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## Global Forecasting for ACTs

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## Acronyms /Abbreviations

|      |                                           |
|------|-------------------------------------------|
| A2S2 | Assured Artemisinin Supply Services       |
| ACT  | Artemisinin Combination Therapy           |
| AMFm | Affordable Medicines Facility for Malaria |
| BCG  | Boston Consulting Group                   |
| BMGF | Bill and Melinda Gates Foundation         |
| CHAI | Clinton Health Access Initiative          |
| CQ   | chloroquine                               |
| GF   | Global Fund to Fight AIDS, Malaria and TB |
| GMP  | Good Manufacturing Practices              |
| M2S2 | Malaria Medicines Supply Services         |
| MMV  | Medicines for Malaria Venture             |
| PMI  | President’s Malaria Initiative            |
| PSM  | Procurement and Supply Management         |
| RBM  | Roll Back Malaria                         |
| SP   | sulfadoxine-pyrimethamine                 |
| WB   | World Bank                                |
| WHO  | World Health Organization                 |

## Acknowledgements

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## Introduction

Artemisinin-based Combination Therapy (ACT) is the most effective treatment for uncomplicated malaria. ACT refers to a combination of a rapidly-acting artemisinin derivative with a longer-acting antimalarial partner drug. In 2002, the World Health Organization (WHO) revised its malaria treatment guidelines to recommend ACTs over all other therapies. In less than a decade after that recommendation, the scale-up of ACTs has been one of the most important health technologies to see such a widespread increase in demand. Demand for ACTs increased from 2 million treatment courses in 2003 to 300 million in 2013. (See Figure 1 for ACT scale-up by year.) The increase in demand also came with demand uncertainties, however, leading to supply and demand mismatches.

Global forecasting has been recognized as an important market intervention to improve supply/demand imbalance in global health markets. Indeed, global forecasting was successfully used to support UNICEF's efforts to provide affordable, reliable access to EPI vaccines in middle- and low-income countries.<sup>1</sup> This case study examines how global forecasting was used to reduce the supply and price volatility of ACTs and discusses the improved results as well as the lessons learned from the process.

## Background on Malaria and the ACT Market

Malaria is an entirely preventable and treatable disease, but in 2015 there were an estimated 214 million new malaria cases and about 438,000 deaths. The disease is borne by mosquitos that transmit the malaria parasites. Sub-Saharan African countries accounted for 89% of worldwide malaria cases and 91% of malaria deaths. Children under age 5 are the most susceptible to dying from malaria (78% of all malaria deaths in 2013) and between 56 and 69 million children with malaria did not receive an ACT in 2013, according to the World Malaria Report 2014.

In the past, malaria was treated with *artemisinin*-only therapies (called mono-therapies), such as chloroquine (CQ) and sulfadoxine-pyrimethamine (SP). Over time, malaria parasites developed resistance to these drugs. Worse, using monotherapies now can speed the rise of drug-resistant parasites. That is why the WHO has been recommending ACTs. Unfortunately, CQ and SP are cheaper than ACTs and are still available in the private sector.

### *Actors in the ACT Market*

**Procurers and Funders:** National malaria programs in malaria-endemic countries purchase ACTs based on financing from the Global Fund, the US President's Malaria Initiative (PMI), the World Bank, and domestic health budgets.

