Of children under five with fever in the last two weeks, treatment taken for fever
H37A Fansidar
H37B Chloroquine
H37C Aspirin
H37D Ibuprofen/acetaminophen
H37E Country specific
H37F Country specific
H37G Country specific
H37H Country specific
H37X Other
H37Y Nothing
H37Z Don't know if or what was taken

FIGURE S1.   Demographic Health Surveys (DHS) malaria module extract.

This module is for use in countries or regions at high risk of malaria. See manual for definition.	
ML1 . IN THE LAST TWO WEEKS, THAT IS, SINCE (*day of the week*) OF THE WEEK BEFORE LAST, HAS (*name*) BEEN ILL WITH A FEVER?	Yes .... 1 No.. 2 DK 9
…	…
ML7. WHAT MEDICINE WAS (*name*) GIVEN? *Circle all medicines given before visiting a health facility or if no visit was made to a health facility.*	Paracetamol .... 1 Chloroquine... 2 Fansidar .... 3 **Develop categories to include locally-used drugs, then pre-test** Other (*specify*) _____ 4 DK 9

FIGURE S2.   Multiple Indicator Cluster Survey (MICS) malaria module extract.
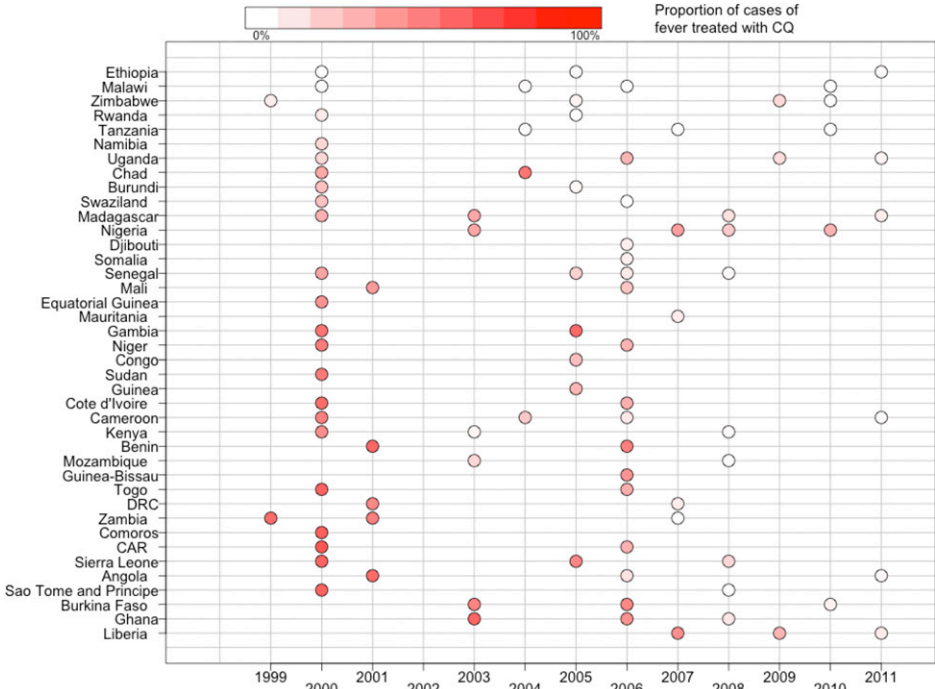

