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Vendor-to-Vendor Education to Improve Malaria Treatment by Drug Outlets in Kenya

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OPERATIONS RESEARCH RESULTS

Vendor-to-Vendor Education to Improve Malaria Treatment by Drug Outlets in Kenya

Abstract

Private drug outlets have grown increasingly important as the main source of malaria treatment for residents of malaria endemic areas. Unfortunately, the quality of information and the quantity and quality of drugs provided is often deficient. The World Health Organization has included the private sector in its Roll Back Malaria strategy, but has noted that it is notoriously difficult to change private sector practices without burdening the governments of developing countries. In the Bungoma district of Kenya, the Quality Assurance Project (USA) teamed up with the Bungoma District Health Management Team and African Medical and Research Foundation to test an innovative, low-cost approach for improving the prescribing practices of private drug outlets. The intervention, called Vendor-to-Vendor Education, involved training and equipping wholesale counter attendants and mobile vendors with customized job aids for distribution to small rural and peri-urban retailers. The job aids consisted of: (a) a shopkeeper poster that described the new malaria guidelines, provided a treatment schedule, and gave advice on the appropriate actions to take in various scenarios; and (b) a client poster that depicted the five approved malaria drugs and advised clients to ask for them. The training of wholesalers began in April 2000.

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Abstract Continued

Six months after the training started, the authors evaluated the program using mystery shoppers, who posed as caretakers of sick children needing medication. The evaluation revealed that outlets receiving job aids had significantly better malaria knowledge and prescribing practices than those that did not. It was estimated that about 500 drug outlets (of 1500 in Bungoma district and 2400 in neighboring districts) were reached by the intervention and that about 82,000 additional malaria clients received proper treatment as a result of the intervention. Since the intervention cost about $8300 to conduct (excluding the cost of the mystery shopper evaluation), the cost is $0.10 per beneficiary. For greater impact, it would be necessary to strengthen consumer demand for the correct drugs, to develop ways to continue to motivate the wholesale counter attendants, and to achieve proper packaging and quality enforcement at the national level.

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Vendor-to-Vendor Education to Improve Malaria Treatment by Drug Outlets in Kenya

Paula Tavrow, Jennifer Shabahang, and Sammy Makama

Abbreviations

AMREF	African Medical and Research Foundation
AQ	Amodiaquine
BDMI	Bungoma District Malaria Initiative
CQ	Chloroquine
DHMT	District Health Management Team
Ksh	Kenyan shilling
MOH	Ministry of Health
NMCC	National Malaria Control Committee
NS	Not significant
QA	Quality Assurance
RBM	Roll Back Malaria
SP	Sulfadoxine-pyrimethamine
USAID	United States Agency for International Development
WHO	World Health Organization

1.0 Introduction

Malaria is one of the most serious public health issues worldwide. It kills at least one million people each year: about 3,000 per day. Almost 300 million people suffer from acute malaria each year, causing not only death and morbidity but severe economic losses (Roll Back Malaria website 2001). Current strategies to combat malaria, led by the World Health Organization's "Roll Back Malaria" initiative, focus on early and effective treatment, along with multiple prevention strategies. Effective treatment is hampered by the lack of universally efficacious and inexpensive drugs. It is also hindered by frequently incorrect dosing—either under- or over-dosing—and the widespread use in endemic areas of anti-malarial drugs without a laboratory diagnosis. These factors lead to the rapid rise of drug resistance, which necessitates constant change in malaria treatment guidelines.

Contributing to the difficulty of malaria control is the decreasing use of public health services. An important consequence of health sector reform in developing countries has been the increased use of private practitioners and drug outlets. Previously, free public health facilities had been most people's prime source of medical care, especially in sub-Saharan Africa. However, public facilities often have a number of drawbacks—such as distance from people's homes, inconvenient operating times, long waits, inconsiderate providers, and drug shortages. In contrast, private services are usually closer to people's homes, have short queues, are open in the evening, and stock sufficient drugs. When public facilities charge for medical consultations and drugs, people opt for private services. It is estimated that for certain common ailments, such as malaria, as many as 60 to 80 percent of people in developing countries now first visit private drug outlets or practitioners for treatment (McCombie 1996). Because caretakers of sick children generally acquire their knowledge on anti-malarial drugs from the site where they obtain them (WHO Technical Report 2000), the quality of private sector services has grown more important.

Unfortunately, the technical quality of private medical and pharmaceutical services is often questionable,

mainly because they are outside most governments' capacity to inform, update, monitor, and regulate. Governments in endemic areas generally do little more than require private establishments to be registered by a licensed doctor or pharmacist. Yet it is widely acknowledged that untrained personnel, whom a licensed practitioner may only nominally supervise, frequently staff these establishments. These personnel may not be able to give consumers correct information about the drugs they purchase. Also, interest in making money may take precedence over healing people.

The World Health Organization (WHO) recognizes that government health services are often not the predominant source of malaria treatment and recommends that private health services be included in strategies to control and treat malaria. It recommends that researchers investigate approaches for collaborating with the private sector, especially drug sellers. WHO acknowledges, however, that achieving rational prescribing in the private sector is "notoriously difficult" due to influences from patient demand, drug advertising, and profit margins (WHO Technical Report 2000).

Monitoring and influencing the quality of private services has been a major challenge for resource-constrained governments. Even communicating new standards of diagnosis and treatment to private practitioners poses immense challenges to governments with limited resources. To date, most approaches for improving the performance of the private sector involve direct shopkeeper training to improve malaria treatment practices, such as is being tested in Kilifi district, Kenya (Marsh et al. 1999). Given the multitudes of shopkeepers in these countries, as well as the constantly changing counter attendants, approaches that require three to eight days of classroom training per drug outlet are not feasible for most governments. Innovative approaches are needed to achieve greater quality of private services without significantly increasing the burden or cost to the government.

In late 1999, the Quality Assurance (QA) Project, together with members of the Bungoma District Health Management Team in Kenya and the African Medical and Research Foundation (AMREF), developed and introduced a new intervention to improve private sector dispensing practices. This intervention, called "Vendor-to-Vendor Education," relies on wholesale vendors to communicate malaria guidelines to retailers via a customized job aid. This intervention was evaluated in October 2000 using mystery shoppers. This paper describes the intervention and presents the main results.

