



Household Survey Report (Baseline)

Republic of Zambia

04/09 – 07/09



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Acknowledgements

This *ACTwatch* household survey was made possible through support provided by the Bill and Melinda Gates Foundation. This study was implemented by Society for Family Health (SFH), coordinated by Felton Mpasela, Country Program Coordinator, *ACTwatch*/Zambia, in collaboration with Dr. Elizabeth Chizema-Kawesha, Director, National Malaria Control Centre and Dr. Mulakwa Kamuliwo, Case Management Specialist, National Malaria Control Centre, Ministry of Health, Zambia. Survey implementation was conducted by SFH/Zambia: Nicholas Shiliya, Cynthia Changufu, and Edward Ngoma.

Project support was provided by PSI from the following individuals: Dr. Kathryn O’Connell, Principal Investigator, *ACTwatch*; Dr. Steven Chapman, Chief Technical Officer; Dr. Desmond Chavasse, Project Director, *ACTwatch*, Vice President, Malaria Control and Child Survival; Illah Evance, Erik Munroe and Tsione Solomon, *ACTwatch* Research Associates; Dr. Abdinasir Amin, Malaria Principal Investigator; Dr. Megan Littrell, Malaria Deputy Principal Investigator; Dr. Kim Longfield, Director, Research and Metrics.; Navendu Shekhar, Regional Researcher, Southern Africa; and Megan Kays, Associate Researcher. Additional support was provided by Dr. Timothy Abuya, KEMRI/Wellcome Trust Research Programme.

A technical review of the household survey study design was provided by the following *ACTwatch* partners, *ACTwatch* Advisory Committee members and other stakeholders:

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Suggested Citation: *ACTwatch* Group and Society for Family Health (SFH)/Zambia. (2009). Zambia Household Survey Report, 2009. Population Services International: DC. Available from: <http://www.actwatch.info>

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Definitions

Antimalarial combination therapy – The simultaneous use of two or more drugs of different classes to treat malaria.

Artemisinin and its derivatives – Artemisinin is a plant extract used in the treatment of malaria. The most common derivatives of artemisinin used to treat malaria are artemether, artesunate, and dihydroartemisinin.

Artemisinin-based Combination Therapy (ACT) – A combination of artemisinin or one of its derivatives with a partner drug. The partner drug is an antimalarial(s) of a different class.

First-line treatment – The government recommended treatment for uncomplicated malaria. Uganda’s first-line treatment is artemether-lumefantrine, 20mg/120mg.

Monotherapy – Antimalarial treatment with a single medicine: either a single active compound or a synergistic combination of two compounds with related mechanisms of action, such as sulfadoxine-pyrimethamine.

Nationally registered ACTs – ACTs registered with a country’s national drug regulatory authority and permitted for sale or distribution in-country. Each country determines its own criteria for placing a drug on its nationally registered listing.

WHO approved ACTs – ACTs that appear on the WHO list of antimalarials approved for procurement.

Legend for tables –

Symbol	
--	No data available
SP	Sulfadoxine-Pyrimethamine
CQ	Chloroquine
AL	Artemether-Lumefantrine
AM	Antimalarials
CHW	Community Health Worker
\$	US Dollars
AOR	Adjusted odds ratio
OR	Odds ratio
CI	Confidence interval
(R)	Negatively phrased statement that are reversed coded

Executive Summary

Background:

The household survey is one of four *ACTwatch* research components. The objective of the household survey component is to monitor consumer treatment-seeking behaviour including choice of antimalarial, and price paid for treatment. Data from the household survey are also used to identify determinants of appropriate treatment behaviour.

This report presents indicators on knowledge, beliefs, experiences and behaviour with respect to seeking treatment for fever in children under five. A set of core indicators related to prompt and effective treatment and cost of antimalarials for treatment of children is presented first. A second expanded section contains indicators on treatment-seeking behaviour; caregiver knowledge, practices and beliefs; and information on acquired antimalarials including source and relative volumes. Indicators are presented at the child, caregiver and treatment (antimalarial drug) levels. Core indicators are presented across household wealth quintiles, urban/rural residence, caregiver knowledge and child age.

Household inclusion criteria for this study included presence of a household member under five years of age that experienced fever in the past 2 weeks. However, data were collected on treatment-seeking behaviour and experiences for all fevers that occurred among household members of all ages in the past 2 weeks. As such, data are presented for children under five in the main body of the report, and for people age five and above in Appendix A. Results for people age five and above should be interpreted with caution given the sampling design.

Methods:

This study used data from a cross-sectional household survey of children's caregivers. A nationally-representative sample of households in malaria-endemic areas of Zambia was drawn with urban/rural equal allocation stratification and three-stage cluster sampling, probability proportional to size (PPS). Thirty-eight sub-districts/wards were selected PPS from a list of 1288 sub-districts/wards in endemic areas. At second stage, 190 enumeration areas (EA) were sampled PPS from a total of 425 and a random sample of households within each EA was drawn. All households included in the study had at least one child under the age of five with fever in the past two weeks. Among eligible households, children's caregivers completed two questionnaire modules: 1) Treatment Seeking and Case Management regarding fever episodes among children under 5; and 2) Caregiver Knowledge, Beliefs and Attitudes. In eligible households containing a member aged five and above that had fever within the past two weeks, the Treatment Seeking and Case Management module was completed by the relevant household member or his/her caregiver on this episode of fever. Household heads provided information on the household including asset ownership and dwelling characteristics.

Several validation and data checking steps occurred during and after data collection. Double data entry was conducted using Microsoft Access (Microsoft Cooperation, Seattle, WA, USA). Stata 10.1 (Stata Corp, College Station, TX) was used for all analyses. To obtain the national estimates provided in this report, data were weighted to account for equal allocation stratified sampling from urban and rural domains. Standard error estimation in logistic regression analysis accounted for clustering at the commune and EA levels.

For more information on the study design log on to www.ACTwatch.info.

Results:

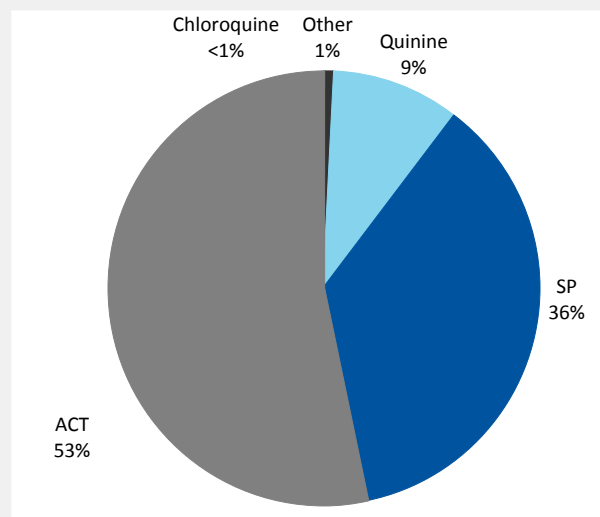
Data were collected between 14th April and 4th July 2009. A total of 2,244 households were screened and 1,703 households met inclusion criteria and agreed to participate in the study. Among these households, 1,727 caregivers were interviewed regarding 1,885 children with fever in the past two weeks preceding the survey. Additionally, caregivers and other household members were interviewed on episodes of fever among 255 people age five and above.

ANTIMALARIALS ACQUIRED FOR CHILDREN UNDER FIVE WITH FEVER: Antimalarials in the household survey are categorized as follows: sulfadoxine-pyrimethamine (SP), chloroquine, quinine, ACT, national first line [AL], and other antimalarial. ACTs are the most commonly accessed drug for treatment of fever in children under five; 53% of the n=722 antimalarials acquired for children under five were ACT treatments. 36% of the antimalarials were SP treatments, and 9% were quinine.