FIGURE S3.   Time plot of the proportion of fever cases treated with chloroquine (CQ). Shading is indicative of usage.
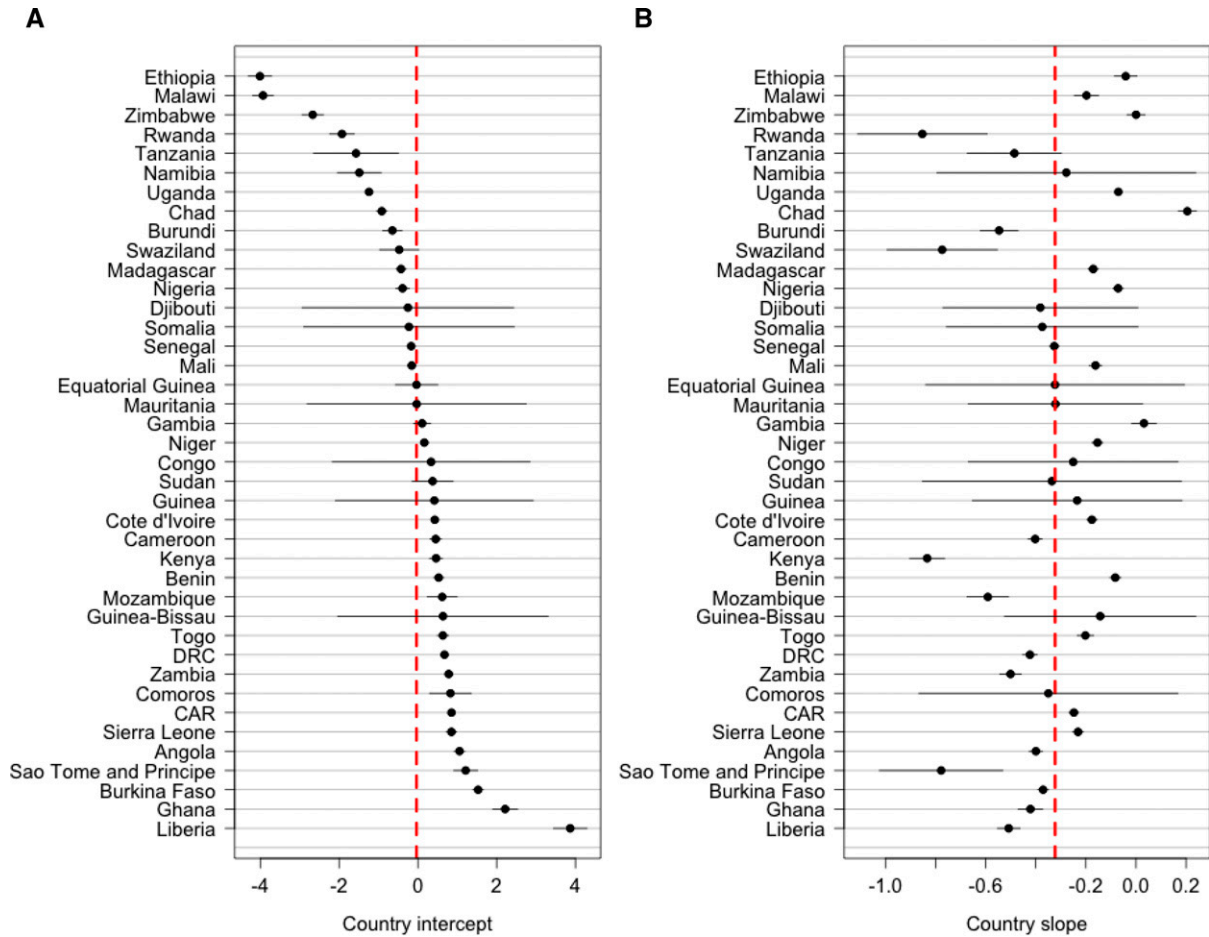
FIGURE S4. (**A**) Country-level intercept for chloroquine (CQ) use (fixed effect intercept plus random effect intercept). (**B**) Country-level slope (fixed effect slope plus random effect slope). On (**A**) and (**B**), the red dashed line represents the fixed effect intercept and slope, respectively, and hence separates countries with a positive random effect (to the right of the red line) and countries with a negative random effect. The black horizontal lines give the 95% confidence intervals for the parameters. The model parameter estimates, standard errors, and *P* values are given in Supplemental Table 3. The order of countries is determined by the level of their CQ use in 1999, as reflected by their intercept in the mixed effects model. In (**A**), countries like Malawi and Ethiopia with low (or no) CQ use in 1999 have a very negative intercept, whereas countries that started with higher CQ use have a larger intercept. In (**B**), the slopes of the decline in CQ use over the period from 1999 to 2011 are depicted. Countries like Rwanda and Kenya with a strong negative slope, reduced CQ use most rapidly, whereas those that show a larger slope (to the right of the fixed effect, shown in the red dashed line) reduced CQ use at a slower rate. The more negative the slope, the faster the rate at which CQ use declined post 1999.
