

Table A.6 Summary of antimalarial drug efficacy results expressed as treatment failure

Africa	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
Angola							
Chloroquine	2002	6	41.8	8.2	54.1	14.8	52.1
Sulfadoxine–pyrimethamine	2002–2003	8	5.7	0.0	28.2	2.7	8.8
Amodiaquine	2002–2003	2	8.7	3.9	13.4	3.9	13.4
Artesunate+amodiaquine	2003	1	0.0				
Artesunate+sulfadoxine–pyrimethamine	2003	1	1.2				
Benin							
Chloroquine	1998–2002	14	19.4	3.4	47.6	14.1	23.2
Sulfadoxine–pyrimethamine	2002	5	9.5	1.6	17.2	4.8	16.8
Botswana							
Chloroquine	1997–2000	6	24.4	20.7	44.0	20.7	44.0
Burkina Faso							
Chloroquine	1996–2003	24	12.0	5.3	35.5	10.0	21.7
Sulfadoxine–pyrimethamine	1998–2003	9	0.8	0.0	6.3	0.0	4.3
Amodiaquine	1996	1	4.4				
Burundi							
Chloroquine	2001	4	69.2	52.4	73.7	58.9	73.4
Sulfadoxine–pyrimethamine	2001	4	30.8	10.9	52.8	20.2	42.4
Artemether–lumefantrine	2001	2	0.0	0.0	0.0	0.0	0.0
Artesunate+amodiaquine	2001	2	1.3	0.0	2.6	0.0	2.6
Cameroon							
Chloroquine	1994–2001	12	33.0	2.0	66.6	15.9	58.2
Sulfadoxine–pyrimethamine	1997–2003	8	9.0	0.0	14.1	6.7	11.0
Amodiaquine	1997–2003	9	1.6	0.0	5.3	0.0	3.2
Amodiaquine+sulfadoxine–pyrimethamine	2001–2003	4	0.0	0.0	0.0	0.0	0.0
Central African Republic							
Chloroquine	1997–1998	5	20.8	19.0	57.1	19.3	39.6
Chad							
Chloroquine	1999–2003	3	21.5	14.2	67.4	14.2	67.4
Sulfadoxine–pyrimethamine	2002–2003	2	11.7	4.0	19.4	4.0	19.4
Amodiaquine	2002–2003	2	3.4	1.9	4.9	1.9	4.9
Comoros							
Chloroquine	1997–2001	9	57.1	31.2	75.0	42.4	67.3
Sulfadoxine–pyrimethamine	2004	2	1.5	0.0	3.0	0.0	3.0
Chloroquine+sulfadoxine–pyrimethamine	2003	3	0.0	0.0	2.6	0.0	2.6
Artemether–lumefantrine	2004	3	0.0	0.0	1.8	0.0	1.8
Artesunate+amodiaquine	2003	3	0.0	0.0	0.0	0.0	0.0
Artesunate+sulfadoxine–pyrimethamine	2003	3	0.0	0.0	3.6	0.0	3.6
Congo							
Chloroquine	1999–2001	2	44.0	38.0	50.0	38.0	50.0
Sulfadoxine–pyrimethamine	1999–2002	3	0.0	0.0	9.5	0.0	9.5
Côte d'Ivoire							
Chloroquine	1997–2002	26	16.4	1.8	43.1	11.4	19.3
Sulfadoxine–pyrimethamine	1999	2	14.8	5.9	23.6	5.9	23.6

Table A.6 Summary of antimalarial drug efficacy results expressed as treatment failure