Caregivers in this study rarely accessed “other antimalarials,” including artemisinin monotherapies; only 0.64% of antimalarials acquired for children with fever (n=7 antimalarials) were categorized as “Other” (see Figure 1).

The most commonly accessed ACT was AL sold under the brand name Coartem®; 90% of the n=380 ACTs acquired for children under five were Coartem®. Most ACTs acquired for children under five were on the list of WHO-approved ACTs and/or were on Zambia’s list of nationally-registered antimalarial treatments (98%).

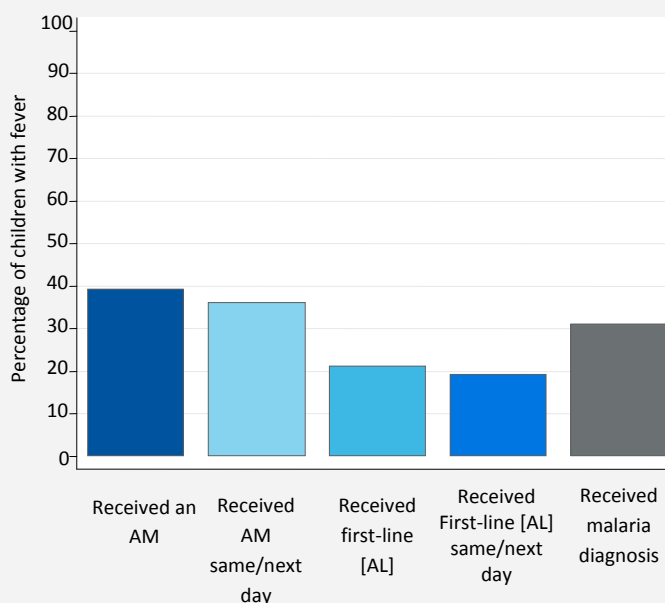
Figure 1. AMs Acquired for Children under Five with Fever



TREATMENT AND DIAGNOSIS OF CHILDREN UNDER FIVE WITH FEVER:

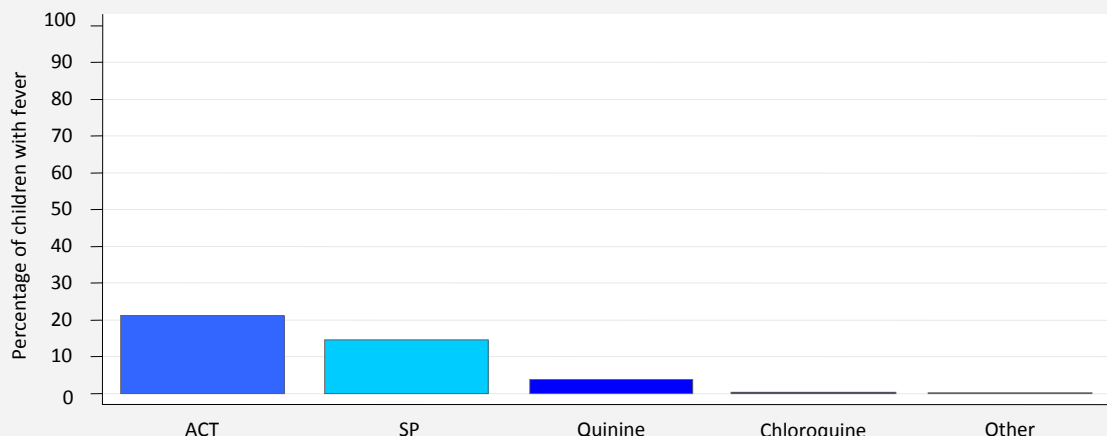
Nearly (40%) of the n=1,885 children under five with fever were treated with an antimalarial. When administered, treatment was typically prompt; 36% of children with fever were treated with an antimalarial the same or next day after onset of fever. 21% of children with fever were treated with the first-line antimalarial [AL], and 19% were treated with the national first-line antimalarial the same or next day. 31% of children under five with fever received a malaria diagnosis.

Figure 2. Percentage of Children under Five with Fever that Received AM Treatment, First-Line Treatment, and Diagnosis



ANTIMALARIAL TREATMENT FOR CHILDREN UNDER FIVE WITH FEVER, BY ANTIMALARIAL TYPE: One in five of the n=1,885 children with fever were treated with ACTs. 15% of the children with fever were treated with SP; 4% with quinine; and less than 1% were treated with chloroquine.

Figure 3. Percentage of Children under Five with Fever that Received an AM, by Type



SOURCE OF ANTIMALARIAL AND ACT TREATMENT: Sources of ACT acquired for children (n=357 children treated with ACT) were similar to sources of all antimalarials acquired for children (n=655 children treated with an antimalarial). Public health facilities were the common source of both ACTs (92%) as well as antimalarial treatment (85%).

Figure 4. Source of AM Treatment, among Treated Children

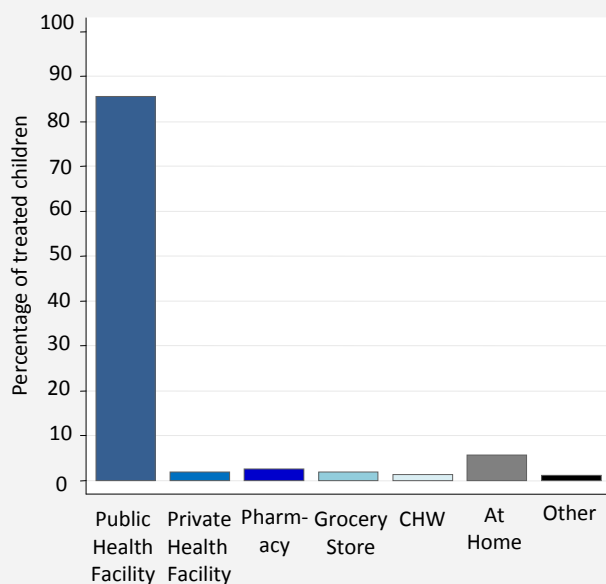
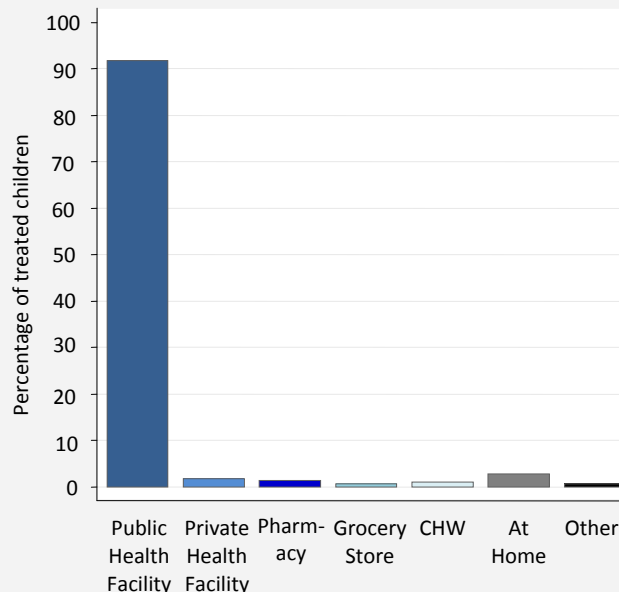
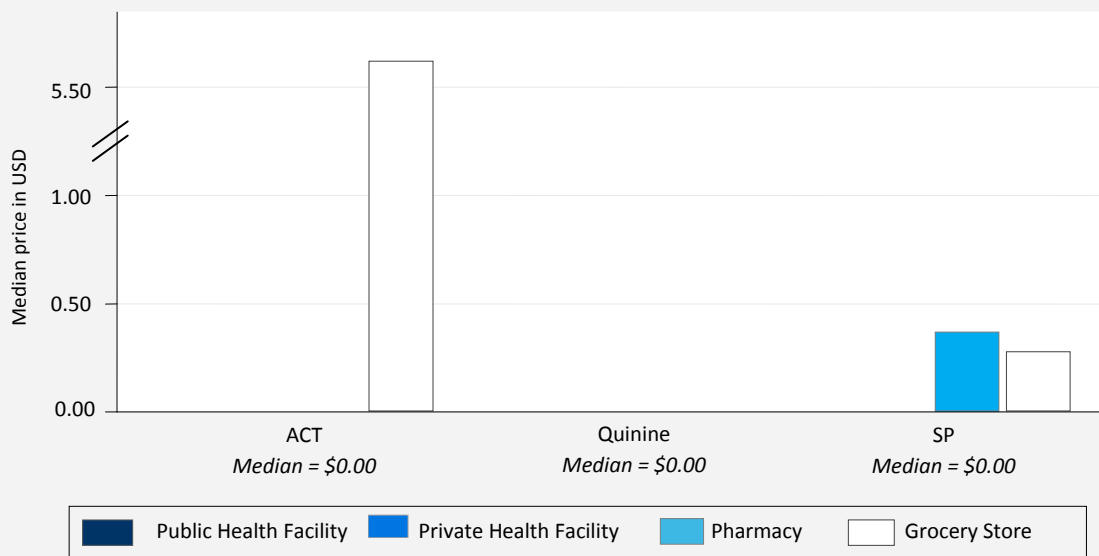