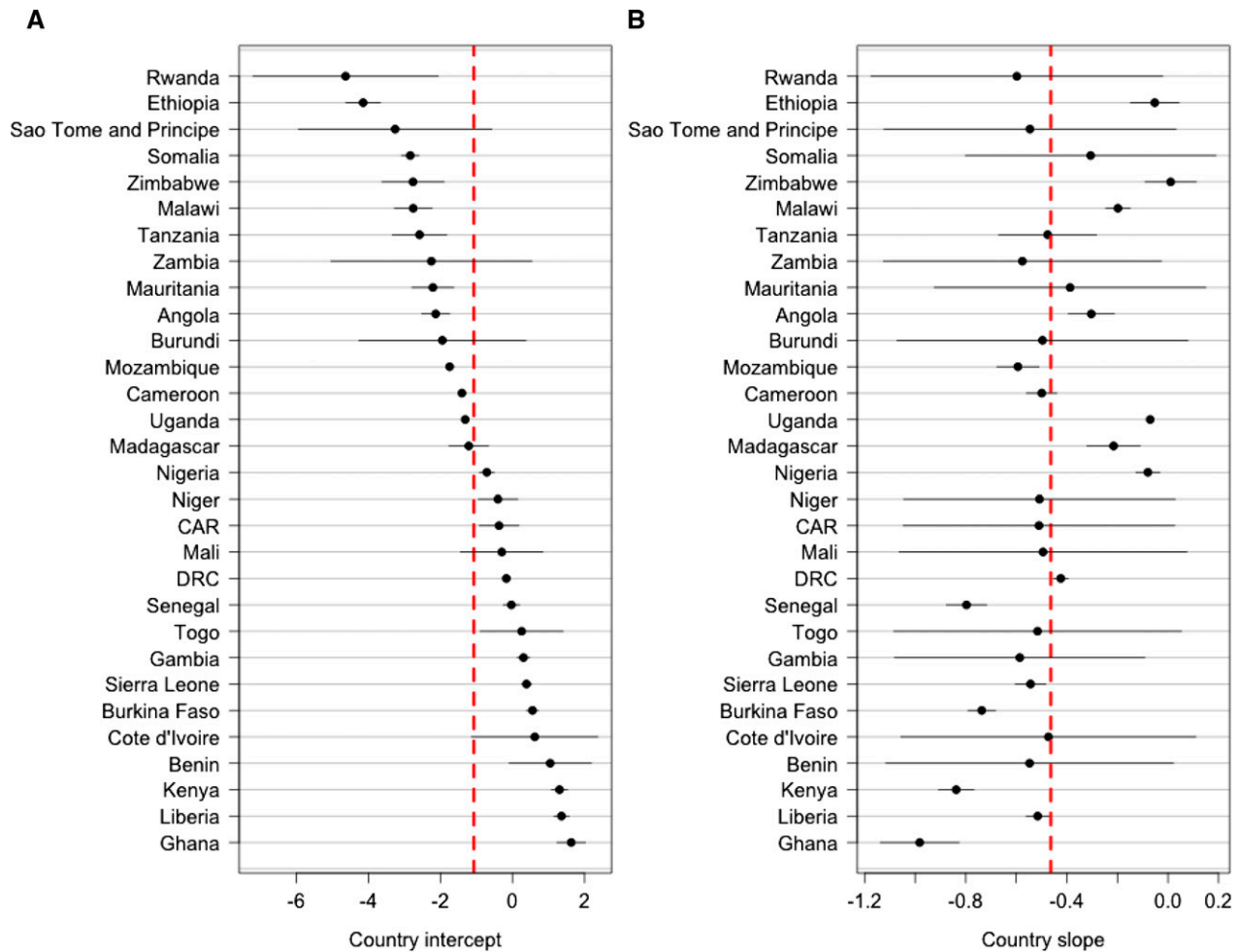
FIGURE S5. (**A**) Country-level intercept for chloroquine (CQ) use post policy change (fixed effect intercept plus random effect intercept). (**B**) Country-level slope (fixed effect slope plus random effect slope). On (**A**) and (**B**), the red dashed line represents the fixed effect intercept and slope, respectively, such that, those to the right of the red line show a positive random effect slope. The black horizontal lines give the 95% confidence intervals for the parameters. Supplemental Table 4 gives the model parameter estimates, standard errors, and *P* values. In (**A**), countries with the lowest reported CQ use at the time of policy change are at the top of the figure and have negative random effects intercepts (to the left of the fixed effect, shown in the red dashed line); those with higher CQ use have higher intercepts (i.e., above the fixed effect). In (**B**), country-level slopes that indicate the temporal trends in CQ use in each country post policy change are shown. The more negative the slope, the faster the rate at which CQ use declined post policy change. Countries are ordered by increasing intercept in the mixed effect output.
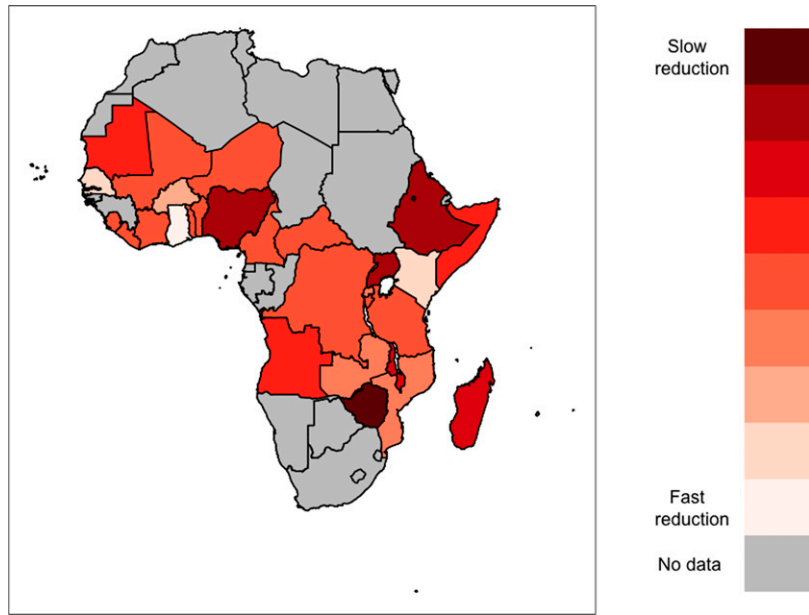
FIGURE S6.   Visualization of the rate of chloroquine (CQ) use reduction per country, after CQ was replaced as a first line policy. The darker shades of red are indicative of a slower reduction of CQ use in a country.
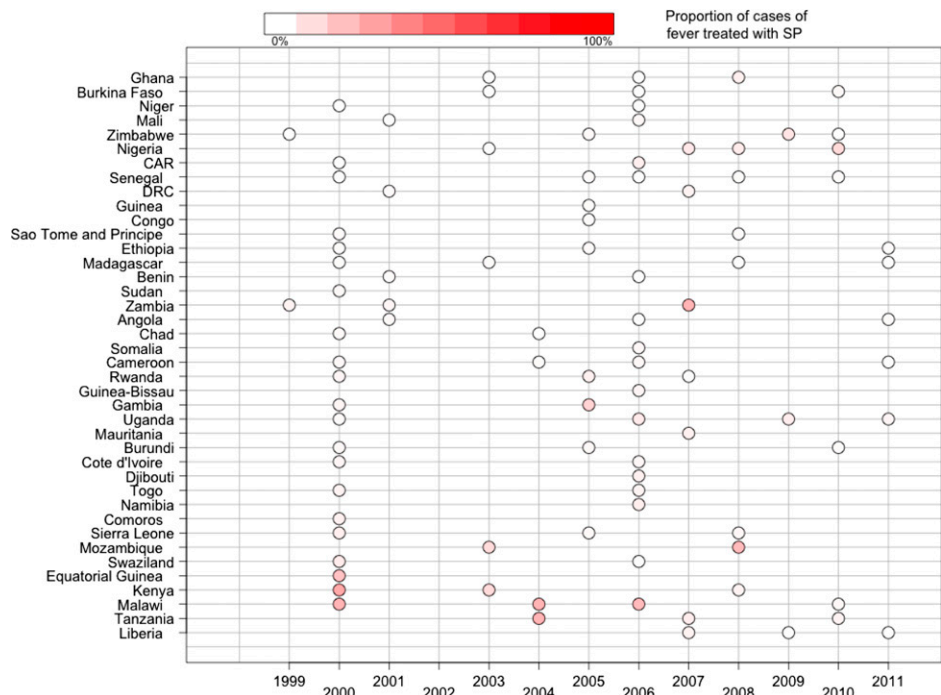

