range and $\beta$ distribution values	Reference
HIV/AIDS-related parameter estimates: Guinea, Liberia, and Sierra Leone			
CD4 count-specific probabilities of ART failure	CD4 499–350 cells/mm <sup>3</sup>	0.03	(11)
	CD4 349–200 cells/mm <sup>3</sup>	0.05	
	CD4 <200 cells/mm <sup>3</sup>	0.1	
Population distributions of CD4 cells/mm <sup>3</sup> counts	CD4 >500 cells/mm <sup>3</sup>	0.1833–0.44	(12–14)
	CD4 499–350 cells/mm <sup>3</sup>	0.1430–0.22	
	CD4 349–200 cells/mm <sup>3</sup>	0.1667–0.22	
	CD4 <200 cells/mm <sup>3</sup>	0.12–0.42	
CD4 count-specific probabilities of death for those not treated	CD4 499–350 cells/mm <sup>3</sup>	0.02–0.0926	(11,15–17)
	CD4 349–200 cells/mm <sup>3</sup>	0.03–0.0926	
	CD4 <200 cells/mm <sup>3</sup>	0.11254–0.25	
CD4 count-specific probabilities of death while receiving ART	CD4 499–350 cells/mm <sup>3</sup>	0.00036–0.03915	(15,18,19)
	CD4 349–200 cells/mm <sup>3</sup>	0.002397–0.0355	
	CD4 <200 cells/mm <sup>3</sup>	0.037731–0.160971	
Guinea			
Probability of receiving ART	Prior to Ebola outbreak	0.43–0.58	(20,21)
Liberia			
Probability of receiving ART	Prior to Ebola outbreak	0.38–0.48	(20,21)
Sierra Leone			
Probability of receiving ART	Prior to Ebola outbreak	0.24–0.42	(20,21)
Tuberculosis-related parameter estimates: Guinea, Liberia, and Sierra Leone			
Probability of death without treatment		0.20–0.40	(22,23)
Probability of death while undergoing treatment	DS-TB	0.02–0.08	(24)
	MDR-TB	0.09–0.13	(25)
Probability of Treatment Failure	DS-TB	0.001–0.004	(26)
	MDR-TB	0.05–0.11	
Probability of defaulting on treatment	DS-TB	0.04–0.15	(27)
Probability of progressing to MDR-TB	Experienced treatment failure	0.173	(26)
	Defaulted on treatment	0.023	
Probability of clearing infection after treatment default		0.20–0.30	(23)
Guinea			
Proportion of all new TB cases that are MDR-TB		0.001–0.016	(28)
Probability of receiving treatment for TB	Prior to Ebola outbreak	0.48–0.61	(20,21)
Liberia			
Proportion of all new TB cases that are MDR-TB		0.001–0.053	(28)
Probability of receiving treatment for TB	Prior to Ebola outbreak	0.51–0.64	(20,21)
Sierra Leone			
Proportion of all new TB cases that are MDR-TB		0–0.047	(28)
Probability of receiving treatment for TB	Prior to Ebola outbreak	0.50–0.83	(20,21)

\*ART, antiretroviral treatment; DS-TB, drug-susceptible tuberculosis; MDR-TB, multidrug-resistant tuberculosis.

**Technical Appendix Table 2.** Population sizes used in models to calculate mortality rates from Malaria, HIV/AIDS, and Tuberculosis, West Africa

Category		Guinea		Liberia		Sierra Leone	
		Population	Ref	Population	Ref	Population	Ref
Population at risk for Malaria (age <5)*	Mean	1,900,000	(29)	700,000	(29)	900,000	(29)
HIV-infected population (age 15–49)	Mean	97,000	(30)	22,000	(31,32)	48,000	(31,33)
	95%CI	81,000–120,000		18,000–26,000		36,000–60,000	
Population with active TB, without HIV/AIDS (all ages)	Mean	21,755	(34)	16,669	(35)	23,846	(36)
	95%CI	11,858–34,504		8,895–26,798		11,922–39,794	

\*For the malaria model, we used the national population size of persons <5 y old. Ref, reference.

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