Figure 5. Source of ACT treatment, among children that received an ACT



COST OF ANTIMALARIAL TREATMENT FOR CHILDREN UNDER FIVE Most antimalarial treatments acquired for children under five were accessed in public health facilities, where treatment was typically free. The median price of ACTs, SP and quinine was \$0.00.

Figure 6. Price in USD of AM Treatments Acquired for Children under Five, by Most Common Treatment Type and Most Common Outlet Type



TREATMENT-SEEKING BEHAVIOUR FOR FEVER IN CHILDREN UNDER FIVE: Caregivers of 92% of children with fever sought treatment for the child's fever. Caregivers of most children sought treatment at a public health facility (49%); however 24% of children were initially treated at home. Caregivers were asked about reasons for choosing this initial source of treatment. Among children whose caregivers sought treatment (n=1,722), most caregivers selected the initial treatment source because it was close to home (51%). Other reasons for first source of treatment included availability of modern medicines (14%); no need for intensive care (10%); availability of inexpensive treatment (10%) and reputation for quality treatment (8%).

Figure 7. First Source of Treatment for Children with Fever

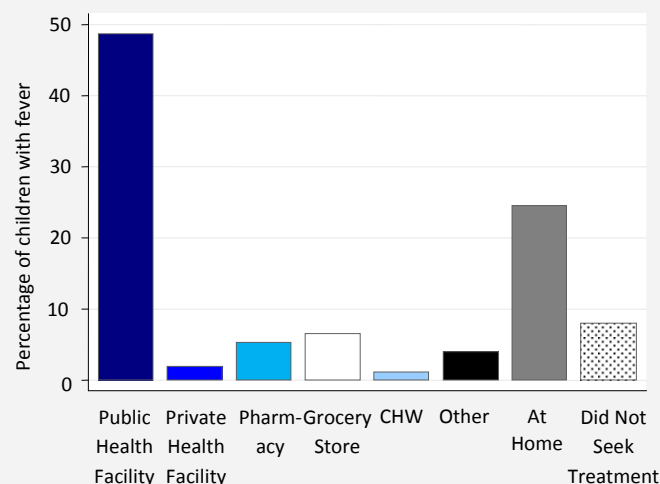
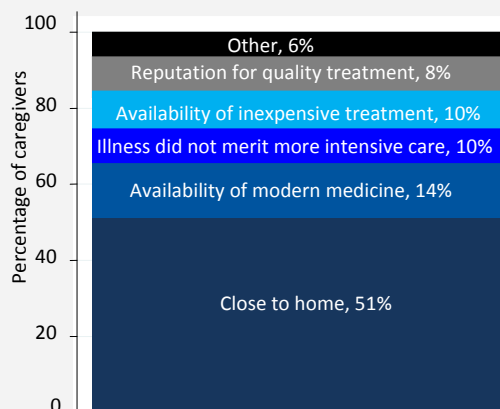
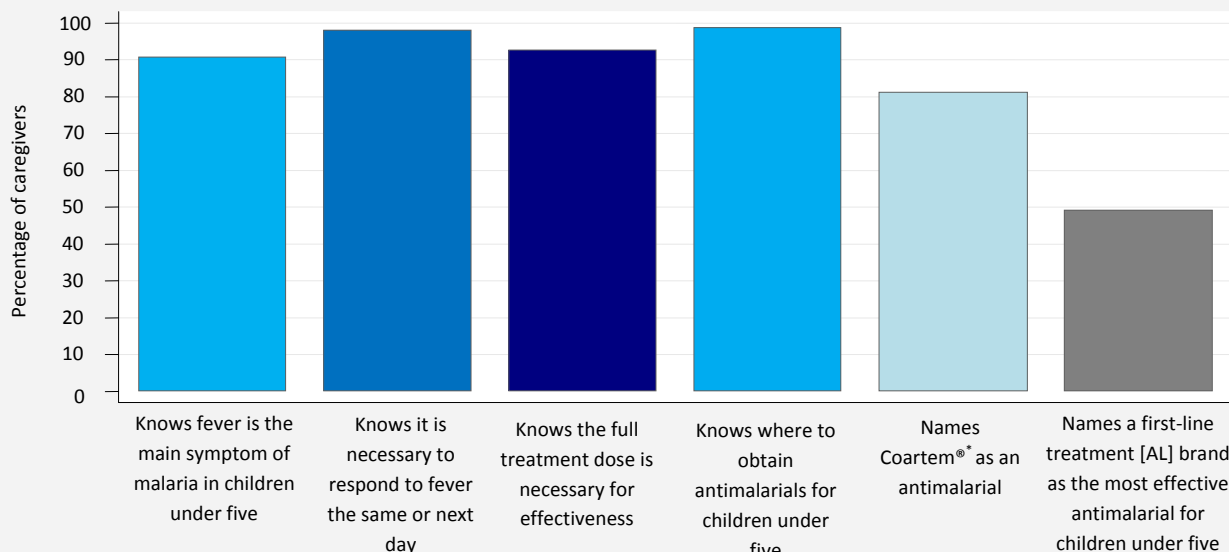


Figure 8. Reason for First Treatment Source among Caregivers who Sought Treatment



CAREGIVER KNOWLEDGE, PRACTICES AND BELIEFS: General knowledge of malaria and treatment of fever was high among caregivers of children under five. A high percentage of caregivers know that fever is the main symptom of malaria in children under five (91%); that fever in children requires prompt response (98%); and that the full treatment dose is required for drug efficacy (93%). A significant number of caregivers reported knowing where to obtain antimalarials for children under five (99%), 81% of caregivers had heard of the most common brand of first-line treatment, Coartem®. Additionally, when asked to name the most effective antimalarial for children under five, 49% cited a brand of the national first-line AL treatment.

