Challenges to Distribution and Marketing of Health Products in Emerging Markets

Ian Matthews
Director, Policy and Special Programs
LiveLeaf, Inc.
May 30, 2014

During a recent trip to Cambodia, I met a mother of two from Phnom Krom –a small village about 20km from Siem Reap. She introduced me to her son, Samnang (real name withheld). Samnang was 7 months old when we visited and had been struggling with diarrhea over the last month. After 2 or 3 days of a recent episode Samnang had stopped eating, so his mother decided to take him to the doctor. She convinced a mototaxi to give them a ride and they quickly covered the 10km to the clinic. Once at the clinic, they waited six hours to be attended by a nurse who administered fluids via an IV, monitored Samnang for the next few hours, and then gave his mother three packets of oral rehydration salts or ORS (Oralyte brand). The entire trip cost approximately 5000 KHR ($1.25 USD): $0.35 for the clinic and medicine, and $0.95 for the taxi.

Unfortunately, by the time they arrived home, Samnang's diarrhea had worsened, so his mother needed to prepare the ORS solution. The ORS package had no graphical instructions and she could not read, so the next morning she walked to the village's market to seek guidance from a local shopkeeper. Although untrained, this shopkeeper is known within the community to help patients understand and use their medications. Samnang's mother paid an additional $0.50 to have the shopkeeper mix the ORS, after which she returned home to begin treatment; which by now was 4-5 days after his diarrhea had started.

One and a half days later the ORS was gone, but the diarrhea wasn't. And Samnang was still not eating well. His mother returned to the clinic, spent another $1.25, waited 8 hours this time, saw a different nurse, received Azithromycin, ORS and another IV, then returned to the market to have the ORS mixed and the antibiotics cut in half, and again initiated treatment. After both roundtrip trips to the doctor and market, Samnang's diarrhea did not resolve for another few days. Two weeks later when I visited, he had diarrhea again. In all, his mother had spent nearly $4, which was two day's wages for her, and two full days seeking treatment for her child. Next time, Samnang's mother told me, she was planning to take her son to Angkor Hospital for Children in the city, which, although it was a long and costly 25km trip, she assumed his care would be better. She also said she might just return to the woman at the market. She was a friend and sold antibiotics for less than the cost of the trip to the doctor. Other mothers I spoke to gave similar accounts of their experience with the healthcare system in and around the cities of Siem Reap and Phnom Penh.

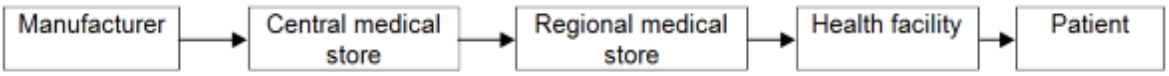
This story illustrates but a few of the obstacles to treatment faced by parents in communities with limited access to adequate healthcare products and services. While market inefficiencies vary from country to country and even from village to village, assessing the macro-level effects of these conditions will introduce some of the logistical considerations facing any company seeking to deliver healthcare products to patients in low- and middle-income countries (LMICs).

In the developing world, distinctions between private and public sector distribution channels can, at times, seem stark. Yet, in practice, each sector is rarely self-contained. Samnang's story exemplifies some of the ways in which the two sectors interact. In this case, an ORS package in English without visual instructions meant the caregiver could not understand how to properly administer treatment. Limited time with the nurse made it difficult to ask questions, and necessitated additional expenditures for multiple trips to the local shopkeeper.

Further complicating LMIC distribution is a third, vertical supply channel. Vertical systems are commonly run by NGOs with support from international donors and are organized to augment the government's efforts to address specific threats to public health, improve overall system capacity, and provide affordable treatments and services to the poorest communities. To ensure the timely distribution of products to last mile patients, companies will need to understand how each of these channels function and where, in practice, they tend to overlap. It is also essential to explore how supply chain inefficiencies can affect rational use by restricting the movement of information and goods, limiting access and threatening affordability.