FIGURE S7.   Time plot of the proportion of fever cases that were treated with sulphadoxine-pyrimethamine (SP). Shading is indicative of usage.
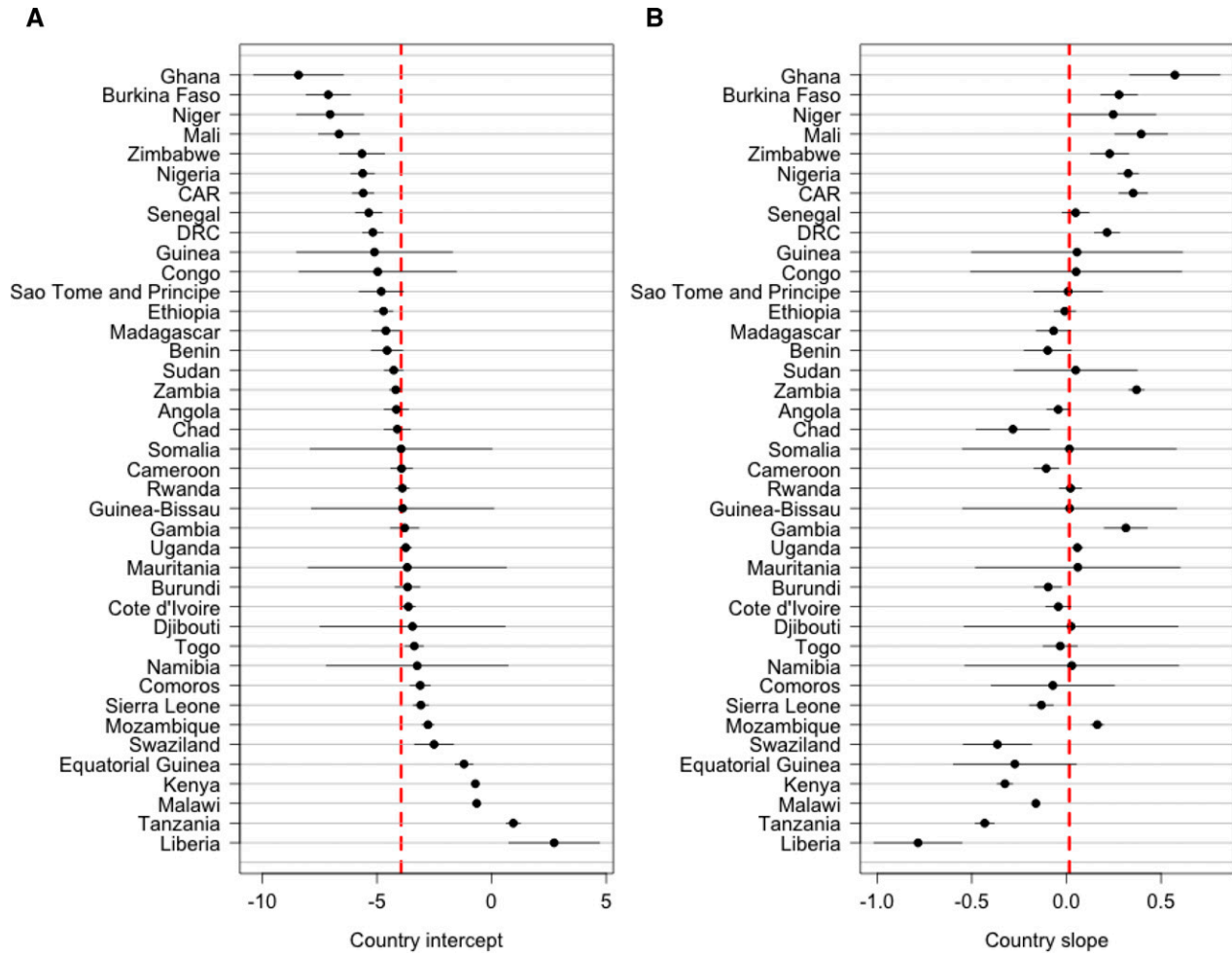
FIGURE S8.   (A) Country-level intercept for sulphadoxine-pyrimethamine (SP) use (fixed effect intercept plus random effect intercept). (B) Country-level slope (fixed effect slope plus random effect slope). On (A) and (B), the red dashed line represents the fixed effect intercept and slope, respectively. The black horizontal lines give the 95% confidence intervals for the parameters. The model parameter estimates, standard errors, and P values are given in Supplemental Table 5. In (B), the more negative the slope, the faster the rate at which SP use declined post 1999.

