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Background Paper

# The Private Sector's Role in Malaria Surveillance

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## Acronyms

ACD – Active case detection

ACT – Artemisinin combination therapy

AMT – Artemisinin monotherapy

AMTR – Artemisinin Monotherapy Replacement

BCC – Behavior change communication

CHAI – Clinton Health Access Initiative

CHAZ – Churches Health Association of Zambia

CNM – National Center for Parasitology, Entomology and Malaria Control

DHIS – District Health Information Software

HMIS – Health management information system

ITN – Insecticide-treated bed net

IRS – Indoor residual spraying

IEC – Information, education and communication

IDNS – Infection Diseases Notification System

MARC – Myanmar Artemisinin Resistance Containment

MIS – Malaria Information System

MISAU – Ministério da Saúde

MMA – Myanmar Medical Association

MOH – Ministry of Health

NGO – Nongovernmental organization

NIMPE – National Institute of Malariology, Parasitology and Entomology

NMCP – National Malaria Control Program

PCD – Passive case detection

PPM – Public-private mixes

PPMV – Proprietary patent medicine vendor

PRA – Pharmaceutical Regulatory Authority

PSI – Population Services International

QAACT – Quality-assured artemisinin combination therapy

RDT – Rapid diagnostic test

SMS – Short message service

SPH – Sun Primary Health

SQH – Sun Quality Health

TB – Tuberculosis

UCSF – University of California, San Francisco

WHO – World Health Organization

## Introduction

Effective malaria surveillance depends primarily upon the timely and accurate identification and reporting of malaria cases that present to the healthcare system. In many settings, the private health sector is a significant source of healthcare. Engagement with the private health sector is essential to ensure complete and timely reporting of all malaria cases and effective case management for people seeking treatment from private providers. This is especially true in elimination settings where all cases must be documented and investigated. However, there is a dearth of research on the breadth of the private health sector's role in malaria case management and reporting. Moreover, there is a lack of knowledge about effective strategies for engaging the private health sector in malaria diagnosis, treatment and reporting in a variety of settings, the challenges malaria elimination programs face when engaging the private sector and ways to address those challenges.

Studies have shown that families often first seek care from the private sector for many child health conditions and primary care services.<sup>1-3</sup> These patterns are similar for malaria treatment, and in fact up to three-quarters of all treatment-seeking for fevers occur in the private health sector in some regions.<sup>4-9</sup> The prominent role of the private health sector in many settings is likely a result of the greater availability and ease of access to private providers, greater flexibility in prescribing medicine, greater availability of antimalarials (although often not frontline drugs) and perceptions of the relative quality of services.<sup>10</sup> The rural poor, who are often at higher risk of malaria infection, are also more likely to use informal private providers.

Given its diversity and reach, the private health sector is an essential partner for malaria surveillance and represents an underutilized opportunity to deliver effective healthcare to populations with limited access to the public sector. For example, the private sector may be best suited to provide case management for mobile and hard to reach populations, as private providers may be more conveniently located in high-risk communities or in border areas. While some of these private sector providers may be leveraged to provide surveillance evidence, there is only limited knowledge of how best to incentivize providers to partner with malaria programs to provide data and/or malaria elimination interventions.

While many governments and ministries of health (MOHs) have successfully engaged the private sector to improve its case management and surveillance practices, the diversity and use of the private sector by large proportions of the population presents a number of challenges for malaria programs. First, the quality of diagnosis and treatment for a variety of conditions varies greatly among private providers and may be quite poor in some settings.<sup>11,12</sup> Second, an inherent conflict often exists for private providers due to their need to generate profits: there is less incentive to accurately diagnose cases, which may reduce antimalarial sales. In elimination settings, private providers may be even less likely to purchase malaria diagnostics given the dwindling number of cases. Third, regulatory frameworks for ensuring access to quality diagnosis and treatment, if they exist, are often inadequate.<sup>11</sup> For malaria, the availability, use, quality and performance of accurate diagnostics, including rapid diagnostic tests (RDTs) and microscopy, in the private sector are inconsistent. The absence of a strong regulatory framework can also result in over-prescription of drugs or inappropriate and substandard treatment. Finally, a further challenge for malaria programs as they approach elimination is that all cases of malaria must be rapidly identified and responded to appropriately to prevent onward transmission. Private providers are often not included in routine disease reporting systems, such as health management information systems (HMIS) and rapid reporting systems, due to lack of knowledge, infrastructure and incentives to participate. Therefore, malaria elimination programs do not have the data needed to adequately respond to all cases in a timely manner.

This paper seeks to fill a knowledge gap by synthesizing current research and expert knowledge on the current state of the private health sector's role in malaria surveillance. We discuss key challenges and how these have

been addressed by several countries, as well as potential opportunities presented by the private sector for case management and response, with a focus on malaria elimination.

## **Methods**

This background paper was informed by interviews and e-mail correspondences with 21 key informants, including malaria elimination, surveillance and private sector engagement experts and an extensive review of grey and published literature.

We used a purposive sample of key informants. We first identified a list of experts working on malaria elimination and control programs or private sector engagement. We then contacted these key informants via e-mail and invited them for in-depth, semi-structured interviews over the phone or through video conferencing. Interview questions were open-ended and focused on private sector diagnosis, treatment and reporting of malaria. Key informants were asked to comment on the role of the private sector in malaria surveillance globally and specifically in countries and regions where they had direct experience. Additional key informants were identified and interviewed based on the endorsements and recommendations of the initial key informants.

We organized our qualitative data in Excel based on predetermined themes that were framed by our interview guide (see Annex 1). These themes included: (1) the significance of private sector engagement in malaria surveillance (2) types of private sector providers and actors, (3) ideal vs. current private sector involvement in malaria surveillance, (4) challenges or issues with private sector engagement, (5) incentives and regulations for the private sector, (6) models or examples of private sector engagement, (7) country examples and (8) examples from other diseases or health programs.

In addition to the key informant interviews, we conducted literature research to gather additional information for six country case studies – three in Africa (Mozambique, Swaziland, and Zambia) and three in Asia (Cambodia, Myanmar, and Vietnam). These countries, which were chosen based on discussions with key informants, represent a mix of control and elimination countries and settings with different private sector engagement strategies and challenges. The case studies provide a variety of strategies for and challenges to engaging the private sector that this paper uses to draw broad recommendations.

For the literature review, we gathered relevant peer-reviewed articles from PubMed, Google Scholar, Scopus and JSTOR. We also conducted an extensive online search to find grey literature, reports, policy documents and web articles. For both searches, we included resources that discussed malaria or infectious disease surveillance, private sector engagement in malaria and other diseases, malaria testing, treatment and case reporting in the private sector and models or examples of private sector involvement in malaria surveillance. We filtered the results and organized the relevant resources by topic. We found few articles that talked about malaria elimination specifically, thus we had to draw from the malaria control literature or from the experiences of other disease programs.

In addition to our literature review, multiple key informants sent us unpublished reports or documents to which they had access.

## **Overview of the private health sector**

The private health sector includes any outlet, facility or person that provides clinical or diagnostic services and is not managed by a national or local government.<sup>1,10,13</sup> The specific composition of the private health sector varies

greatly across countries but can generally be organized into four groups based on their profit or business model (for-profit vs. nonprofit) and their regulation status (formal vs. informal; Figure 1).<sup>14</sup>

**Figure 1.** Private sector matrix

	<b>For-profit provider</b>	<b>Nonprofit provider</b>
	<i>Profit-driven and entrepreneurial</i>	<i>Mission-driven</i>
<b>Formal provider</b> <i>Refers to providers who are formally trained and whose clinical practice is regulated by the government; records are more easily obtained and regulations more easily enforced</i>	<ul style="list-style-type: none"> <li>• Private hospitals</li> <li>• Private clinics</li> <li>• Pharmacies and registered or accredited drug dispensaries</li> <li>• Large corporations or companies that provide healthcare to their workers</li> <li>• Private diagnostic facilities and laboratories</li> </ul>	<ul style="list-style-type: none"> <li>• NGOs and NGO-operated hospitals, clinics and other health facilities</li> <li>• Faith-based and charity hospitals, clinics and other health facilities</li> </ul>
<b>Informal provider</b> <i>Includes providers who may not have received formal training and who are not registered with or licensed by any government body; records are more difficult to obtain and regulations are more difficult to enforce</i>	<ul style="list-style-type: none"> <li>• Unregistered or unaccredited drug sellers (including itinerant vendors) and retail outlets</li> <li>• Private practitioners working from home</li> <li>• Public practitioners working from home as private providers</li> <li>• Village doctors and traditional healers</li> <li>• Unregulated small mining and agricultural companies that provide healthcare to their workers</li> </ul>	<ul style="list-style-type: none"> <li>• Volunteer health workers</li> </ul>

Formal private providers have some formal training, accreditation or licensure.<sup>15</sup> The formal for-profit private sector consists of private hospitals and clinics, pharmacies and registered or accredited drug dispensaries, large corporations and companies that provide their own medical services and private diagnostic facilities. Formal nonprofit providers include nongovernmental organizations (NGOs), faith-based groups and the health facilities they own and operate.

The informal private sector consists of a vast array of outlets run by individuals with little or no formal training.<sup>15</sup> The informal for-profit sector includes unregistered drug vendors and retailers, private and public practitioners who work from home, village doctors and traditional healers, smaller unregulated companies that provide health services, untrained providers and itinerant drug vendors. Volunteer workers fall in the final category of informal nonprofit sector. Informal providers are responsible for varying levels of healthcare interactions in different settings, from 9% in Kenya to 77% in Bangladesh.<sup>16</sup> One multi-country study found that informal providers are the source of up to 90% of all healthcare interactions and informal providers are more likely to serve poorer populations.<sup>16</sup>

Formal providers are often easier to include in national malaria surveillance systems because they are regulated by the government and are typically required to submit records of their services. The informal sector may be more difficult to include because of a lack of regulation or enforcement which makes it difficult to obtain records in a timely and coordinated manner.



The size, contribution and makeup of the private sector vary from country to country.<sup>17</sup> In some regions, such as Southeast Asia and some parts of East and West Africa, the private sector is a major, if not the primary, source of healthcare for people across socioeconomic strata. In other regions, such as Southern Africa and some countries in Latin America, the public sector dominates the health system and provides most preventive and curative care.