	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
Democratic Republic of the Congo							
Chloroquine	2000–2001	7	48.0	29.4	80.0	34.0	50.0
Sulfadoxine–pyrimethamine	2000–2004	12	9.3	0.0	30.2	4.4	18.3
Amodiaquine+sulfadoxine–pyrimethamine	2002–2004	5	1.7	0.0	6.0	0.7	4.4
Artesunate+amodiaquine	2003–2004	3	0.0	0.0	1.4	0.0	1.4
Artesunate+sulfadoxine–pyrimethamine	2002–2004	6	0.0	0.0	5.6	0.0	3.4
Equatorial Guinea							
Chloroquine	1996–1999	2	48.9	42.1	55.6	42.1	55.6
Sulfadoxine–pyrimethamine	1996–1999	2	5.0	0.0	10.0	0.0	10.0
Eritrea							
Chloroquine	1997–2001	29	42.8	12.6	66.6	28.6	47.3
Sulfadoxine–pyrimethamine	2001–2002	6	3.1	0.0	15.4	0.0	10.3
Chloroquine+sulfadoxine–pyrimethamine	2002–2003	4	6.5	0.0	10.2	1.9	9.7
Artesunate+amodiaquine	2002–2003	3	0.0	0.0	1.4	0.0	1.4
Ethiopia							
Chloroquine	1996–1998	18	70.0	5.0	97.8	55.8	85.2
Sulfadoxine–pyrimethamine	1997–2003	17	10.3	0.0	44.9	2.0	26.1
Amodiaquine	1998	7	18.9	6.2	66.7	6.5	45.8
Artemether–lumefantrine	2003	4	0.0	0.0	0.0	0.0	0.0
Gabon							
Chloroquine	2001	2	57.1	52.2	62.0	52.2	62.0
Sulfadoxine–pyrimethamine	2000	1	4.4				
Amodiaquine	1997–2002	5	12.5	3.2	14.0	7.9	14.0
Artemether–lumefantrine	2001–2002	2	0.8	0.0	1.6	0.0	1.6
Artesunate+amodiaquine	2001–2002	2	0.9	0.0	1.7	0.0	1.7
Gambia							
Chloroquine	1998–2003	4	12.2	2.9	28.2	6.1	21.6
Artesunate+chloroquine	2000	1	3.2				
Ghana							
Chloroquine	1998–2003	9	23.2	9.0	31.3	15.8	29.7
Sulfadoxine–pyrimethamine	1998–2003	3	3.0	0.0	5.2	0.0	5.2
Amodiaquine+sulfadoxine–pyrimethamine	2002	1	1.4				
Artemether–lumefantrine	2003	1	0.0				
Artesunate+amodiaquine	2003	1	0.0				
Artesunate+sulfadoxine–pyrimethamine	2002	1	0.8				
Guinea							
Chloroquine	1996–2001	8	15.6	7.7	28.3	9.9	22.6
Guinea-Bissau							
Chloroquine	2001	3	6.8	5.4	10.9	5.4	10.9
Kenya							
Chloroquine	1996–1999	7	65.8	15.2	84.8	31.7	80.4
Sulfadoxine–pyrimethamine	1996–2003	27	8.4	0.0	51.6	3.4	17.9
Amodiaquine	1996–2003	24	2.4	0.0	23.1	0.0	8.3
Amodiaquine+sulfadoxine–pyrimethamine	2003	2	2.0	1.6	2.4	1.6	2.4
Liberia							
Chloroquine	1999	2	25.9	22.5	29.2	22.5	29.2
Amodiaquine	2001	1	7.4				
Madagascar							
Chloroquine	1996–2004	13	9.5	0.0	25.6	6.9	17.1
Sulfadoxine–pyrimethamine	2003	1	0.0				
Amodiaquine	2004	1	0.0				