2.0 Background

In Kenya, approximately 26,000 children die each year from malaria. About a third of out-patient attendance in health facilities throughout the country is attributable to malaria. Adult disability due to malaria translates to an economic loss of about 160 million working days per year. Bungoma district, located in Western Province, is a malaria endemic area with a population of about one million. Malaria in Bungoma district accounts for 39 percent of out-patient visits, 36 percent of in-patient mortality, and 42 percent of hospital in-patient admissions (Bungoma DHMT 1998). Malaria transmission occurs year round, peaking in the rainy season months of April and May.

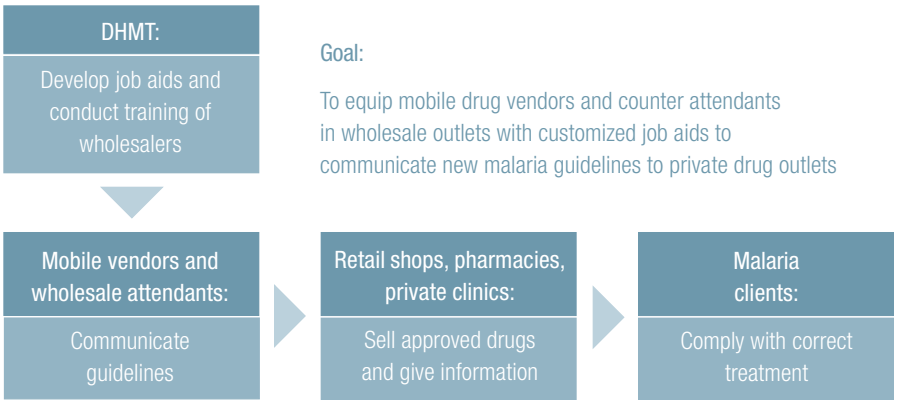
In 1998 the government of Kenya changed its first-line anti-malarial treatment from chloroquine to sulfadoxine-pyrimethamine (SP). Currently, SP is the first-line drug, available over the counter for home use, and amodiaquine is to be used as the second-line drug. Chloroquine can be sold only by prescription. However, the current drug policy is not enforced: chloroquine and amodiaquine are widely available in shops. In 1999, the government of Kenya conducted efficacy-testing of 33 SP brands. Five were approved for malaria treatment: Fansidar, Laridox, Falcidin, Orodar, and Metakelfin. However, because of lack of enforcement, the 28 SP drugs that were not approved still remained on the market.

Several earlier studies in Bungoma district contributed to the initiation of this research. In 1998 the Bungoma District Health Management Team (DHMT) conducted a survey to identify groups and individuals involved in the actual distribution of anti-malarials and anti-pyretics in the district. The research team interviewed private clinicians, pharmacists, drug vendors, and community pharmacies. Shops or kiosks were found to be the main source of drugs for people in rural areas. The survey revealed that 87 percent of the shopkeepers surveyed had never received training on drug use, but 60 percent of them gave some instruction on dosages to their customers. Additionally, 27 percent of the shopkeepers surveyed did not know the difference between anti-

malarials and anti-pyretics (Bungoma DHMT 1998).

A formative study for the Bungoma District Malaria Initiative (BDMI), conducted in 1996, interviewed caretakers of 315 recently febrile children under the age of five. According to caretakers, 47 percent of children received home treatment with an anti-malarial, and one-third of children received their only anti-malarial treatment at home. The study also found that 29 percent of anti-malarials for home treatment were purchased in a small shop or kiosk (Hamel et al. 2001).

Figure 1
Main Components of the Vendor-to-Vendor Education Intervention



3.0 Objectives of the Study

The purpose of this study was to test whether a low-cost outreach education strategy would increase private drug outlets'[1] knowledge of and compliance with national malaria treatment guidelines in Bungoma district, Kenya. Unlike "academic detailing," where outreach educators are health providers or experts, in this study the outreach educators were mobile vendors and counter attendants from wholesale pharmacies and general shops. The strategy promoted a unique partnership between the public health system (namely the Bungoma DHMT) and the private sector.

The study sought to answer the following questions:

- Will wholesale counter attendants and mobile vendors widely and effectively communicate new malaria treatment standards to private drug outlets?
- Do private drug outlets that receive the job aids understand and comply with malaria guidelines better than those that do not?
- What is the cost-effectiveness of the vendor-to-vendor intervention?

4.0 Description of Intervention

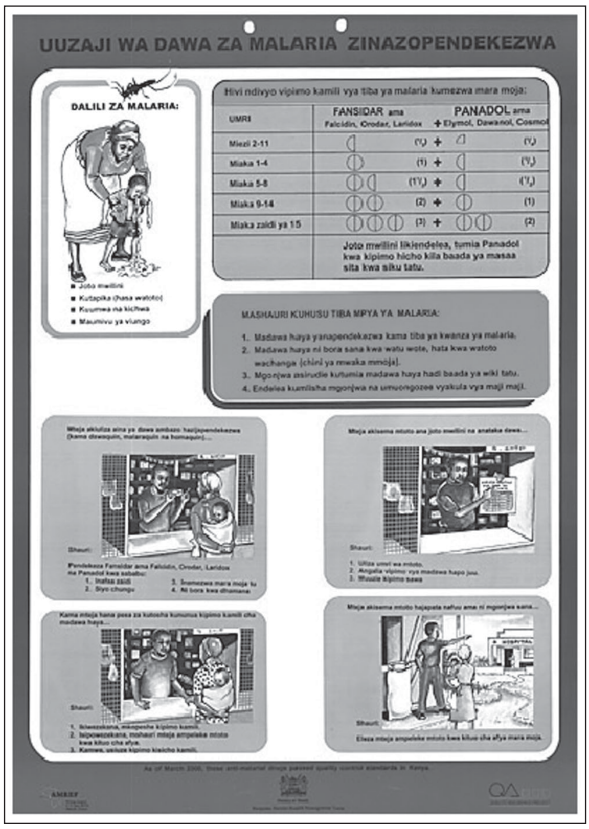
The intervention tested whether wholesalers (mobile vendors and counter attendants from wholesale outlets) equipped with customized job aids could serve as communicators of malaria treatment guidelines to private drug outlets (Figure 1). Mobile vendors usually purchase drugs from general shops in urban areas and then visit rural areas to resell the drugs to rural shops and kiosks. Counter attendants, who are stationary, are employees of urban or large rural pharmacies and wholesale general shops.

To obtain specific information needed for the job aids, the DHMT and QA Project conducted formative research through individual interviews with private drug outlets and wholesalers. The study team learned the common misperceptions and concerns that drug outlet attendants and the public had about SP and the main difficulties faced by drug sellers (e.g., when consumers do not have enough money to buy the complete dose). The team then worked with a graphic artist to develop two job aids (posters) to communicate the malaria guidelines and messages regarding correct treatment. The job aids were pretested several times with the target population.