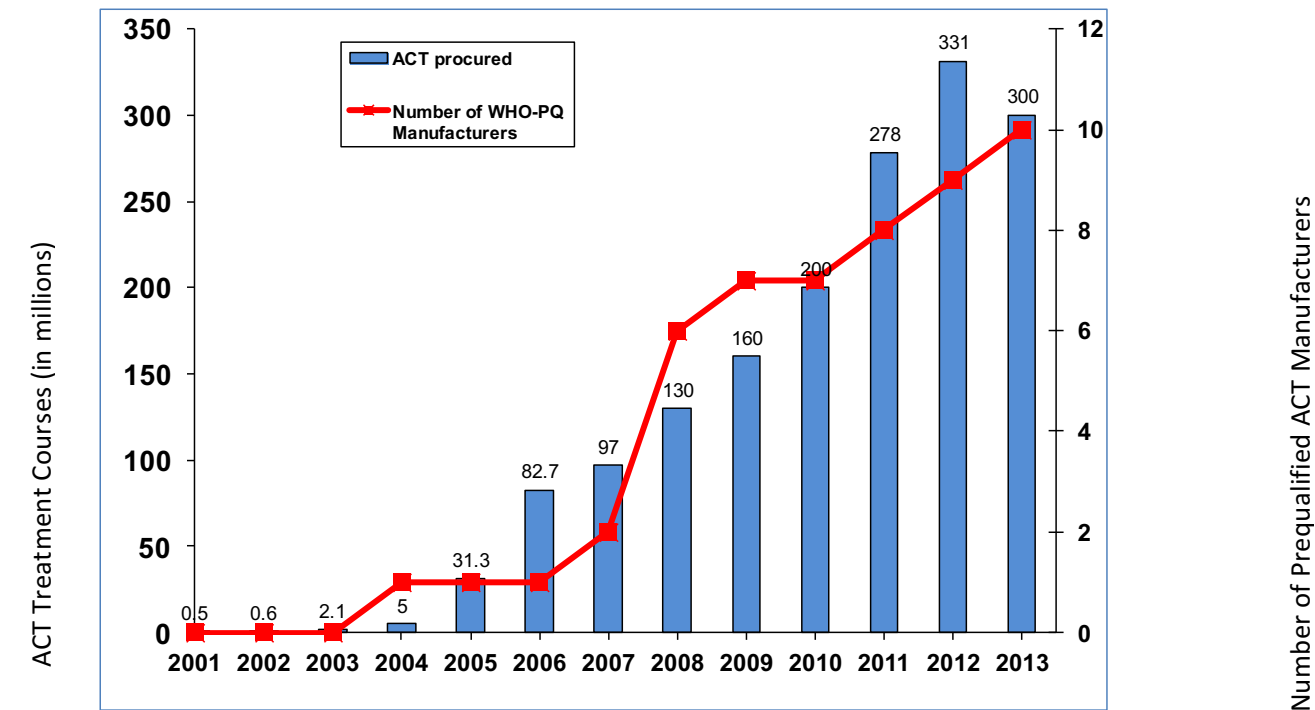
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<sup>1</sup> See the *Pooled Procurement in the Vaccine Market: UNICEF's Experience* case study, 2015.

ACT Manufacturers: In the initial days of ACT scale-up, Novartis was the only manufacturer of ACTs. Novartis was the innovative pharmaceutical company that first launched ACTs, and it ramped up its production of Coartem® from 4 million treatments in 2004 to over 100 million in 2010. As demand uptake accelerated, multiple generic manufacturers entered the market and two additional innovator companies also developed new ACT formulations. Currently, there are 10 WHO prequalified manufacturers of different formulations of ACTs, creating an overall capacity of well over 300 million treatment courses.

Upstream Suppliers: Farmers (approximately 100,000 small farmers, collectors and traders) grow the Artemisia Annua plant, which is the starting material for ACTs. Extractors (fewer than 15) buy the harvest from farmers and extract artemisinin. Extraction processes can vary, however, which means that the artemisinin yield may be less than anticipated. Like most crops, Artemisia Annua suffers during droughts or floods. Furthermore, during shortages, extractors compete with each other to purchase the raw material from farmers, which drives prices higher.

Figure 1: First Decade of ACT Scale-up



Source: UNITAID Malaria Market Landscape Reports; World Malaria Reports

**Private Sector Market and the Affordable Medicines Facility for malaria (AMFm)**

In addition to purchasing by government run-malaria programs, there is also a potentially large private market for ACTs. In many malaria-endemic countries, patients access treatment for

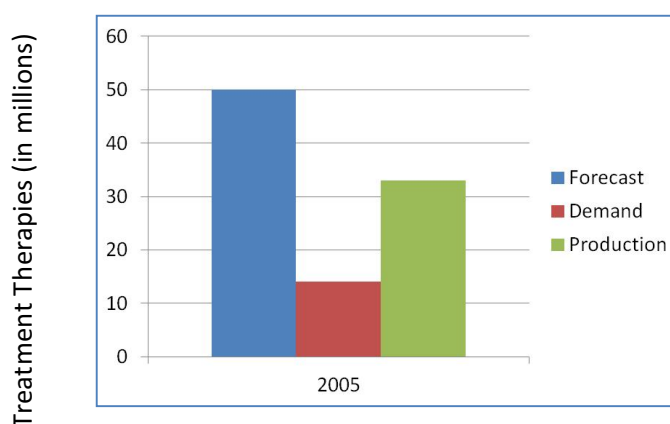
fever (a symptom of malaria but not necessarily malaria) not only from the government-run clinics but also from private sector outlets (private clinics, pharmacies and drug shops). In order to improve ACT affordability to those seeking malaria treatments in the private sector and to contain the spread of resistance from artemisinin mono-therapies, the Affordable Medicines Facility for malaria (AMFm) was launched in 2010. The AMFm negotiates lower manufacturer prices for eligible private, public and NGO importers. The AMFm then makes a co-payment directly to ACT manufacturers, which further lowers the purchase cost of ACTs to eligible first-line buyers of ACTs. This practice has led to significant increases in ACTs demand: in 2012, AMFm constituted approximately one-third of the global ACT procurement volume.

In 2014, AMFm was integrated into the core grant mechanism of the Global Fund to Fight AIDS, Tuberculosis and Malaria, as the Private Sector Co-payment Mechanism. The extent to which countries will utilize this mechanism moving forward is uncertain at this time.