ANNEX 2. COUNTRY DATA, BY REGION

	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
Malawi							
Sulfadoxine-pyrimethamine	1998–2002	15	18.6	2.8	40.0	16.6	33.3
Mefloquine	1998	1	10.2				
Mali							
Chloroquine	1996–2003	19	11.0	2.0	24.3	4.2	13.0
Sulfadoxine-pyrimethamine	2001–2003	3	0.6	0.0	2.0	0.0	2.0
Mauritania							
Chloroquine	1998	2	24.0	11.6	36.4	11.6	36.4
Mozambique							
Chloroquine	1998–2001	20	35.9	13.0	53.0	22.1	42.9
Sulfadoxine-pyrimethamine	1998–2002	10	5.4	0.2	17.3	2.7	13.7
Amodiaquine	2001	1	8.4				
Amodiaquine+sulfadoxine-pyrimethamine	2001	1	0.0				
Artesunate+amodiaquine	2001	1	0.0				
Artesunate+sulfadoxine-pyrimethamine	2001	1	0.0				
Namibia							
Chloroquine	1997–2003	9	19.0	4.0	66.7	6.5	35.1
Sulfadoxine-pyrimethamine	1997–2003	5	8.8	0.0	22.8	0.0	18.6
Niger							
Chloroquine	1998–2001	2	19.2	17.4	20.9	17.4	20.9
Nigeria							
Chloroquine	1998–2003	11	25.8	2.0	53.7	13.6	38.7
Sulfadoxine-pyrimethamine	2001–2003	7	9.3	5.7	43.5	7.7	40.5
Amodiaquine	2001–2002	2	1.5	0.0	2.9	0.0	2.9
Rwanda							
Chloroquine	1997–2000	6	52.4	18.5	60.6	33.2	59.2
Sulfadoxine-pyrimethamine	2000	3	35.1	11.6	35.7	11.6	35.7
Amodiaquine	2001–2002	6	0.0	0.0	2.3	0.0	2.0
Chloroquine+sulfadoxine-pyrimethamine	2000	6	13.2	6.1	39.7	8.1	37.7
Amodiaquine+sulfadoxine-pyrimethamine	2001	3	0.0	0.0	0.0	0.0	0.0
Artesunate+amodiaquine	2002	3	0.0	0.0	1.6	0.0	1.6
Artesunate+sulfadoxine-pyrimethamine	2001	3	0.0	0.0	0.0	0.0	0.0
Senegal							
Chloroquine	1996–2002	19	12.9	2.7	30.7	10.1	16.6
Sulfadoxine-pyrimethamine	2001–2002	7	3.3	1.7	10.2	2.0	5.8
Amodiaquine	2001–2002	3	2.8	2.0	5.1	2.0	5.1
Amodiaquine+sulfadoxine-pyrimethamine	2001–2003	4	0.0				
Artemether–lumefantrine	2003	1	0.0				
Artesunate+amodiaquine	2002	2	0.0	0.0	0.0	0.0	0.0
Artesunate+mefloquine	2002	2	0.0	0.0	0.0	0.0	0.0
Sierra Leone							
Chloroquine	1998–2003	7	34.5	26.3	58.5	32.0	51.5
Sulfadoxine-pyrimethamine	2001–2003	5	11.2	7.8	23.4	9.1	17.7
Amodiaquine	2002–2003	5	1.8	0.0	7.6	0.0	5.8
Somalia							
Chloroquine	1997–2003	5	51.0	27.5	78.0	30.4	74.0
Sulfadoxine-pyrimethamine	1997–2003	3	4.0	2.0	5.9	2.0	5.9
South Africa							
Chloroquine	1997	4	53.8	40.0	62.5	44.2	60.8
Sulfadoxine-pyrimethamine	1997–2002	6	7.3	3.6	87.8	3.7	55.7
Artemether–lumefantrine	2002	1	0.0				
Artesunate+sulfadoxine-pyrimethamine	2004	1	5.0				

Table A.6 Summary of antimalarial drug efficacy results expressed as treatment failure