Figure 9. Caregiver Knowledge, Practices and Beliefs



*Coartem® is the most common brand of first-line [AL] treatment in Zambia

DETERMINANTS OF TREATMENT OF FEVER IN CHILDREN UNDER FIVE:

Treatment of fever with an antimalarial the same or next day after onset of fever: A full model examining prompt treatment of fever included the following determinants: household residence and wealth, caregiver education and age, child age, and psychometric scales measuring opportunity, ability and motivation to treat fever with an antimalarial. Determinants with significant adjusted associations with prompt antimalarial treatment include: perceived quality of care in health facilities (AOR=1.22, 95% CI=1.07-1.40), perceived affordability of antimalarial treatment (AOR=1.29, 95% CI=1.09-1.51), perceived belief and attitude (AOR=1.51, 95% CI=1.26-1.81), perceived threat of malaria to the community (AOR=1.52, 95% CI=1.11-2.06), perceived locus of control (AOR=1.40, 95% CI=1.16-1.70). Household wealth had no significant adjusted association with prompt treatment of fever with an antimalarial.

Country Background

Zambia is located in Southern Africa sharing borders with Angola, Democratic Republic of Congo, Malawi, Mozambique, Namibia, Tanzania, and Zimbabwe. The population is approximately 11.8 million of which an estimated 65% live in rural areas. The per capita gross domestic product is \$1,500 and over 80% of the population lives below the poverty line.¹ One in six children dies in Zambia before reaching their fifth birthday, with malaria acting as a key driver of child mortality.² In 2007, the country had approximately 4.3 million clinically diagnosed cases of malaria reported via the health management information system (HMIS), accounting for 36% of outpatient visits, 48% of disease burden among children under five, and up to 20% maternal mortality.³

Epidemiology and Malaria Control Strategies

Malaria transmission is seasonal in Zambia occurring mainly from November to May.⁴ Despite widespread endemicity, certain areas of the country can be characterized as hyperendemic, mesoendemic, or epidemic prone. The predominant parasite is *P. falciparum* which accounts for about 95% of all infections.⁵ The National Malaria Control Strategy identifies pregnant women and children under five as the population groups most at risk. Key malaria prevention and treatment interventions include distribution of long-lasting insecticide treated nets (LLINs) through campaigns, antenatal clinics (ANCs), the commercial sector, and vulnerable populations such as people living with HIV/AIDS and the poorest of the poor; indoor residual spraying (IRS) in urban and peri-urban areas; intermittent preventive treatment for pregnant women (IPTp) through ANCs; and administration of ACTs through health facilities with increasing focus on confirmed diagnosis using microscopy or rapid diagnostics tests (RDTs).⁶

National Treatment Policy

Zambia was the first African country, in 2002, to adopt artemisinin-based combination therapy (ACT) as the first line treatment for uncomplicated malaria⁷, selecting artemether lumefantrine (AL). SP is the alternative first line treatment in pregnant women and children less than 5 kg; and oral quinine is the second line treatment in cases of failure of first line drugs in all age groups. Severe malaria is treated with quinine. In Zambia, ACTs are classified as prescription-only medications and are therefore not sold legally through unregistered private sector providers; their availability has therefore remained largely limited to the public sector, registered pharmacies and private clinics.⁸

The National Malaria Control Centre (NMCC) recommends parasitological diagnosis for all patients with suspected malaria at hospitals and health centres with laboratory facilities. Clinical diagnosis is recommended where laboratory facilities are not available. Children under five years of age are treated based on laboratory diagnosis in health facilities where available, otherwise are evaluated and treated according to the algorithm of the Integrated Management of Childhood Illness (IMCI).

Antimalarial Treatment Distribution and Delivery

The main provider of health care services in Zambia is the public health care system which is a tiered system comprising more than 1000 health facilities⁹ (hospitals, health centres and health posts). Other health service providers include privately owned hospitals and clinics; mission hospitals and clinics, which are coordinated by the Churches Health Association of Zambia (CHAZ); and health facilities run by Non-Governmental Organizations (NGOs).¹⁰

As part of Zambia's Global Fund to Fight AIDS, Tuberculosis and Malaria implementation (GFATM), ACT treatment has been procured and is made available in the public sector free of charge. AL has been distributed to health facilities

¹ CIA (2009). CIA World Factbook: Zambia. <https://www.cia.gov/library/publications/the-world-factbook/geos/za.html>.

² UNICEF (2009). State of the World's Children.

³ Zambia MOH, National Malaria Control Centre. (2005). "A 5 year strategic plan: A road map for impact in malaria in Zambia 2006-2010".

⁴ WHO (2008). World Malaria Report 2008. WHO/HTM/GMP/2008.1.

⁵ Zambia MOH (2002). Press release on the malaria treatment policy change in Zambia.

⁶ PMI (April 2009). Country Profile: Zambia. http://www.fightingmalaria.gov/countries/profiles/zambia_profile.pdf.

⁷ Sipilanyambe, N. et al. (2008). "From chloroquine to artemether-lumefantrine: the process of drug policy change in Zambia". Malar Journal, 7:25.

⁸ Zambia MOH, National Malaria Control Centre. (2005). "A 5 year strategic plan : A road map for impact in malaria in Zambia 2006-2010".

⁹ Central Board of Health, Government of Zambia (2002). Health Institutions in Zambia: A Listing of Health Facilities According to Levels and Locations.

¹⁰ Ministry of Health, Government of Zambia (2005). National Health Strategic Plan 2006-2010.

since the end of 2004. In order to ensure rational use of these drugs, the GFATM also supported procurement and distribution of RDTs, microscopes and training of health workers. Round 1 provided enough ACTs to cover 28 out of the 72 districts in Zambia, and Round 4 included support for the 28 districts and scale up to the remainder of the districts using existing delivery mechanisms that include IMCI, community health workers (CHW) and pharmacies. As of November 2008, 11 districts have started community based treatment of malaria with ACTs.

ACT delivery in Zambia is also supported by financing from other donors. The World Bank Malaria Booster project provides health system strengthening to improve service delivery, small grants for community-level malaria control, and funding to the MOH/NMCC. In 2009, the United States President's Malaria Initiative (PMI) began to procure AL for children under five and strengthen Zambia's logistics and commodity delivery systems. UNITAID supplies 1.1 million ACT doses for community distribution. Department for International Development (DfID) has provided funds to redesign Zambia's peripheral supply chain distribution system in collaboration with JSI/DELIVER and the World Bank.

Malaria Financing

Malaria prevention and treatment in Zambia is largely supported by international and bi-lateral donors. As noted above, the key malaria partners include the GFATM, World Bank, PMI, UNITAID, and DfID. The NMCC received \$39.2 million during the GFATM Round 1, \$42.7 million during GFATM Round 4, and \$17.7 million during GFATM Round 7 for a range of malaria prevention and treatment interventions. The World Bank provided \$20 million through its 2005-2010 Malaria Health Booster program for health systems strengthening and small community grants. PMI awarded \$9.5 million in fiscal year 2007, \$14.8 million in 2008, and \$14.7 million in 2009 to support LLINs, ACTs, IRS, IPTp, and monitoring and evaluation. UNITAID contributed 1.1 million ACT doses.

Results:

Core Indicators

Table 1. Prompt treatment of fever among children under five

Percentage of children under five with fever in the two weeks preceding the survey who took an antimalarial drug, took an antimalarial drug the same/next day, and received a diagnosis, by background characteristics.

	Percentage who took an AM drug	Percentage who took an AM drug the same/next day	Percentage who received a diagnosis	# of children with fever
Age (in years)	%	%	%	n
<1	28.63	26.41	28.62	430
1	41.84	38.61	32.41	399
2	43.01	39.73	32.57	403
3	38.26	34.19	28.98	305
4	45.22	42.03	33.11	348
Residence				
Urban	32.18	29.81	27.34	926
Rural	42.86	39.31	33.16	959
Caregiver's education				
No education	41.55	37.81	31.76	215
Some primary	38.31	35.19	30.16	627
Primary plus	39.19	36.16	31.72	1040
Wealth index				
Poorest	41.76	38.13	31.46	383
Second	42.40	38.64	34.08	386
Middle	41.56	38.16	30.14	377
Fourth	29.84	27.63	25.96	384
Richest	36.26	34.40	32.70	355
All children	39.22	36.07	31.17	1,885*

* Caregiver's education n =1882; diagnosis n = 1865

Table 2. Type and timing of AM drugs among children under five

Percentage of children under five with fever in the two weeks preceding the survey who took antimalarial treatment, and percentage who took antimalarial treatment on the same day or the next day after developing fever, by background characteristics.