## Market Shortcomings

The ACT market has been fraught with demand and supply matching problems from its inception. In 2004, there was risk of a shortage, and the demand forecasts for 2005 were very high. Little of that demand materialized, however, leading to an excess supply situation. (See Figure 2 for the high forecast compared to the low demand in 2005.) Lack of credible demand forecasts and long lead times continued to cause cycles of supply excess and shortage.

Figure 2: Forecasting Problems in the Early Years of ACT Scale-Up



Source: Yadav et al. (2006)

## Symptoms of Market Shortcomings

The problem of price volatility for the raw artemisinin material, coupled with the cycles of shortages and excesses in the ACT market over the past few years, were the market symptoms that created the greatest concerns for most stakeholders.

The rates at which endemic countries have made policy switches to scale up the use of ACTs have varied. Sometimes the rates were rapid, and other times they were slower than expected, contributing to significant market volatility as supply and demand struggled to achieve equilibrium. When actual uptake in countries was slower than some anticipated, the growers and extractors of artemisinin (and also to some extent the finished product manufacturers) experienced cycles of boom and bust. In addition, procurement delays and financing uncertainties have further exacerbated the problems. Uncertainties in the intrinsic demand for ACTs due to unpredictable country adoption, uncertainties in global financing for ACTs, and a long production lead time created an ACT market in which demand and supply mismatches were a common occurrence.

Figures 3 and 4 show how, in each year since the start of the scale up, there has been either a shortage or surplus of ACTs and artemisinin and how this demand supply mismatch has contributed to a high degree of price volatility in the market.

*Figure 3: Market symptoms chronology in the ACT market*

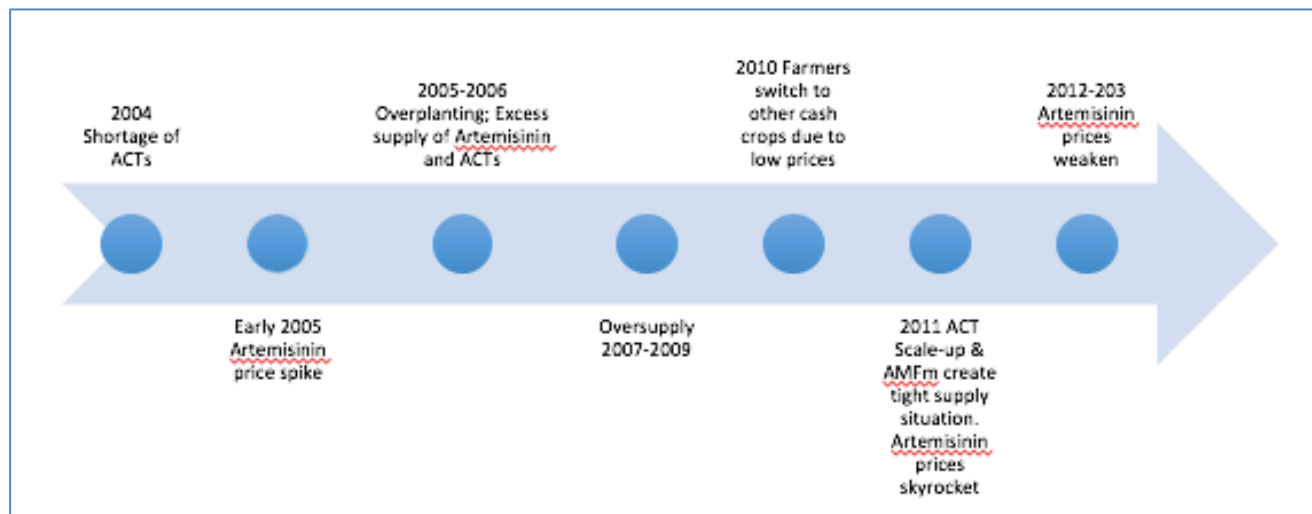
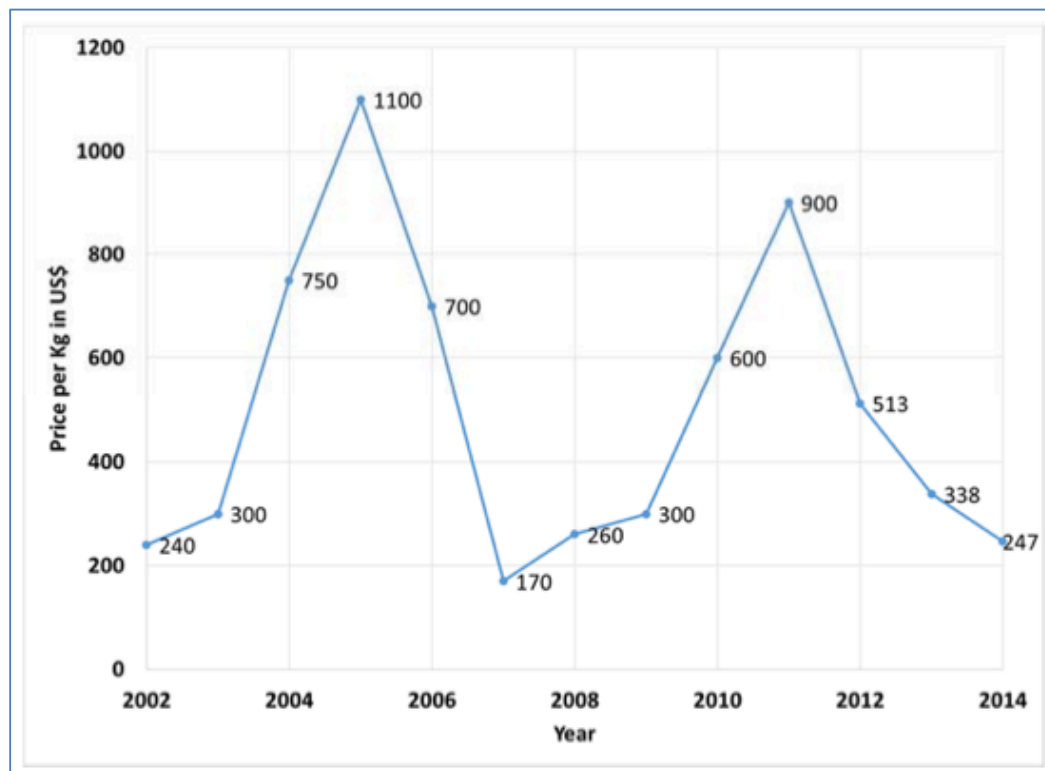