The **shopkeeper job aid** (Figure 2) was intended for shopkeepers and retail drug outlet attendants to consult when selling anti-malarial

[1] In this report, "private drug outlets" refers to retail shops and kiosks, retail pharmacies, and private clinics.

Figure 2
Shopkeeper Job Aid



drugs. It was to be hung prominently in the shop so that the shopkeeper could easily use it when serving clients. The job aid contained the signs of malaria, a dosage chart of the approved SPs and anti-pyretics, treatment advice, and common situations faced by shopkeepers and suggestions on how to deal with them. The **client job aid** (Figure 3) was to be placed at the drug outlet to communicate to clients that SP was now available there. This was particularly important for shops because previously they were not allowed to sell SP. The job aid reminded people to treat malaria properly and depicted the five approved SP drugs in their actual packaging. Both job aids were produced in Kiswahili, a language understood by all retailers in the district.

The DHMT and QA Project then developed a **three-hour orientation** for wholesale owners and a one-day course to train counter attendants and mobile vendors. In order to involve the counter attendants, orientation sessions were first held with the owners of the wholesale pharmacies and general shops. During this three-hour session the new malaria guidelines and the proposed intervention were explained and discussed. The owners then agreed to send their attendants to the training and let them distribute the job aids during the course of their work.

In April and May 2000, the DHMT conducted five separate **one-day training** sessions for mobile vendors and counter attendants in the major urban areas of Bungoma district. Topics were an overview of district malaria activities, general information on malaria, the government of Kenya's policy on malaria treatment, inter-personal communication skills, and practical sessions on the use of job aids. At the end of the training the wholesalers received about 20 copies of each job aid to begin distribution. Out of approximately 105 wholesale vendors identified, about three-quarters participated in the training: 22 wholesale pharmacy attendants, 11 wholesale shop attendants, and 40 mobile drug vendors. All who were trained received yellow caps and T-shirts with the "Tibu malaria sawa sawa" ("Treat malaria correctly") slogan.

The communication of the guidelines was to occur during the normal business interaction. For wholesale counter attendants, they were to communicate the guidelines and give the job aids to retailers when they came to the wholesale pharmacy or general shop to buy antimalarials. For mobile vendors the interaction would occur at the retail shop, pharmacy, or clinic, since the mobile vendors travel to these outlets. The counter attendants and mobile vendors were asked to obtain a receipt from each shopkeeper who received a job aid. By signing the receipt, the recipient of the job aid agreed to follow the malaria guidelines when serving clients.

Two to three months after training, the study team monitored wholesale attendants and mobile vendors. During the monitoring visits, the team checked their malaria knowledge with a quiz and collected receipts. The quiz consisted of key issues covered during the training, and the attendants and mobile vendors were given feedback on questions they answered incorrectly. Out of ten points the average scores were as follows: pharmacy attendants, 9.8; general wholesale attendants, 9.5; and mobile vendors, 9.1. This same quiz was used during the evaluation to assess the malaria knowledge of retailers. It is important to note that we directly trained only the wholesale attendants and mobile

vendors. Retail drug vendors received training only from the wholesalers. Thus, the intervention was given the name "Vendor-to-Vendor Education."

5.0 Evaluation Methodology

5.1 Use of Mystery Shoppers

Mystery shoppers (simulated clients) were used to assess the implementation and impact of the intervention in October 2000. Using mystery shoppers was a useful way to find out what actually happened during an interaction between a client and a drug seller. External observers could introduce bias because the drug sellers, knowing they are being observed, may not act as they normally would. Simulated clients have been used effectively to assess the quality of service provision (mainly family planning) and drug retailers (primarily to assess dispensing practices for diarrhea and respiratory infections) (Madden et al. 1997).

The evaluation team consisted of eight mystery shoppers and four supervisors. Data collection was conducted for eight days. Two mystery shoppers (one man and one woman) and one supervisor (a member of the study team) visited the drug outlets that were included in the evaluation sample. Each mystery shopper visited shops during their normal operating hours to purchase drugs for a child that was supposedly sick at home. After leaving the shop and becoming out of sight of the drug outlet attendant, the mystery shopper completed a form to record the content of the interaction.

There were two scenarios for the mystery shoppers, one for the females and one for the males. The females said they had a nine-month-old child at home who they believed had malaria. They asked the drug outlet attendant for advice on what drug to purchase. The males said they had a two-year-old child sick at home and specifically asked for Malaraquin (a popular brand of chloroquine). Both types of mystery shoppers were to provide more information (e.g., age of the child, duration of the illness, etc.) only if asked. After both mystery shoppers completed visits to a shop, a supervisor visited the shop to check stocks, look for job aids, inquire about prices, and ask questions to assess knowledge.

Figure 3
Client Job Aid

5.2 Sample Design and Data Analysis

To maximize the likelihood of obtaining an adequate number of intervention outlets, the research team chose a sampling strategy based on the receipts they collected during the monitoring visits. The team's objective was to obtain approximately 100 intervention outlets and 150 control outlets for the evaluation. Intervention outlets were defined as outlets that had received the job aids, confirmed either by the actual presence of the job aid or the respondent's stating that the job aids had been received. Controls were outlets that had never received the job aids.

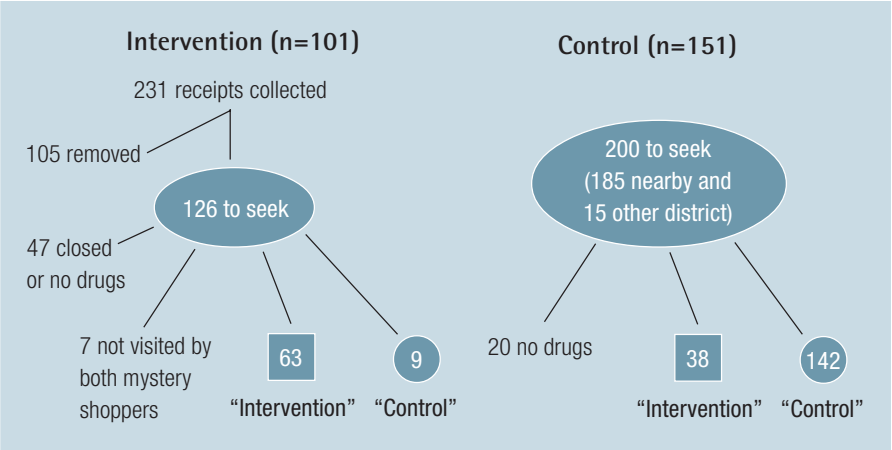
For **intervention** outlets, the team started with the 231 receipts collected. Next, 105 were discarded for the following reasons: 10 were duplicates; 19 were schools or laboratories, did not have names or locations, or were outside the district; and 76 were in remote sub-locations of the district. Thus, 126 intervention outlets were sought. Of these, 47 (37 percent) were no longer operational or had stopped selling drugs or could not be found,

9 (7 percent) had never received the job aids, and 7 (5 percent) were not visited by both mystery shoppers. Hence, 63 outlets from the receipted outlets sought were characterized as intervention outlets. The nine outlets that had not received job aids were characterized as control outlets.