FIGURE S9.   Time plot of the proportion of fever cases that were treated with artemisinin combination therapy (ACT). Shading is indicative of usage.
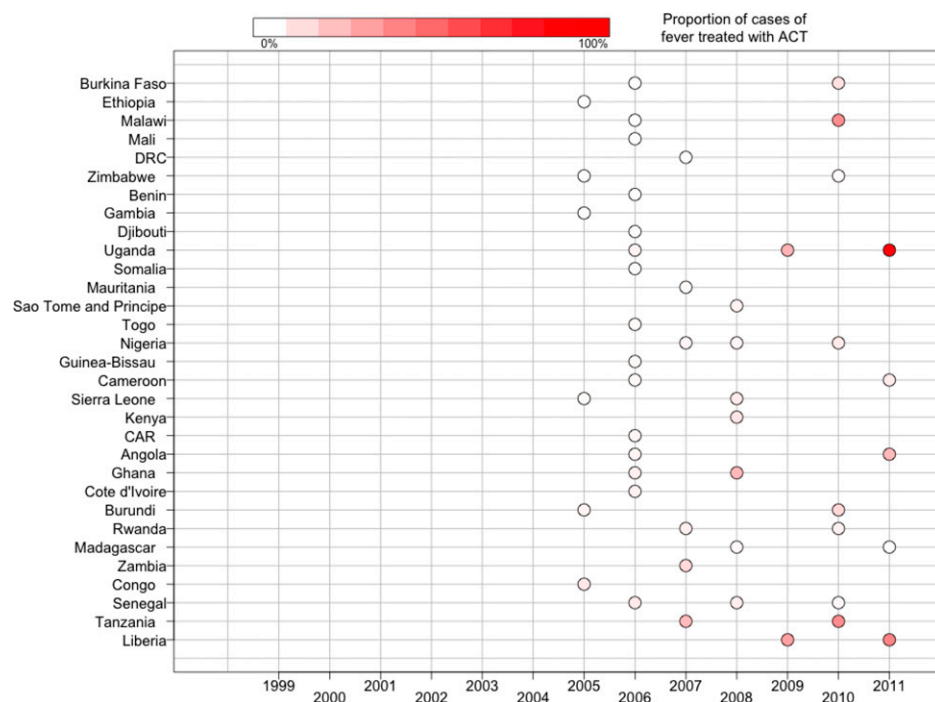
Policy changes for malaria-endemic African countries*