Figure 4: Volatility in the price of artemisinin, the key starting material for ACTs



Source: Prices up to 2012 as reported at the Artemisinin Conference in Hanoi in November 2011. Prices for 2012, 2013 and 2014 are 12-month average of monthly median prices as estimated by William Davidson Institute (WDI) from data on export and import of artemisinin.

### *Identification / Analysis of ACT Market Shortcomings*

Stakeholders in the ACT market -- including ACT manufacturers, artemisinin growers and extractors, and ACT financiers such as the Global Fund, US-PMI, UNITAID, the World Bank and malaria endemic country governments – have observed the effects of the poor matching of demand and supply of ACTs. Erratic pricing has hampered adequate planning, both for the short term and the long term. In some instances, this erratic pricing has put the ability to ensure greater access to treatment at risk. Some market actors attributed the shortages to faster demand uptake resulting from the launch of the AMFm and the other ACT scale-up projects.

### *Process used to Identify Shortcomings*

The underlying causes for the demand-supply mismatches were not fully explored until 2006. Modeling and analysis of the overall ACT market was conducted to understand the overall epidemiological need, the portion of the need that had funding committed to it, and the portion of the need that was translating into demand. Such quantitative comparison enabled a deeper understanding of where the most significant bottlenecks were. Availability of data on epidemiological need, country treatment guidelines, and current and projected financing for

ACTs from different sources were prerequisites for some of this analysis. Although such data were not readily or systematically available, analysts pooled quantitative and qualitative insights data from multiple sources and made a few reasonable assumptions, enabling the analysis to go forward. A risk and incentives study carried out in 2006 (Yadav, Sekhri and Curtis 2006) examined how risks and rewards were shared among the stakeholders in ACT market. Interviews were conducted with a variety of stakeholders in the value chain, such as the WHO-World Health Organization (WHO)-Global Malaria Program, the Global Fund, the World Bank, Roll Back Malaria Partnership (RBM), Novartis, Sanofi-Aventis, Medicines for Malaria Venture, and procurement groups within selected malaria endemic countries.

## Root Causes

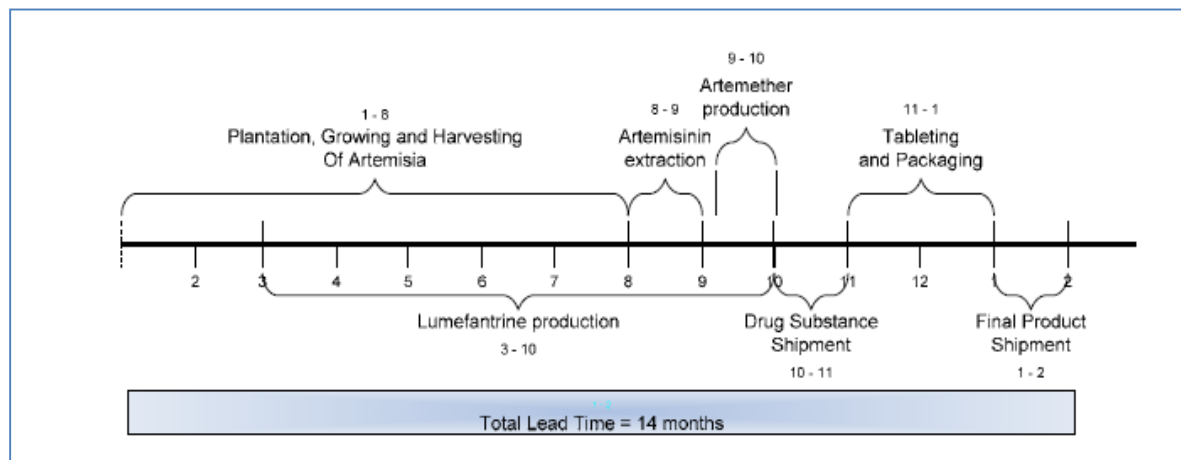
This analysis revealed three underlying root causes for the demand and supply mismatches and poor forecasting.

