



REPUBLIC OF KENYA

**MONITORING OUTPATIENT MALARIA CASE
MANAGEMENT UNDER THE 2010 DIAGNOSTIC AND
TREATMENT POLICY IN KENYA**

2010-2012 progress report

**Division of Malaria Control
Ministry of Public Health & Sanitation**

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Ministry of Public Health and Sanitation
P. O. Box 1992 KNH
Nairobi 00202, Kenya
Email: Head.domc@domckkenya.or.ke
<http://www.nmcp.or.ke>

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SUMMARY

Malaria case-management based on confirmed parasitological diagnosis and artemisinin-based combination therapy (ACT) is the cornerstone of the 2009-2017 National Malaria Strategy (NMS) in Kenya. By 2013, the NMS specified programmatic directions to ensure universal availability of ACTs and diagnostics, universal coverage of health facilities and health workers with health systems support activities, and universal health worker's adherence to malaria case-management guidelines. To monitor the policy progress, the MoPH's Division of Malaria Control undertook five national health facility surveys. The baseline survey was carried out in January/February 2010 and the last follow-up survey in November 2012. This report presents the progress in key health systems and case-management indicators in this period.

The five surveys were respectively undertaken at 174, 176, 174, 172 and 172 public facilities randomly sampled countrywide. Comparing the baseline results with the results of the last survey some declining trends in AL stocks-outs was observed (respectively 5% and 14% declines in total AL stock-out and stock-out of one or more AL packs). However, the proportion of facilities experiencing stock-out at the end of 2012 was still high - during 3 months prior to the survey 22% of facilities experienced total AL stock-out and 45% were stocked out of at least one AL pack over the period of 7 or more consecutive days. With respect to the recent policy change for the second-line therapy (DHA-PPQ) and the treatment of severe malaria (parenteral artesunate), these commodities are still rarely available at public facilities. During all surveys over three-quarters of facilities had various drug inventory materials however the quality of antimalarial drug recording and reporting was substantially lower. Finally, significant improvements were observed in parasitological capacity of health facilities – the availability of at least one malaria diagnostic service increased from 55% to 76%, mainly due to increase in RDT availability (8% vs 31%).

Health facility and health workers coverage with guidelines, wall charts, in-service training and supervisory activities was variable. In comparison with the baseline results when health workers were neither trained on the new case-management policy nor had access to new guidelines and wall charts, the last survey revealed that the coverage with the in-service training, guidelines and new case-management wall charts increased to 26%, 57% and 20-49% respectively. Regarding the supervision, there was an increase from 42% to 66% of health workers who received supervisory visit; however malaria case-management activities and observation of consultations, although showing an improvement trend, were less commonly components of these visits.

The case-management results have shown improvement trends in the management of febrile patients. The composite performance defined as febrile patient tested and treated in accordance with national guidelines improved from 16% to 39% at all study facilities and from 28% to 48% at facilities with diagnostics and AL in stock. At the latter facilities, significant improvements were also observed in testing of febrile patients (43% to 58%), recommended treatment for test positive patients (83% to 93%) and in absence of antimalarial treatment for test negative patients (47% to 79%). With respect to AL dosing, dispensing and counseling practices observed changes were minor. However correct AL dosing was high throughout the period, four out of seven dispensing and counseling tasks were performed for more than two-thirds of the patients, while the main tasks that require substantial improvements were weighing of the patients (51%), administration of the first AL dose at health facility (42%) and provision of advice on what to do in case of vomiting (6%).

In conclusion, the findings revealed that by end of 2012, most of the key indicators have shown improvements however the changes were smaller than expected and for most indicators still well below the optimistic targets aiming at universal intervention coverage and adherence practices (Annex 1-2). To effectively reduce the gap in reasonable time the following recommendations are made:

- Implementation of RDTs should be scaled up as part of the existing national RDT implementation plan containing comprehensive package of case-management interventions.
- Quality control for malaria microscopy and RDTs supported by field supervision should be scaled-up in line with the national policy guidelines for parasitological diagnosis of malaria.
- The routine supervision should include malaria case-management component and be quantitatively increased and qualitatively improved in line with national supervisory manuals.
- The new national malaria case-management guidelines and wall charts should be repeatedly disseminated to the peripheral health facilities.
- Drug management activities should focus on strengthening of logistic management information systems, development of district capacities to respond to stock-out warnings, and procurement of newly recommended national antimalarial therapies (DHA-PPQ and injectable artesunate).
- An emphasis should be placed on the following case-management messages during the current in-service training and supervisory visits: 1) all febrile patients should be tested, 2) test negative patients should not be treated for malaria, 3) all patients should be weighed, 4) the first AL dose should be administered at facilities even in the absence of food, and 5) patients should be advised to return for replacement dose to complete full treatment course in case of vomiting.

1. BACKGROUND

Effective malaria case-management based on confirmed parasitological diagnosis and artemisinin-based combination therapy (ACT) is the cornerstone of the 2009-2017 National Malaria Strategy (NMS) in Kenya (MOPHS 2009a). The NMS launched in November 2009, specified programmatic directions to ensure availability of ACTs, malaria diagnostics and effective case-management based on the use of malaria microscopy or rapid diagnostic tests (RDT) for all febrile patients and subsequent treatment of only test positive patients with nationally recommended first-line ACT, artemether-lumefantrine (AL).

Alongside the NMS, the national Malaria Monitoring and Evaluation (M&E) Plan 2009-2017 has also been developed. The M&E plan has specified that, by 2013, 100% of health facilities should have AL and malaria diagnostics and 100% of fever cases who present to health workers should receive parasitological diagnosis and effective treatment (MOPHS 2009b). As part of the new NMS and M&E plan, nationally representative monitoring surveys undertaken on biannual basis are undertaken to capture case-management indicators and timely inform national policy makers, and donor organizations, on the progress of the new NMS. By the end of 2012, five health facility surveys were performed. The first, baseline survey, was undertaken prior to the implementation activities under the new NMS. This report presents progress in the key national M&E malaria-related health systems and case-management indicators in this period.

2. METHODS

The methodological details were provided in the previous reports (Memusi et al. 2010; Nyandigisi et al. 2011). Briefly, cross-sectional health facility surveys were undertaken. National representativeness was assured drawing a stratified random sample of the public health facilities. Prior to the surveys the training of data collectors was undertaken over five days. At each of the survey facilities data were collected over one day using three methods. First, all patients presenting to the outpatient departments during the survey day underwent rapid screening when they were ready to leave the facility. All non-referred and non-pregnant febrile patients presenting for an initial visit and weighing ≥ 5 kg proceeded with an evaluation during which information was collected about main patients' characteristics, diagnostics requested, results reported and medications prescribed and dispensed. Second, each facility was assessed to determine the availability of medicines, RDTs, malaria microscopy as well as the support tools such as weighing scales, guidelines, job-aids and medicine inventory materials. Finally all health

workers who saw patients on the survey day were interviewed about their demographics, pre-service training, access to guidelines, and retrospective exposure to in-service training and supervision.

3. RESULTS

3.1. Study populations

The first, baseline survey, was carried out in January/February 2010. Subsequently, four follow-up surveys were respectively undertaken in November/December 2010, July/August 2011, March/April 2012 and in November 2012. The Table 1 shows numbers of assessed facilities, interviewed health workers and evaluated outpatient consultations for patients who met inclusion criteria across surveys.

Table 1: Number of health facilities assessed, health worker interviews performed and outpatient consultations evaluated for patients at all facilities and facilities with commodities in stock, by survey

Survey	HFs assessed	HWs interviewed	Outpatient consultations at all HFs		Outpatient consultations at HFs with diagnostics and AL in stock	
			<5 years	≥5 years	<5 years	≥5 years
Baseline (Jan-Feb 2010)	174	224	1,070	1,335	591	648
Follow-up 1 (Nov-Dec 2010)	176	237	675	781	420	441
Follow-up 2 (July-Aug 2011)	174	233	535	673	301	333
Follow-up 3 (Mar-Apr 2012)	172	220	581	710	340	428
Follow-up 4 (Nov 2012)	172	216	510	735	383	536

3.2. Health systems support

The results presented in this section compare the key health facility and health worker characteristics important for the performance of adequate malaria case-management between five surveys.

3.2.1. Availability of basic equipment and malaria diagnostics

Four different types of weighing scales were found at health facilities and the majority of facilities had each type of scale during all surveys (Table 2). At least one functional thermometer was present at the large majority of facilities during all surveys. A significant increase in overall capacities of health facilities to provide parasitological malaria diagnosis was observed between the baseline and the last follow-up

survey (55.2% vs 75.6%; 20.4% increase) mainly due to major increase in the availability of RDTs (7.5% vs 31.4%; 23.9% increase). During the last survey, just above half of the facilities (56.4%) were providing malaria microscopy service however without significant increase observed over the monitoring period (Table 2 and Figure 1).