Country	Policy change from CQ	Drug 1: replacing CQ	Policy change from Drug 1	Drug 2: replacing Drug1
Angola	2006	AL, AQ+SP	2006	AL
Benin	2004	AL		
Botswana	1998	SP	2007	AL
Burkina Faso	2005	AL, AS+AQ		
Burundi	2001	SP	2003	AS+AQ
Cameroon	2004	AS+AQ		
Cape Verde	2007	AL		
CAR	2005	AL		
Chad	2005	AS+AQ, AL		
Comoros	2003	AL		
Congo	2006	AS+AQ		
DRC	2001	SP	2005	AS+AQ
Cote d'Ivoire	2003	SP, AQ	2005	AS+AQ
Djibouti	2008	AS+SP		
Equatorial Guinea	2004	AS+AQ		
Eritrea	2002	CQ+SP		
Ethiopia	2004	AL		
Gabon	2003	AS+AQ		
Gambia	2005	CQ+SP	2008	AL
Ghana	2004	AS+AQ		
Guinea	2006	AS+AQ		
Guinea-Bissau	2008	AL		
Kenya	1998	SP	2004	AL
Liberia	2004	AS+AQ		
Madagascar	2004	AS+AQ		
Malawi	1993	SP	2007	AL
Mali	2004	AL		
Mauritania	2006	AS+AQ		
Mozambique	2003	AQ+SP	2004	AL, AS+AQ
Namibia	2004	AL		
Niger	2005	AL		
Nigeria	2004	AL		
Rwanda	2001	AQ+SP	2005	AL
Sao Tome and Principe	2004	AS+AQ		
Senegal	2003	AQ+SP	2005	AS+AQ
Sierra Leone	2004	AS+AQ		
Somalia	2006	AS+SP		
South Africa	1998	SP	2001	AL,AS+SP
Sudan	2006	AS+SP, AS+AQ		
Swaziland	2009	AL		
Tanzania	2001	SP	2004	AL
Togo	2004	AL, AS+AQ		
Uganda	2000	CQ+SP	2004	AL
Zambia	2002	AL		
Zimbabwe	2000	SP, CQ+SP	2004	AL