For **control** outlets, the team aimed to reach about 150 outlets. The sampling strategy was to select one to two drug outlets near the receipted outlets and 15 outlets from a neighboring district, or about 200 altogether. Of the approximately 200 control outlets sought, 20 (10 percent) did not sell anti-malarials or did not currently have them in stock; 38 (19 percent) had received job aids and were labeled intervention outlets; and 142 (72 percent) never received job aids and were labeled controls. Hence, 101 (63 + 38) intervention outlets and 151 (9 + 142) control outlets were obtained (see Figure 4).

Data entry and statistical analysis was conducted using SPSS 8.0 software. A local data entry clerk was hired and trained by the study managers, one of whom also entered data and checked data accuracy. Normally, data were entered the day after being collected. Mystery shoppers and supervisors were queried about any inconsistencies or missing data. Two data sets were created: one for the data collected by the mystery shoppers and one for the data collected by the supervisors. Chi-square and F-tests were performed to compare intervention versus control outlets and to examine differences by mystery shopper scenario.

Figure 4
How Sample Was Obtained



6.0 Findings

6.1 Characteristics of Respondents Interviewed and Outlets Visited

Respondents

During eight days of data collection, 252 outlets were visited, totaling 504 mystery shopper visits. At each outlet the supervisor interviewed the attendant who was serving clients. Any outlet that reported having received a job aid was considered to be an "intervention" outlet, even if the study team had no receipt for it. All other outlets were labeled as "control" outlets. As shown in Table 1, the respondents were fairly evenly divided between male and female. About one-quarter of respondents had eight or fewer years of education. Intervention and control outlets were similar in terms of sex and education level of the respondent. They did differ, however, on the employment status of the respondent. Respondents at intervention outlets were more likely to be owners and employees, rather than family members.

Outlets

There are approximately 1500 private drug outlets in Bungoma district. Small retail outlets may have a very short life span due to financial difficulties. During the evaluation, about one-quarter of the outlets that had filled out a receipt for the job aids were found to have closed or were no longer selling drugs. Because some retail outlets buy only small quantities of drugs, they may not stock anti-malarial drugs on a consistent basis. About three-fifths of outlets were in rural areas, and three-quarters of outlets were shops or kiosks. Outlets reported serving on average about nine malaria clients per day, with a range of one to 120. They stated that about half of their clients were children under five. Intervention outlets were more likely to be pharmacies.

Table 2 shows the sources where the outlets reported obtaining their drugs. Outlets could report more

than one source. About half purchased their drugs from wholesale general shops, one-third from wholesale pharmacies, and one-fifth from mobile vendors. Almost none bought directly from pharmaceutical companies' distributors. Very few had more than one source of drugs. The source of drugs varied significantly by outlet type. Almost two-thirds of shops bought drugs from wholesale general shops, which only stock over-the-counter drugs. In contrast, almost all pharmacies and private clinics obtained their drugs from large wholesale pharmacies. Mobile vendors sold mainly to rural shops and kiosks.

Drugs

More than 70 different brands of anti-malarial drugs and over 30 brands of anti-pyretics were found in the drug outlets visited.[2] About three-quarters of the mystery shoppers who were sold any anti-malarial drug purchased tablets; the rest purchased syrups.[3] Syrups were sometimes sold in used bottles (such as liquor bottles); one shopper came away with the syrup in a plastic bag. Almost all anti-malarial syrups were sold in pharmacies. Mystery shoppers were never sold injectables and few were sold combinations of anti-malarial drugs. In about 8 percent of the visits, antibiotics, anti-pyretics, or other drugs were sold as anti-malarials.

Drug stocking was found to differ by type of drug outlet. Amodiaquine (AQ), the second-line drug, was the most popular drug stocked. Of outlets visited, 81 percent stocked AQ, while only 39 percent stocked

Table 1

Profile of Respondents and Outlets (in Percentages, unless Noted)

		Intervention Outlets (n=101)	Control Outlets (n=151)	Total (n=252)	Significance
Sex	Female	56.4	55.0	55.6	NS
	Male	43.6	45.0	44.4	
Education	Standard 8 or less	21.0	26.7	24.4	NS
	Form 1-4	69.0	61.0	64.2	
	Above Form 4	10.0	12.3	11.4	
Employment status	Owner	44.6	39.7	41.7	.044
	Employee	28.7	19.2	23.0	
	Family member	26.7	41.1	35.3	
Locale	Rural	58.4	57.6	57.9	NS
	Urban	41.6	42.4	42.1	
Type of outlet	Shop/kiosk	67.3	78.8	74.2	.016
	Pharmacy	26.7	12.6	18.3	
	Clinic	5.9	8.6	7.5	
Malaria clients	Reported average number of malaria clients per day	10	8	9	NS

Note: NS = not significant

Table 2

Source of Drugs by Type of Outlet (in Percentages)

Source:	Shops/Kiosks (n=187)	Pharmacies/Chemists (n=46)	Private Clinics (n=19)	Total (n=252)
Wholesale pharmacy	18.2	93.5	94.7	37.7
Wholesale general shop	60.4	0.0	0.0	44.8
Mobile vendor	25.7	4.3	0.0	19.8
Pharmaceutical company	1.1	2.2	0.0	1.2

[2] This represents a significant increase from about 17 brands of anti-malarials found in Kenya in 1996. See Ongore and Nyabola (1996).

[3] The Kenyan government has not approved syrup formulations of SP.

SP, and 41 percent stocked chloroquine (CQ). Among shops, more than three-quarters stocked AQ and about two-fifths stocked CQ, while less than one-fourth stocked SP. Almost all pharmacies and about three-quarters of private clinics stocked both AQ and SP. (CQ can be sold legally by pharmacies and private clinics, but not by shops.)