	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
Sudan							
<i>High transmission area</i>							
Chloroquine	2001–2003	5	53.1	16.6	60.7	32.4	59.4
Sulfadoxine–pyrimethamine	2001–2002	3	6.0	0.0	12.0	0.0	12.0
Amodiaquine	2001	2	6.5	6.0	7.0	6.0	7.0
Artesunate+amodiaquine	2003	2	0.4	0.0	0.8	0.0	0.8
Artesunate+sulfadoxine–pyrimethamine	2003	2	1.7	0.8	2.5	0.8	2.5
<i>Moderate/low transmission area</i>							
Chloroquine	1996–2003	24	47.6	0.0	76.9	33.8	57.4
Sulfadoxine–pyrimethamine	1996–2003	7	4.2	0.0	11.7	2.0	8.1
Mefloquine	1999	1	2.5				
Chloroquine+sulfadoxine–pyrimethamine	2003	2	10.2	5.9	14.4	5.9	14.4
Swaziland							
Chloroquine	2000	1	12.5				
Togo							
Chloroquine	1998–2001	6	6.1	0.0	28.8	1.6	23.7
Uganda							
Chloroquine	1996–2001	18	29.3	7.5	81.2	16.4	58.7
Sulfadoxine–pyrimethamine	1996–2002	25	11.4	0.0	25.0	5.0	16.8
Amodiaquine	1999–2002	5	8.8	0.0	14.5	1.6	12.3
Chloroquine+sulfadoxine–pyrimethamine	1996–2003	15	12.0	0.0	37.0	7.0	19.0
Amodiaquine+sulfadoxine–pyrimethamine	1999–2003	12	1.6	0.0	13.0	0.5	3.5
Artesunate+amodiaquine	2002–2003	5	1.0	0.0	4.0	0.5	3.7
Artesunate+sulfadoxine–pyrimethamine	2000	1	0.5				
United Republic of Tanzania							
<i>Mainland</i>							
Chloroquine	1997–1999	8	43.0	27.6	71.0	36.6	53.5
Sulfadoxine–pyrimethamine	1997–2002	15	10.5	1.4	33.8	5.6	16.9
Amodiaquine	1999–2002	12	3.7	0.0	10.8	1.6	6.9
Amodiaquine+sulfadoxine–pyrimethamine	1999	1	3.4				
<i>Zanzibar</i>							
Chloroquine	2001	2	60.5	60.2	60.8	60.2	60.8
Sulfadoxine–pyrimethamine	2001	2	8.9	4.7	13.1	4.7	13.1
Amodiaquine	2001	2	5.6	4.7	6.5	4.7	6.5
Artemether–lumefantrine	2002	2	1.0	0.0	2.0	0.0	2.0
Artesunate+amodiaquine	2002	2	1.9	1.8	1.9	1.8	1.9
Zambia							
Chloroquine	1996–2002	22	31.9	6.6	54.0	24.6	46.3
Sulfadoxine–pyrimethamine	1996–2003	17	7.9	0.0	17.9	3.3	14.2
Artemether–lumefantrine	2003	3	0.0	0.0	0.0	0.0	0.0
Artesunate+sulfadoxine–pyrimethamine	2002–2003	5	0.0	0.0	1.7	0.0	0.9
Zimbabwe							
Chloroquine	1999–2003	28	10.8	0.0	42.3	5.0	19.9
Sulfadoxine–pyrimethamine	1999	2	10.0	0.0	20.0	0.0	20.0
Chloroquine+sulfadoxine–pyrimethamine	2001–2004	25	1.1	0.0	8.6	0.0	3.9
Asia							
Afghanistan							
Chloroquine	1999–2002	4	67.7	60.0	89.5	61.7	80.8
Sulfadoxine–pyrimethamine	2002–2003	3	8.7	4.0	22.7	4.0	22.7
Amodiaquine	2004	1	37.7				
Amodiaquine+sulfadoxine–pyrimethamine	2003–2004	2	2.0	1.0	3.0	1.0	3.0