*AL = artemether lumefantrine; AS = artesunate; AQ = amodiaquine; CQ = chloroquine, and SP = sulphadoxine-pyrimethamine.

SUPPLEMENTAL TABLE 2

Indication of Demographic Health Surveys (DHS) and Multiple Indicator Cluster Survey (MICS) surveys included in the analysis, across countries and years

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Angola			MICS					DHS					DHS
Benin		DHS						DHS					
Burkina Faso					DHS			MICS				DHS	
Burundi		MICS					MICS					DHS	
Cameroon		MICS				DHS	MICS						DHS
CAR		MICS						MICS					
Chad		MICS				DHS							
Comoros		MICS											
Congo							DHS						
DRC			MICS						DHS				
Cote d'Ivoire		MICS						MICS					
Djibouti								MICS					
Equatorial Guinea		MICS											
Ethiopia		DHS					DHS						DHS
Gambia		MICS					MICS						
Ghana					DHS			MICS		DHS			
Guinea							DHS						
Guinea-Bissau								MICS					
Kenya		MICS			DHS					DHS			
Liberia									DHS		DHS		DHS
Madagascar		MICS			DHS					DHS			DHS
Malawi		DHS				DHS	MICS					DHS	
Mali			DHS					DHS					
Mauritania									MICS				
Mozambique					DHS					MICS			
Namibia		DHS						DHS					
Niger		MICS						DHS					
Nigeria					DHS				MICS	DHS		DHS	
Rwanda		MICS					DHS		DHS			DHS	
		DHS											
Sao Tome and Principe		MICS								DHS			
Senegal		MICS					DHS	DHS		DHS		DHS	
Sierra Leone		MICS					MICS			DHS			
Somalia								MICS					
Sudan		MICS											
Swaziland		MICS						DHS					
Tanzania						DHS			DHS			DHS	
Togo		MICS						MICS					
Uganda		DHS						DHS			DHS		DHS
Zambia	MICS		DHS						DHS				
Zimbabwe	DHS						DHS					MICS	DHS

SUPPLEMENTAL TABLE 3

Summary of the mixed model results for chloroquine (CQ) use

Fixed effects	Estimate	Standard error	P value
Intercept	−0.03	0.26	0.89
Year	−0.32	0.05	< 0.001
Random effects	Variance	Standard deviation	
Slope	0.07	0.27	< 0.001

*The significance of the random effects was estimated using a likelihood ratio test, which is known to be conservative (i.e., over-estimates the P value) when testing the null hypothesis that a variance parameter is zero.

SUPPLEMENTAL TABLE 5

Summary of the mixed model results for sulphadoxine-pyrimethamine (SP) use

Fixed effects	Estimate	Standard error	P value
Intercept	−3.95	0.39	< 0.001
Year	0.02	0.05	0.77
Random effects	Variance	Standard deviation	
Slope	0.08	0.29	< 0.001

SUPPLEMENTAL TABLE 4

Summary of the mixed model results for chloroquine (CQ) use, where time is measured as time since policy change away from CQ

Fixed effects	Estimate	Standard error	P value
Intercept	−1.07	0.35	0.002
Time (since policy change)	−0.46	0.07	< 0.001
Random effects	Variance	Standard deviation	
Slope	0.09	0.30	< 0.001