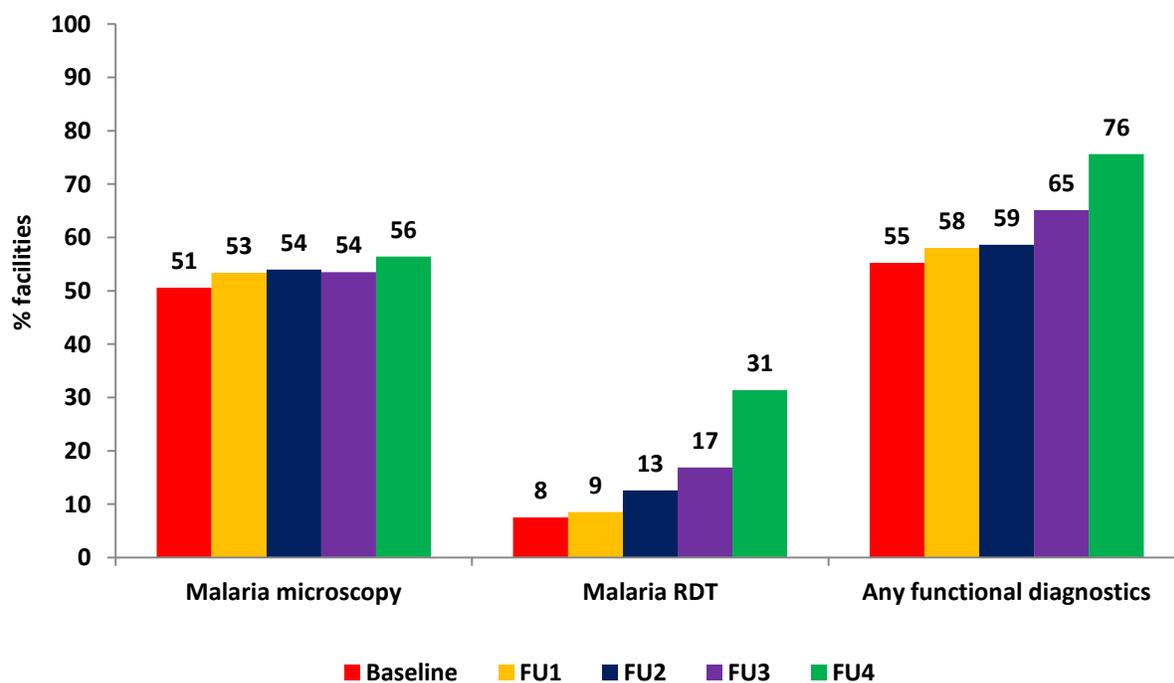
Table 2: Availability of basic equipment and malaria diagnostics

	Baseline N=174 (%)	FU 1 N=176 (%)	FU 2 N=174 (%)	FU 3 N=172 (%)	FU 4 N=172 (%)	% change B vs FU4
Availability of weighing scales^a						
Salter hanging scale	58.1	61.4	64.9	61.1	57.4	-0.7
Infant scale	83.9	80.1	79.3	79.7	81.3	-2.6
Bathroom scale	75.9	69.9	69.0	63.4	73.1	-2.8
Balance scale	50.6	50.6	54.0	58.1	53.2	+2.6
Availability of thermometer	90.8	90.3	93.1	87.2	86.6	-4.2
Availability of diagnostics						
Functional malaria microscopy	50.6	53.4	54.0	53.5	56.4	+5.8
Non-expired malaria RDT	7.5	8.5	12.6	16.9	31.4 ^b	+23.9
Expired malaria RDTs	3.5	0.6	1.2	0.0	2.9	-0.6
Any functional diagnostics	55.2	58.0	58.6	65.1	75.6	+20.4

^a Denominator during FU 4 survey does not include 1 facility with missing information for the availability of Salter scale and 2 facilities with missing information for the remaining 3 scales

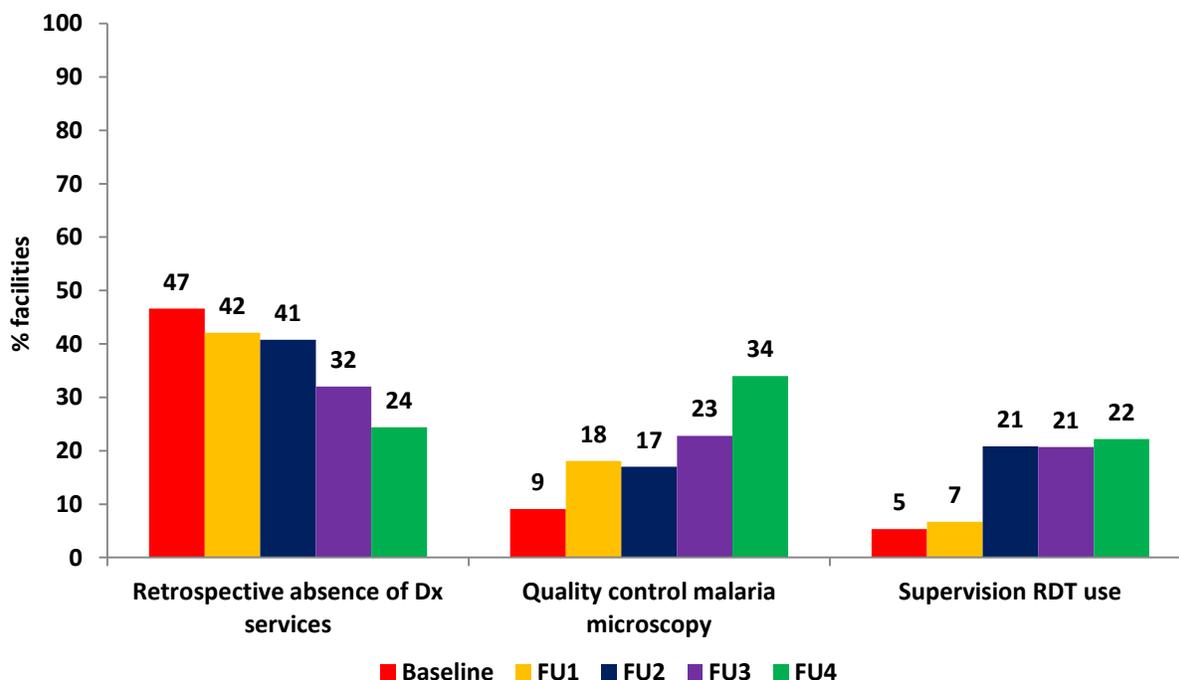
^b The availability of non-expired RDTs at level 2 and 3 facilities was 33.1%

Figure 1: 2010-2012 national trends in the coverage of health facilities with malaria diagnostics



Retrospective availability of malaria diagnostic services was assessed for 3 months period prior to the surveys (Figure 2). The new malaria policy recommends universal parasitological diagnosis, using either malaria microscopy or RDTs. Therefore, comparing all facility results between the baseline and the last follow-up survey, the results showed a substantial decreasing trend (46.6% vs 24.4%; 22.2% decrease) in the absence of both malaria diagnostic services in duration of at least 7 consecutive days. Among health facilities which had functional microscopy on survey days, an absence of this service prior to the surveys was similarly distributed across survey rounds (survey range: 3.3-9.6%). Finally, at facilities providing malaria microscopy services an increase in the quality control visits that took place at least once in 3 months prior to the surveys was observed (from 9.1% at baseline to 34.0% at the last follow-up; 24.9% increase). Similarly at facilities providing RDT testing, there was also a significant increase in the facilities receiving a supervisory visit on the use of RDTs (5.3% vs 22.2%; 17.0% increase) (Figure 2).

Figure 2: 2010-2012 national trends in the retrospective absence of malaria diagnostics and the coverage with quality control and supervisory activities for microscopy and RDTs



Highlight: Malaria diagnostic capacities

KEY FINDINGS:

By the end of 2012, over three quarters (76%) of facilities provided at least one malaria diagnostic service, largely through malaria microscopy service (56%) while, despite an increasing trend in the availability of RDTs, these diagnostic tools were available at the end of the monitoring period in less than a third of the surveyed facilities (31%). At facilities with microscopy, there was 25% increase in the facilities receiving quality control visit while at facilities with RDTs there was also 17% increase in the supervisory visits on the use of RDTs. However, at these facilities the overall coverage with quality control activities at the end of the monitoring period was still low for both diagnostic services (34% for microscopy and 22% for RDTs).

IMPLICATIONS:

The effect of the first national distribution of RDTs to peripheral health facilities which was initiated in the last quarter of 2012 has been partially reflected in the survey results undertaken in November 2013. Following further establishment of the routine supply chain for RDTs it could be expected that the RDT availability at peripheral facilities would be substantially increased during the surveys planned in 2013. Yet deployment of RDTs should be accompanied with the scale-up of quality control systems for malaria diagnostics in line with the national policy for parasitological diagnosis of malaria.