The types of providers that deliver the most malaria diagnostic and curative services differ widely by country. For example, an analysis of ACTwatch surveys in six African countries found that among children under five years old who sought care for fever, the proportion who first approached the private sector for care varied from 17.5% to 39.8%.<sup>18</sup> In Uganda, private health facilities were a more popular source of fever treatment than pharmacies, drug stores or general retailers.<sup>19</sup> The same was true for Zambia. In contrast, Nigerians were more likely to approach proprietary patent medicine vendors (PPMVs)—a specific type of informal health provider in Nigeria that is popular among the poor—for fever treatment compared to any other type of private health facility.<sup>20</sup> Similarly, in Benin, Madagascar and Zambia more people seek fever treatment from general retailers, pharmacies and drug shops compared to private health facilities.<sup>21-23</sup>

Additionally, the same multi-country ACTwatch study found that the proportion of survey respondents who bought their artemisinin combination therapy (ACT) drugs from the private sector varied between 8% and 52%. In Nigeria, significantly more individuals bought their ACTs from private pharmacies and drug shops (39%) compared to private health facilities (10.8%).<sup>20</sup> Among pharmacies and drug shops, PPMVs were a more frequent source of ACTs than general retailers, itinerant drug vendors and pharmacies combined.<sup>24</sup> In Madagascar where 29.2% of children under five bought their ACTs from the private sector, general retailers (13.3%) provide more ACTs than pharmacies or drug stores (10.2%) and private health facilities (5.7%).<sup>21</sup>

The size of the private sector and its overall share in malaria testing and treatment also varies widely among the 34 malaria eliminating countries (Table 1 and Annex 2). For example, in Cambodia, Myanmar and China more than 40% of all malaria cases are estimated to be diagnosed in the private sector. In countries like Swaziland and Zambia where the public health sector dominates, the contribution of the private sector to malaria testing and treatment is much lower.

## **Challenges for malaria programs**

Interviews with key informants highlighted many challenges and complexities malaria programs must address when engaging with the private sector, and we summarize the key challenges here. Public health disease programs are usually designed by the public sector with public providers in mind, often with little consideration of how to include private providers. In addition, the public sector may not have explicit national guidelines for the private sector and may not have systems in place for sharing national guidelines with private providers. National malaria programs rarely conduct outreach to private providers, often because the private sector is loosely organized and hard to access. Even when it is possible to identify and reach the private sector, finding an effective incentive for engagement or authority for enforcement can be a further challenge. Other challenges include difficulties in data verification, limited training in routine surveillance amongst private providers and the need for a reporting system that is timely, systematic and easy-to-use. It should be noted that in many settings a number of these challenges are similar among public providers, but the mechanisms for overcoming them may differ given that public providers are more directly accountable to the government. The primary challenges presented by private providers that our key informants discussed are summarized as follows:

- **Private providers are often excluded from the design, planning and implementation of public sector disease programs.** Inclusion of the private sector in this process is essential to effective engagement and to ensure feasible approaches are adopted.
- **The goals of the national malaria programs and private providers may differ.** Private providers may not be incentivized to diagnose or report all cases. In fact, a profit-driven model may incentivize private providers to overprescribe. In contrast, national malaria programs are primarily interested in ensuring accurate case management and reporting.
- **The informal private sector is particularly difficult to address due to its size, lack of organization and lack of government engagement.** In some settings there may be an association of private sector providers that represent a large group, and in other settings private providers may be linked through social franchises. But in many places there may be hundreds of private sector stakeholders, including pharmacies and drug vendors, who provide huge volumes of treatment but are not linked with one another and whose behaviors are often poorly understood.
- **Many private providers do not recognize the value and importance of counting and reporting all cases.** Drug retailers, for example, may not think in terms of cases at all but are instead concerned primarily with product sales. In addition, when case data are collected and provided, ensuring the data are meaningful and accurate can be difficult.
- **A large proportion of private providers have only limited training in accurate diagnosis, prescribing and reporting.** Training programs can be designed to address this, but turnover and longevity of private providers create a challenge to training programs. In addition, literacy and numeracy issues among some private providers may hamper training efforts.
- **New regulations and protocols may not be communicated to all private providers and providers may choose not follow current regulations and protocols.** Changing national government regulations has been a challenge to many private providers who need to keep up with treatment guidelines. Additionally, many informal providers and some formal providers work to some degree outside the law, such as selling medicines they are not allowed to sell and without prescriptions.

Understanding how to effectively address these challenges is key to appropriate private sector engagement. While some strategies have been shown to be effective in multiple settings, the approaches that will be used by countries are highly context-specific. The size and composition of the private sector vary among and within countries which create unique regulatory and logistical challenges for national governments and MOHs when engaging the private sector. Thus, countries must understand the private sector landscape in their own settings by determining the types, relative sizes and geographical distribution of private providers and the services they provide. With this information, countries can better identify solutions that are appropriate and feasible for them.

**Table 1.** Private sector size, utilization and regulation in selected malaria eliminating and non-eliminating countries\*

Country	Relative Size of the Private and Public Sectors†		Private Sector Utilization				Private Sector Regulation		
	Number or proportion of private providers or health facilities	Number or proportion of public providers or health facilities	Among children under 5 years who sought treatment for fever, the proportion of individuals who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the lowest wealth quintile who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the highest wealth quintile who received care from a private provider or health facility	Proportion or number of malaria cases diagnosed by private providers or in private facilities‡	Government agency regulating private providers	Regulations for malaria surveillance in private sector (Yes or No)	Government requirements for malaria reporting
<b>Eliminating Countries</b>									
<b>Swaziland</b>	2 mission hospitals, 53 private clinics, 73 mission facilities, 22 industry owned facilities (2012); 1 medical doctor and 3.6 nurses per 10,000 (2013) <sup>25</sup>	6 hospitals, 8 public health units, 5 health centers, 162 clinics, 187 outreach sites (2012); 1.3 doctors and 15 nurses per 10,000 (2012) <sup>25</sup>	No data	No data	No data	No data	Ministry of Health and Social Welfare and Swaziland Nursing Council <sup>26</sup>	Yes	Reactive surveillance system using a toll-free hotline for all notifiable diseases <sup>27</sup>
<b>Vietnam</b>	11.5 per 10,000 population (2005) <sup>28</sup>	6.7 per 10,000 population (2005) <sup>28</sup>	No data	No data	No data	No data	Ministry of Health <sup>29</sup>	No <sup>30,31</sup>	N/A
<b>Non-eliminating Countries</b>									
<b>Cambodia</b>	2,572 health facilities (consultation clinics, clinics with 10 beds or more, and polyclinics) in 2004 and 1,372 licensed pharmacies and	1,049 health centers and health posts, 8 national referral hospitals, and 24 provincial referral hospitals	56.10% (95% CI 52.46 - 59.68) <sup>33</sup>	24.31% (95% CI 20.10 - 29.14) <sup>33</sup>	19.31% (95% CI 15.34 - 24.02) <sup>33</sup>	79% <sup>34</sup>	Ministry of Health and various health councils	No <sup>35</sup>	N/A

Country	Relative Size of the Private and Public Sectors†		Private Sector Utilization				Private Sector Regulation		
	Number or proportion of private providers or health facilities	Number or proportion of public providers or health facilities	Among children under 5 years who sought treatment for fever, the proportion of individuals who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the lowest wealth quintile who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the highest wealth quintile who received care from a private provider or health facility	Proportion or number of malaria cases diagnosed by private providers or in private facilities‡	Government agency regulating private providers	Regulations for malaria surveillance in private sector (Yes or No)	Government requirements for malaria reporting
	drug outlets (2008) <sup>32</sup>	(2012) <sup>32</sup>							
<b>Mozambique</b>	No data	No data	55.70% (95% CI 34.72 - 74.85) <sup>36</sup>	No observations <sup>36</sup>	80.01% (95% CI 58.45 - 91.99) <sup>36</sup>	0.4% in 2007 <sup>37</sup>	Ministry of Health	Yes	Health center reports sent to provincial health directorate <sup>38, 39</sup>
<b>Myanmar</b>	17,032 doctors, 2,208 dental surgeons, and 5,979 traditional medicine practitioners (2013) <sup>40</sup>	12,800 doctors, 802 dental surgeons, and 875 traditional medicine practitioners (2013) <sup>40</sup>	75% <sup>41</sup>	No data	No data	42.30% <sup>41</sup>	Ministry of Health	No <sup>42</sup>	N/A
<b>Zambia</b>	21% of health facilities (2010) <sup>43</sup>	79% of health facilities (2010) <sup>43</sup>	13.40 (95% CI 11.14 - 16.05) <sup>44</sup>	9.79% (95% CI 6.32 - 14.87) <sup>44</sup>	35.71% (95% CI 26.82 - 45.72) <sup>44</sup>	9.10% <sup>23</sup>	Ministry of Health and various health councils	Yes <sup>45</sup>	DHIS reporting platform for faith-based and private hospitals <sup>45</sup>

\*95% CI – 95% confidence interval; *No data* – no data found from published surveys (i.e., Demographic and Health Surveys, Malaria Indicator Surveys or ACTwatch surveys); *No observations* – no reported respondents (n=0) from specific survey referenced; *N/A* – not applicable.

†The types of private and public providers reported vary by country and by source of data. Most include formal providers only. For private providers, both for-profit and nonprofit providers are included.

‡Private facilities in this column include retail outlets that provide malaria diagnostic services.

## Strategies for engaging the private sector

Developing strategies to engage the private health sector, either through incentive schemes, greater communication or policy, is critical for achieving public health goals across a variety of conditions. However, only limited operational and implementation research has been conducted to guide how to effectively engage the private sector. Bustreo and colleagues (2003) provide a helpful framework outside of malaria. In their paper, they describe the primary available strategies for incorporating private sector providers to achieve positive child health outcomes across a range of conditions. These strategies include: (1) contracting private providers to provide specific services, (2) social marketing, (3) regulations and setting standards and (4) information dissemination or training.<sup>3</sup> Here we discuss these strategies in addition to the concept of social franchising.

Contracting is a means to directly involve private providers in the implementation of public sector disease programs and to engage the private sector to make publicly funded services “more accountable, transparent, and efficient.”<sup>46</sup> Contracting to private providers may include utilizing public funds to engage private entities to deliver specific types, qualities and quantities of services. Contracting of health services has been successfully conducted for the provision of nutrition services through community nutrition workers and NGOs in Senegal and Madagascar, a project that led to substantial decreases in malnutrition.<sup>47</sup> Contracting was also successfully employed to provide equitable child health services in Cambodia through NGOs.<sup>48</sup> Commonly raised potential difficulties with contracting include limited ability to take to scale, cost effectiveness compared with government services, increased inequity in service delivery, government’s limited capacity to manage contracts and financial sustainability.<sup>49</sup> However, a review of ten health contracting experiences found them to be highly effective at achieving rapid improvements in service delivery, to be scalable, cost effective and able to increase coverage among the most marginalized groups.<sup>49,50</sup> Contract management by government agencies is a potential challenge, but as demonstrated by the Senegal, Madagascar and Cambodia experiences, it can be done effectively. Financial sustainability is a remaining concern subject to government and donor financing, but in these examples initial contracts were either continued or expanded.

