WHY STUDY ANTIMALARIALS IN ZAMBIA?

Malaria is the leading cause of child mortality under the age of five and the third leading cause of both morbidity and mortality in Zambia. People living in rural areas of Zambia are the most susceptible to malaria.

The Zambia National Malaria Control Strategy relies on a set of proven interventions for prevention and case management to effectively reduce the malaria burden. These include training and equipping facility-based and community-based health workers to provide malaria testing and appropriate treatment, and provision of free Artemisinin based Combination Therapy (ACT) and malaria diagnosis in the public health system.

Increasing access to quality-assured ACT is an important intervention for reducing malaria mortality today. A key challenge to improving access to ACT is the lack of evidence on antimalarial markets. Understanding what types of antimalarials are available across both the public and private sector, as well as malaria diagnostic availability will provide an understanding of the performance of different markets and identify gaps and needs in the current health system. The ACTwatch project is designed to provide such antimalarial market intelligence.

The ACTwatch evidence can be used to inform national strategic policies aimed at improving malaria case management and making progress towards national goals for malaria elimination.

ZAMBIA NATIONAL MALARIA TREATMENT GUIDELINES

All suspected malaria cases receive confirmation by a blood test using microscopy or malaria rapid diagnostic tests (mRDT).

Microscopy is utilized in public health facilities and mRDT are deployed in all health facilities, with priority given to facilities that do not offer microscopy. mRDT are not intended to supplant microscopy as the first choice for parasitological confirmation.

Since 2002, the first-line treatment for uncomplicated malaria is the ACT artemether-lumefantrine (AL). Sulfadoxine-pyrimethamine (SP) is used for intermittent preventive treatment of pregnant women (IPTp). SP is also the recommended first-line medicine for treating uncomplicated malaria in children who weigh less than 5kg.

In cases of severe malaria, antimalarial treatment is carried out with injectable artesunate for adults and children. If injectable artesunate is unavailable, injectable artemether or injectable quinine are the alternatives.
WHAT IS ACTWATCH?
ACTwatch is a multi-country research project implemented by Population Services International (PSI). Standardized tools and approaches are employed to provide comparable data across countries and over time. ACTwatch is designed to provide timely, relevant, and high quality antimalarial market intelligence, including information on ACT and mRDT. The project was launched in 2008 with funding from the Bill and Melinda Gates Foundation (BMGF), and is currently funded through 2016 by the BMGF, UNITAID, and the Department for International Development (DFID). Research methods implemented include outlet and household surveys, supply chain studies, and key informant interviews.

GOAL
The goal of the ACTwatch project is to provide policymakers with evidence to inform and monitor national and global policy, strategy, and funding decisions for improving malaria case management and elimination efforts.

RELEVANCY
ACTwatch market monitoring in Zambia from 2008 to present has been implemented in the context of national strategies designed to improve coverage of appropriate malaria case management. These efforts include:

- National efforts to improve availability of malaria blood testing in public health facilities and ensure continuous stock of ACT.
- Efforts to extend malaria blood testing and antimalarial treatment to the community level through equipping community health workers (CHW) with mRDT and ACT.

OUTLET SURVEYS
Outlet surveys are the core component of the ACTwatch. The outlet surveys in Zambia were designed to monitor key antimalarial market indicators at the national level and within urban/rural domains.

This summary report presents data points from the three most recent outlet surveys conducted in 2009, 2011 and 2014.
WHAT QUESTIONS ARE ANSWERED BY THE OUTLET SURVEY?

What types of outlets in the public and private sectors are distributing antimalarials and providing malaria blood testing?

What types of antimalarials and mRDT are available and distributed by public and private sector?

What proportion of public and private sector antimalarial medicine outlets are stocking: 1) quality-assured ACT; 2) non quality-assured ACT; and 3) malaria blood testing?

What is the antimalarial market share of quality-assured ACT relative to the market share for other types of antimalarials?

What is the consumer price for antimalarial medicines and malaria blood testing among private sector outlets?
METHODS

Standardized methods and questionnaires were administered to allow for comparisons between survey rounds. A full census of all outlets providing malaria care and a full audit of all available antimalarials provides a complete picture of the antimalarial market.

HOW WAS THE SAMPLING CONDUCTED?
A nationally representative sample of outlets providing antimalarials to consumers was selected using a one-stage probability-proportional-to-size cluster design. Wards were the primary sampling unit, and selected from urban and rural domains.

WHAT TYPES OF OUTLETS WERE SAMPLED?
The main types of outlets sampled included public and not-for profit health facilities, CHWs, private health facilities, pharmacies, drug stores and grocery stores/kiosks.