3.2.2. Availability of antimalarial drugs

The stock assessments on survey days showed that the availability of at least one AL pack was relatively high at facilities during all survey rounds (survey range: 89-97%), however facilities less commonly had all four packs in stock (survey range: 45-72%)(Table 3). Similarly, a fluctuating pattern without significant changes was observed between survey rounds in the availability of individual AL packs (Table 3). With respect to other antimalarials, the availability of SP substantially declined from 88.5% at baseline to 65.3% at the last follow-up survey. Interestingly, during the last survey in 2012, SP was found at 86.2% of facilities in IPTp districts but also at 54.5% of facilities in districts where IPTp policy was discontinued during 2010. During the last survey only 3.5% of facilities stocked dehydroartemisinin-piperaquine (DHA-PPQ) and 14.0% of facilities stocked injectable artesunate, the respective treatments nationally recommended during 2010 (but not yet supplied) for the management of treatment failures and severe malaria. Finally, during all survey rounds expired antimalarial drugs were uncommon and a fluctuating trend, ranging between rounds from 2.9% to 14.0% of facilities stocking at least one expired AL pack, was observed.

Table 3: Facilities with non-expired antimalarial drugs in stock on survey day

	Baseline N=174 (%)	FU 1 N=176 (%)	FU 2 N=174 (%)	FU 3 N=172 (%)	FU 4 N=172 (%)	% change B vs FU4
Any AL pack	94.3	97.2	89.1	93.0	92.4	-1.9
All AL packs	64.9	71.6	45.4	61.1	71.5	6.6
AL 6 pack	81.0	89.2	78.2	78.5	83.1	2.1
AL 12 pack	79.9	86.4	59.8	73.3	85.6	+5.7
AL 18 pack	79.3	81.8	66.7	72.7	80.7 ^a	+1.4
AL 24 pack	86.2	86.9	73.6	85.5	84.9	-1.3
SP tablets	88.5	88.0 ^a	73.6	72.5 ^a	65.3 ^b	-23.2
Quinine tablets	69.0	84.6 ^a	80.5	83.5 ^b	79.1	+10.1
Quinine injections	77.6	84.5 ^b	78.6	69.0 ^a	69.0	-8.6
DHA-PPQ	0	0	2.9	0.6	3.5	+3.5
Artesunate injections	0	0.6	1.1	1.2	14.0	+14.0

^a Denominator does not include 1 health facility without information

^b Denominator does not include 2 health facilities without information

Finally, retrospective stock-out data were collected for periods prior to the physical surveys. In accordance with international standards the stock-out of at least 7 consecutive days over 3 months period was used as the criterion for the stock-out presence. A declining trends in all stock-out indicators was observed between the baseline survey and the third follow up survey undertaken in March/April 2012: simultaneous stock-out of all four AL packs decreased from 27.2% to 9.4%, stock out of one or more AL packs from 59.5% to 39.0%, while stock-outs of individual AL packs ranging prior to baseline between 37.6-52.0% decreased to 19.9-29.8%. However the results observed during 3 months prior to the last follow up survey (1 August-30 October 2012) revealed a stock-out rebound for all indicators resulting in only modest declines at the end of 2012 compared to the baseline results (AL stock-out indicator range: 5-14% decline) (Table 4 and Figure 3).

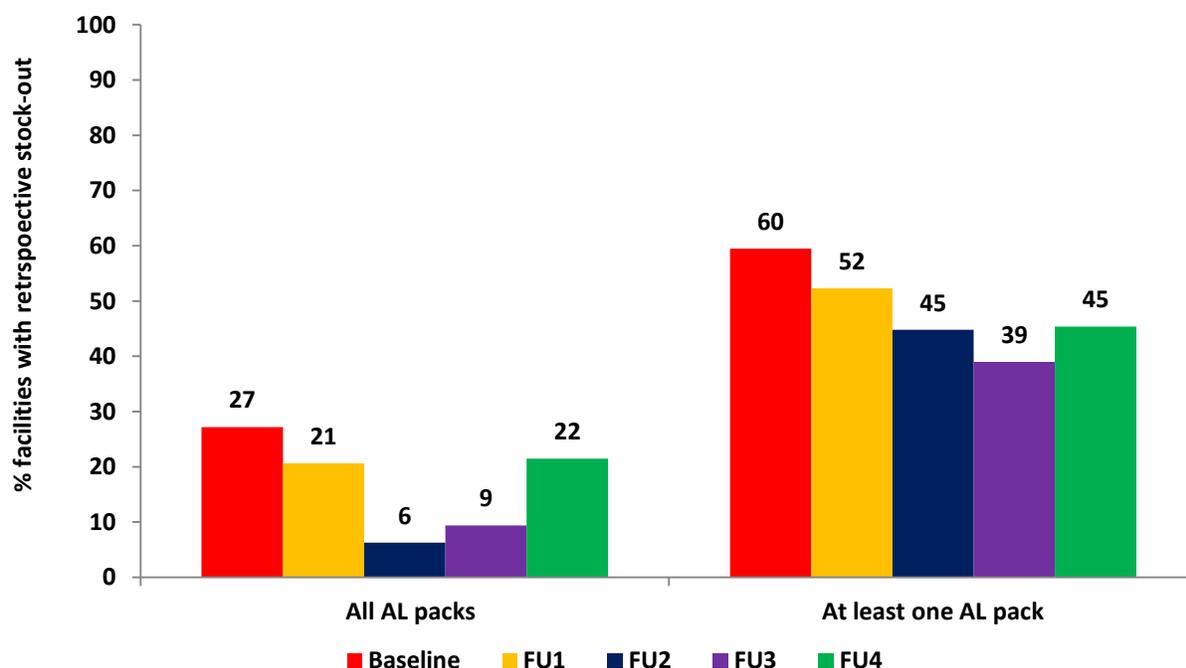
Table 4: Retrospective stock-outs of antimalarial drugs during 3 months prior to the surveys

Stock out of at least 7 consecutive days in 3 months prior to the surveys	Baseline N=174 (%)	FU 1 N=176 (%)	FU 2 N=174 (%)	FU 3 N=172 (%)	FU 4 N=172 (%)	% change B vs FU4
All AL packs	27.2 ^a	20.6	6.3	9.4	21.5	-5.7
AL 6 pack	37.6	30.1	19.5	21.1 ^a	27.9	-9.7
AL 12 pack	43.9	32.4	31.6	28.7 ^a	34.9	-9.0
AL 18 pack	52.0	42.1	27.6	29.8 ^a	39.0	-13.0
AL 24 pack	39.3	35.2	19.5	19.9 ^a	34.3	-5.0
Any AL pack	59.5	52.3	44.8	39.0	45.4	-14.1
SP tablets	14.4	9.1	16.1	20.4	31.8 ^b	+17.4
Quinine tablets	25.4 ^a	22.2	16.1	15.1	24.0 ^a	-1.4
Quinine injections	20.8 ^a	20.5	17.2	20.9	43.9 ^a	+23.1

^a Denominator does not include one facility where information was not available

^b Denominator does not include two facilities where information was not available

Figure 3: 2010-2012 national trends in the retrospective AL stock-out indicators



3.2.3. Availability and completeness of antimalarial drug management records

During all surveys, the availability of antimalarial drug management inventory materials was relatively high, ranging from 73.2% to 91.3% (Table 5). However updating and completing of the inventory materials was less common. Of particular interest for antimalarial drug management activities, updating

of AL dispenser book for a month prior to the survey declined from 66.7% at baseline to 45.9% at the last follow up while completion of monthly summary forms for antimalarials for the period 3 months prior to the surveys declined from 65.9% to 57.1% (Table 5 and Figure 4).