ANNEX 2. COUNTRY DATA, BY REGION

	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
Bangladesh							
Chloroquine	1996–1999	3	63.6	50.0	77.2	50.0	77.2
Mefloquine	1996	1	27.2				
Chloroquine+sulfadoxine–pyrimethamine	1996–2003	7	30.7	12.9	37.2	24.0	33.0
Artemether–lumefantrine	2002	1	0.8				
Artesunate+mefloquine	2002	1	0.9				
Bhutan							
Chloroquine	1997	4	78.1	64.7	80.7	70.8	80.0
Sulfadoxine–pyrimethamine	1998	1	34.8				
Mefloquine	1999	1	9.7				
Artesunate combinations	2000–2003	8	4.9	1.1	12.0	2.2	8.7
Cambodia							
Artemether–lumefantrine	2001–2004	3	26.9	13.5	30.0	13.5	30.0
Artesunate+mefloquine	2001–2004	12	3.7	0.0	14.3	1.1	8.1
China							
Chloroquine	1997–1999	2	29.6	18.4	40.7	18.4	40.7
India							
Chloroquine	1996–2004	25	34.0	0.0	95.9	23.6	65.4
Sulfadoxine–pyrimethamine	1999–2003	12	17.9	0.0	68.2	3.0	45.4
Mefloquine	1996–2001	3	4.5	0.0	7.8	0.0	7.8
Chloroquine+sulfadoxine–pyrimethamine		1	6.5				
Artesunate+mefloquine	2001	2	6.4	1.9	10.9	1.9	10.9
Indonesia							
Chloroquine	1995–2003	18	69.5	11.1	100.0	49.5	78.3
Sulfadoxine–pyrimethamine	1996–2003	12	17.8	0.0	82.9	12.0	43.0
Chloroquine+sulfadoxine–pyrimethamine	1999–2003	2	22.2	6.2	38.2	6.2	38.2
Artesunate+sulfadoxine–pyrimethamine	1999	1	4.3				
Iran (Islamic Republic of)							
Chloroquine	2000–2002	4	72.5	61.0	75.0	66.4	74.2
Sulfadoxine–pyrimethamine	1999–2001	3	0.0	0.0	5.7	0.0	5.7
Lao People's Democratic Republic							
Chloroquine	1998–2002	5	44.8	31.3	52.8	36.7	49.5
Sulfadoxine–pyrimethamine	2001–2002	3	18.0	17.9	18.7	17.9	18.7
Mefloquine	2001	1	0.0				
Chloroquine+sulfadoxine–pyrimethamine	2001	2	12.3	7.8	16.7	7.8	16.7
Artemether–lumefantrine	2001–2003	2	4.7	3.1	6.3	3.1	6.3
Artesunate+mefloquine	2001–2003	2	0.0	0.0	0.0	0.0	0.0
Malaysia							
Chloroquine	2003	1	45.2				
Sulfadoxine–pyrimethamine	1996	1	29.4				
Mefloquine	1996	1	0.0				
Chloroquine+sulfadoxine–pyrimethamine	1999–2003	4	47.6	31.3	62.5	37.5	57.0
Myanmar							
Chloroquine	1997–2002	18	24.7	6.0	76.0	12.5	34.7
Sulfadoxine–pyrimethamine	1997–2002	18	27.8	0.0	100.0	7.9	37.7
Mefloquine	1997–2002	18	6.0	0.0	44.4	0.0	16.4
Artemether–lumefantrine	2003	3	2.0	0.0	2.0	0.0	2.0
Artesunate+amodiaquine	2003	4	4.0	3.0	7.0	3.5	5.5
Artesunate+sulfadoxine–pyrimethamine	2003	2	0.0	0.0	0.0	0.0	0.0
Artesunate+mefloquine	1996–2003	10	1.5	0.0	8.0	0.0	5.1
Nepal							
Sulfadoxine–pyrimethamine	1997–2003	7	22.0	0.0	88.2	0.0	72.7

Table A.6 Summary of antimalarial drug efficacy results expressed as treatment failure

	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
Pakistan							
Chloroquine	2001–2002	13	28.9	18.2	79.0	25.9	66.6
Sulfadoxine–pyrimethamine	2001–2002	4	13.0	8.7	18.7	9.8	16.9
Amodiaquine	2002	1	83.3				
Artesunate+amodiaquine	2002	1	18.0				
Artesunate+chloroquine	2002	1	28.8				
Artesunate+sulfadoxine–pyrimethamine	2002	1	0.0				
Papua New Guinea							
Chloroquine+sulfadoxine–pyrimethamine	1998–2003	4	0.0	0.0	27.0	0.0	13.5
Amodiaquine+sulfadoxine–pyrimethamine	1998	1	0.0				
Philippines							
Chloroquine	1996–2000	9	42.1	16.4	76.2	32.1	52.0
Sulfadoxine–pyrimethamine	1999–2001	7	42.6	8.5	66.7	12.5	60.6
Chloroquine+sulfadoxine–pyrimethamine	2001–2002	3	18.4	11.1	29.6	11.1	29.6
Saudi Arabia							
Chloroquine	1997–1998	2	15.4	12.4	18.4	12.4	18.4
Solomon Islands							
Chloroquine	1997–2001	5	27.8	10.7	66.7	12.2	49.8
Sri Lanka							
Chloroquine	2002–2003	2	31.8	10.0	53.5	10.0	53.5
Artesunate+sulfadoxine–pyrimethamine	1999	1	0.0				
Tajikistan							
Chloroquine	2002	1	56.0				
Sulfadoxine–pyrimethamine	2002	1	16.0				
Chloroquine+sulfadoxine–pyrimethamine	2003	1	2.1				
Thailand							
Mefloquine	1995–2003	19	13.8	2.0	68.4	7.5	28.0
Artemether–lumefantrine	1996–2002	6	2.6	0.0	3.9	0.5	3.5
Artesunate+mefloquine	1995–2003	34	3.6	0.0	21.4	1.2	8.1
Timor-Leste							
Chloroquine	2000	1	66.7				
Sulfadoxine–pyrimethamine	2001	1	10.0				
Vanuatu							
Chloroquine+sulfadoxine–pyrimethamine	2001	1	16.0				
Viet Nam							
Chloroquine	1997–2001	4	52.3	6.2	71.9	27.0	64.3
Sulfadoxine–pyrimethamine	1997–2002	4	16.6	12.2	70.6	13.0	41.9
Mefloquine	1998–1999	4	11.7	0.0	42.3	0.0	32.8
Artemether–lumefantrine	2001	1	2.2				
Artesunate+chloroquine		2	37.4	28.0	46.8	28.0	46.8
Artesunate+sulfadoxine–pyrimethamine		2	33.2	8.3	58.1	8.3	58.1
Artesunate+mefloquine	1998–2000	2	5.6	0.0	11.1	0.0	11.1
Yemen							
Chloroquine	1998–2003	9	42.4	9.0	57.0	23.3	44.9
Sulfadoxine–pyrimethamine	2003	1	0.0				