	Percentage who took:						Percentage who took the drug on the same or the next day:						# of children with fever
	SP	CQ	Quinine	First Line [AL]	ACT	Other AM	SP	CQ	Quinine	First Line [AL]	ACT	Other AM	
Age (in years)	%	%	%	%	%	%	%	%	%	%	%	%	n
<1	9.12	0.00	2.68	16.33	16.49	0.33	8.48	0.00	2.06	15.37	15.54	0.33	430
1	13.77	0.00	1.92	26.42	26.59	0.51	13.13	0.00	1.92	23.51	23.68	0.51	399
2	16.22	0.32	4.42	22.04	22.04	0.34	15.73	0.32	3.78	19.72	19.72	0.34	403
3	16.06	0.00	4.23	18.39	18.39	0.00	13.71	0.00	3.81	16.68	16.68	0.00	305
4	18.73	0.00	6.13	22.20	22.40	0.00	16.87	0.00	4.83	21.08	21.27	0.00	348
Residence													
Urban	13.71	0.00	1.84	15.87	16.20	0.76	12.85	0.00	1.73	14.36	14.69	0.76	926
Rural	15.02	0.10	4.80	23.88	23.88	0.00	13.76	0.10	3.96	21.90	21.90	0.00	959
Caregiver's education													
No education	11.52	0.00	5.84	24.71	24.71	0.00	11.52	0.00	4.79	22.04	22.04	0.00	215
Some primary	14.79	0.19	3.84	20.24	20.24	0.00	13.18	0.19	3.37	18.82	18.82	0.00	627
Primary plus	15.25	0.00	3.22	20.74	20.97	0.52	14.20	0.00	2.67	18.84	19.06	0.52	1040
Wealth index													
Poorest	12.82	0.27	4.01	25.72	25.72	0.00	11.34	0.27	3.34	23.72	23.72	0.00	383
Second	14.68	0.00	5.38	22.88	22.88	0.00	13.33	0.00	4.30	21.00	21.00	0.00	386
Middle	15.69	0.00	4.99	21.82	21.82	0.00	14.53	0.00	4.25	19.74	19.74	0.00	377
Fourth	15.15	0.00	0.69	14.00	14.00	0.00	14.72	0.00	0.69	12.21	12.21	0.00	384
Richest	15.47	0.00	2.38	16.78	17.57	1.85	14.68	0.00	2.38	15.72	16.51	1.85	355
All children	14.57	0.07	3.79	21.15	21.26	0.26	13.45	0.07	3.20	19.33	19.44	0.26	1,885*

* n = 1882 for caregiver's education

Table 3. Source of AMs, among children under five who received an AM treatment[†]

Source an antimalarial and ACT treatment for children under five years with fever in the two weeks preceding the survey, among children who received an antimalarial treatment or ACT, by background characteristics.

	Source of AM treatment among treated children:								Source of ACT among children treated with ACT:							
	Public Health Facility	Private Health Facility	Pharm-acy [‡]	Grocery	CHW	At home	Other	# of children treated with AM	Public Health Facility	Private Health Facility	Pharm-acy [‡]	Grocery	CHW	At home	Other	# of children treated with ACT
Age (in years)	%	%	%	%	%	%	%	n	%	%	%	%	%	%	%	n
<1	88.21	3.05	2.36	1.14	0.00	3.50	1.75	112	90.01	2.08	1.94	1.94	0.00	1.04	2.98	64
1	86.85	1.78	1.66	0.83	1.66	7.21	0.00	144	92.19	1.38	2.57	0.00	0.00	3.86	0.00	88
2	88.24	0.44	1.70	1.64	0.00	6.73	1.26	156	96.02	0.00	0.00	0.00	0.00	3.98	0.00	85
3	83.97	1.94	3.14	4.27	1.21	4.27	1.21	101	95.04	2.57	0.00	0.00	2.40	0.00	0.00	51
4	79.98	2.79	4.00	2.20	3.48	5.74	1.80	142	85.33	2.87	1.79	1.79	3.57	3.70	0.96	69
Residence																
Urban	80.95	6.96	3.66	0.73	0.00	6.23	1.47	273	87.77	6.47	0.00	0.00	0.00	4.32	1.44	139
Rural	87.17	0.00	2.09	2.36	1.83	5.50	1.05	382	93.12	0.00	1.83	0.92	1.38	2.29	0.46	218
Caregiver's education																
No education	88.30	0.00	2.70	0.72	0.00	8.28	0.00	83	93.31	0.00	2.23	0.00	0.00	4.46	0.00	49
Some primary	90.90	0.00	2.40	2.64	1.06	2.72	0.28	216	91.18	0.00	1.93	0.96	1.93	3.48	0.52	119
Primary plus	80.66	3.86	2.59	1.72	1.90	7.14	2.13	354	91.60	3.38	0.70	0.70	0.70	1.83	1.08	187
Wealth index																
Poorest	87.89	0.00	2.76	0.69	2.76	5.89	0.00	149	90.68	0.00	2.18	0.00	3.27	3.86	0.00	93
Second	84.17	0.00	1.37	4.12	2.06	6.91	1.37	149	95.13	0.00	2.43	0.00	0.00	1.22	1.22	84
Middle	90.61	0.00	2.49	2.43	0.00	3.00	1.47	138	92.44	0.00	0.00	3.71	0.00	3.84	0.00	72
Fourth	82.45	3.27	5.61	0.82	0.00	4.69	3.16	105	91.48	3.41	0.00	0.00	0.00	1.70	3.41	50
Richest	77.91	11.89	1.59	0.00	0.00	7.82	0.79	114	85.56	11.23	0.00	0.00	0.00	3.21	0.00	58
All children	85.45	1.93	2.53	1.91	1.33	5.70	1.16	655	91.76	1.65	1.37	0.68	1.03	2.81	0.71	357

[†] Where source of antimalarial could be established; source could not be established for n=54 children as multiple sources of treatment were sought outside of the home.

[‡] The pharmacy category includes part one pharmacies as well as drug shops.

* n = 653 and 355 for caregiver's education

Table 4. Cost of AM treatment for children under five †

Median price in USD ‡ paid for a single antimalarial drug regimen acquired for a child with fever. *

	SP	Chloroquine	Quinine	First Line [AL]	ACT	Other AM	All AMs
Source of treatment	\$	\$	\$	\$	\$	\$	\$
Public health facility	0.00 ^[181]	0.00 ^[1]	0.00 ^[46]	0.00 ^[317]	0.00 ^[309]	3.74 ^[2]	0.00 ^[547]
Private health facility	0.00 ^[3]	-	-	0.75 ^[4]	0.00 ^[5]	11.23 ^[2]	0.00 ^[10]
Pharmacy [#]	0.37 ^[14]	-	-	0.00 ^[2]	0.00 ^[2]	-	0.37 ^[16]
Grocery store	0.28 ^[8]	-	-	5.62 ^[2]	5.62 ^[2]	-	0.37 ^[10]
CHW	0.00 ^[3]	-	-	0.00 ^[3]	0.00 ^[3]	-	0.00 ^[6]
At home	0.00 ^[20]	-	0.00 ^[7]	0.00 ^[11]	0.00 ^[12]	-	0.00 ^[39]
Other	0.28 ^[5]	-	-	0.00 ^[3]	0.00 ^[3]	-	0.00 ^[8]
All AMs ††	0.00 ^[259]	0.00 ^[1]	0.00 ^[60]	0.00 ^[362]	0.00 ^[365]	3.74 ^[5]	0.00 ^[690]

† Where source of antimalarial could be established; source could not be established for n=59 antimalarials as multiple sources of treatment were sought outside of the home.