**Lop-sided risk allocation:** ACT manufacturers, extractors and artemisinin growers bore a disproportionate share of market risks and the consequences of those risks. Worse, the manufacturers, extractors and growers who were suffering the most from the demand and supply uncertainty were not in the best position to remedy it, while the parties in the best position to act to remedy some of those uncertainties, (the financing agencies and global technical standard-setting agencies) did not suffer enough to invest substantially in addressing the problems. The global financiers and malaria-endemic countries did not have explicit incentives to invest in generating accurate forecasts of ACT demand, primarily because they did not bear the financial risk of overcapacity or shortages. The manufacturers had the incentives to generate (or invest in obtaining) accurate forecasts but did not have all the information about future funding they needed in order to create a good forecast. The global agencies that had the information and were creating the demand forecasts, however, bore no risk for poor forecasts.

**Information asymmetry:** There was lack of appropriate and well-shared information about global policy changes related to ACTs, ACT financing, and procurement plans. Global agencies such as the Global Fund, PMI, WHO-GMP and Roll Back Malaria (RBM) partnership were relatively better informed about these issues, but ACT manufacturers had very limited knowledge of these policy changes. This asymmetry of information about future demand and financing between different actors in the market was manifesting as demand supply mismatches. In addition to the information asymmetry between the global agencies and the ACT manufacturers, there was also lack of information sharing about future demand between the ACT manufacturers and extractors. Similarly, there was insufficient information sharing between extractors and growers.

**Long lead-time:** The supply of artemisinin is based on a long and complex agricultural process. The entire cycle from planting *Artemisia Annua* crops to final production of ACTs takes approximately 12-18 months (See Figure 5). The long duration of the artemisinin production cycle limits market responsiveness to sudden changes in demand, and it has, in the past, resulted in a volatile market with large price fluctuations. It takes almost three years to ramp up manufacturing capacity for ACTs; as a result, the lack of a long-term forecast can also create potential supply shortages that cannot be overcome in the short term.

*Figure 5: Long Lead Time for ACT Manufacture*



Source: Prashant Yadav, Kirsten Curtis and Neelam Sekhri, "Mapping and Realigning Incentives in the Global Health Supply Chain," *Global Health Forecasting Working Group Background Paper*, Dec. 2006.

## Selecting and Implementing the Market Intervention

The three root causes deciphered through the market analysis could be resolved through different market interventions. Multiple stakeholder consultations occurred between 2006-2010 for discussion of the options. For example, a rolling horizon forecast commitment requires that funding agencies such as the Global Fund commit to ACT manufacturers to purchase a certain quantity of the product over two-three years with some flexibility in updating the commitment as new information becomes available. The stakeholders considered two mechanisms -- long-term contracting and minimum volume guarantees to ACT manufacturers -- to correct the lop-sided risk allocation but ultimately did not adopt them due to number of legal factors and lack of institutional appetite among the largest financiers to take on those risks.

Instead, creating and communicating accurate forecasts for ACTs and artemisinin across the value chain was identified as a key mechanism for stabilizing both artemisinin and ACT prices and for promoting a consistent supply of ACTs toward improved global access to quality malaria

treatment. Accurate and robust forecasts would be generated and shared with manufacturers, extractors and growers at an annual meeting (the Artemisinin Conference). This intervention would reduce the information asymmetry in the market and would provide more timely and rapid updates regarding policy, financing and demand-side changes related to ACT to all stakeholders in the value chain.

Furthermore, this intervention would not be implemented in isolation. The Bill and Melinda Gates Foundation (BMGF) had already financed scientists at the University of California, Berkeley to develop a genetically engineered microbial line to mass-produce a semi-synthetic artemisinin. This project had the potential to reduce the supply lead time from an overall 14 months to less than six months. It would also stabilize price volatility in the market. In addition, an initiative called Assured Artemisinin Supply Services (A2S2) would create intelligence on the supply of artemisinin in any given year and would resolve the supply-side information asymmetry for the global purchasers. Moreover, A2S2 had an Artemisinin Pre-Finance Facility, which would provide better access to capital to artemisinin extractors by pre-financing their sales to manufacturers of anti-malarial ACTs. Upstream suppliers in the ACT value chain (i.e., artemisinin extractors) often lacked access to adequate working capital finance. Given the long production cycle, lack of working capital could be a major problem, particularly for suppliers in emerging markets.