Social marketing is one mechanism to align the profit incentive of the private sector with the broader goals of national programs. Social marketing or commercialization of health products is conducted to expand delivery of key interventions to target populations and requires actions to make the interventions or services more profitable and therefore appealing to private providers. This frequently involves a substantial subsidy on the marketed product so that they are affordable for consumers and more likely to be sold by private providers. A prominent example is the subsidization of ACTs through the Affordable Medicines Facility—malaria program, which has shown varying success in improving access and affordability of frontline antimalarials.<sup>51,52</sup> Social marketing strategies have been extensively used to increase demand and use of insecticide-treated bed nets (ITNs) and to promote hand-washing practices.<sup>3</sup> However, these strategies have shown varying effectiveness and, in the case of ITNs, varying ability to achieve equity and reach those most at risk.<sup>53,54</sup>

Social franchising is a related mechanism for linking private providers to provide and market socially desirable goods. Social franchising has been successfully employed in a number of settings whereby networks of private sector providers are connected through formal agreements, the end result of which is social rather than financial gain.<sup>55</sup> In this mechanism designed to improve quality and consistency of care, individual providers are incentivized to join a network of franchises through the creation of brand identity, mass marketing campaigns, access to commodities below market rates and trainings. Throughout their engagement, franchised providers are trained and supported to provide specific services and given access to data and feedback to improve their practices.<sup>55</sup> This feedback is apparent from both provider and client perspectives. In Myanmar, providers who joined the Sun Quality Health (SQH) network cited social responsibility for serving the poor as a primary

motivation.<sup>56,57</sup> Social franchising through this network has resulted in increased client volumes, due to perceived higher quality and availability of effective and affordable drugs.<sup>56</sup>

Regulation through the establishment of laws, policies and standards is a potential means to ensure appropriate case management and reporting in the private health sector but requires verification that standards are followed. Regulation includes creating specific diagnosis and treatment protocols, licensing and accrediting providers, creating price controls for health services, regulating pharmaceuticals and essential drug lists, regulating private insurance, requiring notification of diseases, executing drug quality standards and involving private providers in establishing standards.<sup>9</sup> However, developing countries often allocate insufficient resources to enforcing regulations and there are often gaps in regulatory frameworks such as infrequent regulatory inspections, lack of heavy sanctions and unspoken permission of local regulatory staff.<sup>58–60</sup>

Training of private sector providers may be one of the more operationally feasible approaches to improving private sector case management and reporting and has been shown to improve adherence to national guidelines for antimalarial prescription and to improved prescription behaviors by private practitioners in integrated management of childhood illnesses.<sup>3,61–63</sup> Training and provision of subsidized commodities, such as ACTs and RDTs, is commonly reported by providers as a means to improve the stature of their business.<sup>64</sup> Private health providers can also be included in the design and implementation of training. However, reviews of training interventions reveal that training alone may be insufficient if market-based strategies aligned with a provider's incentives are not employed at the same time.<sup>65</sup> Several studies have documented this gap between knowledge and practice, especially for informal private providers such as rural drug vendors.<sup>66</sup> Combinations of interventions that reinforce each other are likely the most effective. A review of the literature suggests effectiveness is greatest when training is ongoing rather than one-off and when integrated with social marketing approaches, referral systems and increased local regulatory oversight.<sup>65</sup>

### **Examples of private sector involvement in disease surveillance**

Several mechanisms have been employed in different settings to integrate private providers in disease surveillance systems. In general, all healthcare facilities such as clinics, hospitals and laboratories that are registered, accredited or monitored by a country's MOH are required to submit routine statistical reports on specified indicators to a local or national authority.<sup>67</sup> This may include reports on reproductive health procedures, data on the leading cases of outpatient and emergency services, the leading causes of death, private laboratory test results and other health data.<sup>68–72</sup>

In some countries, certain private for-profit and nonprofit providers are seamlessly integrated into the national HMIS. For example, in Zambia health facilities run by the Churches Health Association of Zambia (CHAZ)—a group of Christian organizations that provides over 35% of healthcare in the country and implements malaria control activities in 22 districts—and other large hospitals submit monthly morbidity and mortality data to the national HMIS.<sup>73,74</sup> A 2007 assessment of the Zambian HMIS found that reporting completeness and consistency was adequate across most health indicators.<sup>73</sup> Angola<sup>75</sup>, Kenya<sup>76</sup>, South Africa<sup>77</sup>, Tanzania<sup>78</sup>, Uganda<sup>79</sup>, Zimbabwe<sup>80</sup> and other countries also receive some HMIS data from the private sector, but reporting completeness among private health facilities is variable. In Uganda, facility-based reporting completeness was 85% in 2011 and in Tanzania reporting completeness among private facilities was 54.8%.<sup>81,82</sup> In South Africa, private providers do not always report notifiable diseases to the Department of Health, including malaria, where only 26% of cases diagnosed in the private sector were reported.<sup>77,83</sup>

Disease-specific surveillance systems offer another model for integrating the private sector.<sup>75,76,78,84,85</sup> Many of these surveillance systems were established through donor funding and are now run by MOHs. For example in

Kenya, the National AIDS/STD Control Program engages in significant private sector reporting because the release of key commodities is tied to case reporting.<sup>76</sup> The Division of Malaria Control at the Kenyan MOH also runs a separate surveillance system with five facilities in epidemic-prone areas reporting regularly on disease burden.<sup>76</sup> However, in some cases these parallel surveillance systems cause fragmentation due to different reporting formats and timeframes and strain limited human resources available to manage these reporting systems.<sup>78</sup>

While standalone tuberculosis (TB) surveillance systems still exist, most countries have included TB surveillance in their national HMISs where the private sector is an active participant.<sup>86</sup> This was primarily driven by the adoption of the Stop TB Strategy in 2006 which clearly specified that countries must engage all providers that provide TB care, including those in the private sector.<sup>87</sup> Thus, several public-private mixes (PPMs) were established between national TB programs and private providers that not only addressed appropriate treatment of TB but also integrated case reporting. The annual Global TB Report published by the World Health Organization (WHO) is able to track the number of TB cases notified by private care providers and the contribution of PPMs to total TB case notifications.<sup>88</sup>

Another common method of capturing private sector surveillance is by establishing a list of notifiable diseases. A notifiable or reportable disease is any disease or medical condition that medical providers and laboratories are required by law to report to local or national authorities.<sup>89</sup> Diseases are made reportable if they are of significant public health importance and if the frequent gathering of data on individual cases can help prevent or control the disease.<sup>90,91</sup> Most notifiable diseases are rare or vaccine-preventable communicable diseases, such as polio, measles and malaria in elimination settings, but a number of non-communicable diseases such as cancer are reportable to cancer registries. The list of notifiable diseases varies from country to country, and in countries with decentralized health systems, different states or provinces may establish their own list of notifiable diseases while still adhering to national guidelines.<sup>92-94</sup>

Making a disease notifiable can improve surveillance, but it is not a perfect system. Many countries have documented varying levels of reporting completeness (with completeness rates ranging from 2% to 95% in different studies) and timeliness among public and private providers,<sup>69,89,95-100</sup> both of which are critical issues for disease control and elimination. Several barriers and facilitators have been identified in reporting notifiable diseases. A common barrier that has been documented in studies among healthcare providers in the U.S.<sup>101</sup>, U.K.<sup>102</sup>, Iran<sup>103</sup>, Syria<sup>104</sup>, Nigeria<sup>105,106</sup>, South Africa<sup>107</sup> and Taiwan<sup>108</sup> is poor physician knowledge about which diseases are notifiable and the proper procedures and channels to follow when reporting a disease. Another barrier raised by both private and public providers is the length of time required to fill out the forms to report a disease, which many consider an added burden to their work.<sup>103,107-109</sup>

To address these barriers, a number of interventions have been implemented, including posting a condensed list of notifiable diseases in health facilities, making reporting forms widely available to providers, administering training and retraining to health workers on the process of disease notification and providing regular feedback to providers about how their data is used.<sup>94,104,105</sup> One facilitator of notifiable disease reporting is the use of electronic or Internet-based reporting systems, which have been shown to improve completeness and timeliness in different settings.<sup>94,110</sup> Another facilitator is appropriate incentivization. In Taiwan, linking notifiable disease reporting to national health insurance reimbursements (i.e., “the stick”) and a small remuneration (i.e., “the carrot”) has significantly improved reporting completeness and timeliness.<sup>111,112</sup>

The contribution of the private sector to disease surveillance in other elimination programs has varied. During the smallpox eradication campaign in 1965-1980, private providers helped to increase vaccination rates in the general population. However, most of the eradication activities such as active case detection (ACD) and

epidemic containment were carried out by centralized health systems within countries that were typical of that period with heavy assistance from the WHO.<sup>113,114</sup> There are also examples of private industries assisting the eradication campaign, particularly to reach high-risk populations. For example, in the final stages of the smallpox eradication in India, an iron and steel company in Bihar state provided significant materials, personnel and management resources for ACD and vaccination campaigns after they were informed by WHO that the town the company was operating in was a major source of smallpox.<sup>115,116</sup>

For the polio eradication campaign that continues today in Afghanistan, Nigeria and Pakistan, the private sector has taken a more active role and has been a key partner in polio elimination in different regions.<sup>114</sup> Private providers from the formal and informal health sectors have been tapped as vaccinators and surveillance officers in many settings.<sup>117</sup> Many private companies have donated personnel, vehicles, facilities and financial support for training and vaccination programs.<sup>118</sup> Last, private providers have contributed to the timely identification of final cases of acute flaccid paralysis, allowing public health officials to respond appropriately.<sup>115,119</sup> Because the private sector is used more widely in many countries today, experts believe that involvement of the private sector in disease surveillance is a key feature of any disease eradication program and that barriers that hinder private sector reporting of cases must be addressed.<sup>119-121</sup>

## **Country case studies**

The following case studies examine different country approaches to private sector engagement in malaria surveillance. Here, we discuss both eliminating and neighboring, non-eliminating countries, including Swaziland, Vietnam, Cambodia, Mozambique, Myanmar and Zambia. This section describes the private sector in these countries, quantifies the use of the private sector for general malaria services, highlights various strategies to engage the private sector and discusses the successes and challenges of these strategies.

### **A. Eliminating countries**

#### **Swaziland**

Malaria in the Kingdom of Swaziland has declined significantly in the past decade, from 4,005 cases in 2000-01 to 369 in 2011-12.<sup>122,123</sup> Only the western half of the country is receptive to malaria, and the National Malaria Control Program (NMCP) attempts to follow-up every case detected in the receptive area and conduct reactive case detection.

In Swaziland, the private sector consists of hospitals, private, industrial and NGO clinics and pharmacies and comprises approximately 10 – 15% of Swaziland's health sector. One hundred and twenty-eight private facilities were identified in a service availability mapping evaluation, and 93 of these facilities were identified as offering any malaria services. The majority were private clinics, NGO clinics and industrial clinics associated with sugar plantations.<sup>124</sup>

The majority of malaria patients in Swaziland use public health facilities where they receive an RDT and are prescribed ACTs. Following a positive RDT, the MOH mandates that all health providers, both public and private, report the case to the Infection Diseases Notification System (IDNS), a system developed and managed by the NMCP with support from the Clinton Health Access Initiative (CHAI), by phone within 24 hours.<sup>122</sup> However, an assessment of reporting found that while “greater than three-quarters of facilities reported to the HMIS system, only slightly more than half reported to [IDNS].”<sup>124</sup>

Swaziland's NMCP has made significant progress in engaging private sector health facilities in Swaziland. After trainings and awareness-raising, members of the private sector are now instructed to report malaria cases to the



IDNS in the same manner as public health facilities. When reporting a case, the private provider's name is recorded to ensure that private sector reporting is properly monitored. In addition, after discussions between the NMCP and private sector representatives, the NMCP provides RDTs and ACTs to private facilities free of charge and NMCP program officers make regular visits to private providers to address any difficulties with reporting.