HOW WERE THE OUTLETS IDENTIFIED?
The ACTwatch outlet survey included all outlets with the potential to sell antimalarial medicines. As many of these outlets were unregistered, mobile or recently opened, official listings of these shops and their locations were not typically available. A census approach was therefore implemented, supported by the use of key informant interviews with local officials, local maps, and lists of registered outlets where available.

WHAT IS AN OUTLET CENSUS?
This involved a team of data collectors moving systematically through selected wards in order to identify all outlets that had the potential to sell or distribute antimalarials.

HOW WERE OUTLETS IDENTIFIED?
Outlets were screened for availability of malaria medicines or diagnostic testing. Outlets were included in the survey if they had antimalarials or malaria diagnostic tests in stock at the time of survey or in the previous 3 months. Permission to conduct the interview was obtained from the main provider.

HOW WAS INFORMATION ON ANTIMALARIALS AND MRDTS CAPTURED?
Among outlets with antimalarials or/malaria tests in stock a full audit of the antimalarials was conducted. Information was recorded for each unique antimalarial and mRDT identified in the outlet.

WHAT INFORMATION WAS RECORDED ON THE AUDITS?
An audit sheet was completed for each unique antimalarial and mRDT in stock. The audit sheet captured product information from the product package including the brand name, the manufacturer, country of manufacturer, formulation and strength. The audit sheet also captured information from the provider including the amount sold in the last seven days and retail price. If a particular product was available in multiple package sizes, strengths, or formulations, an audit sheet was completed for each unique product.

Comprehensive product information and provider reports on amount distributed and retail price allowed for calculating estimates of antimalarial and mRDT availability, price and relative market share.
What types of outlets have antimalarials in stock and how did this change over time?

The screening of all outlets with the potential to stock antimalarials identified \( N = 294 \) outlets with at least one antimalarial in stock in 2009, and \( N = 472 \) antimalarial-stocking outlets in 2014. These pie charts show the types of outlets that were stocking antimalarials during each survey round, described as the antimalarial market composition.

Approximately 30 percent of antimalarial-stocking outlets were public health facilities during each survey round. General retail stores and drug stores accounted for about one-half of all antimalarial-stocking outlets over time.

While antimalarial market composition has remained similar in Zambia over time, private for-profit health facilities have decreased over time from 13 percent of all outlets with antimalarials in 2009 to 4 percent in 2014, and CHW accounted for 9 percent of all antimalarial-stocking outlets visited in 2014.
When people seek treatment for fever, where will they find antimalarial medicines?

This graph shows the percentage of all screened outlets with at least one antimalarial in stock on the day of survey. Among all outlets approached and screened between 2009, 2011 and 2014, public health facilities, private-for-profit facilities, pharmacies and drug stores commonly stocked antimalarial medicines.

General retail outlets typically were not stocking antimalarials; fewer than 5 percent had antimalarials in stock at the time of the survey across rounds.
PUBLIC AND PRIVATE SECTOR MARKET SHARE

In 2014, 81 percent of all antimalarials were distributed by the public sector.

Antimalarial Market Share
This graph shows the relative public and private sector distribution (market share) for all antimalarials. This is estimated using information about reported distribution of each antimalarial during the week preceding the survey.

Observing trends, public sector volumes increased from 60 percent in 2009 to over 80 percent in 2011 (84 percent) and 2014 (81 percent). It is clear that the public sector distributes most antimalarials in Zambia, however around twenty percent of antimalarial distribution occurs in the private sector.

What types of private sector outlets sold antimalarials in Zambia in 2014?

This graph shows the relative volumes in 2014 between the public and private sector, and further describes the contribution of the private sector, according to the different outlet types.

The private sector accounted for 19 percent of all antimalarials distributed at the national level including distribution by drug stores (10% of the national market share) and general retailers (5% of the national market share).
Quality-assured versus non quality-assured ACT

Quality-assured ACT are ACT that comply with the Global Fund to Fight AIDS, Tuberculosis and Malaria’s Quality Assurance Policy. A quality-assured ACT is any ACT that appeared on the Global Fund’s indicative list of antimalarials meeting the Global Fund’s quality assurance policy prior to data collection, or that previously had C-status in an earlier Global Fund quality assurance policy and was used in a program supplying subsidized ACT. Quality-assured ACT also include ACT that have been granted regulatory approval by the European Medicines Agency – specifically Eurartesim® and Pyramax®.

What types of antimalarials are dispensed in the public and private sector?

This graphs shows relative distribution of different types of antimalarials in the public and private sector. A key finding is that quality-assured ACT relative market share has increased overall from 26 percent in 2009 to 56 percent in 2011, but decreased to 30 percent in 2014. The decrease in 2014 is due to the market share captured by non quality-assured ACT accounting for 27 percent of all antimalarials distributed in 2014.