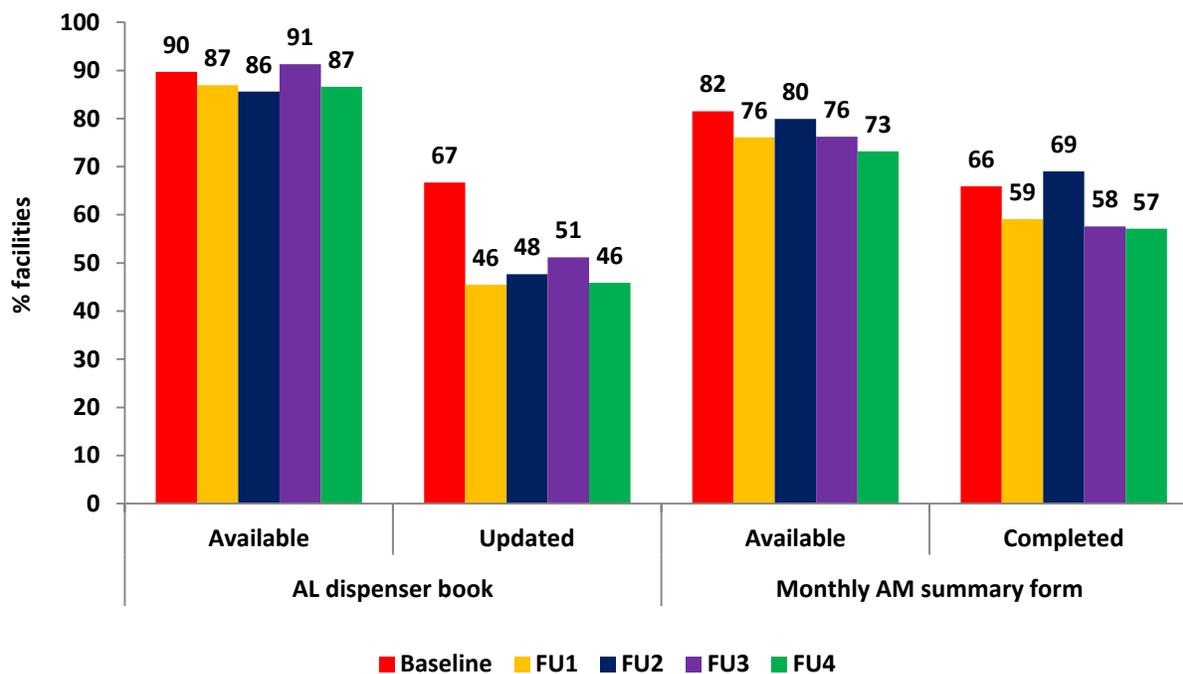
Table 5: Availability and quality of antimalarial drug management records

	Baseline N=174 (%)	FU 1 N=176 (%)	FU 2 N=174 (%)	FU 3 N=172 (%)	FU 4 N=172 (%)	% change B vs FU4
Stock cards available	86.2	77.3	74.7	79.7	84.2 ^a	-2.0
Stock cards updated (1m)	44.8	38.6	44.3	42.4	51.2	+6.4
AL dispenser book available	89.7	86.9	85.6	91.3	86.6	-3.1
AL book updated (1m)	66.7	45.5	47.7	51.2	45.9	-20.8
Monthly summary form available	81.5 ^a	76.1	79.9	76.2	73.2	-8.3
Summary form completed (3m)	65.9 ^a	59.1	69.0	57.6	57.1 ^b	-8.8

^a Denominator does not include one facility with missing value

^b Denominator does not include two facilities with missing values

Figure 4: 2010-2012 national trends in the availability and the quality of key antimalarial drug management records



Highlight: Availability of antimalarial medicines and antimalarial drug management

KEY FINDINGS:

Despite some declines in AL stock-outs over the monitoring period, the proportion of facilities experiencing stock-out at the end of 2012 is still high. The latest results show that during 3 months prior to the survey, 22% of facilities experienced total AL stock-out and 45% were stocked out of at least one AL pack over the period of 7 or more consecutive days. With respect to the national policy change for the second-line therapy (DHA-PPQ) and the treatment of severe malaria (parenteral artesunate), these commodities are still rarely available at public health facilities. Finally, despite the widespread availability of inventory materials the quality of antimalarial drug recording and reporting was suboptimal throughout the monitoring period.

IMPLICATIONS:

Future drug management activities should focus on improving routine recording and reporting, strengthening of district capacities to respond to stock-outs, procurement and distribution of new therapies for treatment failures and severe malaria, and scaling-up of real-time stock monitoring interventions which have shown massive impact on stock-outs in pilot districts. The elimination of stock-outs should be also viewed alongside the further strengthening of “test, treat and track” case-management policy and rational use of antimalarial drugs.

3.2.4. Availability of guidelines and job aids

The new national malaria guideline for health workers was officially launched in September 2010 and subsequently disseminated nationwide. The wall chart on malaria outpatient algorithm specifying new malaria diagnostic recommendations was finalized in 2010 and disseminated in the first half of 2011. The coverage of health facilities with new guidelines increased from 5.7% at the first follow-up survey to 56.7% during the last survey while the coverage of health facilities with the new diagnostic algorithm chart was 19.8% at the last survey. The availability of AL dosing and dispensing chart, which was produced prior to the launch of the new policy, increased from 36.8% at baseline to 54.1% and 49.1% during the last two surveys respectively. Simultaneously, a decline trend was observed in the availability of obsolete guidelines and wall charts. The proportion of facilities having displayed old algorithm charts promoting presumptive treatment in children decreased from 44.8% to 22.8% while the availability of old malaria guidelines providing the same presumptive recommendations decreased from 69.5% to 43.5%.

Highlight: Availability of new case-management guidelines and wall charts

KEY FINDINGS:

By November 2012, the majority (57%) of health facilities had new malaria case-management guidelines. AL dosing and dispensing charts were displayed at 49% of facilities, however the charts with new diagnostic algorithms were available at only 19% of facilities. Despite a declining trend, old guidelines and wall charts are still available at substantial proportion of health facilities.

IMPLICATIONS:

The coverage with new national malaria case-management guidelines and wall charts has significantly increased however it is still far below universal targets. These job aids should be repeatedly disseminated to the peripheral health facilities through the implementation channels such as in-service training for health workers and KEMSA supply chains. The obsolete guidelines and wall charts should be removed from health facilities.

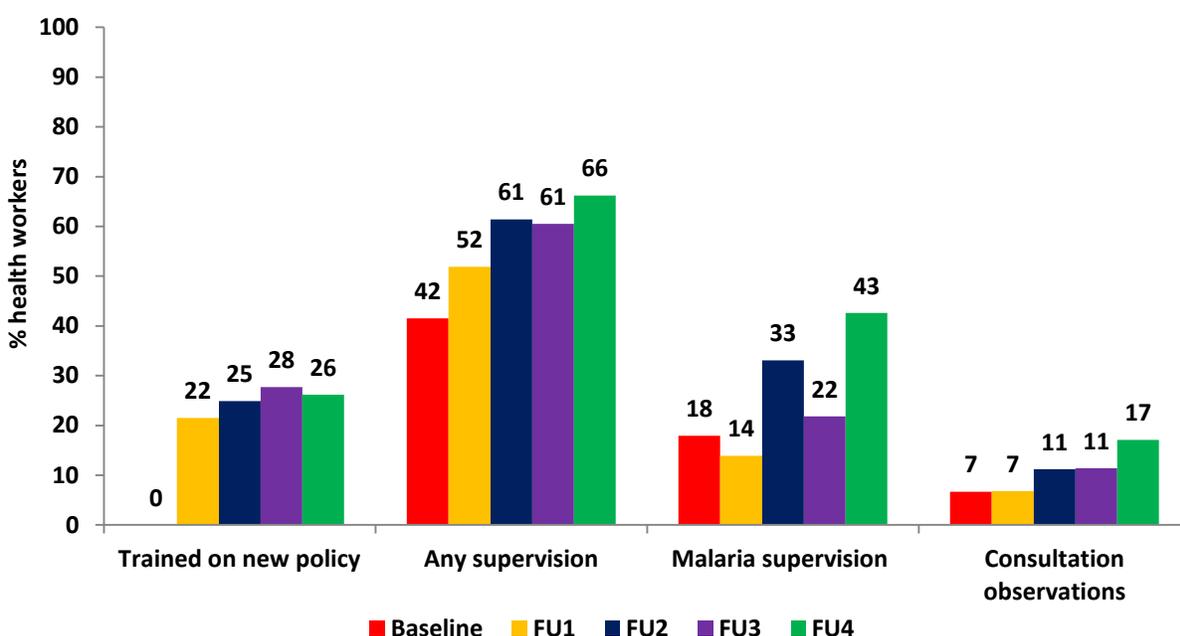
3.2.5. Health workers' exposure to in-service training and supervision

General characteristics of outpatient health workers who saw patients on survey days were similar. During all surveys the majority of health workers were female (survey range: 53-56%), health workers not in-charge of facilities (survey range: 54-62%) and by cadre nurses (survey range: 59-65%) followed by clinical officers (survey range: 28-31%). The main case-management activity undertaken in 2010 and taking place between the baseline and the first follow-up survey was a nationwide training for front-line health workers. The first follow-up survey showed that 21.5% of health workers were trained on the new case-management policy and in the absence of major subsequent trainings programmes, this coverage has not substantially increased at the time of the last survey in 2012 (26.2%) (Table 6 and Figure 5). With respect to the supervision, there was a significant increase from 41.5% of health workers receiving at least one supervisory visit in 3 months prior to the baseline to 66.2% (24.7% increase) prior to the last follow-up survey. Similarly, compared to the baseline results a significant increase was observed in the coverage of health workers with supervisory visits including malaria case-management (24.7%) and with the visits including observations of outpatient consultations (10.4%). When during the last survey the supervision coverage indicator was also measured at facility level, 78.5% of facilities received at least one supervisory visit and 56.4% received a visit including malaria case-management topic. Yet despite an overall increasing trend in malaria supervision the overall coverage at the end of the monitoring period was still well below universal targets (Table 6 and Figure 5).