### *The Need for Global Forecasting*

It was evident that the absence of a robust global forecast could lead to multiple problems. Under-estimating demand could lead to ACT shortages, expensive emergency shipments, lack of capacity investment in ACT manufacturing, and fewer suppliers entering the market. Too high a forecast, on the other hand, could tie up precious financial resources, increase the risk of expired stock, and in the long term dilute manufacturer incentives to invest in capacity for products for low-income countries.

Several attempts have been made to forecast the ACT market since 2004. WHO-GMP and the Roll Back Malaria Partnership's M2S2 (Malaria Medicines Supply Services) were involved in generating ACT forecasts from 2004- 2006. Newer groups such as the Clinton Health Access Initiative, Boston Consulting Group, Dalberg Global Development Advisors, McKinsey & Co., and MIT-Zaragoza were also involved in the developing forecasts from 2007/2008 onwards.

Although the stakeholders recognized the technical merit of using multiple forecasting approaches and diversity in forecasting groups, they realized that for a global forecast to have wider acceptability and relevance for decision-making, it was important to have a single consensus forecast for global ACT demand. ACT manufacturers, the Roll Back Malaria Partnership, the Global Fund and other stakeholders strongly articulated the need for a forecast that incorporated multiple forecasting techniques while reconciling the differences, being

timely, and taking into account the most current data and information about the ACT market. A consensus forecast would also be more widely disseminated by different stakeholders in the global malaria markets. The launch of the AMFm further strengthened the need for projecting global demand for ACTs.

Together, many factors in the market were converging toward the strong need for a global ACT and artemisinin demand forecasting service. Such a service would resolve the information asymmetry and present credible, transparent and robust global forecasts (and other market intelligence information) to inform decision making by policy makers and market participants.

### **Global ACT Forecasting Intervention: 2010**

Given its significant investments in the ACT market, UNITAID in 2010 sponsored a global ACT forecasting service that would produce and disseminate global ACT forecasts and update them quarterly. The ACT forecasting service brought together three groups with experience forecasting the ACT market: The Boston Consulting Group (BCG), the Clinton Health Access Initiative (CHAI), and MIT-Zaragoza. The tripartite consortium was overseen by a Steering Committee that included representatives from the Global Fund, the WHO-GMP, RBM, UNITAID, and Medicines for Malaria Venture (MMV). The steering committee's role was to ensure the validity of the assumptions in the forecast, to apprise the forecasting group of policy and financing changes in the ACT market as they occurred, and to ensure wider dissemination of the forecasts into the policy community.

#### ***Multiple Forecasts***

The ACT Forecasting Service used a combination of forecasting models, run in parallel and drawn from different information sources. The group then reconciled the differences between the different models through analytical approaches and expert consultation. Gradually, the forecasters could refine their methodologies by cross-methodology comparisons of forecast vs. actual demand.

#### ***Data Inputs***

A variety of data sources were utilized for generating the forecasts for inputs, such as the incidence of malaria-like fevers, treatment-seeking behavior, treatment penetration in private and public channels, and country-level procurement trends. The global forecasts required different types of data from a variety of sources. Table 1 below captures key data inputs and likely sources for ACT forecast development.

*Table 1: Data Needs and Sources for ACT Forecasting*

| <b>Data Needs</b>                          | <b>Data Sources</b>                                                                                                                                                                                                                                                                 |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Epidemiological Needs                      | <ul style="list-style-type: none"> <li>• World Malaria Report (updated each year)</li> <li>• Kiszewski (2007), Snow (2003, 2005)</li> <li>• Malaria Atlas Project</li> </ul>                                                                                                        |
| Treatment-seeking Behavior                 | <ul style="list-style-type: none"> <li>• DHS/MIS/MICS survey data</li> <li>• ACT-Watch survey data</li> </ul>                                                                                                                                                                       |
| Financing Availability & Procurement Plans | <ul style="list-style-type: none"> <li>• GF Grant Agreements R1-10</li> <li>• GF Grant Disbursement Details</li> <li>• GF Grant PSM plans</li> <li>• PMI Operations Plans</li> <li>• World Bank ACT funding data</li> <li>• National Malaria Control Plans and Documents</li> </ul> |
| Historical Purchase Data                   | <ul style="list-style-type: none"> <li>• Global Fund PQR data</li> <li>• AMFm ACT orders</li> <li>• AMFm summary data</li> </ul>                                                                                                                                                    |
| Uptake Curves                              | <ul style="list-style-type: none"> <li>• Tanzania ACT subsidy pilot</li> <li>• Uganda MMV pilot</li> <li>• AMFm uptake data from Year 1</li> </ul>                                                                                                                                  |
| Expert Inputs                              | <ul style="list-style-type: none"> <li>• In-country PSM experts in select high burden countries</li> <li>• CHAI team and FLB interviews</li> </ul>                                                                                                                                  |