SP accounted for more than half of all antimalarials distributed in 2009 (66 percent) and SP relative market share declined to 40 percent in 2014. While most of the antimalarials distributed in the public sector in 2014 were an ACT, in the private sector SP was the most commonly distributed antimalarial. The SP was primarily distributed by drug stores and general retail outlets.
Most quality-assured ACT available in the public and private sector were AL tablets. Non quality-assured ACT available in the public sector was primarily AL tablets manufactured by S Kant Healthcare Ltd, which does not appear on the WHO list of prequalified medicines for malaria. Non quality-assured ACT available in the private sector included AL tablets (41 percent), AL in the form of suspensions (31 percent), as well as Artesunate tablets (25 percent). Few dihydroartemisinin-piperaquine treatments were found.
PUBLIC SECTOR AVAILABILITY

ACT availability has remained high in the public sector, however in 2014 many of the ACT were not quality-assured.

These graphs show availability of quality-assured and non quality-assured ACT, among all public health facilities. Public health facilities maintained a high level of quality-assured ACT availability over time (90 percent in 2014). Significant increases in non quality-assured ACT were observed in public health facilities. While availability of any quality-assured ACT was high in 2014, 75 percent of public health facilities stocked a child formulation but only half had adult formulations available, suggesting stock outs of adult dosages at the time of survey.

SP Availability in the public sector

SP is used for IPTp and is administered to pregnant women in Zambia during antenatal care visits. This graph shows availability of SP among all screened public health facilities.

SP availability among public health facilities has increased over time from 58.5 percent in 2009 to 73 percent in 2011 and 87 percent in 2014, indicating the ability of public health facilities to provide IPTp.
A closer eye on public health facilities in 2014

Availability of ACT treatment and SP at different levels of the public health system

This graph shows the availability of quality-assured ACT, non quality-assured ACT and SP among all public health facilities in 2014. ACT and SP availability was high across different facility types, indicating the readiness of public health facilities at all levels to provide ACT and SP for IPTp.

![Graph showing ACT and SP availability](image)

Availability of malaria testing at different levels of the public health system

This table shows the availability of malaria testing among outlets with antimalarials available at different levels of the public health system. Malaria testing is commonly available across all public health facility types.

<table>
<thead>
<tr>
<th></th>
<th>Community Health Centre Level 1</th>
<th>Community Health Centre Level 2</th>
<th>Hospitals</th>
<th>All Public Health Facilities</th>
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<tbody>
<tr>
<td><strong>Any malaria blood testing</strong></td>
<td>N=95</td>
<td>N=347</td>
<td>N=49</td>
<td>N=491</td>
</tr>
<tr>
<td></td>
<td>93.5 (81.7, 97.9)</td>
<td>89.7 (83.4, 93.8)</td>
<td>97.5 (90.2, 99.4)</td>
<td>91.3 (86.1, 94.6)</td>
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<tr>
<td>Microscopic blood tests</td>
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<td>N=346</td>
<td>N=47</td>
<td>N=488</td>
</tr>
<tr>
<td></td>
<td>0.0</td>
<td>14.4 (10.5, 19.4)</td>
<td>88.6 (72.4, 95.8)</td>
<td>18.0 (13.8, 23.1)</td>
</tr>
<tr>
<td>mRDT</td>
<td>N=95</td>
<td>N=347</td>
<td>N=49</td>
<td>N=491</td>
</tr>
<tr>
<td></td>
<td>93.5 (81.7, 97.9)</td>
<td>87.2 (80.8, 91.7)</td>
<td>88.3 (69.7, 96.1)</td>
<td>88.7 (83.2, 92.5)</td>
</tr>
</tbody>
</table>
PRIVATE SECTOR ANTIMALARIAL AVAILABILITY AND PRICE

In 2014, quality-assured ACT in the private sector was more than three times more expensive than the most commonly distributed non-artemisinin therapy, SP.

What is availability of ACT treatment and SP in the private sector?

These graphs show availability of quality-assured ACT and SP, among antimalarial stocking outlets.

Quality-assured ACT availability has remained relatively lower in the private sector as compared to the public sector. Quality-assured ACT availability remained particularly low in drug stores and general retailers – outlets that are responsible for most of the private sector antimalarial distribution.

Data trends suggest a decline in SP availability among private for-profit health facilities and pharmacies. However, availability remained high among antimalarial-stocking drug stores and general retail outlets.
How does the price of ACT serve as a barrier to uptake in the private sector?