Public Sector Supply Chains

The traditional public supply of pharmaceuticals relies on a centralized distribution model with a Central Medical Store (CMS) acting as the importing distributor for the national health system (see Figure 1). The CMS acts as a sort of warehouse for the Ministry of Health (MOH) or acting regulatory authority (equivalent to the US FDA) by procuring, warehousing, and distributing healthcare products through the public and, occasionally, private healthcare system. Regional Medical Stores (RMS) receive product delivered by the CMS to then transport them on to district level stores (DLS), service delivery points community-based distributors (in Figure 1 referred to collectively as health facilities) and eventually to patients. Depending on the size of the country and the specific distribution model, there may be more or less need for lower-level service providers. In some countries, a single CMS will distribute product to service delivery points and even patients directly.



Public sector supply in LMICs appears highly inefficient when measured by order fill rate –a common metric of supply chain performance. In the United States the typical order fill rate from distributor to pharmacy within 24 hours is 95%; order fill rates at the clinic-patient level are greater than 99% (Healthcare Distribution Management Association, 2004). By contrast, in the developing world, order fill rates hover around 65%. This is a result of constrained initial procurement, infrequent resupply, and infrastructure challenges, culminating in local stockouts of essential medicines. In a recent report, mean availability of basic essential medicines in sub-Saharan Africa was measured as 38.2% (Cameron *et al.*, 2008).

Inefficiencies can be found at every level of the supply chain, from forecasting and procurement to storage, distribution and inventory management. A domino effect ensues in which poor data on patient demand, coupled with restrictive donor funding cycles, effectively confines procurement to a single annual order. This, in turn, causes inevitable stockouts and wastages. Stockouts reverberate throughout the system as local service providers scramble to find products for their patients, creating parallel procurement networks with little central oversight. Wastages are a financial drain on overstretched

health systems and increase the potential for drugs to be misused as providers are pressured to offload product before its expiry date.

Wastage is also exacerbated by limited storage capacity and poor infrastructure –the WHO estimates that up to 50% of procured vaccines are never used (Dowling, 2011). At the service provider level, distribution is affected by constrained transport capacity with resupply deliveries occurring monthly or quarterly at best. As a result, inventory levels are measured in months rather than days, tying up important funds. The sum of these inefficiencies can be measured as spiraling costs and increasing levels of patient frustration.

Private Sector Supply Chains

The commercial or private sector plays an increasingly pivotal role in the distribution of essential medicines in LMICs. Market consolidation varies greatly by country with some countries, like Mali, having only two wholesalers control 80% of the market and others, like Ghana, being highly fragmented with 60 importers and 166 wholesalers supplying approximately 700 pharmacies and 11,000 chemical shops. Commercial supply chains parallel traditional commodity distribution models in high-income countries (HICs) but are not without additional complexities (see *Figure 2*).

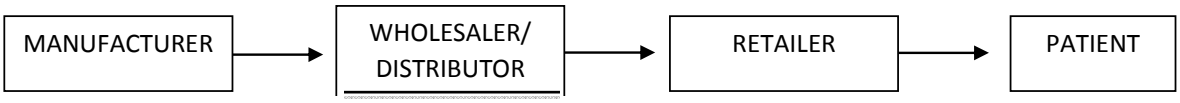


Figure 2: Private Sector Supply

In the developing world, multiple wholesalers are required to reach the private sector at scale given certain obstacles to countrywide distribution including underdeveloped infrastructure (*e.g.*, Liberia), high cross-country shipping costs (*e.g.*, Haiti), and delivery to geographically-challenging areas (*e.g.*, Nepal).

Population density can be a good shorthand measurement for estimating logistics costs. All things being equal, countries with higher population densities tend to have an easier time delivering products to consumers. Singapore, for example, with its high population density has the lowest logistics cost of any country in the world. A recent costing study by USAID's Deliver Project reports Bangladesh as having logistics cost less than 1% of the value of products (USAID, 2009). Ironically, high initial prices for pharmaceuticals greatly reduce the relative cost of moving and storing them. In the U.S., logistics costs for pharmaceuticals are estimated at only 4% of the product value (USAID, 2012).

However, population density alone cannot guarantee low costs. Nepal is a densely populated country, but has one of the highest logistics costs in the world due to of its difficult geography. Economic development and competitiveness also play a significant role. Haiti is ranked sixth in the world in population density, but has the third highest logistics costs (World Bank, 2012). Logistics costs in poorer, underdeveloped economies with infrastructure shortcomings and transport monopolies are higher than in economies with greater competition and higher levels of investment in infrastructure (USAID, 2009). Higher costs are ultimately borne by the consumer who pays for inefficiencies in delivery through considerable markups along the supply chain. Importing wholesalers in El Salvador, for instance, have been known to markup the antibiotic ciprofloxacin 1,702%, because of high costs associated with the drug's importation (Ball, 2011).