Outlet types varied significantly in the number of brands and types of anti-malarial drugs they had in stock. Pharmacies had an average of 10.4 different brands of anti-malarials in stock, while shops had 1.7, and private clinics 4.5. Not only did the shops stock very few brands at once, but it was common for nearby shops to be selling different types or brands. The most commonly stocked anti-malarial drug brand was Malaratab, an AQ produced in Kenya.

Not only was AQ the most-stocked type of anti-malarial, but it was also purchased most by the mystery shoppers, as shown in Table 3. In half of the visits, mystery shoppers purchased AQ. SP, the recommended drug, was purchased in less than one-fourth of mystery shopper visits. Interestingly, in 23 percent of mystery shopper visits, the attendant at the drug outlet refused to sell any drug. There were significant differences by scenario: female mystery shoppers (who said they had a nine-month-old child) were refused more often than male mystery shoppers (who said they had a two-year-old child). This was probably due to outlet attendants' fear of treating under-one children, but it is also possible that attendants were more inclined to refuse selling drugs to women than to men. In several instances, outlet attendants seem to have suspected that the shoppers were counterfeit and refused to sell drugs to them. Only 56 percent of outlets sold drugs to both mystery shoppers.

Table 3

Drugs Sold to Mystery Shoppers and Whether Told the Correct Dose

	Mystery Shoppers Who Were Sold the Drug*		Mystery Shoppers Who Were Told Correct Dose	
Anti-Malarial Drug	N	(Percentage)	N	(Percentage)
AQ-based	194	(49.9)	46	(23.7)
SP-based	89	(22.9)	56	(62.9)
CQ-based	76	(19.5)	5	(6.6)
Other	30	(7.7)	3	(10.0)
Total	389	(100.0)	110	(28.3)

*115 mystery shoppers were not sold anything.

N*otes*: AQ=amodiaquine (second-line drug); SP=sulfadoxine-pyremethamine (first-line drug); CQ=chloroquine (to be sold by prescription only)

Whether shoppers were told the correct dose differed significantly by drug type. Although half of the mystery shoppers purchased AQ, only 23.7 percent of them were told the correct dose, compared to 62.9 percent of mystery shoppers who purchased SP. Many attendants appeared to be recommending a single dose of AQ instead of the required three-day treatment. Very few attendants told mystery shoppers the correct dose of CQ.

Prices

In Bungoma district there is a very wide range for the cost of a child's malaria treatment, from $.03 to $2.29. Average prices for a full dose of malaria treatment differ greatly, from $0.18 (Ksh 12) for Laridox (SP) to $0.97 (Ksh 68) for Amobin syrup (AQ). On average, the price per tablet was Ksh 7, whereas the price per bottle of syrup was Ksh 57.[4] The price for one drug brand may vary greatly. For example, one tablet of Malaratab (AQ) ranged from $.07 to $.21 (Ksh 5 to 15). Significant profit margins may indicate a motive for recommending certain drugs. Average profits for a full child dose ranged from $.03 (Ksh 2.6) for Fansidar (SP) to $.34 (Ksh 24.1) for Malaramed syrup (AQ).

6.2 Estimated Coverage and Acceptability of the Intervention

Coverage

As mentioned earlier, 33 mobile vendors and 40 attendants from wholesale outlets were trained by the study team to be communicators

[4] At the time of the evaluation, US $1 = Ksh 70.

of the malaria guidelines. During the training, about 1300 copies of each job aid were distributed to the attendants and mobile vendors for dissemination. It is estimated that in six months they reached approximately 500 drug outlets, of which about one-fifth were outside Bungoma district.[5]

Job aids acceptability, visibility, and use

At all outlets, supervisors looked for displayed job aids and assessed their visibility. Supervisors found that almost two-thirds of the intervention outlets were displaying the job aids. Of those, the majority were displayed in a visible location, such as on the shelves behind the counter, on a wall, or on a door. Some job aids were not displayed but were found folded and placed in a drawer. Most were found in good condition, though some were torn or had gotten wet and were not very legible.

Respondents who had job aids were also asked about the usefulness of the job aids. For the shopkeeper job aid, over half reported that they used it a lot, and almost one quarter said they used it sometimes. For the client job aid, respondents were asked how often they thought clients used it. About a third thought that it was used a lot, and a fourth thought it was used sometimes. An indication of the usefulness of the shopkeeper job aid is that 31 percent of respondents who had received a shopkeeper job aid used it when asked about the dosages of SP drugs. (The supervisor observed use of the job aid before asking any questions about it.)

Table 4
Specific Malaria Knowledge, by Intervention Status

Main Malaria Messages	Percentage of Correct Responses		
	Intervention (n=101)	Control (n=151)	Total (n=252)
Fever is main symptom of malaria	94.1	94.7	94.4
Fansidar more effective than other drugs	92.1	85.4	88.1
Fansidar not too strong for children*	69.3	47.4	56.3
Fansidar and panadol is correct treatment*	88.1	64.2	73.8
Fansidar is a single dose treatment*	83.2	64.9	72.2
Fansidar can be sold in shops*	76.2	43.7	56.7
Continue feeding child with malaria	95.0	90.1	92.1
Don't sell another drug if child gets worse*	91.1	71.5	79.4
Don't always sell what is demanded*	87.1	65.6	74.2
Shouldn't sell smaller doses of drug*	95.0	82.8	87.7

* Significant at p<.01

6.3 Impact of the Intervention

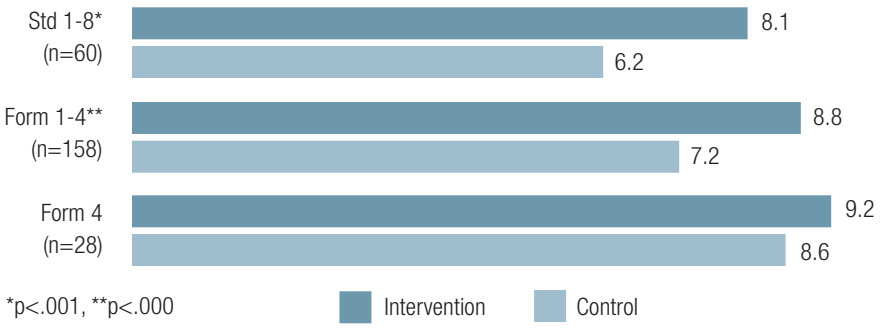
Knowledge of correct malaria treatment

During the evaluation the supervisors administered a ten-question malaria knowledge quiz to the respondents. Intervention outlets scored significantly better than control outlets on seven of ten questions, and slightly better or equivalent on the remaining three questions. As shown in Table 4, the intervention outlets had better knowledge of important concepts, such as that SP is not too strong for children and that SP can be sold in shops.