Table 6: Health workers exposure to in-service training and supervision

	Baseline N=224 (%)	FU 1 N=237 (%)	FU 2 N=233 (%)	FU 3 N=220 (%)	FU 4 N=216 (%)	% change B vs FU4
In-service training						
Trained on new CM policy	0	21.5	24.9	27.7	26.2	+26.2
Supervision						
Any supervisory visit in past 3m	41.5	51.9	61.4	60.5	66.2	+24.7
Any visit including malaria CM	17.9	13.9	33.1	21.8	42.6	+24.7
Had visit including observations	6.7	6.8	11.2	11.4	17.1	+10.4

Figure 5: 2010-2012 national trends in health workers exposure to in-service training on the new case-management policy and supervision



Highlight: Health workers' coverage with in-service training and supervision

KEY FINDINGS:

The coverage of health workers trained on the new case-management policy is 26%. Despite a substantial increase in health workers' exposure to supervisory activities, the coverage of visits that include malaria case-management (43%) and observations of consultations (17%) is still low.

IMPLICATIONS:

The coverage of trained health workers on the new case-management policy should be urgently increased and it can be expected that the new national round of in-service trainings launched alongside the large scale implementation of RDTs at the end of 2012/beginning of 2013 will be reflected in increased exposure of health workers during the subsequent surveys in 2013. Furthermore, despite the improvements demonstrated, routine supervisory activities at district level focusing on malaria case-management activities should be quantitatively increased and qualitatively improved in line with recently produced supervisory manuals for malaria control.

3.3. Malaria case-management

This section presents results on the case-management practices for febrile, non-pregnant patients weighing ≥ 5 kg and presenting for an initial outpatient visit without being referred for hospitalization. The presentation of the results followed the multi-level analytic approach of the study. First, to assess the performance of the new case-management policy the results are presented from all health facilities regardless of the availability of case-management commodities. Second, to assess health workers adherence to the new guidelines the same results were restricted to the facilities where AL and diagnostics were in stock on the survey day. Third, at facilities with available AL, the quality of AL dosage prescriptions, and the quality of dispensing and counseling practices was respectively restricted to patients who had AL prescribed and to those who had both, AL prescribed and dispensed at facility. Finally, case-management results were stratified for children below 5 and above 5 years of age.

3.3.1. Main patients' characteristics

Main patients' characteristics were similar between surveys with respect to patients' sex, age, weight, body temperature and prior use of antimalarial drugs (Table 7).

Table 7: Main characteristics of febrile patients across surveys

	Baseline N=2,405 (%)	FU 1 N=1,456 (%)	FU 2 N=1,208 (%)	FU 3 N=1,291 (%)	FU 4 N=1,245 (%)
Female	56.1	53.8	55.3	57.9	58.1
Age					
<1 year	12.0	13.7	9.3	13.5	11.4
1-4 years	32.5	32.6	35.0	31.5	29.6
5-14 years	21.1	18.1	18.8	19.2	21.3
≥ 15 years	34.4	35.5	36.9	35.8	37.8
Weight^a					
5-14 kg	41.0	41.4	39.1	41.7	37.1
15-24 kg	17.1	17.3	16.8	15.5	17.2
25-34 kg	5.0	4.3	4.2	4.6	5.6
≥ 35 kg	37.0	36.7	38.9	38.3	40.1
Temperature $\geq 37.5^{\circ}\text{C}^{\text{b}}$	26.3	31.1	30.9	23.8	27.6
Prior use of any AM	5.0	4.6	4.6	3.3	4.8
Prior use of AL	1.9	1.5	2.4	2.4	3.1
Prior use of complete AL dose	0.5	0.6	1.2	0.6	0.7

^a Denominator does not include respectively 2 and 4 patients with missing values during the FU 1 and FU 4 surveys

^b Denominator does not include respectively 1 and 3 patients with missing values during the FU 1 and FU 4 surveys

3.3.2. Performance of the new diagnostic and treatment policy

The national case-management guidelines recommend that 1) “*all patients with fever or history of fever should be tested for malaria and only patients who test positive should be treated for malaria*” and 2) “*the recommended first line treatment for uncomplicated malaria is artemether-lumefantrine*” (MOPHS 2010). We considered composite case-management performance in line with guidelines if the following criteria were met: 1) febrile patient was tested for malaria; 2) if positive test result was reported patient was treated with AL, and 3) if negative test result was reported patient was not treated for malaria.

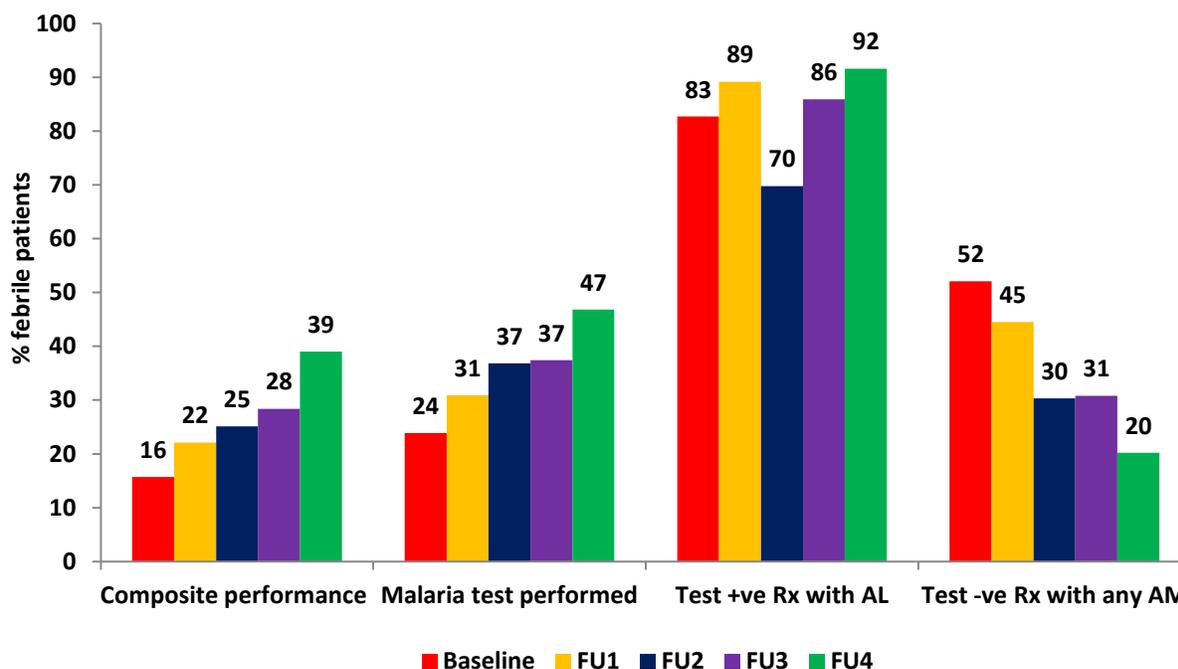
Overall, at all study facilities the composite performance improved from 15.7% at the baseline to 39.0% at the last follow-up survey (23.6% increase) (Table 8 and Figure 6). The same upward trend was observed in children below 5 years (11.8% vs 37.8%; 26.0% increase) and in patients 5 years and older (18.9% vs 39.9%; 21.0% increase). A similar improvement trend was observed in testing rates of febrile patients – from 23.9% at the baseline to 46.8% at the last follow-up survey (23.9% increase). Testing rates in children below 5 years increased from 20.5% to 44.1% (23.6 % increase) while performance of the same task for patients 5 years and older improved from 26.7% to 48.6% (21.9% increase).

Stratified analysis by the use and result of malaria test provides further light on the case-management practices (Table 8 and Figure 6). First, recommended AL treatment for test positive patients was relatively high but not entirely followed. Yet comparing the baseline results with the results of the last survey an improvement of 8.9% was observed in correct treatment of test positive patients (from 82.7% to 91.6%). In the same period a decline of 8.9% was observed in the treatment of test positive patients with non-recommended combination of AL and quinine. Second, among patients with negative test result, a substantial decline in proportion of patients treated for malaria during the last survey was observed compared to the baseline results (52.1% vs 20.2%; 31.9% decrease). The decline in this practice was seen in both age groups – in children below 5 years (56.7% vs 16.9%; 39.8% decrease) and in patients 5 years and older (48.7% vs 24.1%; 24.6% decrease). Finally, despite 28.7% decline in antimalarial prescriptions observed among patients without malaria test performed, 39.1% of these patients were however treated for malaria during the last survey, nearly all with AL therapy (Table 8).