Vertical Supply Chains

In LMICs, NGOs operate largely autonomously and can therefore choose their method of procurement and service delivery. Despite this independence, NGOs are accountable to the government that controls their non-profit, operational status, and to international agencies that provide funding and monitor the progress of program implementation. Efforts are also coordinated through policy agreements on the Coordinated Management of Illness and through Ministry-level advisory boards that are increasingly restrictive. In many cases, NGOs, particularly faith-based organizations (FBOs), have established countrywide supply chains for the delivery of essential medicines. In Ghana, Churches Health Association provides about 30% of all healthcare services through a network of 152 institutions (Ballou-Aares *et al.*, 2008), operating central warehouses, and sourcing from private distributors or the CMS. In Kenya, the Mission for Essential Drugs and Supplies is the registered importing body for all Core List Priority medicines for the nearly 1200 faith-based service providers that work in the country (MOPHS, 2011).

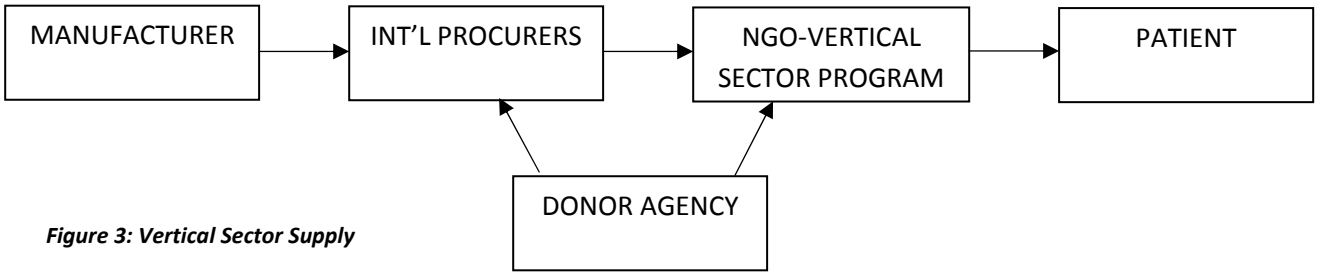


Figure 3: Vertical Sector Supply

Traditionally, international NGOs purchase medicines overseas through third-party procurement agencies such as the IDA Foundation, Mission Pharma or UNICEF (see *Figure 3)*. These groups rely on international donor funds to purchase medicine as part of multi-year funded projects, sometimes receiving product as in-kind donations directly from the manufacturer. As donor agencies move toward direct budget support for government health systems (see the *USAID localization strategy* and the *Feed the Future Initiative*), NGOs are becoming increasingly more reliant on government funds and coordinated procurement mechanisms to stock medicines. Further muddling these distinctions, NGOs may be affiliated directly with the government, acting as service provider or managing national health facilities (Dowling, 2011). This relationship is most common in coordinated vertical programs, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, or specific vaccination drives. Despite heavily leveraged support, NGOs suffer from funding constraints, which make it difficult to build scale into their programs. Three-to-five year donor project cycles also make it difficult to adjust product levels to protect against shortage and wastage over the project's lifetime.

Historically, NGOs have provided products and services to beneficiaries at no cost; however, over the last decade some organizations have begun to address issues of scale and cost effectiveness by embedding cost recovery principles into their program work. As a result, products and services are now regularly offered at wholesale cost or with slight markups to promote product value and work towards financial sustainability of programs.

Public-Private-Vertical Overlap

In practice, supply chains rarely conform to tidy flow charts. Healthcare delivery systems in LMICs are intricate webs of overlapping responsibilities and procurement practices. What defines the system's functionality is the manner in which different sectors interact and the degree to which they can successfully complement one another. At the country level, Figures 1, 2 and 3 give way to highly fragmented and, often, unregulated structures with sub-levels seeking to purchase product from public and private sources simultaneously. Figure 4 demonstrates the fluid and complex nature of these multifaceted relationships.