‡ 1 USD = 5341.30 ZMK at the time of data collection

* Price for n=17 antimalarials was reported as "don't know".

The pharmacy category includes part one pharmacies as well as drug shops.

†† Including AMs without source information

Supplementary Indicators

Table 5. Treatment-seeking behaviour

Primary treatment source and reason for seeking treatment at this source among those who sought treatment, among children with fever in the two weeks preceding the survey.

	Percentage of children
Source of treatment	%
Public health facility	48.62
Private health facility	1.94
Pharmacy‡	5.28
Grocery store	6.51
Community health worker	1.17
Other source	4.03
Treatment at home	24.47
Did not seek treatment	7.98
Number of children	1,877
Reason for treatment source	
Close by or easy to reach	51.18
Reputation for quality treatment	7.91
Availability of inexpensive treatment	9.90
Availability of modern medicine	14.43
Felt illness did not merit more intensive care	10.35
Other	6.24
Number of children that sought treatment	1,722

‡ The pharmacy category includes part one pharmacies as well as drug shops.

Table 6. Demand for specific antimalarial drugs

Percentage of children with fever in the two weeks preceding the survey whose caregiver reportedly requested an antimalarial treatment by name, among children that received an antimalarial treatment, by type of antimalarial acquired.

	Percentage of treated children who received an antimalarial requested by their caregiver	# of children treated
Type of AM acquired	%	n
National first line [AL]	3.34	371
ACT	3.32	374
SP/Fansidar	14.89	267
Chloroquine	0.00	1
Quinine	4.60	63
Other AM	6.94	21
All children	7.97	700*

* Categories are not mutually exclusive; first line treatment also falls within the ACT category, and n=13 children received 2 antimalarial treatment.

Table 7. Relative volumes of AM acquired

Relative volumes of antimalarial treatments acquired for children under 5 with fever in the 2 weeks preceding the survey.

	Relative volumes	# of treatments
AM type	%	n
First line treatment [AL]	52.99	377
ACT	53.27	380
SP/Fansidar	36.44	271
Chloroquine	0.17	1
Quinine	9.47	63
Other AM	0.64	7
Total	*	722*

*Categories are not mutually exclusive (first line treatment also falls within the ACT category).

Table 8. Caregiver knowledge and practices

Percentage of caregivers of children under 5 with fever in the two weeks preceding the survey who have correct knowledge of malaria symptoms and treatment, know of an outlet where antimalarials can be obtained, have heard of the most common ACT brand[‡], and who store partial doses.

	Percentage of caregivers
Malaria knowledge	%
Knows that fever is the main symptom of malaria in children under five	90.79
Knows to respond to fever the same or next day	97.96
Knows the full treatment dose is necessary for effectiveness	92.65
Knowledge of treatment source	
Knows where to obtain antimalarials for children under five	98.64
Knowledge of ACTs	
Names Coartem [®] as an antimalarial	81.09
Number of caregivers	1,727 [*]

[‡] Coartem[®] is a national first-line antimalarial [AL] and is the most common ACT brand.

^{*} n=1,724 for knowing main symptom; n=1,705 for responding to fever; n=1,722 for knowing full treatment dose is necessary; and n=1,707 for knowing a treatment source

Table 9. Caregiver beliefs on the most effective AM treatment

Type of antimalarial identified by caregivers of children under five with fever in the two weeks preceding the survey as most effective for malaria in children under five, pregnant women and adults.

	Percentage who cite AM type for children under five	Percentage who cite AM type for pregnant women	Percentage who cite AM type for adults
Antimalarial type	%	%	%
First line treatment [AL]	49.24	3.64	38.33
ACT	49.36	3.64	38.33
SP/Fansidar	34.49	84.30	44.97
Chloroquine	0.68	0.23	0.54
Quinine	6.61	1.12	7.60
Other AM	0.48	0.08	0.24
Non-AM [‡]	0.36	0.16	0.16
Don't know	4.58	6.75	4.36
Number of caregivers	1727	1727	1727

[‡] Medicines identified by the caregiver that are not antimalarials including pain-relievers and fever-reducers

Determinants of Prompt Treatment of Fever in Children Under Five

Several potential determinants of prompt treatment seeking behaviour were explored in this study. Behavioural determinants were measured using scales or indices. Qualitative research among children's caregivers was conducted to identify behavioural determinants related to opportunity, ability and motivation to seek prompt and effective treatment for fever. Focus group discussions and individual in-depth illness narratives were conducted among children's caregivers to identify relevant determinants and develop scale and index items. Items were generated in the vernacular of the target group. Agreement with each scaled item statement was measured on a four-point likert scale (strongly agree, agree, disagree, strongly disagree). Determinants were pilot tested on 124 respondents and psychometric analyses were conducted to refine the scaled items further and ensure reliability of constructs. Scale development was guided by exploratory factor analysis (principal axis factoring with varimax rotation) and scale reliability was assessed using Cronbach's alpha. Mean scale item scores were created. Resulting determinants include:

- Perceived availability of antimalarial treatment in community and public health facilities
- Perceived availability of antimalarial treatment in private health facilities
- Perceived affordability of antimalarials
- Perceived quality of care at health facilities
- Beliefs and attitudes towards prompt and appropriate treatment-seeking behaviour
- Financial support to seek treatment for fever in children
- Spousal support to seek treatment for fever in children
- Locus of control over requesting antimalarial treatment (treatment)
- Outcome expectations with respect to antimalarials and prompt treatment of fever
- Perceived threat that malaria poses to child health and survival
- Perceived threat that malaria poses to the community
- Perceived threat that malaria poses mental health

A summary of all scale items and properties is provided in Appendix D.

A descriptive model included background characteristics of the household, caregiver, child and the potential determinants. Adjusted associations for each determinant were examined. The final model includes only those determinants with significant ($p < 0.05$) or marginally significant ($p < 0.10$) adjusted associations (see Table 10) at 95% confidence level. Significant determinants include:

- **Quality of care at health facilities:** measured with 4 items (see Appendix D) assessing perceived quality of care at health centres (e.g. provision of quality care, kind treatment, good reception, good treatment)
- **Affordability of antimalarials:** measured with 5 items (see Appendix D) assessing caregiver perceived affordability of antimalarials in different outlets.
- **Belief and attitude:** measured with 9 items (see Appendix D) assessing caregiver perceived beliefs and attitude.
- **Threat of malaria to the community:** measured with 4 items (see Appendix D) assessing caregiver perceived threat of malaria to the community.
- **Locus of control:** measured with 3 items (see Appendix D) assessing caregiver perceived locus of control.

These results suggest that children with fever who are significantly more likely to receive prompt antimalarial treatment for fever are those with caregivers who 1) perceive higher quality of care at health facilities 2) perceive antimalarial treatment as affordable 3) perceive positive beliefs and attitude 4) perceive that malaria is a threat to the community 5) perceive a good locus control. Household wealth had no significant adjusted association with prompt treatment of fever with an antimalarial.