The median private sector price of one quality-assured ACT has declined over time. However in 2014, quality-assured ACT was still three times more expensive than the most commonly distributed non-artemisinin therapy, SP.

ACT treatment is provided for free in public health facilities.
This graph shows the availability of either microscopic blood tests or mRDT among antimalarial-stocking outlets. Malaria blood testing has remained high over time among public and private for-profit health facilities (2014, 91 percent and 88 percent respectively).

Blood testing availability has increased among antimalarial-stocking pharmacies from 17 percent in 2009 to 51 percent in 2014. Drug shops and general retail outlets most commonly do not provide malaria blood testing.

This graph highlights the availability of mRDT in the antimalarial-stocking private sector, and the median price of an mRDT. In drug stores and general retailers, which are the most common sources of antimalarial distribution in the private sector, availability of mRDT is exceptionally low. However the price of an mRDT is less than that of a quality-assured ACT suggesting that where mRDT are available, there is a financial incentive to test prior to treatment with a quality-assured ACT.
What types of malaria tests are dispensed in the public and private sector?

This graph shows the relative distribution of different types of malaria tests (microscopy or mRDT) in the public and private sectors. A key finding is that most tests are performed in the public sector.

The public sector accounted for over 90 percent of all malaria blood tests performed at the national level (91 percent). Across sectors, most blood tests performed in Zambia were RDTs (90 percent).
URBAN AND RURAL DIFFERENCES
How do urban and rural antimalarial markets differ?
Drug stores make up the majority of antimalarial-stocking outlets in urban areas (45 percent) followed by general retailers (26 percent). In rural areas, more than half of all antimalarial-stocking outlets are public sector including public health facilities (39 percent) and CHWs (17 percent). General retailers accounted for nearly one-third (30 percent) of antimalarial-stocking outlets in rural areas.

Is ACT availability the same in urban and rural areas?
ACT availability among antimalarial-stocking outlets was similar across urban and rural areas among public health facilities. ACT availability was higher among antimalarial-stocking drug stores in rural areas (68 percent) as compared with urban areas (20 percent) and data trends suggest higher availability among rural (23 percent) versus urban (11 percent) general retail outlets.
How does antimalarial market share differ in urban versus rural areas?

In 2014, the public sector accounted for nearly 70 percent of all antimalarials distributed in urban areas (67 percent) and 90 percent of antimalarials distributed in rural areas. Quality-assured ACT relative market share was higher in rural (37 percent) as compared with urban areas (20 percent) however non quality-assured ACT market share was similar (urban, 28 percent; rural, 27 percent). SP accounted for half of all antimalarials distributed in urban areas (48 percent) as compared with one-third of antimalarials distributed in rural areas (34 percent).

How does availability of malaria diagnostics differ according to urban and rural areas?

The availability of malaria blood testing was similar across urban and rural areas for public health facilities. Blood testing availability was higher among antimalarial-stocking drug stores in rural (42 percent) as compared with urban areas (3 percent).
Recent public sector strategies to improve malaria case management in Zambia have largely been successful. At the time of the 2014 national outlet survey, nearly all public health facilities had ACT in stock and more than 90 percent had malaria testing available (mRDT or microscopy). The availability of SP among public health facilities has improved in recent years to nearly 90 percent in 2014. This result indicates improved readiness of public health facilities to deliver IPTp using SP as indicated by national policy. The high degree of readiness for malaria case management and IPTp among public facilities in Zambia was observed in both urban and rural areas.

The major change in the antimalarial market observed in Zambia in 2014 as compared with previous surveys was the availability and distribution of ACT that was not quality-assured according to global manufacturing standards. Non quality-assured ACT were previously found among private for-profit health facilities and pharmacies in Zambia. In 2014, non quality-assured AL tablets were found in public health facilities and accounted for about one-third of all antimalarial distribution in the public sector. Non quality-assured ACT accounted for about one-quarter of all antimalarials distributed across sectors.

The majority of antimalarial distribution in Zambia occurs in the public sector. However, in 2014 the private sector accounted for about 20 percent of all antimalarial distribution at national level (34 percent in urban areas and 10 percent in rural areas). Antimalarial distribution in the private sector occurs primarily among drug stores and general retail outlets, and these outlets most commonly distribute SP. The private sector price of quality-assured ACT is more than 3 times as expensive as SP. This relatively high price may be a barrier to ACT uptake where antimalarial treatment is being sought/dispensed in the private sector for fever case management. The 2014 study also documented very low levels of availability of malaria testing in the private sector. Sub-optimal fever case management practices in the private sector will be important to examine further and address to ensure continued progress towards ensuring that all malaria cases are detected and treated according to national policy.
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