Trends in antimalarial medicine and malaria diagnostic availability in Cambodia between 2009 and 2013

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BACKGROUND

• Treatment failure using the artemisinin combination therapies (ACT) artemether lumefantrine (AL), artemether piperaquine (ASMQ) and dihydroartemisinin piperaquine (DHA-PQ) has been detected in more than 10% of cases in Cambodia. Factors believed to have contributed to emerging drug resistance in Cambodia include the unregulated sale of artemisinin monotherapies for over 40 years; limited access to ACTs; co-blistered ACTs that are not co-formulated (facilitating misuse/overuse); and ubiquitous counterfeits and sub-standard drugs. Current regulatory efforts and malaria policy are aimed at protecting artemisinin-based combination therapy (ACT) treatment efficacy.

• To protect the efficacy of artemisinin, the sale of oral artemisinin monotherapy (oAMT) was banned in Cambodia in 2009 and strategies were deployed to enforce this ban through stronger regulation of private sector outlets.

• To ensure parasite clearance in the context of evolving drug resistance, the first-line treatment for P.falciparum (Pf) in Cambodia changed from ASMQ to ASMQ or DHA-PQ in 2012 following targeted use of DHA-PQ since 2009 in artemisinin resistance containment areas.

• The 2012 national malaria treatment guidelines state that all suspected cases should receive confirmatory testing prior to treatment.

• MANY efforts have been undertaken to ensure the scale up of malaria blood testing and first-line treatment. These include a Village Malaria Worker (VMW) program supported within public and private sector outlets have been funded through the Global Fund including delivery of co-paid DHA-PQ to first-line buyers in 2012 and 2013.

RESULTS

• Outlets distributing antimalarials in Cambodia: Outlets stocking antimalarials in Cambodia include public health facilities and Village Malaria Workers (VMWs) regulated private sector outlets including private-for-profit facilities and pharmacies, and unregulated private sector outlets (including drug shops, general retail outlets, and itinerant drug vendors). Antimalarial availability declined over time among private sector outlets, and by 2013 was particularly low among unregulated private sector outlet types (Fig 1). Private sector market composition shifted over time towards increasing relative contribution from regulated private sector outlet types, and declining contribution from unregulated private outlet types (Fig 2).

• Antimalarials in stock (among antimalarial-stocking outlets): The percentage of private sector outlets stocking artemisinin monotherapy decreased over time and in 2013 was decreased to less than 1% among private-for-profit health facilities and 5% among itinerant drug vendors (Fig 3). Public health facilities and pharmacies’ availability of artemisinin-based products decreased over time and DHA-PQ availability increased such that by 2013, most antimalarials stocked in public health facilities and pharmacies (60%) had first-line ACT in stock. Among private sector outlets, availability of DHA-PQ also increased following policy change and by 2013, 34% of private health facilities (3%) and pharmacies (52%) had DHA-PQ in stock. DHA-PQ availability was lower among drug stores (42%), general retailers (14%) and itinerant drug vendors (6%) (Fig 3). Chloroquine availability decreased over time and was low among public and private sector outlets in 2013 with the exception of drug stores (46%) and general retailers (86%) (Fig 3).

• Availability of malaria blood testing: Malaria blood testing availability (BDT) or microscopy remained high over time among public and private health facilities and VMWs. Availability has remained relatively lower among other private sector outlets. Nonetheless in 2013, 60% of antimalarial-stocking drug shops and 61% of pharmacies had malaria blood testing available (Fig 5).

METHODS

• Antimalarial medicine outlet surveys were conducted as part of the ACTwatch project in Cambodia in 2009 (June - July), 2011 (June - August) and 2013 (September - October). A census of all outlets with the potential to sell/distribute antimalarials was conducted within a nationally representative sample of clusters (communes) with stratification by the national malaria program zones (see Table 1).

• Drug information, sale/distribution in the previous week, and retail price were collected for each antimalarial in stock. Product and distribution information was used to calculate relative market share using the adult equivalent treatment dose as the unit of analysis.

<table>
<thead>
<tr>
<th>Table 1. Sample Summary</th>
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<tbody>
<tr>
<td>Number of Outlets:</td>
</tr>
<tr>
<td>2009</td>
</tr>
<tr>
<td>Interviewed</td>
</tr>
<tr>
<td>Eligible: Antimalarial(s) in stock</td>
</tr>
<tr>
<td>Eligible: Antimalarial(s) out of stock but reportedly in stock within 3 months</td>
</tr>
<tr>
<td>Eligible: Antimalarial(s) out of stock but blood testing available</td>
</tr>
<tr>
<td>Eligible: Antimalarial(s) not in stock but blood testing available</td>
</tr>
<tr>
<td>Interviewed: Antimalarial(s) not in stock but blood testing available</td>
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Fig 1. Percentage of all outlets with at least one antimalarial in stock on the day of the survey

Fig 2. Market composition: outlet type distribution among outlets with at least one antimalarial in stock

Fig 3. Percentage of antimalarial-stocking outlets with ASMQ, DHA-PQ, oral artemisinin monotherapy and chloroquine in stock on the day of the survey

Fig 4. Antimalarial market share

Fig 5. Percentage of antimalarial-stocking outlets with malaria blood testing available

DISCUSSION

Multiple drug policy changes and effective enforcement strategies have been required in Cambodia to respond to the threat of artemisinin drug resistance and to drive progress towards PF elimination. These drug policy changes have been mainly focused on the public sector partners with success. The majority of antimalarials distributed in Cambodia through public and private outlets are first-line ACT treatments. Adherence to case management policy stipulating confirmatory testing prior to treatment is currently facilitated by high availability of malaria blood testing among public and private health facilities and VMWs and moderate availability among pharmacies and drug shops. Continued implementation of successful public and private sector strategies in support of evolving drug policy will be important for protecting the efficacy of antimalarials and ultimately facilitating PF elimination in Cambodia and throughout the Greater Mekong Sub-Region.

Antimalarial medicine outlet surveys were conducted as part of the ACTwatch project in Cambodia in 2009 (June - July), 2011 (June - August) and 2013 (September - October). A census of all outlets with the potential to sell/distribute antimalarials was conducted within a nationally representative sample of clusters (communes) with stratification by the national malaria program zones (see Table 1). Drug information, sale/distribution in the previous week, and retail price were collected for each antimalarial in stock. Product and distribution information was used to calculate relative market share using the adult equivalent treatment dose as the unit of analysis.