Table 10. Determinants of prompt treatment of fever in children under five			
Adjusted odds ratios predicting treatment of fever with an antimalarial drug the same or next day after onset of fever in children under five with fever in the two weeks preceding the survey.			
INDICATORS	Prompt AM treatment (N=631, 35.6%)	No or delayed AM treatment (N=1,211, 64.4%)	AOR (95% CI)
OPPORTUNITY	Mean Scores	Mean Scores	
Quality of care <ul style="list-style-type: none"> I do not have to wait for a long time to be tested for malaria at clinics in my community Staff at the local clinics give malaria test results in a timely manner Malaria test results at local clinics are accurate Antimalarials at local clinics are offered in a timely manner 	2.88	2.76	1.22 (1.07-1.40)
Affordability <ul style="list-style-type: none"> Treatment for malaria in my community are expensive Antimalarials are affordable in my community (R) Clinics in my community provide free treatment for malaria Treatments for malaria in my community are inexpensive The public health facility in my area provides inexpensive malaria treatment 	3.11	2.98	1.29 (1.09-1.51)
MOTIVATION	Mean Scores	Mean Scores	
Belief and attitude <ul style="list-style-type: none"> You should first try to treat malaria at home before going to a clinic (R) Traditional medicines are effective for treating malaria (R) It is ok to use traditional medicines to treat malaria (R) Traditional healers are capable of treating malaria (R) Treatment from doctors is necessary only if herbal treatment (treatment from plants) is ineffective (R) Malaria can be caused by evil spirits (R) Traditional medicines are an effective way to treat malaria (R) One should only seek medical treatment for malaria after 3 or 4 days of symptoms (R) Drinking boiled herb roots help cure malaria (R) 	3.53	3.36	1.51 (1.26-1.81)
Threat of malaria to the community <ul style="list-style-type: none"> Malaria is a serious threat to children in my community Children are vulnerable to malaria Malaria is a major problem in your community Malaria is one of the worst diseases in my community 	3.74	3.64	1.52 (1.11-2.06)
Locus of control <ul style="list-style-type: none"> I know which malarial treatment I want when I go to see a health provider I ask for specific antimalarials by name It is up to my provider what antimalarial treatment is given to my child (R) 	1.51	1.40	1.40 (1.16-1.70)

	Prompt AM treatment (N=631, 35.6%)	No or delayed AM treatment (N=1,211, 64.4%)	AOR (95% CI)
POPULATION CHARACTERISTICS	% or Mean scores	% or Mean scores	
Age			
Caregiver	29.4	29.2	1.00 (0.99-1.01)
Child	2.0	1.8	1.12 (1.04-1.20)
Caregiver's Education (Ref: No education)			
Some Primary	34.5	37.9	0.92 (0.61-1.39)
Primary plus	54.6	51.5	1.08 (0.66-1.79)
Wealth index (Ref: Poorest)			
Second	24.6	26.1	0.98 (0.67-1.44)
Middle	35.0	28.9	1.26 (0.77-2.06)
Fourth	14.6	18.7	0.80 (0.42-1.53)
Richest	7.4	7.0	0.98 (0.52-1.83)
Residence			
Rural	83.1	76.3	1.52 (0.94-2.48)
F - Adjusted Mean Residual goodness of fit		0.65	
P- value		0.74	

Appendix A: Treatment-Seeking, Diagnosis & Treatment of Fever among People Age Five & Above

Table A 1. Treatment-seeking, diagnosis and treatment for fever among people age five and above

Percentage of people age five and above with fever in the two weeks preceding the survey who sought treatment for fever by treatment source, received a malaria diagnosis, and received an antimalarial treatment. Median price paid for acquired antimalarial regimens in urban and rural areas*.

	Percentage of children age 5-14	Percentage of adults age 15+
AM treatment	%	%
Received an AM	46.19	37.13
Number of children/adults	115	139
	Median price [n] among children age 5-14	Median price [n] among adults age 15+
Median price paid in USD[‡] for acquired AM regimens	\$	\$
Urban	0.00 ^[13]	0.00 ^[24]
Rural	0.00 ^[36]	0.00 ^[27]
First line treatment [AL]	0.00 ^[23]	0.00 ^[13]
ACT	0.00 ^[23]	0.00 ^[13]
SP/Fansidar	0.00 ^[21]	0.00 ^[35]
Chloroquine	-	-
Quinine	0.00 ^[5]	0.00 ^[3]
Other AM	-	-
All AM	0.00 ^[49]	0.00 ^[51]

* Price for n=2 antimalarials was reported as "don't know"

The pharmacy category includes part one pharmacies as well as drug shops.

‡ 1 USD = 5341.3 at the time of data collection

Table A 2. Relative volumes of AMs acquired for children age 5 to 14

Relative volumes of full-course antimalarial treatments acquired for children age 5 to 14 with fever in rural and urban areas, by antimalarial type.

	Urban		Rural		All AMs	
	Relative volumes	# of treatments	Relative volumes	# of treatments	Relative volumes	# of treatments
AM type	%	n	%	n	%	n
First line treatment [AL]	53.85	7	42.11	16	43.92	23
ACT	53.85	7	42.11	16	43.92	23
SP/Fansidar	30.77	4	50.00	19	47.02	23
Chloroquine	0.00	0	0.00	0	0.00	0
Quinine	15.38	2	7.89	3	9.05	5
Other AM	0.00	0	0.00	0	0.00	0
Total	*	13*		38*	*	51*

*Categories are not mutually exclusive (first line treatment also falls within the ACT category).

Table A 3. Relative volumes of AMs acquired for people age 15 and above

Relative volumes of full-course antimalarial treatments acquired for people age 15 and above with fever in rural and urban areas, by antimalarial type.

	Urban		Rural		All AMs	
	Relative volumes	# of treatments	Relative volumes	# of treatments	Relative volumes	# of treatments
AM type	%	n	%	n	%	n
First line treatment [AL]	29.63	8	24.14	7	25.96	15
ACT	29.63	8	24.14	7	25.96	15
SP/Fansidar	70.37	19	65.52	19	67.13	38
Chloroquine	0.00	0	0.00	0	0.00	0
Quinine	0.00	0	10.34	3	6.90	3
Other AMs	0.00	0	0.00	0	0.00	0
Total	*	27*		29*	*	56*

*Categories are not mutually exclusive (first line treatment also falls within the ACT category).

Appendix B: Price & Volumes Data for Antimalarials Acquired for Children Under Five in Rural & Urban Areas

Table B 1. Cost of AM treatment for children under five

Median price in USD[‡] paid for a single antimalarial drug regimen acquired in urban and rural areas for a child with fever, among children under five.*

Source of treatment	Median price [n] of AMs acquired in urban areas:							Median price [n] of AMs acquired in rural areas:						
	SP	CQ	Quinine	First Line [AL]	ACT	Other AM	All AMs	SP	CQ	Quinine	First Line [AL]	ACT	Other AM	All AMs
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Public health facility	0.00 ^[83]	-	0.00 ^[11]	0.00 ^[118]	0.00 ^[118]	1.87 ^[2]	0.00 ^[214]	0.00 ^[98]	0.00 ^[1]	0.00 ^[35]	0.00 ^[199]	0.00 ^[199]	-	0.00 ^[333]
Pharmacy [#]	0.33 ^[10]	-	-	-	-	-	0.33 ^[10]	0.42 ^[4]	-	-	0.00 ^[2]	0.00 ^[2]	-	0.33 ^[6]
Grocery store	0.29 ^[2]	-	-	-	-	-	0.29 ^[2]	0.33 ^[6]	-	-	3.28 ^[2]	3.28 ^[2]	-	0.37 ^[8]
Private health facility	0.00 ^[3]	-	-	0.37 ^[4]	0.00 ^[5]	5.62 ^[2]	0.00 ^[10]	-	-	-	-	-	-	-
CHW	-	-	-	-	-	-	-	0.00 ^[3]	-	-	0.00 ^[3]	0.00 ^[3]	-	0.00 ^[6]
At home	0.00 ^[10]	-	3.18 ^[1]	0.00 ^[6]	0.00 ^[7]	-	0.00 ^[18]	0.00 ^[10]	-	0.00 ^[6]	0.00 ^[5]	0.00 ^[5]	-	0.00 ^[21]
Other	0.37 ^[2]	-	-	0.00 ^[1]	0.00 ^[1]	-	0.28 ^[3]	0.09 ^[3]	-	-	0.00 ^[2]	0.00 ^[2]	-	0.09 ^[5]
All AMs^{††}	0.00^[121]	-	0.00^[14]	0.00^[138]	0.00^[141]	3.74^[5]	0.00^[281]	0.00^[138]	0.00^[1]	0.00^[46]	0.00^[224]	0.00^[224]	-	0.00^[409]

[‡] 1 USD = 5341.3 ZMK at the time of data collection

* Price for n=17 antimalarials was reported as “don’t know”; where source of antimalarial could be established - source could not be established for n=59 drugs as multiple sources of treatment were sought outside of the home.