Table 8: Performance of the new case-management policy - diagnostic and treatment practices for febrile patients presenting to all health facilities regardless of the availability of commodities

	Baseline N=2,405 (%)	FU 1 N=1,456 (%)	FU 2 N=1,208 (%)	FU 3 N=1,291 (%)	FU 4 N=1,245 (%)	% change B vs FU4
Composite performance	15.7	22.1	25.1	28.4	39.0	+23.6
Malaria test performed	23.9	30.9	36.8	37.4	46.8	+22.9
Rx among test positives	N=295	N=212	N=205	N=191	N=180	
AL	82.7	89.2	69.8	85.9	91.6	+8.9
AL+QN	10.2	0.9	12.2	9.9	2.8	-7.4
QN	4.1	3.3	12.7	1.6	4.4	+0.3
Other AM	2.4	3.8	2.9	1.0	0.6	-1.8
No AM prescribed	0.7	2.8	2.4	1.6	0.6	-0.1
Rx among test negatives	N=280	N=238	N=239	N=292	N=402	
AL	34.6	39.9	24.3	25.7	17.2	-17.4
SP	11.4	3.4	2.5	1.7	1.2	-10.2
AL+QN	2.9	0	1.3	2.1	0.3	-2.6
QN	1.8	0.4	1.7	0.7	0.3	-1.5
Other AM	1.4	0.8	0.4	0.7	1.2	-0.2
No AM prescribed	47.9	55.5	69.8	69.2	79.9	+32.0
Any AM prescribed	52.1	44.5	30.3	30.8	20.2	-31.9
Rx when test not done	N=1,830	N=1,006	N=764	N=808	N=663	
AL	59.8	55.4	48.2	45.7	31.4	-28.4
AL+QN	3.1	1.5	2.8	1.7	2.3	-0.8
SP	2.9	1.4	2.5	1.2	1.4	-1.5
QN	1.6	1.1	2.9	0.4	3.6	+2.0
Other AM	0.5	0.5	0.3	0.5	0.5	0.0
No AM prescribed	32.2	40.2	43.3	50.5	60.9	+28.7
Any AM prescribed	67.8	59.8	56.8	49.5	39.1	-28.7

Figure 6: 2010-2012 national trends in the diagnostic and treatment performance of the new case-management policy



3.3.3. Health workers adherence to the new diagnostic and treatment guidelines

This section reports health workers case-management practices from facilities where diagnostics and AL were in stock during the surveys (Table 9 and Figure 7). At these facilities, the performance of the composite case-management indicator improved from 28.1% at the baseline to 47.8% (19.7% increase) during the last follow-up survey, while testing rates improved from 42.5% to 57.5% (15.0% increase). In children below 5 years of age the composite performance improved from 19.3% to 44.9% (25.6% increase) while testing rates improved from 33.3% to 52.2% (18.9% increase). In patients 5 years and older the composite performance improved from 36.1% to 49.8% (13.7% increase) while testing rates increased from 50.8% to 61.2% (10.4% increase).

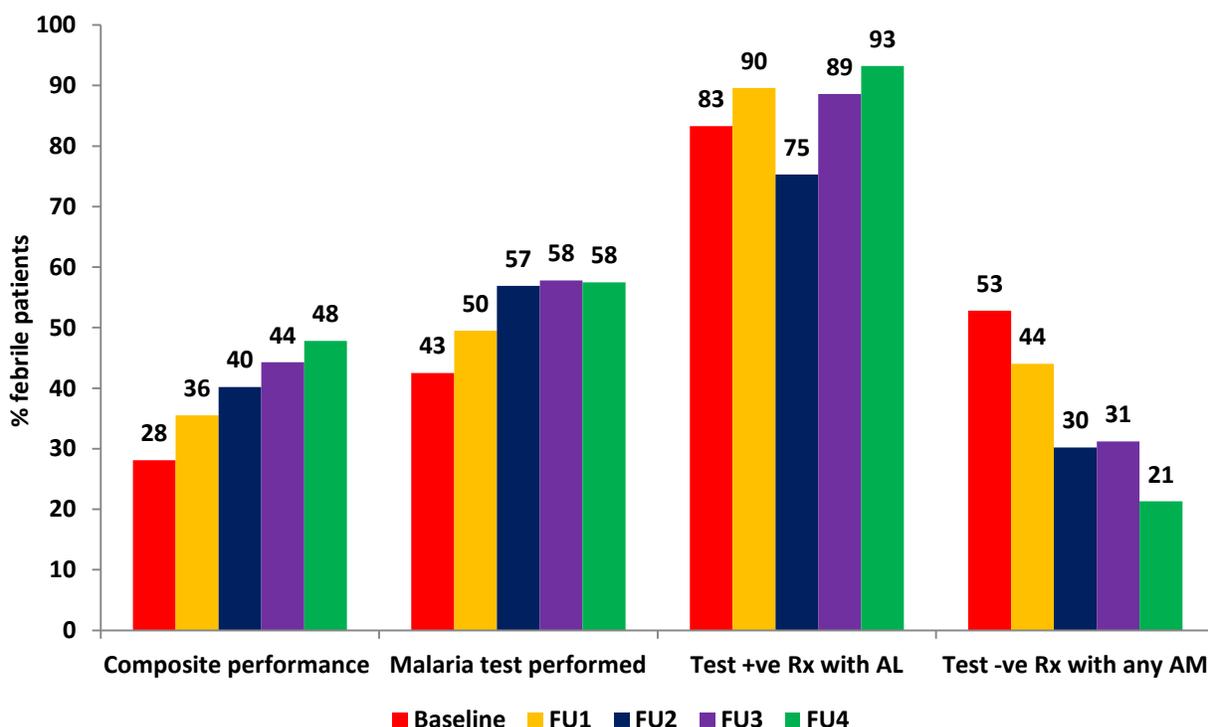
Since AL was absent from the stock in only 6-11% of facilities across all surveys, the key indicators on treatment practices for test positive and test negative patients were similar to the patterns observed at all facilities. In summary, at these facilities AL treatment for test positive patients improved from 83.3% at the baseline to 93.3% at the last follow-up survey (9.9% increase) while in the same period antimalarial treatment for test negative patients decreased from 52.8% to 21.3% (31.5% decrease) (Table 9 and Figure 7). Among febrile patients without test performed, a substantial decline (40.2%) in

prescriptions of antimalarial treatments was also observed. However, by the end of the monitoring period and despite the availability of diagnostics at these facilities, 23.5% of patients in this category were still treated for malaria (Table 9).

Table 9: Health workers adherence to guidelines - diagnostic and treatment practices for febrile patients presenting to facilities where malaria diagnostic services were available and AL was in stock

	Baseline N=1,239 (%)	FU 1 N=861 (%)	FU 2 N=634 (%)	FU 3 N=769 (%)	FU 4 N=919 (%)	% change B vs FU4
Composite performance	28.1	35.5	40.2	44.3	47.8	+19.7
Malaria test performed	42.5	49.5	56.9	57.8	57.5	+15.0
Rx among test positives	N=276	N=201	N=154	N=175	N=162	
AL	83.3	89.6	75.3	88.6	93.2	+9.9
AL+QN	10.5	1.0	14.9	8.6	3.1	-7.4
QN	4.0	3.5	5.2	1.1	3.1	-0.9
Other AM	1.5	3.5	2.0	1.1	0.6	-0.9
No AM prescribed	0.7	2.5	2.6	0.6	0.0	-0.7
Rx among test negatives	N=250	N=225	N=205	N=269	N=366	
AL	35.6	40.4	23.9	26.4	18.3	-17.3
SP	10.8	2.7	2.9	1.9	1.1	-9.7
AL+QN	3.2	0	1.5	1.5	0.3	-2.9
QN	2.0	0.4	1.5	0.7	0.3	-1.7
Other AM	1.2	0.4	0.5	0.7	1.4	+0.2
No AM prescribed	47.2	56.0	69.8	68.8	78.7	+31.5
Any AM prescribed	52.8	44.0	30.2	31.2	21.3	-31.5
Rx when test not done	N=713	N=435	N=275	N=324	N=391	
AL	55.3	42.3	36.7	32.4	19.4	-35.9
AL+QN	3.2	1.2	1.1	0.3	1.8	-1.4
SP	3.0	1.6	0.7	1.9	1.3	-1.7
QN	1.5	0.7	1.1	0.6	0.8	-0.7
Other AM	0.7	0	0.4	0.9	0.3	-0.4
No AM prescribed	36.3	54.3	60.0	63.9	76.5	+40.2
Any AM prescribed	63.7	45.8	40.0	36.1	23.5	-40.2

Figure 7: 2010-2012 national trends in health workers diagnostic and treatment adherence to national case management guidelines



Highlight: Case-management policy performance and health workers adherence

KEY FINDINGS:

- A) The composite case-management performance - measured at all facilities regardless of the availability of the commodities as an indicator of the policy performance - increased from 16% to 39%. The changes in individual case-management components were as follows: 1) testing rates increased from 24% to 47%, 2) treatment of test positive patients with AL increased from 83% to 92%, and 3) antimalarial treatment of test negative patients decreased from 52% to 20%.
- B) The same composite performance - measured at facilities where malaria diagnostics and AL are available as an indicator of the health workers adherence - increased from 28% to 48%. At these facilities the changes in individual case-management components were as follows: 1) testing rates increased from 43% to 58%, 2) treatment of test positive patients with AL increased from 83% to 93%, and 3) antimalarial treatment of test negative patients decreased from 53% to 21%.