To better understand the results of the quiz, a total exam score was calculated by assigning one point to a correct answer and zero points for an incorrect answer or "don't know." Intervention outlets scored 8.7 on average while controls scored 7.1. Analysis by type of outlet showed that for both shops and pharmacies, intervention outlets scored significantly better than controls. Intervention shops and pharmacies scored on average 8.8 and 8.6, respectively, whereas control shops and pharmacies scored 7.0 and 7.5, respectively. There was no difference among private clinics. Analysis of the malaria knowledge score by education level shows that, at each level, intervention outlets scored higher than controls. These differences were statistically significant for respondents who had 12 years or less of education (see Figure 5).

[5] See Appendix 1 for an explanation of how the estimate was calculated.

Figure 5
Composite Malaria Score by Education Level



In addition to the malaria knowledge quiz, at outlets that stocked SP, supervisors asked the correct dose for an 18-month-old child of the five approved SP drugs. Because outlets were only asked about drugs currently in stock and because intervention outlets stocked more SP drugs, there were 149 responses from interventions and 36 from controls. Responses from intervention outlets were significantly different than control outlets. Among intervention outlets 75.8 percent of SP dosage information was correct, while among controls 41.6 percent was correct.

Dispensing practices

In order to provide effective malaria treatment, the drug seller should ask the client or caretaker several diagnostic questions about the patient. On their data collection forms, mystery shoppers recorded whether drug outlet attendants asked these types of questions. In comparing intervention to control outlets, 92 percent versus 85 percent inquired about the child's age, 50 percent versus 30 percent asked about symptoms, and 21 percent versus 11 percent asked about the duration of illness. Intervention outlets were significantly more likely to ask all of these diagnostic questions ($p<.001$).

The shopkeeper job aid also contained advice that should be given to the client. Significantly more intervention outlets told the mystery shopper what to do if the child gets sicker: 24 percent versus 12.5 percent for controls. Although very few outlets gave advice on feeding during illness, intervention outlets did so more often.

Although private drug outlets are assumed to be affected strongly by the desire to make money, this study found that a significant number of mystery shoppers were not sold any drugs. Shopkeepers seemed particularly leery of selling anti-malarial drugs to children less than a year old. Control outlets were significantly more likely to refuse to sell drugs, probably because of the mistaken belief that they were not permitted to sell drugs for very young children.

A key malaria practice is selling an approved first-line anti-malarial for uncomplicated cases. The Kenya National Malaria Guidelines state that SP is the first-line drug for all age groups and should be taken with an anti-pyretic. If the patient does not improve or gets sicker, he or she should go to a health center. The study team classified as correct or incorrect the malaria drugs purchased by the mystery shoppers. A correct drug was defined as an approved SP plus an anti-pyretic. SP brands that had passed Kenya quality control standards were Fansidar, Falcidin, Laridox, Orodor, and Metakelfin. Significantly, 18.3 percent of mystery shoppers visiting intervention outlets purchased correct drugs, compared to only 2.0 percent of shoppers visiting control outlets. Control outlets were also more likely to refuse to sell any treatment to the mystery shoppers. At intervention outlets, mystery shoppers were more likely to receive any SP, not just the approved brands, than at control outlets. At intervention outlets 28.7 percent of mystery shoppers purchased some type of SP, compared to 5.0 percent at control outlets.

In addition to being sold an appropriate drug, it is important that clients receive correct information on how to take the drug. Mystery shoppers were asked to record the drug dosage that the shopkeeper told them. More than twice as many mystery shoppers were told the correct dose by intervention outlets (37.6 percent) than by control outlets (15.3 percent).

6.4 Summary of Key Indicators

Key indicators for Bungoma's malaria control activities are shown in Table 5. In all categories, intervention outlets performed significantly better than controls.

Table 5
Summary of Key Indicators

Indicator	Intervention Outlets	Control Outlets
Knowledge		
Percentage of outlets that correctly answered all 10 malaria knowledge questions	34.7% (35/101)	4.0% (6/151)
Percentage of outlets that correctly knew that SP is not too strong for a child under one	69.3% (70/101)	47.7% (72/151)
Percentage of outlets that knew that SP is a single dose	83.2% (84/101)	64.9% (98/151)
Practice		
Percentage of shoppers who purchased an approved SP and an anti-pyretic, and were told the correct dose [of shoppers who purchased a drug]	17.2% (27/157)	1.5% (3/202)
Scenario 1*	15.5%	1.1%
Scenario 2**	18.6%	1.8%
Percentage of shoppers who purchased an approved SP and an anti-pyretic [of shoppers who purchased a drug]	23.6% (37/157)	3.0% (6/202)
Percentage of shoppers who purchased an approved SP and an anti-pyretic [of all mystery shopper visits]	18.3% (37/202)	2.0% (6/302)

* Scenario 1: 9-month-old child, female mystery shopper asks for advice

** Scenario 2: 2-year-old child, male mystery shopper asks for chloroquine-based drug

6.5 The Effect of Explicit Consumer Demand

One issue that interested the study team was to determine whether retail drug outlet attendants were recommending specific drugs or mostly selling what clients demanded. Previous studies have suggested that consumer demand has a strong impact on drug sellers (Brugha and Zwi 1998). To estimate the effect of consumer demand, all male shoppers were specifically told to request a popular CQ-based drug, Malaraquin. The drugs sold to the two types of mystery shoppers were then compared. Overall, 9 percent of female shoppers (who did not demand CQ) were sold a CQ-based drug compared to 21 percent of males (who did demand CQ). These results suggest that explicit demand for a particular anti-malarial drug does have a significant effect, but it is not very strong (about 12 percent). Control outlets were twice as likely as intervention outlets to sell CQ-based drugs to mystery shoppers.

The intervention seems to have lessened slightly the effect of consumer demand. In intervention outlets, 5 percent of female shoppers purchased CQ versus 14 percent of males, giving a consumer demand effect of only about 9 percent. In control outlets, 12 percent of female shoppers and 25 percent of male shoppers were sold CQ, giving a consumer demand effect of about 13 percent. The main reason that more male shoppers were not sold CQ may be that only about 40 percent of the outlets stocked it.