Another means of engaging the private sector in Swaziland is through private companies that operate their own health facilities. Sugar cane plantations, which have work sites that may be a great distance from the closest public facility, are actively involved in the malaria program. The plantations report cases to the IDNS, and they receive trainings on malaria elimination strategies, national case management and surveillance guidelines. They have also contributed to malaria elimination through the purchase of chemicals for indoor residual spraying (IRS), which the NMCP spray teams employ on plantation buildings.

One area that still requires active engagement is the inclusion of pharmacies in malaria surveillance. In Swaziland, pharmacies do not distribute ACTs without a prescription, according to our interviews. If the patient does not have a prescription, the pharmacy can perform an RDT and prescribe medication after a positive result. Despite their role in malaria diagnostics and treatment, they have not yet been actively engaged in surveillance efforts in the same manner as private healthcare providers.

In 2013, the NMCP and CHAI worked together to assess capacity, barriers and incentives for engaging private sector health providers for malaria elimination.<sup>124</sup> The results of this assessment guide the NMCP's private sector engagement strategies described above. For example, previously the NMCP offered malaria trainings, but members of the private sector rarely participated because spending three days at a training was not feasible. To address this, the NMCP now visits private health facilities monthly to offer one-hour malaria trainings that better fit the schedules of those facilities.<sup>124</sup>

During the 2013 CHAI and NMCP assessment, the NMCP learned that while in general, the private sector is eager to participate in malaria elimination, the lack of knowledge about how to effectively engage with the MOH and report in a systematic manner is an obstacle to effective inclusion of the private sector. Most private sector representatives were not familiar with the IDNS, and many were unaware that the purpose of reporting a case is to trigger a community level investigation. However, nearly all non-reporting health facilities expressed a willingness to report to both HMIS and IDNS.<sup>124</sup>

What has been most challenging is ensuring that the private sector and the MOH have a voice in building the system for private sector malaria reporting. It was essential for these groups to sit together, discuss their needs and capacities and for the MOH to change the way they do some things (e.g., give trainings) rather than mandate that the private sector participate in the existing system. Another challenge is that a bill governing health facilities does not exist, thus the MOH has no power to sanction health facilities that refuse to report and there is no method in place to incentivize reporting. Additionally, there are no guidelines for engaging the private sector, and decisions are made according to the needs of each health facility.

Swaziland is an excellent example of the value of engaging the private sector directly in discussions to ensure that private providers understand their role in malaria elimination and that the systems and programs in place meet providers' needs. Now, when making programmatic decisions about malaria elimination and surveillance, Swaziland includes both public and private health facilities in their planning and implementation to help ensure that their surveillance data are complete and accurate.

## Vietnam

Vietnam has reduced its malaria burden significantly and consistently in the last decade. In 2013, there were estimated 35,406 cases of malaria in the country, which is less than half the number of cases in 2006.<sup>125</sup> In contrast, malaria deaths went up to six in 2013 compared to zero deaths in the previous year.<sup>125</sup>

The private sector is ubiquitous in Vietnam. The public sector provides most institutional and specialty care in the country (e.g., birth delivery services)<sup>126,127</sup>, but the private sector delivers over 60% of all outpatient care, particularly for young children.<sup>128-130</sup> In some areas, the number of private providers (including pharmacies and drug vendors) is double that of public providers and facilities.<sup>28</sup> For diseases such as TB, as many as 80% of individuals use the private sector for care<sup>131</sup>, and among patients who are diagnosed with TB in the public sector, approximately 50% of them first sought care from a private provider.<sup>132,133</sup>

The Malaria Information System (MIS) in Vietnam currently does not collect data from the private sector, thus it is unclear what proportion of malaria patients seeks care from private providers. The National Institute of Malariology, Parasitology and Entomology (NIMPE), however, aims to integrate the private sector into disease surveillance.<sup>30</sup> NIMPE is currently piloting a district-level web-based reporting system through a grant received from the Global Fund to Fight AIDS, Tuberculosis and Malaria that will automate monthly reporting of routine cases, as well as vector control activities, stocks of malaria supplies and information, education and communication (IEC) activities. Reporting from individual facilities is conducted via phone and paper records to the district level, where it is entered into the web-based system. However, private providers are still excluded from this system.<sup>30,134</sup>

While data on stock quantities, IEC and vector control activities are generally complete, malaria morbidity and mortality data received by the MIS are less accurate. A retrospective study (1999-2001) that assessed the data quality of the MIS found that the MIS missed 80 to 95% of malaria cases detected through ACD (consisting of weekly visits to obtain blood samples) and up to 90% of cases detected through passive case detection (PCD).<sup>134</sup> The researchers also found that the number of malaria cases missed through PCD was proportional to the number of active private providers in the country, which suggests that the MIS is missing a substantial number of cases because of the poor integration of private providers and health facilities into the disease surveillance system.<sup>134</sup>

Despite the poor integration of the private sector in disease surveillance, Vietnam has a number of successful public-private collaborations to improve access to essential health services and commodities that can serve as a good foundation for improved case reporting. For example, Vietnam has addressed a projected \$45 million contraceptive budget shortfall by embracing a total market approach for contraceptives.<sup>135</sup> This entails the national government working closely with private sector stakeholders to understand market demand and manage targeting of resources and supplies. Additionally, the creation of a multisectoral group, which includes the commercial sector, to oversee the monitoring and evaluation of the contraceptive market will be critical to meet changing market demands.<sup>135</sup> Demonstrating success in meeting demand across the public and private sectors would be of particular interest for malaria programs.

Vietnam also has examples of public-private partnerships in TB care, which has been shown to improve case detection of new smear-positive cases but has met with mixed success in terms of treatment outcomes.<sup>136-138</sup>

Population Services International (PSI) Vietnam is using social franchising strategies to improve the access and quality of other priority public health issues including reporting. Under the brand name "Good Health, Great Life," 150 private clinics are franchised in four provinces and have a contractual agreement to uphold franchise standards including maintaining national critical health services, reporting monthly results and participating in

trainings and meetings.<sup>55</sup> Private clinics benefit by being able to promote the quality brand and additional trainings. The government benefits by having private providers comply with national guidelines for health services and reporting. While none of the social franchise programs in Vietnam currently provide malaria testing and treatment, organizations like PSI Vietnam are consulting with the NMCP to understand how they can apply their core competencies in behavior change communication (BCC), product marketing and social franchising to improve malaria control efforts, including improved surveillance within the private sector.

Vietnam has several successful examples of engagement with the private sector for TB and family planning, which provides an opportunity to learn from those experiences and apply them to malaria testing, treatment and case reporting. The government should leverage the strengths of the private sector, acknowledge all stakeholders involved, coordinate across many private providers and convene stakeholder meetings to provide outreach and education on the importance of malaria surveillance. Efforts to include private providers will need additional supervision systems and oversight to monitor the testing, treatment and reporting of cases.

## **B. Non-eliminating countries**

### **Cambodia**

Cambodia has made significant gains in reducing malaria morbidity and mortality. In 2013, 24,130 presumed and confirmed malaria cases were reported, along with 12 malaria deaths.<sup>125</sup> Compared to figures from 2012, malaria cases in Cambodia have been reduced by more than half and malaria deaths reduced by more than two thirds.

The primary source of healthcare in Cambodia is the private sector, constituting an estimated 80% of all health treatment.<sup>139</sup> Approximately 70% of malaria patients reported seeking treatment in the private sector.<sup>140</sup> Private pharmacies are often the first point of contact for the majority of ill individuals.<sup>139</sup> The private sector in Cambodia includes both registered providers (pharmacists, doctors, nurses) and unregistered providers (drug sellers and itinerant vendors) in addition to small and large private companies such as agriculture and construction enterprises that provide health services to their workers.

The private sector, which is largely unregulated in Cambodia, provides approximately 75% of antimalarials in the country which are supplied by PSI.<sup>139</sup> Local village vendors have been found to be the most common source of malaria drugs, followed by private health workers and public health facilities. The National Center for Parasitology, Entomology and Malaria Control (CNM), has increased efforts to regulate and monitor private drug sellers in order to control *Plasmodium falciparum* artemisinin resistance, which was first documented in the country.<sup>141</sup> As part of the regulation efforts, CNM has created a bureau dedicated to ensuring that providers are registered and to increase enforcement of non-registered providers selling medicines including artemisinin monotherapies. The Cambodian Government, with support from the U.S. government, has been effective in regulating illegal outlets selling antimalarials by closing the number of outlets by 65% between 2009 and 2010 from 1,081 to 379, respectively.<sup>142</sup> Additionally, the Department of Drug and Food within the MOH has drug inspection police who monitor private pharmacies on a regular basis and sample malaria drugs in both the public and private sectors to ensure quality of antimalarials and prevent the sale of monotherapies.<sup>143</sup>

Evidence generated by ACTwatch outlet surveys has supported decision-making in Cambodia with regards to drug policy and strategies for drug implementation and scale-up, including engagement with the private sector.<sup>144</sup> For example, in an effort to shift the private sector towards more formal regulated outlets, the unregulated private sector antimalarial-stocking outlets have been reduced to 43% from 70% between 2009 and 2013.<sup>145</sup> This experience has been useful for Cambodia to understand private sector market composition over time, and can be applied in other settings to monitor policy change effects.

Cambodia was the first country to pilot and scale-up the provision of subsidized ACTs in the private sector. PSI has provided malaria services through the private sector in Cambodia since 2003. This includes distributing and subsidizing malaria RDTs and Malarine, a prepackaged ACT (artesunate plus mefloquine), which accounts for 75% of antimalarial drugs sold in the country. PSI's experience supporting large-scale provision and use of ACTs in the private sector shows that it is possible to implement. This experience has also demonstrated that routine interaction and trainings with the private providers must be included to develop relationships with other stakeholders and assure provider use. Despite this success, a challenge will be to identify the appropriate financial incentives to achieve the desired provider and consumer behaviors for diagnosis and quality treatment, particularly in the face of a declining malaria caseload.<sup>52</sup> Furthermore, incentives will need to be tailored for the context in which they are required.

In Cambodia, it is challenging to track patients that visit private providers so many are lost to follow up, making it difficult to ensure that treatment was successful. To address this, a short message service (SMS) alert system was implemented for village malaria workers, CNM and its partners including Malaria Consortium and other groups. This is a PPM project that aims to train private providers on appropriate diagnosis, treatment and referral procedures.<sup>146</sup> Targeting areas with the highest risk of drug resistance, the pilot referral system was implemented with more than 100 private providers to give a more accurate picture of the malaria burden and avoid duplication of registered cases in the public sector. If a private provider at a private clinic suspects a malaria case, he/she can SMS message the referral slip number and patient's phone number to the database. When the patient arrives at the public clinic, their referral information has already been captured in the database and can be matched to the original private clinic referral. This allows the CNM to account for patients at public facilities by tracking referrals to estimate caseload and track commodities by matching diagnostics to treatment. Early results indicate that 65% (104 of 160) of referrals reached the public sector.<sup>147</sup> Only non-financial incentives such as trainings and completion certificates were provided to the private providers, and may have contributed to fewer referrals overall based on expected caseload. The SMS referral system is an innovative way to enable private providers to participate in patient care while adhering to national guidelines. Partnering with telecommunication companies was a key component to ensure that all SMS messages were sent free of charge. Despite the success of this system, challenges remain, including not knowing whether all patients visiting the private providers and needing to be referred actually have been. Additionally, the referral system does not capture patients visiting providers that are not in the referral network.