The forecasts projected global demand for ACTs in the public channel that was largely funded by international donors and the subsidized private channel (AMFm). The forecasting approaches and data inputs that were used to forecast for each of these channels were quite different. These forecasts of ACTs were also converted into requirements for artemisinin. The quarterly demand forecasts, forecasting methodology, and other details about the project are available at: <http://www.unitaid.eu/actforecasting>

### ***Sharing Forecasts: Annual Artemisinin Conference***

All stakeholders in the production and delivery of artemisinin for malaria medicines meet at the Artemisinin Conference each year, and forecasts for the next planting season are shared. Finished product manufacturers, artemisinin extractors, growers, financiers, and representatives from malaria endemic countries gather to discuss the state of the artemisinin market. Sharing forecasts at this forum enables wide dissemination of the forecasts. The meeting is organized by Roll Back Malaria partners UNITAID, the Global Fund, and the WHO. The discussions center around artemisinin and ACT demand forecasts, market and production

reports from manufacturers, and demand-side updates from malaria-endemic countries and global financiers of ACTs.

### *Stakeholders and Coordination*

The success of a global forecasting initiative depends to a great extent on the coordination across the different stakeholders that feed into the forecasting process or who are users of the forecasts. The global ACT forecasting service worked closely with all stakeholders -- WHO-GMP, Global Fund, PMI, World Bank, RBM, UNITAID, BMGF, ACT manufacturers, upstream suppliers, and country governments -- to ensure that the forecasts were reflective of what each of those groups needed from the forecasts and that each group understood the forecasts and the underlying assumptions. Many aspects of the forecasting process are based on assumptions. The forecasting group coordinated with multiple stakeholders to reach consensus on the key assumptions needed for forecasting. Similarly, in some instances when future information was highly uncertain, the forecasts required creating and analyzing scenarios. The basis for such scenarios required inputs from multiple stakeholders. Such multi-stakeholder coordination was not always easy but was crucial to the success of the project.

### **Results**

A systematic approach to global ACT forecasting contributed to ensuring global product availability and reducing the information asymmetry in the market. The global forecasts built confidence among the different actors in the market. There were no major shortages of artemisinin and the price fluctuations were moderate in comparison to the ups and downs observed between 2006 and 2009. In September 2011, many stakeholders in the global malaria community expressed concerns regarding relative ACT supply vs. demand. The global ACT forecasting service was able to alleviate these concerns by providing accurate information on ACT demand. The global ACT forecasting service also highlighted the key gaps in essential data related to malaria drug financing and needs estimates.

Although the forecasts were not ideal -- ACT manufacturers require more granular forecasts than the yearly ones -- nonetheless, the manufacturers had greater confidence in the estimates generated by this exercise as compared to earlier estimates. Many manufacturers used the global forecasts as the starting point to develop their own finer-grained forecasts to feed into their production plans. New ACT suppliers utilized the forecasts in their new manufacturing capacity investment decisions.

Second, for successful planting of artemisia annually to fulfill ACT needs, farmers need global forecasts two years in advance. Unfortunately, obtaining data on funding, generating forecasts and validating them with multiple agencies is a time-consuming activity. As a result, the global

forecasts are only for a one-year time horizon. This short forecast horizon does not suffice for proactive planning of the artemisia planting.

## Challenges and Lessons Learned

The global ACT forecasting service also demonstrated several challenges in the use of global forecasting as a means to stabilize markets and better match demand and supply. The 2010 global ACT forecasting intervention was intended to reduce information asymmetry, but it could not reduce the intrinsic risks in the market, as explained in the paragraph below. This aspect was not necessarily fully anticipated by or made clear to the stakeholders involved.

### *Forecasting resolves information asymmetry but cannot reduce intrinsic demand uncertainty*

Forecasting takes into account information about need, available financing, and treatment-seeking behavior to generate estimates of demand. However, when financing is highly uncertain or the inherent epidemiological need itself is uncertain, forecasting can do little to reduce that uncertainty. Changes in the level and mechanisms of financing for private-sector ACT treatment (AMFm), how the Global Fund's New Funding Model will impact future ACT demand, or the extent and timing of ACT financing for Nigeria -- are all examples of what can be difficult to capture in point-based forecasts. These can perhaps only be modeled as scenarios. Similarly, the amount of funding each country would receive for malaria and ACTs under the new Funding Model of the Global Fund remained unclear until the new funding model was fully operationalized. During this period, uncertain funding created additional demand uncertainty. In large countries like Nigeria, the Global Fund mandated that certain preconditions (related to better supply chain management) had to be met before the funds for ACT procurement would be released. This uncertainty about when funds would become available further amplified the uncertainty surrounding ACT demand uptake in Nigeria. In addition, the epidemiology of malaria is changing rapidly because of effective malaria control interventions, resulting in rapid changes in epidemiological needs that are not easy to estimate. Stakeholders have a tendency to expect the forecasts to present precise point estimates. It is important to highlight from the outset that forecasting is not a silver bullet and that there are limits to its utility as a mechanism for stabilizing markets.