Decentralization in many countries is challenging the centralized supply model with mixed results. Some countries have had success, harnessing public-private partnerships to create better access (*e.g.,* Bangladeshi private transportation contractors) or affordability. In others, nepotism and corruption flourish in areas where competitive information on pricing and quality are scarce. In Ghana, skewed incentives at public clinics have led to high procurement prices from CMS, forcing local service providers to look to the private sector. In addition to inflated prices, lack of convenience and stockouts at CMS also account for the turn toward the private sector.

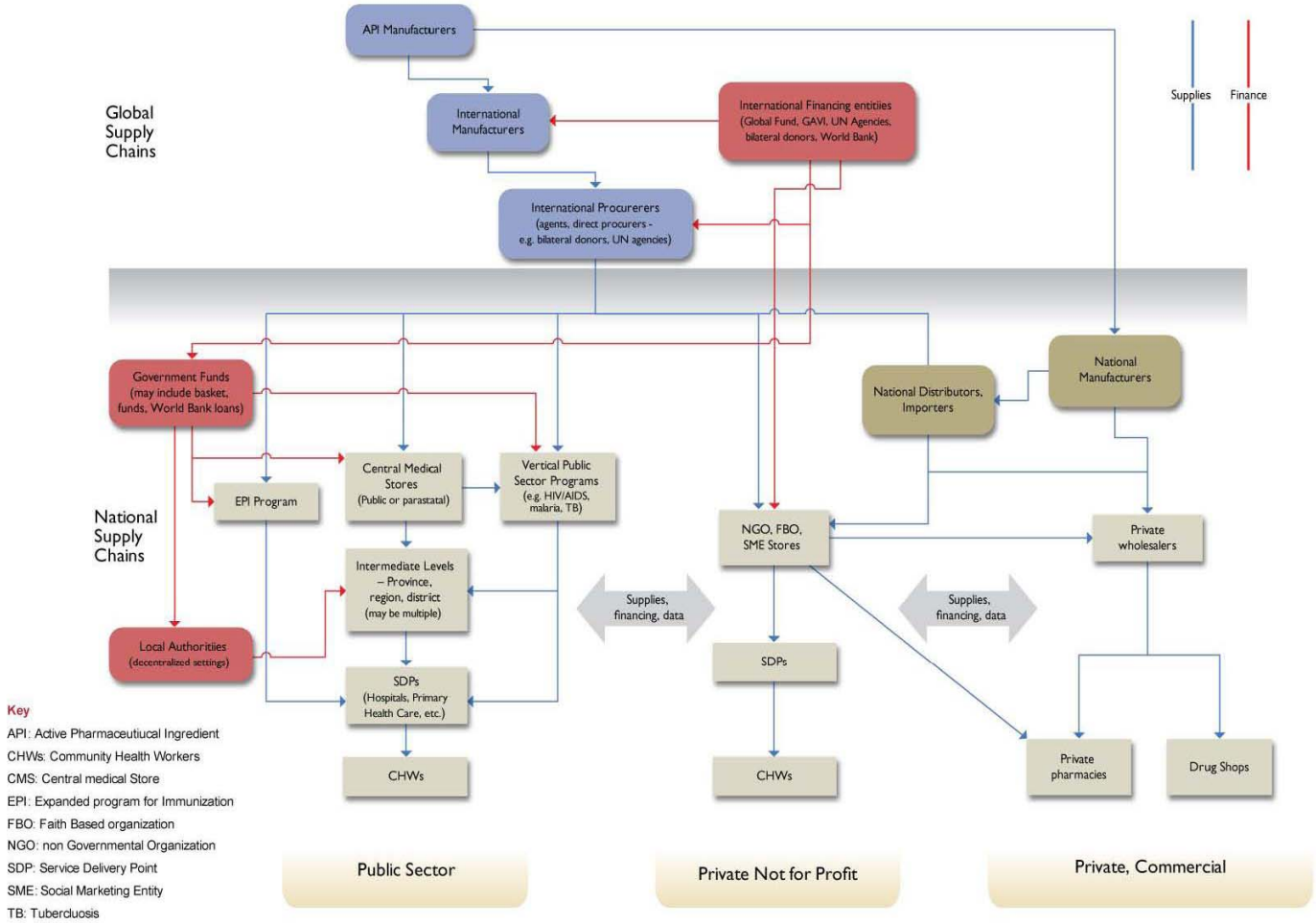


Figure 4: Public-Private-Vertical Supply Chain Overlap (Dowling, 2011)

This is particularly the case at the community level where mission directors and community health workers have developed better price-sensitive shopping habits and tend to compare supply sources

more carefully. Last-mile service providers may also have better associations with local shopkeepers, drug sellers or with vertical program officers in their communities and can negotiate lower prices for the same product.