To strengthen the linkages between the private and public health sectors and thereby improve health outcomes, the CNM commissioned PATH to develop a PPM model in two Cambodian provinces.<sup>148</sup> The PATH PPM aimed to build partnerships and linkages between the public and private sectors to improve coordination and reporting. The project implemented regularly scheduled meetings between these two stakeholders to discuss the benefits and challenges experienced by private providers, particularly those are unregistered and informal which provide malaria services. Additionally, more than 250 private providers were trained on appropriate malaria diagnosis, treatment and referrals. Through this collaboration, trust between the public and private sectors has been established to facilitate improved communication.

The government of Cambodia has developed a malaria control policy framework that encourages partnerships between public and private sectors. The large number of private providers is a challenge to manage for the CNM. How to best incentivize private providers to participate in public sector treatment and reporting is not well understood and only non-financial incentives (i.e., trainings) have been included. Given that the demand for private sector care is so high in Cambodia, acknowledging and accepting their importance and working closely to partner with private providers is the best means to encourage their participation and adherence.

## **Mozambique**

In 2013, there were over 3.9 million presumed and confirmed malaria cases and over 2,900 malaria deaths in Mozambique. Compared to 2007, Mozambique has reduced its malaria cases by almost 40% while malaria deaths have increased by almost 70%.<sup>125</sup>

The private healthcare sector in Mozambique is relatively small, primarily comprised of health facilities operated by private industry and private pharmacies that sell RDTs but not ACTs. Many privately-owned health facilities are funded by donors who choose to channel funding into NGO-run health facilities rather than the public sector.<sup>149</sup> Currently, there are no regulations that mandate private sector participation in the national surveillance system, although malaria is a reportable disease. In addition, there are no existing channels for private sector health facilities to report malaria data routinely.

Involvement of the private sector in the malaria surveillance system is currently under discussion at the MOH, and guidelines for their involvement may be included in the next Health Sector Strategic Plan, which will cover 2020 - 2025. Initial steps implemented include identifying existing private sector health facilities.

Private industry healthcare is the most successful example of private sector activities in Mozambique. Some coal mining and natural gas companies provide healthcare to their workers, including malaria prevention, testing and treatment. They have a vested interest in keeping their employees healthy, thus companies engage in malaria surveillance and treatment—including tracking malaria commodities and cases—and conduct parasitemia or baseline studies, the results of which have been shared with the Ministério da Saúde [Ministry of Health] (MISAU).

One example of private companies successfully engaging in malaria control includes the mining companies Anadarko and Vale who are beginning to work with Malaria Consortium to address malaria in the communities around their worksites. They have partnered to implement projects that address health challenges faced by surrounding communities within the province where they work, particularly malaria.

There are several challenges to engaging the private sector in Mozambique. One significant challenge shared by a key informant is the political and financial influence of private companies within Mozambique, which may make the government hesitant to ask for or mandate reporting. However, this perception was not universal among interviewees. Another challenge to engaging the private sector is when there is a conflict between the aims of the private sector that implements corporate social responsibility projects and the aims of MISAU's strategic plan for malaria.<sup>149</sup> This occurred with the Goodbye Malaria project, which was funded primarily by Nando's, a South African restaurant chain. This project began with a pre-conceived idea of what was needed, and rather than consulting MISAU or others working in malaria control, the project implemented activities that did not follow national guidelines and at best were not a good use of resources, such as conducting IRS with insecticides to which mosquitoes were resistant.

While Mozambique is at the beginning stages of engaging the private sector in malaria surveillance, the potential inclusion of this work in the national strategic plan is encouraging. Given the challenges faced by Mozambique's public health facilities, including frequent commodity stockouts and lack of electricity and running water, involvement of the private sector could significantly increase access to quality health services.<sup>150,151</sup> Additionally, one company's partnership with an NGO currently working on malaria in the country could be a promising example of how companies can engage in corporate social responsibility projects around malaria by relying on NGOs with local experience and existing relationships with the NMCP.

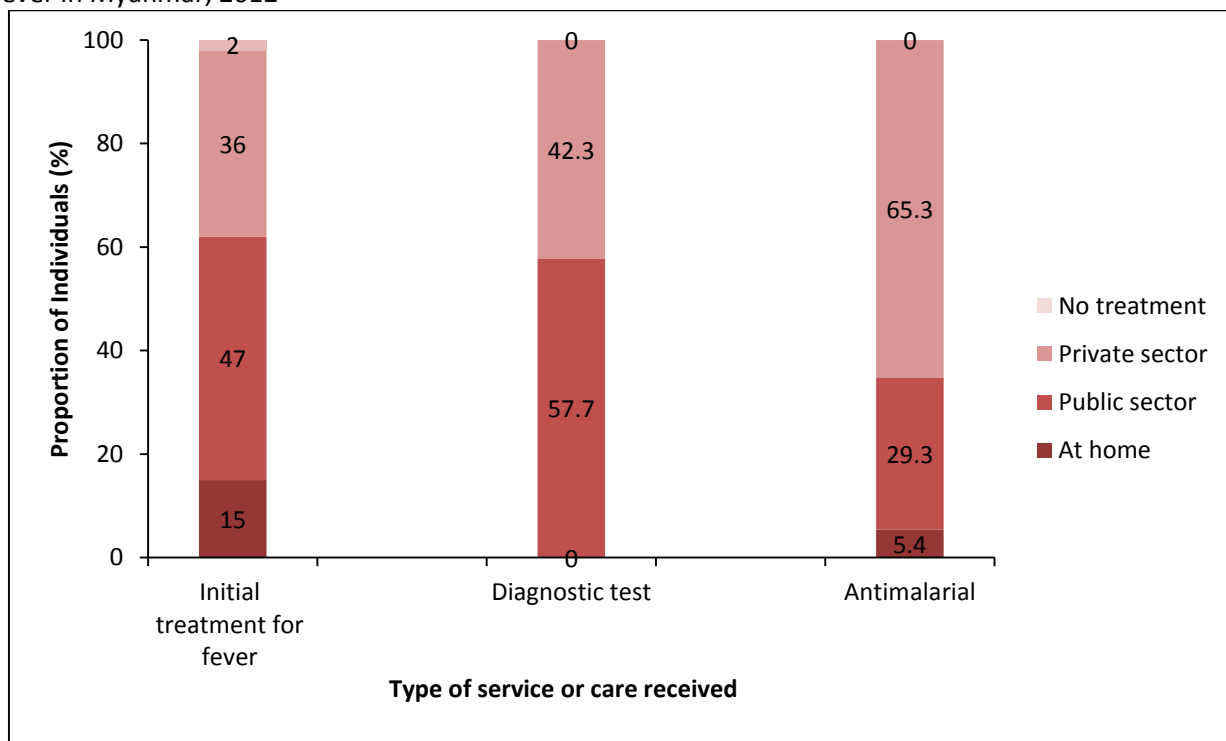
## Myanmar

More than 50% of malaria cases and about 75% of malaria deaths in the Greater Mekong subregion occur in Myanmar.<sup>152,153</sup> In 2013, 333,871 presumed and confirmed malaria cases were reported in the country, along with 236 malaria deaths.<sup>125</sup>

The private sector in Myanmar is the dominant healthcare delivery system. It is estimated that about 80% of all care in Myanmar is provided by private providers which include physicians, midwives, traditional healers and health facilities run by faith-based organizations and NGOs.<sup>154,155</sup> While the public system in Myanmar is highly structured and provides most of the specialty and inpatient care, private providers are the largest source of ambulatory care in the country and includes reproductive health services and infectious disease diagnostics and treatment.<sup>42,154–156</sup>

While there have been conflicting findings about the relative contributions of the public and private sectors in overall malaria testing and treatment in Myanmar<sup>41,157</sup>, an ACTwatch survey conducted in 2012 concluded that private clinics and retail outlets are a more common source of antimalarials compared to the public sector (Figure 2).

**Figure 2.** Source of care among individuals who sought diagnostic tests, antimalarial drugs, and initial treatment for fever in Myanmar, 2012



Adapted from PSI Myanmar. Household survey: baseline – the Republic of the Union of Myanmar 2012 AMTR survey report. PSI Myanmar: November 2013.

Myanmar has one of the most active social franchising programs globally through the work of PSI. PSI has been an active organizer of private providers in Myanmar for over two decades and has emerged as one of the largest providers of healthcare services and products in the country.<sup>158</sup> PSI manages two private provider networks in Myanmar that provide primary care, family planning and reproductive health commodities and services, malaria diagnostic and treatment services, among others.<sup>159</sup> SQH is composed of physicians and advanced health professionals and serves primarily urban and peri-urban populations.<sup>56,160</sup> Sun Primary Health (SPH) is composed

of lower level health professionals such as midwives.<sup>160</sup> In 2013, over 3,300 private providers were registered in these two networks.<sup>161</sup> SQH and SPH contribute significantly to malaria diagnostics and treatment in Myanmar. In 2013 alone, these two networks tested approximately 350,000 suspected malaria cases and treated approximately 50,000 confirmed cases.<sup>158</sup>

As part of the Myanmar Artemisinin Resistance Containment (MARC) project funded by the Three Diseases Fund and led by the MOH, the Myanmar Medical Association (MMA) has procured RDTs and rolled out their use, conducted mobile visits to reach at-risk populations, trained village health workers who conduct community-based malaria control, and recruited general practitioners to several townships previously without providers.<sup>162–164</sup> MMA, which boasts a membership of over 17,000 registered medical providers, also provides training and refresher programs to its members on current malaria treatment guidelines.<sup>165</sup> MMA is also working with Malaria Consortium and other partners to roll out integrated vector management and BCC interventions in pilot communities.<sup>166</sup>

A key component of MARC is the Artemisinin Monotherapy Replacement (AMTR) project co-funded by the Bill & Melinda Gates Foundation and the U.K. Department for International Development and implemented by PSI. Initiated in 2011, AMTR aimed to replace oral artemisinin monotherapy (AMT) sold in the private sector with quality-assured ACT (QAACT).<sup>167</sup> This was achieved by working with two licensed drug distribution companies in Myanmar, AA Pharmaceuticals and PolyGold to halt the importation of AMT and implement a nationwide ban on AMT sales. These distributors were then given access to subsidized QAACT (artemether lumefantrine), and as of November 2014, over 1.3 million QAACTs have been sold to these two distributors.<sup>168</sup> PSI also conducted medical detailing to private pharmacies, itinerant drug vendors and general retailers by sending promoters to explain the importance of QAACTs and encourage its use in fever case management. Collectively these drug sellers provide 21% of initial fever treatment, 15.7% of treatment for malaria diagnoses and 13% of all antimalarials in Myanmar.<sup>41</sup> Through a public communication campaign, consumers were also educated about QAACTs to increase demand. The campaign focused on the pandoma logo, the quality-assurance seal used on ACTs approved by the WHO and the government. As of June 2013, AMTR has increased the availability of ACTs to 63% from 27% in 2012 among private drug outlets.<sup>168</sup> Additionally, the market share of ACTs has increased relative to AMTs. After nine months of AMTR implementation, over 73% of all antimalarial drugs sold in the pilot townships were ACTs.<sup>168</sup> As part of the second phase of the project, PSI is planning to introduce RDTs to the private sector and improve the rational use of QAACTs.