IMPLICATIONS:

Despite a substantial improvement trends observed by end of 2012, the composite performance is still low. The reasons for low policy performance are absence of diagnostics in a quarter of facilities, suboptimal testing rates, and some non-adherence to malaria test results more commonly to test-negative than to test positive patients. To bridge the gap the future activities should focus on 1) supply of diagnostics to all health facilities and 2) reinforcement of clinical practices during the in-service training, supervisory visits and IEC campaigns targeting health workers to increase testing of febrile patients and treatment adherence to test results.

3.3.4. Correctness of AL dosing

The correctness of AL dosage prescriptions was assessed in comparison with national guidelines dosage recommendations for four weight-specific AL categories. They were classified as: 1) recommended, 2) overdosed, and 3) underdosed prescriptions. The baseline value for AL prescribing in recommended dose was high (89.2%). Yet an increasing trend in the correct dosing practices was observed (Table 10 and Figure 8). During the last follow-up survey 97.9% of patients (8.7% increase) were correctly dosed for their weight - the proportion equally high in children below 5 years of age (99.4%) and patients 5 years and older (97.0%). Finally, we also observed a decline trend in overall prescriptions of AL below and above recommended dose, the practices that became nearly non-existent by the end of the monitoring period (Table 10).

Table 10: Correctness of weight-specific AL dosing for patients who had AL prescribed

	Baseline N=1,328 ^a (%)	FU 1 N=839 (%)	FU 2 N=569 ^c (%)	FU 3 N=568 ^d (%)	FU 4 N=428 ^a (%)	% change B vs FU2
Recommended dose	89.2	92.4	92.8	97.7	97.9	+8.7
Underdose	7.2	4.4	3.7	0.2	1.6	-5.6
Overdose	3.7	3.2	3.5	2.1	0.5	-3.2

^a Denominators do not include incomplete AL prescriptions (107 at baseline, 2 at FU 2, 40 at FU 3 and 14 at FU 4)

Highlight: Correctness of AL dosing

KEY FINDINGS:

An improvement trend was observed in AL prescribing in accordance with weight-specific recommendations. During all survey rounds the large majority (89-98%) of patients had AL correctly prescribed while underdosed and overdosed prescriptions were very rare (0-7%).

IMPLICATIONS:

Correct weight-based dosing is a critical pre-requisite to ensure high rates of patients' adherence to AL regimen and AL treatment success. The optimistic findings observed by end of 2012 should be regularly monitored.

3.3.5. Dispensing and counseling practices

The quality of AL dispensing and counseling was evaluated for 7 performance tasks specified in the national malaria guidelines and training manuals. The performance was similar across survey rounds with an exception of the administration of the first AL dose at the facility which improved by 10% between the baseline and the last follow-up survey (Table 11 and Figure 8). Comparing the same survey periods, the changes for the remaining 6 tasks were negligible and ranged between tasks from 0-2%. Overall, of 7 tasks measured during the last survey, 4 were performed for more than two-thirds of the

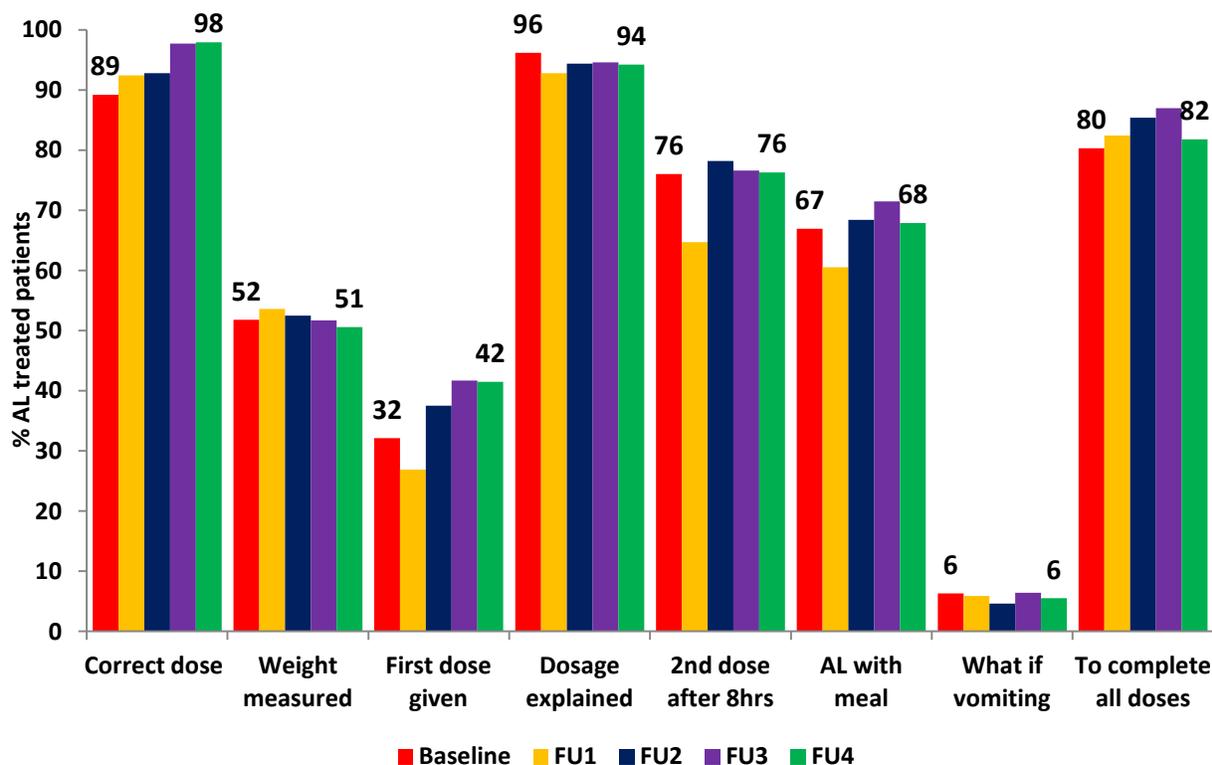
patients - advice on dosing (94.2%), advice on the second dose after 8 hours (76.3%), advice on taking AL after the meal (67.9%) and advice on completing all doses (81.8%). During the same assessment period, the remaining 3 tasks were less commonly performed - weighing of patients (50.6%), administration of the first dose at health facility (41.5%), and advice on vomiting (5.5%) (Table 11 and Figure 8).

Table 11: Dispensing and counseling practices among patients who had AL dispensed

	Baseline N=1,408 (%)	FU 1 N=797 (%)	FU 2 N=478 (%)	FU 3 N=576 (%)	FU 4 N=417 (%)	% change B vs FU3
Weight measured	51.8	53.6 ^a	52.5	51.7	50.6	-1.2
First dose given at facility	32.1	26.9	37.5	41.7	41.5	+9.4
Dosage explained	96.2	92.8	94.4	94.6	94.2	-2.0
Told to take 2 nd dose after 8hrs	76.0	64.7	78.2	76.6	76.3	+0.3
Told to take drugs after meal	66.9	60.5	68.4	71.5	67.9	+1.0
Told what to do if vomiting	6.3	5.9	4.6	6.4	5.5	-0.8
Told to complete all doses	80.3	82.4	85.4	87.0	81.8	+1.5

^a Denominator does not include 2 observations with missing values

Figure 8: 2010-2012 national trends in health workers AL dosing, dispensing and counseling practices



Highlight: AL dispensing and counseling practices

KEY FINDINGS:

There were hardly any improvements observed in the performance of dispensing and counseling tasks. The main tasks that require substantial improvements include provision of advice on what to do in case of vomiting (6%), administration of the first AL dose at the facility (42%) and weighing of patients (51%).

IMPLICATIONS:

The performance of recommended AL dispensing and counseling tasks is critical to ensure high rates of patients' adherence and treatment success. The future in-service training, supervisory and IEC activities targeting health workers should focus on these tasks.

4. CONCLUSION AND RECOMMENDATIONS

The findings of five rounds of national surveys revealed that most of the key indicators measured in this study have shown improvements by the end of 2012 however the changes were smaller than expected. Consequently, most of the key indicators are still well below the 2013 targets aiming at universal availability of malaria case-management commodities, universal coverage of health facilities and health workers with malaria related health systems support activities and universal health worker's adherence to national outpatient guidelines for malaria diagnosis, treatment, counseling, and drug dispensing (Annexes 1-2). To effectively reduce the gap in reasonable time the following recommendations are made:

- Implementation of RDTs should be scaled up as part of the existing national RDT implementation plan containing comprehensive package of case-management interventions.
- Quality control for malaria microscopy and RDTs supported by field supervision should be scaled-up in line with the national policy guidelines for parasitological diagnosis of malaria.
- The routine supervision should include malaria case-management component and be quantitatively increased and qualitatively improved in line with national supervisory manuals.
- The new national malaria case-management guidelines and wall charts should be repeatedly disseminated to the peripheral health facilities through the implementation channels such as in-service training for health workers and KEMSA supply chains.
- Drug management activities should focus on strengthening of logistic management information systems, development of district capacities to respond to stock-out warnings, and large scale procurement and distribution of newly recommended antimalarial therapies for management of treatment failures (DHA-PPQ) and severe malaria (parenteral artesunate).