6.6 Cost-Effectiveness of the Intervention

A main goal of this study was to determine the intervention's cost-effectiveness. Affordability is a critical issue for scaling up beyond one district. The cost of replicating this intervention in another district in Kenya is estimated at $8,300 (Ksh 581,000). The main costs were the development and production of 1500 client and shopkeeper job aids, training of attendants and mobile vendors, and monitoring. If the mystery shopper exercise is added, the cost of replication would be about $11,500 (Ksh 805,000).

In six months, it is estimated that the intervention reached 500 outlets. Given that 16 percent additional clients were treated properly at the intervention outlets, one could

expect that about 82,000 additional people were treated correctly. This would mean that the intervention cost approximately $0.10 (Ksh 7) per case properly treated. If one assumes that the effect of the intervention lasted at least another six months, the cost per beneficiary would drop to about $0.06. Alternatively, one could say that the intervention cost about $17 (Ksh 1200) per outlet reached. For a full explanation of how these estimates were made, see Appendix 1.

7.0 Discussion

It seems likely that the private sector will continue as the dominant source of anti-malarial treatment for uncomplicated cases of malaria in Kenya, as well as in other developing countries. For this reason, strengthening the capacity of private drug outlets to provide quality anti-malarial drugs and information has become one of Roll Back Malaria's strategic objectives. The challenge is to increase the capacity of private outlets at a cost low enough that the activity can be scaled up nationally. At a cost of about $17 per outlet reached, most countries could probably afford the Vendor-to-Vendor intervention.

Four strategies have been advanced for improving the practices of retail pharmacies in developing countries: information, persuasion, incentives, and coercion (Goel et al. 1996). The most successful strategy for changing physician prescribing practices in developing countries has been through persuasion or "academic detailing." Persuasion is defined as "a successful, intentional effort to influence another's mental state through communication in a setting in which the target audience has a measure of freedom" (Goel et al. 1996). Indications are that persuasion can have an impact on private sector practices if doing so does not significantly reduce profits.

To date, very few interventions to change retailer behaviors through persuasion (or by any other means) have been systematically introduced and evaluated. One intervention for pharmacy attendants in Kenya and Indonesia, called "face to face educational outreach," resulted in significant short-term improvements in diarrheal product sales and communication with customers on diarrhea treatment (Ross-Degnan et al. 1996). However, its long-term impact and cost-effectiveness are not known.

The Vendor-to-Vendor Education intervention combined the strategies of **customized information and persuasion** to achieve improved knowledge and dispensing practices among private retailers. Formative research in setting up the intervention had revealed that wholesalers were considered credible sources of information for private retail outlets on the test anti-malarial drugs. Hence, they were designated to serve as the "persuaders" for this activity. Informal interviews with wholesalers indicate that the mobile vendors were more enthusiastic and energetic distributors of the job aids than were the counter attendants. The reason seems to be that the intervention heightened the status of mobile vendors more than counter attendants. Also, because the mobile vendors do not face queues of retailers, communicating the guidelines may have been more feasible for them than the counter attendants.

Other studies have indicated that job aids tailored to the needs of the target audience can positively affect performance (Knebel et al. 2000). The shopkeeper job aid seems to be the other most important component of the Vendor-to-Vendor intervention. Nearly two-thirds of shopkeepers reported that it was useful to them, and one-third used it spontaneously when asked about SP dosages. Because no clients were interviewed during the evaluation, we do not know the impact of the client job aid on them. However, indications from the shopkeepers are that more than half of the clients found them to be useful.

The main alternate model for changing shopkeeper anti-malarial dispensing behaviors has been piloted in Kilifi, Kenya. The cornerstone of the intervention was a series of three workshops, each lasting three days, followed by a two-day refresher training for 46 shopkeepers from 23 shops. The activity seems to have led to dramatic improvements in anti-malarial prescribing practices and advice given (Marsh et al.1999). In our view, the main problems with the Kilifi model are:

- It is not clear that all of the training provided the shopkeepers is necessary for them to serve the public effectively
- The training may be reaching mostly owners of shops, rather than many of those who actually sell drugs to the public (e.g., family members)
- The turn-over among employees in shops and short life spans of many small establishments would necessitate constant retraining

- It seems to be quite costly (although cost information is not provided) and time-consuming, which would make it difficult to achieve wide coverage

While the Vendor-to-Vendor intervention did seem to have significantly improved drug outlets' knowledge and behavior in a relatively short time (six months), the gap between actual and desired performance was still quite large. More than half the drugs that intervention outlets sold to the mystery shoppers were not SP-based. This could be due to several factors. First, it is likely that intervention outlets still had stocks of old drugs that they needed to sell. Virtually all drug outlets operate on very limited budgets and cannot afford to discard drugs that are no longer recommended. Second, confusion and fear about SPs were still common in the district. Many outlets still were not sure whether they were indeed entitled to sell SPs over the counter. Third, the intervention did not comment about the use of AQ, which had become extremely popular in the district due to extensive advertising, high profit margins for sellers, and an apparently cheaper price for consumers than SP.[6] Because SP is slow-acting whereas AQ is fast-acting, AQ seems to be more effective than SP. No one was aware of the long-term negative side effects of long-term use of AQ. Addressing these issues would make the intervention more effective.

In general, the mystery shopper approach, using "third person" scenarios, seems to have been very effective in evaluating dispensing practices of the outlets in Bungoma district. Including supervisory visits to the outlets after the shopper visits gave important additional information. The decision to vary the scenarios by gender of the mystery shopper may not have been wise, however. It made it more difficult to discern whether the differences in the treatment given to shoppers related more to their scenario or to their gender.

It is important to recognize the limitations of the mystery shopper approach. The main drawback to using mystery shoppers is that they cannot evaluate certain institutions where they would be detected as outsiders (such as school dispensaries) or where they are required to bring their child with them (such as some private clinics). If the mystery shoppers had been actual clients with children, private clinics probably would have dispensed more injections. It is also possible that real clients, who are familiar with the shopkeepers, would be refused treatment less often than unknown clients (mystery shoppers). In several situations, outlets may have become suspicious of the mystery shoppers and given them different treatment than they would have normally. A few shops locked their doors after the first shopper had completed his or her visit, so the second shopper was never served there. These shops had to be excluded from the analysis. Lastly, it seems likely that the mystery shoppers received more information about the drugs than typical customers. Mystery shoppers noted that if a real customer asked for a drug by brand name, the shopkeeper was inclined to assume that they knew how to take the drug and hence gave little information about it.