Myanmar is also another example of a country with active engagement with private industries such as palm oil and rubber plantations, prawn farms, gold panning and gem mining, all of which employ a significant number of mobile laborers, a group that is at higher risk of contracting malaria.<sup>42,169</sup> The NMCP assists these companies and provides technical guidance on developing their diagnostic and treatment services, BCC interventions and prevention strategies for malaria among their workers. In return, the NMCP seeks malaria surveillance data from these private companies, although it remains unclear if case reporting already takes place on a regular basis.<sup>42</sup>

Challenges with fully engaging the private sector remain, however. NGOs and private providers are not formally integrated in the national HMIS, although efforts to change this are underway.<sup>42</sup> In 2011, a new case reporting system was adopted by the NMCP which utilized a new form that NGOs were mandated to use.<sup>170</sup> The NMCP is now developing guidelines and tools, including mHealth solutions, to standardize case data reporting among public and private health workers at every township and to facilitate rapid and complete reporting.<sup>171</sup> PSI has also mapped over 10,000 drug outlets in pilot townships where it aims to roll out the use of District Health Information Software 2 (DHIS 2) through mobile technology for routine data collection, entry and reporting. This project will be rolled out in select townships in eastern Myanmar in 2015 and scaled up the following year.

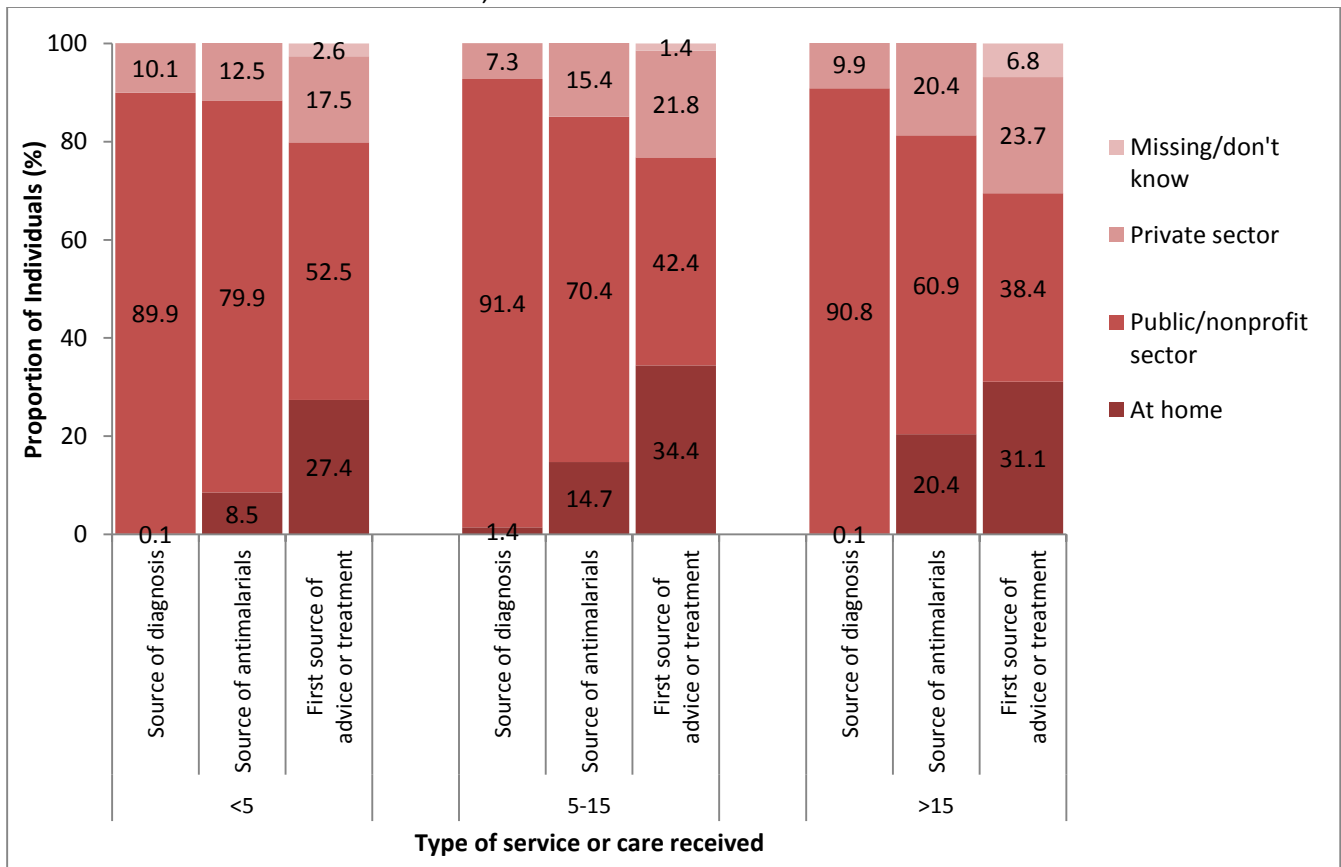
## Zambia

Zambia remains one of the highest burden countries for malaria. In 2013, over 5.4 million cases of presumed and confirmed malaria cases were reported, along with 3,548 malaria related deaths.<sup>125</sup> The number of cases in 2013 has been the highest since 2000.

Zambia’s healthcare system is composed of a decentralized public health system and the private sector. The public health system is managed by the MOH and serves as the main provider of healthcare services. A significant number of public health facilities, however, are run by CHAZ, an aforementioned association formed in 1970 by 16 Catholic and Protestant groups.<sup>172</sup> CHAZ is funded largely by the MOH and provides approximately 35% of healthcare services in Zambia.<sup>172,173</sup>

The private sector—comprised of for-profit hospitals and clinics, employer-owned and NGO-based health facilities, pharmacies, drug stores, and general retailers or shops—is a less significant source of healthcare in Zambia. In 2009, there were only 432 registered private medical providers in the country and only 14% of the 1,882 formal healthcare facilities were privately owned and operated in 2010.<sup>43,174</sup> Private providers, however, deliver antenatal, child, and maternal care, HIV/AIDS prevention and treatment, contraception commodities and service and immunizations to many Zambians,<sup>44,175,176</sup> and evidence suggests that compared to the public sector, the private sector provides equal or greater quality care.<sup>177</sup>

**Figure 3.** Source of care among individuals in various age groups who sought diagnostic tests, antimalarial drugs, and initial treatment for fever in Zambia, 2011



Adapted from ACTwatch, Society for Family Health Zambia. Household survey, Zambia, 2011 – survey report. Population Services International: 2011.



The latest ACTwatch survey has found that across all age groups, the majority of Zambians first utilize the public sector for advice or treatment of fevers (see Figure 3).<sup>23</sup> The public sector is the primary source of diagnosis for fevers and antimalarials, a finding that has been reported in several national malaria indicator surveys.<sup>178</sup> In contrast, less than a quarter of Zambians approach the private and non-profit sectors for advice or treatment of fevers, thus they serve as a less significant source of fever diagnoses and antimalarials.<sup>23</sup>

Despite the less central role that the private sector plays in the Zambian health system, several efforts have been made to integrate them into national disease programs or expand their reach in the communities they operate. For example, the Zambia Access to ACTs Initiative (ZAAI) funded by UK Department of International Development and the World Bank was implemented in 2011 to explore the regulation of private drug shops in rural and remote areas.<sup>179</sup> Subsidized ACTs and RDTs were sold to wholesalers and distributed to accredited private drug sellers in pilot districts through normal distribution channels. After the 10-month pilot study, 50 health shops were accredited, more than 22,430 people were tested for malaria, and over 7,764 people were treated with effective antimalarials.<sup>180</sup> Access to and affordability of ACTs in the private sector increased, as well as the diagnostic capacity of drug sellers, and the use of ineffective antimalarials decreased. Additionally, it was found that care-seeking for children in public and private facilities increased among pilot districts compared to control districts.<sup>181</sup>

Because the provision of subsidized commodities was tied to record-keeping, most drug shops maintained records of the number of ACTs they dispensed and the results of the RDTs used. These records were accessible to district health officers, but it is unclear if they routinely collected or used this data. Similar drug shop accreditation programs such as the accredited drug dispensing outlets in Tanzania also incorporated guidelines for improved record-keeping on drug consumption quantities, patient-related data, adverse drug reactions and product losses due to drug expiry.<sup>182-184</sup> These efforts were shown to be effective although the data were never communicated to any health authority.<sup>185</sup>

Recognizing both the success of ZAAI and the limitations of current regulations, the Pharmaceutical Regulatory Authority (PRA) in Zambia proposed amendments to the 2004 pharmaceutical law.<sup>181</sup> In 2013, the Medicines and Allied Substances Act was passed by the Zambian Parliament that allows the PRA (which has been renamed to the Zambian Medicines Regulatory Authority) to register and issue licenses to health shops, allowing these sellers to stock and sell drugs from a prescribed list including ACTs.<sup>186</sup> This change will help increase access to quality-assured RDTs and ACTs in areas where health shops operate but will pose a new challenge for malaria surveillance.

Private companies have historically played a large role in malaria control. A recent assessment has measured the impact made by malaria prevention and control programs of three private companies in Zambia (i.e., Zambia Sugar Plc, Mopani Copper Mines Plc, and Konkola Copper Mines Plc). These companies, which implemented IRS, distributed ITNs, and detected and treated cases, coordinated their efforts closely with the National Malaria Control Centre of Zambia. The assessment found that over the period 2000-2009, annual malaria cases decreased by 94% and over 108,000 malaria episodes and 300 deaths were averted in the areas they work.<sup>187</sup> In addition, malaria-related workdays lost and healthcare spending decreased by 94% and 76% respectively. To build on the successes of these companies, engagement with the Zambia Association of Chambers of Commerce and Industry is underway to expand malaria control efforts to other sectors.<sup>188</sup> However, while the rate of return for these malaria control efforts is significant (approximately 28%), disease control budgets in private companies are not stable and are affected by fluctuations in revenue.<sup>187</sup> Additionally, experts caution that financial support from private companies for malaria prevention and treatment activities may wane once malaria becomes an uncommon disease.<sup>189</sup>

Despite these successes, integrating private sector actors into local surveillance systems still has its challenges. The national HMIS which was established by the MOH in 1996, routinely receives data from public facilities and large private hospitals but largely excludes smaller clinics and health facilities, pharmacies, and shops.<sup>73</sup> The District Health Information System, which uses a passive surveillance system, also includes all private hospitals but excludes other types of private providers.<sup>45,190</sup> Generally, private sector reporting in Zambia is poor and there is currently no legislation that requires private providers to report case data to the national government.<sup>73</sup>