- An emphasis should be placed on the following case-management messages during the current in-service training and supervisory visits: 1) all febrile patients should be tested, 2) test negative patients should not be treated for malaria, 3) all patients should be weighed, 4) the first AL dose should be administered at facilities even in the absence of food, and 5) patients should be advised to return for replacement dose to complete full treatment course in case of vomiting.

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Annex 1: Summary of key health systems support M&E indicators

Health systems support M&E indicators	2010 Rd 1	2010 Rd2	2011 Rd 3	2012 Rd 4	2012 Rd 5	Target 2013
% of facilities with AL stock out on survey day						
All AL packs	64.9	71.6	45.4	61.1	71.5	100
AL 6 pack	81.0	89.2	78.2	78.5	83.1	100
AL 12 pack	79.9	86.4	59.8	73.3	85.6	100
AL 18 pack	79.3	81.8	66.7	72.7	80.7	100
AL 24 pack	86.2	86.9	73.6	85.5	84.9	100
Any AL pack	94.3	97.2	89.1	93.0	92.4	100
% of facilities with stock out of AL for 7 or more consecutive days in past 3 months						
All AL packs	27.2	21.0	6.3	9.4	21.5	0
AL 6 pack	37.6	30.1	19.5	21.1	27.9	0
AL 12 pack	43.9	32.4	31.6	28.7	34.9	0
AL 18 pack	52.0	42.1	27.6	29.8	39.0	0
AL 24 pack	39.3	35.2	19.5	19.9	34.3	0
Any AL pack	59.5	52.3	44.8	39.0	45.4	0
% of facilities with stock out of recommended antimalarials for 7 or more consecutive days in past 3 months						
Quinine tablets	25.4	22.2	16.1	15.1	24.0	0
Quinine injections	20.8	20.5	17.2	20.9	43.9	0
% of facilities without any malaria diagnostic support (RDT or microscopy) for 7 or more consecutive days in past 3 months	46.6	42.1	40.8	32.0	24.4	0
% of facilities having national malaria case-management guideline	0	5.7	47.7	45.3	56.7	100
% of HWs trained on new malaria case-management policy	0	21.5	24.9	27.7	26.2	100
% of HWs who had at least one supervisory visit in past 3 months that included observation of malaria case-management	6.7	6.8	11.2	11.4	17.1	100
% of facilities which had at least one visit in past 3 months that included quality control of malaria microscopy^a	9.1	18.1	17.0	22.8	34.0	100
% of facilities which had at least one visit in past 3 months that included use of malaria RDTs^a	5.3	6.7	20.8	20.7	22.2	100

^aThe indicator includes only facilities which provide these services on survey days

Annex 2: Summary of key malaria case-management M&E indicators

Malaria case-management M&E indicators	2010 Rd 1	2010 Rd2	2011 Rd 3	2012 Rd 4	2012 Rd 5	Target 2013
Indicators showing overall performance of the new case-management policy - all facilities regardless the availability of the commodities						
% of febrile patients who are managed according to national guidelines (tested for malaria AND only positive test results are treated with AL)	15.7 (11.8 _{<5} , 18.9 _{≥5})	22.1 (18.7 _{<5} , 25.0 _{≥5})	25.1 (21.5 _{<5} , 27.9 _{≥5})	28.4 (23.6 _{<5} , 32.3 _{≥5})	39.0 (37.8 _{<5} , 39.9 _{≥5})	100
% of febrile patients who are tested with RDT or microscopy	23.9 (20.5 _{<5} , 26.7 _{≥5})	30.9 (25.6 _{<5} , 35.5 _{≥5})	36.8 (31.0 _{<5} , 41.5 _{≥5})	37.4 (31.5 _{<5} , 42.3 _{≥5})	46.8 (44.1 _{<5} , 48.6 _{≥5})	100
% of febrile patients with positive test result who are treated with AL	82.7 (74.8 _{<5} , 86.7 _{≥5})	89.2 (90.9 _{<5} , 88.2 _{≥5})	69.8 (70.3 _{<5} , 69.5 _{≥5})	85.9 (84.1 _{<5} , 86.9 _{≥5})	91.6 (90.9 _{<5} , 92.1 _{≥5})	100
% of febrile patients with negative test result who are <u>not</u> treated for malaria	47.9 (43.3 _{<5} , 51.3 _{≥5})	55.5 (58.3 _{<5} , 53.5 _{≥5})	69.8 (68.7 _{<5} , 70.6 _{≥5})	69.2 (69.3 _{<5} , 69.1 _{≥5})	79.9 (83.7 _{<5} , 77.4 _{≥5})	100
Indicators showing health workers adherence to guidelines – facilities where malaria diagnostics and AL are available						
% of febrile patients who are managed in accordance with national guidelines (tested for malaria AND only positive test results treated with AL)	28.1 (19.3 _{<5} , 36.1 _{≥5})	34.6 (29.0 _{<5} , 41.7 _{≥5})	40.2 (32.6 _{<5} , 47.2 _{≥5})	44.3 (37.9 _{<5} , 49.3 _{≥5})	47.8 (44.9 _{<5} , 49.8 _{≥5})	100
% of febrile patients who are tested with RDT or microscopy	42.5 (33.3 _{<5} , 50.8 _{≥5})	49.5 (38.8 _{<5} , 59.6 _{≥5})	56.9 (46.8 _{<5} , 66.4 _{≥5})	57.8 (50.6 _{<5} , 63.6 _{≥5})	57.5 (52.2 _{<5} , 61.2 _{≥5})	100
% of febrile patients with positive test result who are treated with AL	83.3 (75.3 _{<5} , 87.4 _{≥5})	89.6 (91.8 _{<5} , 88.3 _{≥5})	75.3 (71.9 _{<5} , 77.3 _{≥5})	88.6 (85.5 _{<5} , 90.3 _{≥5})	93.2 (93.1 _{<5} , 93.3 _{≥5})	100
% of febrile patients with negative test result who are <u>not</u> treated for malaria	47.2 (42.3 _{<5} , 50.7 _{≥5})	56.0 (61.1 _{<5} , 52.6 _{≥5})	69.8 (67.1 _{<5} , 71.7 _{≥5})	68.8 (69.1 _{<5} , 68.6 _{≥5})	78.7 (83.1 _{<5} , 75.9 _{≥5})	100
Indicators showing quality of AL prescribing, dispensing and counseling – febrile patients with AL prescribed and dispensed						
% of patients with AL prescribed in recommended weight-specific dose	89.2 (88.7 _{<5} , 89.6 _{≥5})	92.4 (93.8 _{<5} , 91.3 _{≥5})	92.8 (93.4 _{<5} , 92.3 _{≥5})	97.7 (99.1 _{<5} , 96.7 _{≥5})	97.9 (99.4 _{<5} , 97.0 _{≥5})	100
% of patients with AL dispensed who had weight measured	51.8 (60.0 _{<5} , 45.1 _{≥5})	53.6 (71.4 _{<5} , 39.4 _{≥5})	52.5 (57.3 _{<5} , 50.8 _{≥5})	51.7 (58.6 _{<5} , 46.9 _{≥5})	50.6 (56.7 _{<5} , 46.9 _{≥5})	100
% of patients with AL dispensed who had first dose given at facility	32.1 (35.7 _{<5} , 29.2 _{≥5})	26.9 (29.3 _{<5} , 24.9 _{≥5})	37.5 (31.0 _{<5} , 42.2 _{≥5})	41.7 (42.7 _{<5} , 41.0 _{≥5})	41.5 (46.5 _{<5} , 38.5 _{≥5})	100
% of patients with AL dispensed who were explained on dosing at home	96.2 (96.2 _{<5} , 96.1 _{≥5})	92.9 (92.4 _{<5} , 93.2 _{≥5})	94.4 (93.2 _{<5} , 95.3 _{≥5})	94.6 (95.0 _{<5} , 94.4 _{≥5})	94.2 (94.3 _{<5} , 94.2 _{≥5})	100
% of patients with AL dispensed who were advised what to do if vomiting occurs	6.3 (7.8 _{<5} , 5.0 _{≥5})	5.9 (6.5 _{<5} , 5.4 _{≥5})	4.6 (5.0 _{<5} , 4.4 _{≥5})	6.4 (7.5 _{<5} , 5.6 _{≥5})	5.5 (10.2 _{<5} , 2.7 _{≥5})	100