### *Determine the Scope Clearly and Communicate It Well*

Global forecasting as a successful intervention requires understanding the various audiences and their information needs, clarity on the various types of forecasts and related time horizons, and the use of robust and credible inputs.

### ***Needs Forecast vs. Demand Forecast***

Needs forecasting refers to the number of people affected by a disease based on epidemiological data and the proportion of those requiring treatment. In contrast, demand forecasts are tied to funding. There is often greater need than there is funding to meet the need; therefore, the needs forecast does not match the demand forecast. Needs forecasts are often used to set program targets, define funding levels, and assess coverage gaps. However, it is important to clarify at the beginning that a demand forecast is the portion of the needs that will translate into actual orders for manufacturers in the specified period of time. Often, stakeholders use these terms interchangeably. Using a demand forecast as a needs forecast can create low-coverage traps. The ACT forecasting group's forecasts were estimates of demand at the level of projected orders to manufacturers. This projection of orders to manufacturers is based on need, as well as funding available for procurement of ACTs and rate of new product adoption/diffusion.

### ***Forecasts for Manufacturers vs. Forecasts for Funders and Global Agencies***

It is important to identify the principal target audience(s) of the forecast and clearly understand their needs. Manufacturers require forecasts of aggregate orders in a year to utilize it for production planning processes. Global agencies need forecasts to feed into their planning and target-setting activities. The nature of forecasts for each is very different, as forecasts for funders would be based on needs and for which countries; whereas aggregate forecasts for manufacturers could be sufficient.

### ***Long Term Strategic Forecasts vs. Tactical Forecasts***

Long-term forecasts for two-to-five years are useful projections for manufacturers to use when making capacity investment decisions. Tactical forecasts (six months to two years out) are relevant for manufacturers to carry out production planning and sourcing decisions. Explicitly discussing the objectives and time horizon of the forecasting exercise with all relevant stakeholders at the beginning is imperative.

### ***Accuracy of Global Forecasts Depends on Robust National Quantification***

Accurate forecasting information from the country level is a prerequisite for a closer matching of global demand and supply. In the absence of a good national quantification, the national supply plans and funding plans will be imprecise and hence the global aggregate plans will also be imprecise.

### ***Obtaining Data and Information across Global Agencies is not Easy***

Demand forecasts depend on information about financing available for purchasing that particular product from different global and in-country financiers. The availability of this

information and the level of transparency vary considerably across different financing agencies. Forecasting groups should invest significant resources at the onset to ensure that such data and information will be made available systematically.

### ***Forecasting does not Replace Rolling Horizon Forecast Commitments***

Rolling horizon forecast commitments require that funding agencies such as the Global Fund commit to manufacturers to purchase a certain quantity of the product over two or three years, with some flexibility on updating the commitment as new information becomes available. This resolves the lop-sided risk allocation between the manufacturers and global funding agencies described earlier. Forecasting only resolves (partially) the information asymmetry problem. Combining risk sharing with global forecasting can be a more impactful market intervention and is being tried in some instances. (See case on FP Implants: Market Shaping for Family Planning by Dalberg Global Development Advisors and Reproductive Health Supplies Coalition, June 2014. [www.dalberg.com/documents/Market\\_Shaping\\_for\\_Family\\_Planning.pdf](http://www.dalberg.com/documents/Market_Shaping_for_Family_Planning.pdf))

## **Summary**

The global ACT forecasting service continues to work closely with WHO-GMP, Global Fund, PMI, WB, RBM, UNITAID, BMGF, ACT manufacturers, upstream suppliers and country governments to ensure that relevant, helpful forecasts are created and communicated to all major actors. Global ACT forecasting has contributed significantly to the health of the ACT market. That said, forecasting by itself does not address causes of demand uncertainty, nor does it replace the need for demand commitments.

The main benefits of global forecasting are:

- Better alignment of supply and demand
- Reduced price fluctuation
- Greater supplier confidence in the market so that suppliers don't exit the market
- Manufacturers willing to commit adequate capacity without overcapacity

Global forecasting is a valuable tool that can align the vision of demand and the actions of the various actors in the supply chain to create better product availability, more predictable prices and a healthier market if good forecasting practices are followed and actors understand the uses and limitations of forecasting.