The pharmacy category includes part one pharmacies as well as drug shops.

†† Including AMs without source information

Table B 2. Relative volumes of AMs acquired in urban versus rural areas

Relative volumes of antimalarial treatments acquired for children under 5 with fever in the 2 weeks preceding the survey.

	Urban		Rural	
	Relative volumes	# of treatments	Relative volumes	# of treatments
AM type	%	n	%	n
First line treatment [AL]	49.01	148	54.52	229
ACT	50.00	151	54.52	229
SP/Fansidar	42.05	127	34.29	144
Chloroquine	0.00	0	0.24	1
Quinine	5.63	17	10.95	46
Other AM	2.32	7	0.00	0
Total	*	302*	*	420*

*Categories are not mutually exclusive (first line treatment also falls within the ACT category).

Appendix C: Demographic Characteristics

Table C 1. Demographic characteristics			
Characteristics of children under five with fever in the two weeks preceding the survey, of children's caregivers, and of households			
	Percentage of children under 5	Percentage of people age 5+	Percentage of caregivers
	%	%	%
Residence			
Rural	50.88	60.39	50.26
Household wealth index			
Lowest	20.32	26.77	20.23
Second	20.48	20.08	20.12
Middle	20.00	20.87	19.77
Fourth	20.37	17.72	20.12
Highest	18.83	14.57	19.77
Age in years			
Infants (<1 year)	22.81	-	-
1	21.17	-	-
2	21.38	-	-
3	16.18	-	-
4	18.46	-	-
5-14	-	45.28	0.29
15-24	-	19.69	34.36
25-34	-	20.47	43.53
35-44	-	11.42	15.96
45-54	-	2.76	3.66
55+	-	0.39	2.21
Sex			
Female	51.14	73.73	100
Education			
No education	-	-	11.44
Some primary	-	-	32.98
Primary or higher	-	-	55.57
Total Number	1,898	255	1,727*

* Caregiver education n=1,722; Caregiver age n=1,723

Appendix D: Behavioral Determinants, Scale Items & Scale Properties

Scale Items	Scale Properties
Availability of AM - community & public health facilities	
Clinics in my community are easy to reach	Cronbach's Alpha: 0.87 Range: 1-4 Mean (SD): 2.88 (0.89) Median: 3.00
Antimalarials are easily available in my community	
Antimalarials are easy to find in my area if the need arises	
Antimalarials are easy to find at any time in my community	
Antimalarials are easy to find in public health facilities	
Availability of AM - private health facilities	
Antimalarials are easy to find in pharmacies	Cronbach's Alpha: 0.93 Range: 1-4 Mean (SD): 2.76 (1.22) Median: 3.00
Antimalarials are easy to find in private health facility	
You can find antimalarials with private doctors	
Affordability	
Treatment for malaria in my community are expensive	Cronbach's Alpha: 0.79 Range: 1-4 Mean (SD): 3.00 (0.78) Median: 3.00
Antimalarials are affordable in my community (R)	
Clinics in my community provide free treatment for malaria	
Treatments for malaria in my community are inexpensive	
The public health facility in my area provides inexpensive malaria treatment	
Quality of care	
I do not have to wait for a long time to be tested for malaria at clinics in my community	Cronbach's Alpha: 0.76 Range: 1-4 Mean (SD): 2.82 (0.81) Median: 3.00
Staff at the local clinics give malaria test results in a timely manner	
Malaria test results at local clinics are accurate	
Antimalarials at local clinics are offered in a timely manner	
Beliefs & Attitudes	
You should first try to treat malaria at home before going to a clinic (R)	Cronbach's Alpha: 0.90 Range: 1-4 Mean (SD): 3.44 (0.69) Median: 3.70
Traditional medicines are effective for treating malaria (R)	
It is ok to use traditional medicines to treat malaria (R)	
Traditional healers are capable of treating malaria (R)	
Treatment from doctors is necessary only if herbal treatment (treatment from plants) is ineffective (R)	
Malaria can be caused by evil spirits (R)	
Traditional medicines are an effective way to treat malaria (R)	
One should only seek medical treatment for malaria after 3 or 4 days of symptoms (R)	
Drinking boiled herb roots help cure malaria (R)	
Financial support	
My friends lend me money for malaria treatment	Cronbach's Alpha: 0.89 Range: 1-4 Mean (SD): 2.97 (0.95) Median: 3.20
Members of my family lend me money for malaria treatment	
My neighbors will provide financial help if my child has fever	
I can easily access transport from friends or neighbors when I need to seek treatment for my child	
I can borrow money from my family for malaria treatment	

Scale Items	Scale Properties
Spousal support	
My spouse helps me find treatment for my child	Cronbach's Alpha: 0.97 Range: 1-4 Mean (SD): 3.73 (0.74) Median: 4.00
My spouse gives me money for my child's treatment	
My spouse encourages me to see a health provider when my child has fever	
Locus of control	
I know which malarial treatment I want when I go to see a health provider	Cronbach's Alpha: 0.68 Range: 1-4 Mean (SD): 1.46 (0.65) Median: 1.00
I ask for specific antimalarials by name	
It is up to my provider what antimalarial treatment is given to my child (R)	
Outcome expectations	
Using antimalarial drugs will cure malaria in children	Cronbach's Alpha: 0.91 Range: 1-4 Mean (SD): 3.88 (0.29) Median: 4.00
Antimalarial medicine is effective for treating fever in children under 5	
Children less than 5 years old with malaria will be healed after using an antimalarial medicine	
Antimalarials provide a quick recovery	
Malaria is quickly cured with antimalarial medicine	
Children will recover fully from malaria after antimalarial use	
A child's temperature drops after antimalarial use	
If malaria is treated early, a child will not get very sick	
If a child is given modern antimalarial drugs, they will get better more quickly	
Antimalarial medicine is effective for treating fever in children under 5	
Threat to child health & survival	
Fever is a sign of serious illness in children	Cronbach's Alpha: 0.86 Range: 1-4 Mean (SD): 3.86 (0.28) Median: 4.00
Malaria in children should be treated immediately	
Malaria will become severe in case of non treatment	
Malaria will cause death in a child in case of non treatment	
Malaria will cause death in a child in case of incomplete treatment	
Malaria will cause death in a child in case of incorrect treatment	
If left untreated, malaria symptoms will get worse	
If left untreated, malaria can lead to death	
Malaria can get worse if treatment is incorrect	
If you don't treat fever quickly in a child under 5 they might die	
Threat to the community	
Malaria is a serious threat to children in my community	Cronbach's Alpha: 0.85 Range: 1-4 Mean (SD): 3.66 (0.53) Median: 4.00
Children are vulnerable to malaria	
Malaria is a major problem in your community	
Malaria is one of the worst diseases in my community	