The Americas	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
Bolivia							
Sulfadoxine–pyrimethamine	2002	1	18.7				
Mefloquine	2001	2	0.0	0.0	0.0	0.0	0.0
Artesunate+mefloquine	2001	3	0.0	0.0	0.0	0.0	0.0
Brazil							
Mefloquine	1996–2002	6	5.2	0.0	9.7	0.5	7.9
Colombia							
Chloroquine	1997–1998	5	66.6	44.5	96.6	47.3	83.7
Sulfadoxine–pyrimethamine	1997–2002	12	10.8	0.0	26.5	1.9	15.8
Amodiaquine	1997–2002	7	11.5	0.0	50.0	3.2	27.3
Mefloquine	2002–2003	3	2.2	0.0	6.4	0.0	6.4
Chloroquine+sulfadoxine–pyrimethamine	2002	2	17.4	12.1	22.6	12.1	22.6
Amodiaquine+sulfadoxine–pyrimethamine	2001–2003	4	2.3	0.0	10.8	1.1	6.6
Ecuador							
Chloroquine	1998–2003	4	85.4	83.3	94.4	84.2	90.1
Sulfadoxine–pyrimethamine	2001–2003	3	4.0	0.0	17.1	0.0	17.1
Chloroquine+sulfadoxine–pyrimethamine	2003	1	0.0				
Artesunate+sulfadoxine–pyrimethamine	2003	2	0.0	0.0	0.0	0.0	0.0
French Guiana							
Mefloquine	1996	1	3.4				
Guyana							
Chloroquine	1998	1	55.6				
Mefloquine	2003	1	28.1				
Artesunate+mefloquine	2003	1	7.5				
Peru							
Chloroquine	1998–2002	6	86.4	75.6	90.0	78.3	89.8
Sulfadoxine–pyrimethamine	1998–2002	9	11.8	0.0	80.0	1.7	65.2
Mefloquine	1999–2000	4	0.0	0.0	0.0	0.0	0.0
Artesunate+sulfadoxine–pyrimethamine	2000	1	1.1				
Artesunate+mefloquine	2000	1	0.0				
Suriname							
Mefloquine	2002	1	7.3				
Artemether–lumefantrine	2003	2	2.0	1.9	2.0	1.9	2.0
Artesunate+mefloquine	2002–2003	2	4.1	2.4	5.8	2.4	5.8
Venezuela							
Chloroquine	1997–2002	5	48.6	0.0	100.0	13.1	88.6
Sulfadoxine–pyrimethamine	1997–1999	3	20.0	0.0	23.0	0.0	23.0

Notes:

Median, range and quartiles are based on percentage clinical failure with at least 14-day follow up for countries in Africa south of the Sahara. For all other areas, including South Africa and moderate/low transmission areas of Sudan, percentage total failure is used.