The sampling design also had some limitations. Because outlets were not randomly selected, one cannot extrapolate from the study to estimate the percentage of all outlets in Bungoma district stocking SPs or giving correct advice to customers. Also, the decision to exclude receipted outlets in remote locations due to logistical considerations may have led to some selection bias. It is also possible that there was a self-selection bias among intervention outlets; some control outlets may have been offered job aids but refused them. The occasional discrepancy between "receipted" outlets and shopkeepers' reports may also have biased the sample to some extent.

8.0 Conclusions and Recommendations

The Vendor-to-Vendor Education intervention, a low-cost outreach education strategy, seems to have had a positive impact on private drug outlets' compliance with malaria treatment guidelines in Bungoma district. Significant differences were discerned between intervention and control outlets on types of drugs sold, dosages sold, questions asked of clients, and advice given. The intervention also had a significant positive impact on

[6] Misleading packaging contributed to the misperception that AQ was cheaper than SP. For instance, the most popular AQ brand (Malaratab) was packaged in three-tablet blister packs, just like SP. But consumers actually need to purchase three blister packs of Malaratab to get the correct dose. With SP (such as Falcidin), one blister pack is sufficient. Since one blister pack of SP was about 3-5 shillings more costly than one blister pack of AQ, consumers were inclined to buy AQ.

knowledge of malaria treatment guidelines. More intervention outlets knew key concepts about malaria treatment than control outlets. The intervention appears to have had the greatest impact on shops and kiosks and the least impact on private clinics. Most outlets that received job aids reported that they were useful and were displaying them in a prominent location.

To have greater impact, the intervention would have to address several issues more intensively:

- Build consumer demand for SP
- Sustain the interest of wholesale counter attendants as communicators of malaria guidelines
- Encourage national-level enforcement of correct drug packaging and standard pricing

Based on the findings, the following recommendations were made to Kenya's policy-makers:

National level:

- *The National Malaria Control Committee (NMCC) should consider replicating the Vendor-to-Vendor Education program in all endemic areas of the country*
- *The MOH should revisit its policy about amodiaquine as the second-line drug and make clear its concerns about wider use*
- *The MOH should insist that major national pharmaceutical companies accurately indicate dosages for all age groups on drug packages. Information should be clear enough for low-literate clients and shopkeepers to understand*
- *The MOH should enforce the policy that unapproved anti-malarials do not reach the market or are pulled from the market*

District level:

- *The DHMT should designate an annual "malaria control month" just before the rains to engage in vendor-to-vendor activities*
- *To increase client demand for SPs, health facilities should be encouraged to include recommended anti-malarial drugs in their micro-teachings*
- *To address confusion regarding SP, an official letter needs to be sent to wholesalers and vendors, which they can show to shops/kiosks*
- *Ongoing misconceptions about malaria treatment (e.g., that SP is too strong for children) should be addressed in subsequent activities*

Appendix 1

Calculation of the Cost-Effectiveness of the Intervention

To calculate the cost-effectiveness of the intervention, we began by estimating the coverage of the intervention in the 6 months between the training of wholesalers and the mystery shopper evaluation. It should be recalled that our sample consisted of several types of outlets: (a) receipted outlets that had indeed received the job aids, (b) receipted outlets that reported not receiving job aids, (c) outlets without receipts that had in fact received the job aids, and (d) outlets without receipts that had not received the job aids.[7]

Our first step was to calculate how many of the 221 receipted outlets (after removing 10 duplicate receipts) actually had received job aids. Because of time constraints, we sought to visit only 126 receipted outlets. We found that **63** (50 percent) of them had job aids. We estimated therefore that 50 percent of the 95 receipted outlets that we did not seek to visit also had job aids, or **47.** Next, we found that 19 percent of the 200 unreceipted outlets in Bungoma district that we visited actually had received job aids, or **38.** Consequently, we assumed that about 19 percent of all unreceipted outlets in the district had in fact received job aids. The DHMT estimated that the total number of outlets selling anti-malarial drugs in Bungoma district was about 1500. Of that 1500, we excluded in our calculations the 252 visited by the mystery shoppers and the other 95 receipted outlets, leaving about 1150. If 19 percent of these 1150 outlets were reached with job aids, then **219** of the 1150 were reached. Finally, 6 percent of outlets in a neighboring district were found with job aids. If we estimate that the spill-over effect to neighboring districts was about 6 percent, and that there are about 2400 outlets in three neighboring districts to Bungoma, then we need to add 6 percent of 2400, or **144.** Our total coverage is thus estimated at 63+47+38+219+144 = 511, rounded downward to **500 outlets reached.**

Of the 500 outlets, it was estimated that about 75 percent (375) were using the job aids for about 5 months or 120 working days. On average, outlets reported that they see about 9 malaria clients per day, or 405,000 clients in the period we were evaluating (375 outlets x 9 clients x 120 days = **405,000**). The remaining 125 outlets were estimated to have been using the job aids for about 4 months or 90 working days, which would yield about 101,250 clients (125 outlets x 9 clients x 90 days = **101,250**). Our total estimated caseload at the intervention outlets is therefore 405,000 + 101,250 = 506,250, rounded to **506,000 malaria clients served by the intervention outlets.**

The percentage of malaria cases (mystery shoppers) treated properly *due to* the intervention can be estimated at 18.3 percent (the amount treated properly in the intervention group) minus 2.0 percent (the amount treated correctly in the control group), or 16.3 percent. We thus can assume that 16.3 percent of 506,000 malaria cases, or 82,478 cases, received proper malaria treatment during the first 6 months *because* the outlets they visited had received job aids. For ease of calculation, we rounded this figure to **82,000 clients properly treated due to the intervention** in the first 6 months. These people could be considered the beneficiaries of the program. If these outlets continued to provide correct treatment for at least another six months, it is possible that there were at least 150,000 beneficiaries. (Turnover among outlet attendants and malaria seasonality could deflate this number somewhat.)

To determine the cost per beneficiary, we took the cost of the intervention, $8,300, and divided it by 82,000, the number of cases estimated to have been treated properly due to the intervention, resulting in **$0.10 per beneficiary in the first 6 months of the activity.** If the number of beneficiaries reached 150,000 after one year, the cost of the intervention per beneficiary could fall to about $0.06. Alternatively, if we considered the outlets as the beneficiaries, the intervention can be estimated as costing about **$17 per outlet** ($8300 / 500 = $16.60).

[7] Any outlet receiving the job aids was supposed to sign a receipt indicating that it would follow the new malaria guidelines.

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