## Conclusions and recommendations

In this report, we reviewed background literature and data on private sector treatment seeking, case management and engagement in surveillance. Additionally, we conducted key informant interviews of private healthcare experts and case studies of representative country experiences in Africa and Asia. Data on private sector surveillance and case management for malaria are limited, especially for the informal sector. While several countries have piloted strategies to engage the private sector, including the informal sector, systematic evaluations of these activities have only rarely been conducted, which makes it difficult to provide general evidence-based recommendations. As a result the available and recommended strategies are highly dependent on country context and a mix of activities is likely required in most settings. Engagement of the private sector is essential to malaria elimination, but the opportunities for and means of including the private sector in national elimination strategies will vary by setting. Despite these contextual nuances, there are some general lessons that can be applied based upon the background literature, case studies and key informant interviews we present in this report. These include the following:

1. **Research how to effectively engage the private sector in each setting.** Private sector provision of healthcare is a reality everywhere and methods of engagement need to be better understood. All eliminating countries should at a minimum conduct a landscaping effort to understand the breadth and quality of private sector diagnosis, treatment and reporting and identify gaps and challenges in their country. Landscaping exercises can be localized to malaria endemic and/or highly vulnerable and receptive areas. This effort should lead to a prioritization of which specific provider groups to work with as it may not be feasible to engage all groups. For example, some drug vendors working outside the law will always present challenges. The landscaping effort should also lead to a collaborative multi-stakeholder discussion of appropriate engagement strategies. In addition, small research studies or experiments will be useful to understand how best to incentivize private providers to report cases.
2. **For countries approaching malaria elimination, make malaria a notifiable disease.** Making malaria a notifiable disease will ensure, at a minimum, a framework for mandatory reporting by all providers who diagnose and treat malaria. Additionally, as countries approach malaria elimination, programs should increase restrictions on providers that are legally permitted to provide malaria diagnosis and treatment.
3. **Provide simple and inexpensive reporting and referral systems for the private sector.** Reporting and referral systems may include SMS reporting, web-based platforms or other convenient and easy to use systems. Training on how to use the reporting referral systems and how to ensure quality data collection is an important part of this recommendation. It will not be possible to include all private providers in the reporting and referral system, therefore knowing the private providers that are most important in each country and district will help prioritize this process.
4. **Where feasible, facilitate linkages and routine interaction between the national malaria program, public providers and private providers.** Linkages can be established through PPM systems, referral

systems, direct contracting or regular shared trainings. At a minimum, regular meetings at provincial or district levels will help to build relationships and trust and will enable private providers to see themselves as valuable partners who are an essential piece of the elimination process. Ideally, human and financial resources should be dedicated to support these relationships. It will not be possible to include all private providers in these interactions, but the landscaping of the private sector that we prioritized will help identify the key private provider groups in each setting. One initial manner to engage for-profit providers in malaria surveillance may be to track diagnosis and treatment flows through a limited sample of sentinel providers rather than on a national scale.

5. **Determine appropriate and effective incentives and disincentives to private providers.** Incentives, while not necessarily financial, will have to somehow address a financial need if they are to be sustainable. Social franchising and social marketing are potentially effective incentivization schemes to align the goals of population health with the interests of private providers. Punitive incentives or disincentives such as refusing renewal of registration or licensure if providers have not consistently reported or restricting access to subsidized commodities or government support to providers who have consistently reported, may be an alternative approach.
6. **Invest in schemes to provide opportunities for accreditation of informal private providers.** Providers that are able to reach agreed standards should be allowed to operate legally and should be regulated to those standards, including the provision of surveillance information. Those that are unable to reach these standards need to be shut down. Standards for informal providers need to be realistic enough to be achieved and vested interests of larger pharmacies carefully considered. While an ambitious goal in many settings, the formalization of these institutional relationships is a key step for fully integrating public and private sector healthcare delivery under a reformed regulatory framework effectively managed by governments.
7. **Ensure frequent trainings of private providers.** National trainings will provide private providers with updates to regulations and guidelines and will allow private providers an opportunity to discuss the challenges they face. Trainings should build up to accreditation and then managed through quality assurance processes to ensure standards are met and maintained.
8. **Utilize a strong intermediary presence such as a large NGO.** In many settings, NGOs can help manage the public and private relationships with funding, technical expertise and other resources and in some settings may be an ideal direct contractor to implement services.
9. **Map out areas where the private sector is the predominant source of care for high-risk groups and provide direct support in these areas.** There is a need to identify sources of healthcare sought by high-risk groups. Mapping out and linking with these healthcare providers could help the national programs to implement improved prevention and elimination strategies to populations that are missed by the public sector.

Numerous opportunities exist to address private sector engagement in malaria diagnosis, treatment, and reporting, but strategies need to be tailored to each country's unique political, economic and epidemiologic context. Knowledge sharing between countries and collaborations that include private sector healthcare providers is essential to building consensus on effective approaches. As demonstrated in this report, there is substantial awareness that private providers in many settings are already doing much of this work effectively, but improved efforts to include them in formal national processes are crucial to achieving and maintaining malaria elimination.

## Annex 1. Interview guide for key informant interviews

Thank you for agreeing to discuss the role of the private sector in malaria surveillance with us. We are currently working on a background paper about this topic for the Bill & Melinda Gates Foundation. (Our team has previously published four background papers on other topics related to malaria elimination, which you can access through [this link](#).) We're eager to hear about your knowledge of and experience in this pertinent issue. Below is a list of the questions we plan to ask you. If you know of any published or unpublished papers, manuscripts, or reports that could help us answer these questions, we would appreciate it if you can share those with us.

1. What exactly does "private sector" mean when we're talking about malaria surveillance? What types of private sector entities have been involved or should be involved in malaria surveillance?
2. Thinking about the private sector entities you just mentioned, ideally, how do you think they should be involved in malaria surveillance?
3. How does this "ideal involvement" compare to how things currently function?
4. What are some of the key challenges for malaria programs when engaging the private sector for malaria surveillance? Where possible, please comment on specific countries that have attempted to engage the private sector. What are some of the key challenges they have experienced? How were these addressed?
5. What countries or surveillance systems have successfully engaged the private sector? Can you tell us about the ones that have been most successful?
6. What types of information should programs seek to gather to better engage the private sector? What do you think are the key steps to improving involvement of the private sector in malaria surveillance?
7. What ongoing research, programs, or initiatives exist to engage the private sector in malaria surveillance that you think is particularly promising?
8. If you had the opportunity to design either research or a pilot project to investigate a private sector engagement strategy for malaria elimination, what would you do?
9. Thinking about diseases outside of malaria, are there any examples of how the private sector has been successfully engaged that could be transferred to the malaria sphere?
10. In addition to anyone you have already mentioned, is there anyone we should speak to about the private sector's involvement in malaria surveillance? These people could be working with malaria programs in country, conducting research, or involved in policy or advocacy about the issue.
11. In addition to anything you have already mentioned, what articles, documents, or other resources about private sector involvement with malaria surveillance should we review?
12. Is there anything else you would like to share with us about the private sector's involvement in malaria surveillance? Are there important questions we missed or failed to ask?

## Annex 2. Private sector size, utilization and regulation in malaria eliminating countries\*

Country	Relative Size of the Private and Public Sectors†		Private Sector Utilization				Private Sector Regulation		
	Number or proportion of formal private providers or health facilities	Number or proportion of formal public providers or health facilities	Among children under 5 years who sought treatment for fever, the proportion of individuals who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the lowest wealth quintile who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the highest wealth quintile who received care from a private provider or health facility	Proportion or number of malaria cases diagnosed by private providers or in private facilities‡	Government agency regulating private providers	Regulations for malaria surveillance in private sector (Yes or No)	Government requirements for malaria reporting
<b>Algeria</b>	20% of physicians <sup>191</sup>	No data	No data	No data	No data	No data	Ministry of Health and Population	Yes	Case reporting mandatory <sup>125</sup>
<b>Argentina</b>	60% of hospitals (2000) <sup>192</sup>	30% of hospitals in (2000) <sup>192</sup>	No data	No data	No data	No data	Ministerio de Salud	Yes	Case reporting mandatory <sup>125</sup>
<b>Azerbaijan</b>	No data	1450 healthcare facilities (2010) <sup>193</sup>	4.36 (95% CI 1.74 - 10.50) <sup>194</sup>	No observations <sup>194</sup>	No observations <sup>194</sup>	No data	Ministry of Healthcare	Yes	Case reporting mandatory (since 1930) <sup>125</sup>
<b>Belize</b>	4 hospitals and 69 outpatient centers and 25% of health professionals (2007) <sup>195</sup>	7 hospitals and 44 outpatient centers and 75% of health professionals (2007) <sup>195</sup>	No data	No data	No data	No data	Ministry of Health	Yes	No data
<b>Bhutan</b>	Almost zero <sup>196</sup>	Majority <sup>196</sup>	No data	No data	No data	No data	Medical and Health Council	Yes	Case reporting mandatory (since 2012) <sup>125</sup>
<b>Botswana</b>	650 general practitioners (2013) <sup>197</sup> and 6	683 general practitioners (2013) <sup>197</sup> and 34	No data	No data	No data	No data	Botswana Health Professions	Yes	No data

Country	Relative Size of the Private and Public Sectors†		Private Sector Utilization				Private Sector Regulation		
	Number or proportion of formal private providers or health facilities	Number or proportion of formal public providers or health facilities	Among children under 5 years who sought treatment for fever, the proportion of individuals who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the lowest wealth quintile who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the highest wealth quintile who received care from a private provider or health facility	Proportion or number of malaria cases diagnosed by private providers or in private facilities‡	Government agency regulating private providers	Regulations for malaria surveillance in private sector (Yes or No)	Government requirements for malaria reporting
	private hospitals and 167 medical clinics (2008) <sup>198</sup>	hospitals and 1,499 clinics and health posts (2008) <sup>198</sup>					Council		
<b>Cape Verde</b>	60 medical practices, 31 pharmacies, and 15 laboratories <sup>199</sup>	2 national reference hospitals, 3 regional hospitals 30 health centers, 34 health posts, 113 basic health units <sup>199</sup>	No data	No data	No data	No data	Ordem dos Medicos de Cabo Verde	Yes	Case reporting mandatory <sup>125</sup>
<b>China</b>	8440 hospitals (2011) <sup>200</sup> and 133,132 clinics (2005) <sup>201</sup>	14,328 hospitals (2011) <sup>202</sup> and 201,509 clinics, infirmaries, and health centers (2005) <sup>201</sup>	No data	No data	No data	80% <sup>203</sup>	Ministry of Public Health	Yes	National web-based case reporting system <sup>125</sup>
<b>Costa Rica</b>	38.4% of health professionals (2008) <sup>204</sup>	61.6% of health professionals (2008) <sup>204</sup>	No data	No data	No data	50% <sup>205</sup>	Ministry of Health	Yes	Case reporting mandatory <sup>125</sup>
<b>Democratic People's Republic of Korea</b>	No data	300,000 health workers <sup>206</sup>	No data	No data	No data	No data	No data	Yes	Case reporting mandatory (since

Country	Relative Size of the Private and Public Sectors†		Private Sector Utilization				Private Sector Regulation		
	Number or proportion of formal private providers or health facilities	Number or proportion of formal public providers or health facilities	Among children under 5 years who sought treatment for fever, the proportion of individuals who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the lowest wealth quintile who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the highest wealth quintile who received care from a private provider or health facility	Proportion or number of malaria cases diagnosed by private providers or in private facilities‡	Government agency regulating private providers	Regulations for malaria surveillance in private sector (Yes or No)	Government requirements for malaria reporting
									1999) <sup>125</sup>
<b>Dominican Republic</b>	8.30% (2007) <sup>207</sup>	91.70% (2007) <sup>207</sup>	23.65% (95% CI 19.74 - 28.07) <sup>208</sup>	5.76 (95% CI 3.86 - 8.5) <sup>208</sup>	31.36% (95% CI 20.56 - 44.64) <sup>208</sup>	No data	Dominican Medical Board <sup>207</sup>	No data	No data
<b>El Salvador</b>	Exact number not known (2010) <sup>209</sup>	619 health facilities (2010) <sup>209</sup>	No data	No data	No data	No data	Ministerio de Salud	No <sup>125</sup>	N/A
<b>Iran</b>	No data	No data	No data	No data	No data	No data	Ministry of Health and Medical Education	Yes	Case reporting mandatory (since 1949) <sup>125</sup>
<b>Kyrgyzstan</b>	600 medical doctors (2007) <sup>210</sup>	~14,393 medical doctors (2007) <sup>210</sup>	No data	No data	No data	No data	Ministry of Health	Yes	Case reporting mandatory (since 2007) <sup>125</sup>
<b>Malaysia</b>	10,382 physicians or 34% (2009) <sup>211</sup>	20,154 physicians or 66% (2009) <sup>211</sup>	No data	No data	No data	No data	Ministry of Health	Yes	Case reporting mandatory (since 1975) <sup>125</sup>
<b>México</b>	42.6% health employees (2012)	57.4% health employees (2012)	No data	No data	No data	No data	Secretaria de Salud	Yes	Case reporting mandatory <sup>125</sup>

Country	Relative Size of the Private and Public Sectors <sup>†</sup>		Private Sector Utilization				Private Sector Regulation		
	Number or proportion of formal private providers or health facilities	Number or proportion of formal public providers or health facilities	Among children under 5 years who sought treatment for fever, the proportion of individuals who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the lowest wealth quintile who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the highest wealth quintile who received care from a private provider or health facility	Proportion or number of malaria cases diagnosed by private providers or in private facilities <sup>‡</sup>	Government agency regulating private providers	Regulations for malaria surveillance in private sector (Yes or No)	Government requirements for malaria reporting
<b>Namibia</b>	0.20 per 10,000 population or 53% of all healthcare workers (2007; 72% of doctors, 46% of RNs, 89% of pharmacists, 53% of pharmacist assistants, and 70% of social workers) <sup>212</sup>	0.88 per 10,000 population or 47% of all healthcare workers (2007; 28% of doctors, 54% of RNs, 11% of pharmacists, 47% of pharmacist assistants, and 30% of social workers) <sup>212</sup>	No data	No data	No data	No data	Ministry of Health and Social Services, Health Professions Council of Namibia	Yes <sup>213</sup>	N/A
<b>Nicaragua</b>	N/A	2,530 health facilities <sup>193</sup>	2.89% (95% CI 1.96 - 4.26) <sup>214</sup>	No observations <sup>214</sup>	84.16% (95% CI 67.17 - 93.24) <sup>214</sup>	No data	Ministerio de Salud	No data	No data
<b>Panamá</b>	No data	No data	No data	No data	No data	No data	Ministerio de Salud	No data	No data
<b>Paraguay</b>	1126 health facilities (2007) <sup>215</sup>	984 health facilities (2007) <sup>215</sup>	No data	No data	No data	No data	Ministerio de Salud Publica y Bienestar Social	No <sup>125</sup>	N/A
<b>Philippines</b>	70% of all health professionals (2011) <sup>216</sup>	30% of all health professionals (2011) <sup>216</sup>	27.66% (95% CI 24.30 - 31.30) <sup>217</sup>	11.47% (95% CI 7.76 - 16.64) <sup>217</sup>	27.56% (95% CI 21.43 - 34.67) <sup>217</sup>	No data	Philippine Regulatory Commission, Department	Yes	Case reporting through national



Country	Relative Size of the Private and Public Sectors <sup>†</sup>		Private Sector Utilization				Private Sector Regulation		
	Number or proportion of formal private providers or health facilities	Number or proportion of formal public providers or health facilities	Among children under 5 years who sought treatment for fever, the proportion of individuals who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the lowest wealth quintile who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the highest wealth quintile who received care from a private provider or health facility	Proportion or number of malaria cases diagnosed by private providers or in private facilities <sup>‡</sup>	Government agency regulating private providers	Regulations for malaria surveillance in private sector (Yes or No)	Government requirements for malaria reporting
							of Health		health information system <sup>218</sup>
<b>Republic of Korea</b>	90% of all medical institutions (2006) <sup>219</sup>	10% of all medical institutions (2006) <sup>219</sup>	No data	No data	No data	No data	Ministry of Health and Welfare	Yes	Case reporting mandatory (since 1963); <sup>125</sup> web-based surveillance system <sup>220</sup>
<b>São Tomé and Príncipe</b>	Almost none <sup>221</sup>	Majority <sup>221</sup>	22.98% (95% CI 16.00 - 31.83) <sup>222</sup>	16.66% (95% CI 7.82 - 32.02) <sup>222</sup>	19.87% (95% CI 9.16 - 37.89) <sup>222</sup>	No data	Ministério da Saúde	No data	No data
<b>Saudi Arabia</b>	7.59 physicians, 9.72 nurses, 0.34 pharmacists, and 3.48 allied health professionals per 10,000 population (2012) <sup>223</sup>	2.87 physicians, 5.59 nurses, 0.05 pharmacist, and 3.46 allied health professionals per 10,000 population (2012) <sup>223</sup>	66% of outpatient visits <sup>223</sup>	No data	No data	No data	Ministry of Health	Yes	Case reporting mandatory (since 1990) <sup>125</sup>

Country	Relative Size of the Private and Public Sectors†		Private Sector Utilization				Private Sector Regulation		
	Number or proportion of formal private providers or health facilities	Number or proportion of formal public providers or health facilities	Among children under 5 years who sought treatment for fever, the proportion of individuals who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the lowest wealth quintile who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the highest wealth quintile who received care from a private provider or health facility	Proportion or number of malaria cases diagnosed by private providers or in private facilities‡	Government agency regulating private providers	Regulations for malaria surveillance in private sector (Yes or No)	Government requirements for malaria reporting
<b>Solomon Islands</b>	4 private hospitals (2012) <sup>224</sup>	8 public hospitals, plus 187 nurse aid posts, 102 rural health clinics, and 38 area health centers (2012) <sup>224</sup>	No data	No data	No data	No data	The Ministry of Health and Medical Services	No <sup>225</sup>	N/A
<b>South Africa</b>	6,702 physicians or 60% (2002) <sup>226</sup> ; 216 private hospitals (2010) <sup>227</sup>	4,468 physicians or 40% (2002) <sup>226</sup> ; 393 hospitals (2012) <sup>227</sup>	No data	No data	No data	No data	Department of Health	Yes	Weekly reports submitted to district offices <sup>228,229</sup>
<b>Sri Lanka</b>	125 hospitals or 17% (2011) <sup>230</sup>	592 hospitals or 83% (2011) <sup>230</sup>	No data	No data	No data	19% <sup>231</sup>	Ministry of Health and Private Health Services Regulatory Council	Yes	Case reporting mandatory (since 2008) <sup>125</sup> ; toll-free line <sup>232</sup>
<b>Tajikistan</b>	14 hospitals and a number of pharmacies, dental care centers, and small diagnostic	426 hospitals (2007) <sup>233</sup>	1.27% (95% CI 0.315 - 5.00) <sup>234</sup>	No observations <sup>234</sup>	No observations <sup>234</sup>	No data	Ministry of Health <sup>233</sup>	Yes	Case reporting mandatory (since 2000) <sup>125</sup>

Country	Relative Size of the Private and Public Sectors†		Private Sector Utilization				Private Sector Regulation		
	Number or proportion of formal private providers or health facilities	Number or proportion of formal public providers or health facilities	Among children under 5 years who sought treatment for fever, the proportion of individuals who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the lowest wealth quintile who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the highest wealth quintile who received care from a private provider or health facility	Proportion or number of malaria cases diagnosed by private providers or in private facilities‡	Government agency regulating private providers	Regulations for malaria surveillance in private sector (Yes or No)	Government requirements for malaria reporting
	facilities (2010) <sup>233</sup>								
<b>Thailand</b>	17% of doctors, 7.2 % of dentists, 14.7% of pharmacists, and 10.7% of nurses (2009) <sup>235</sup>	53.5% of doctors, 64.8% of dentists, 73.4% of pharmacists, and 73.4% of nurses (2009) <sup>235</sup>	No data	No data	No data	0% (antimalarials banned in private sector) <sup>236</sup>	Ministry of Public Health and professional councils <sup>237</sup>	No <sup>238</sup>	N/A
<b>Turkey</b>	19.5% of physicians, 85.0% of nurses, 60.6% of dentists, and 34.0% of all hospitals (2010) <sup>239</sup>	80.5% of physicians, 15.0% of nurses, 39.4% of dentists and 66.0% of hospitals in (2010) <sup>239</sup>	No data	No data	No data	No data	Ministry of Health <sup>240</sup>	Yes	Case reporting mandatory (since 1930) <sup>125,240</sup>
<b>Uzbekistan</b>	59 private hospitals and 3,000 physicians (1998) <sup>241</sup>	1175 hospitals (1998) <sup>241</sup>	No data	No data	No data	No data	Ministry of Health <sup>242</sup>	Yes	Case reporting mandatory (since 1925) <sup>125</sup>
<b>Vanuatu</b>	1 international	231 aid posts, 89	No data	No data	No data	No data	Ministry of	No <sup>244</sup>	N/A

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Country	Relative Size of the Private and Public Sectors†		Private Sector Utilization				Private Sector Regulation		
	Number or proportion of formal private providers or health facilities	Number or proportion of formal public providers or health facilities	Among children under 5 years who sought treatment for fever, the proportion of individuals who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the lowest wealth quintile who received care from a private provider or health facility	Among children under 5 years who sought treatment for fever, the proportion of individuals in the highest wealth quintile who received care from a private provider or health facility	Proportion or number of malaria cases diagnosed by private providers or in private facilities‡	Government agency regulating private providers	Regulations for malaria surveillance in private sector (Yes or No)	Government requirements for malaria reporting
	health center, 6 medical clinics, 4 pharmacists, 1 physiotherapy clinic, 1 dental clinic, 2 laboratory, and 4 counseling centers (2010) <sup>243</sup>	dispensaries, 37 health centers, 8 municipal clinics, 2 referral hospitals, 4 provincial hospitals in (2010) <sup>243</sup>					Health		

\*95% CI – 95% confidence interval; *No data* – no data found from published surveys (i.e., Demographic and Health Surveys, Malaria Indicator Surveys or ACTwatch surveys); *No observations* – no reported respondents (n=0) from specific survey referenced; *N/A* – not applicable.

†The types of private and public providers reported vary by country and by source of data. Most include formal providers only. For private providers, both for-profit and nonprofit providers are included.

‡Private facilities in this column include retail outlets that provide malaria diagnostic services.