Larger private hospitals that serve as *de facto* government service operators have negotiated contracts with the government to purchase drugs solely through the CMS. Still, hospitals will seek private sector procurement if certain products are not available in the public sector. Private hospitals are frequently in the enviable position of being able to straddle both procurement markets –buying drugs solely on the basis of price or availability.

Vertical programs and NGOs are most likely to take advantage of multiple procurement options given their somewhat greater funding flexibility. For instance, the Global Fund has developed a Voluntary Pooled Procurement (VPP) mechanism to ensure "attractive prices", "compliance with quality standards" and "efficient, timely and reliable" procurement and delivery of healthcare commodities to country recipients. In Malawi, antiretroviral drugs (ARVs) are distributed to public sector sites weekly by a third party commercial contractor paid by UNICEF. In Nigeria, contraceptives are distributed through a separate vertical supply chain operated by a government-run reproductive health program. These vertical programs have proven essential over the last decade to reducing a few high profile public health threats, such as HIV, but have achieved very few overall improvements to the functioning of healthcare systems as a whole. Many donor agencies, including USAID, have acknowledged this shortcoming and are providing more support for local solutions through the USAID DELIVER Project, which invests in capacity improvements to supply chains. To date, these initiatives have focused primarily on creating policy to regulate and advance the coordination of public, private, and vertical channels, while making improvements to supply chain infrastructure and inventory management systems.

Rational use

The muddled environment for the procurement and delivery of healthcare products in the developing world greatly affects their rational use. Rational use is defined as a patient receiving the right medication, in the right amount, over the right period of time, at an affordable cost. Achieving positive health outcomes therefore hinges on a supply chain that can ensure the quality (right medication), access and availability (right amount, right period) and affordability of essential medicines. The WHO estimates that more than 50% of all medicines are prescribed, dispensed or sold inappropriately and more than 50% of patients fail to take their medications correctly (WHO, 2009), so establishment of rational use should be a priority for LMICs.

Limited financial resources constrain the public health sector, stifling the dissemination of technology and information. Further, inefficiencies in supply and inventory management create stockouts encouraging the misuse of drugs by doctors, who are compelled to treat their patients' symptoms. Overburdened local clinics, like Samnang's in Cambodia, are unlikely to spend significant time with patients to help them understand treatments and explain the appropriate use of medications. As a result, patients may choose to buy products from untrained drug sellers locally rather than waste a costly trip to the doctor only to be turned away empty-handed.

Despite the many shortcomings of public healthcare facilities, the same regulations that make them cumbersome and lethargic also force conformity to national policy on the coordinated management of disease. Samnang's mother certainly had some issues interacting with the referral clinic in Siem Reap, but she did receive the appropriate treatment (ORS) and the appropriate dosage (3 sachets). The clinic

was also a reasonable distance from her home (10km) and care was provided at an affordable price ($0.35). Although she wasn't given proper instructions for use, her son eventually received the treatment and survived a critical period of illness at a young age. When we met him, Samnang was underweight, but not malnourished. Still, in spite of these mostly positive outcomes, Samnang's mother was unhappy with the experience and suggested she would seek alternative options in the future.

While a myriad of factors influence decision-making when it comes to healthcare seeking behavior, it is important to acknowledge that the private sector has increasingly become a critical partner in delivering care to poor communities in LMICs. Private drug sellers and pharmacies evolve making business decisions about how best to compete and market products to customers within a nation's regulatory framework. Limited oversight in many LMICs can lead to a proliferation of untrained pharmacists and drug sellers recommending medicines of uncertain origin and quality. A recent WHO report states that only 28% of patients at private facilities were being treated according to clinical guidelines (WHO, 2009). The British think-tank International Policy Network estimates that as many as 700,000 deaths per year are caused by fake malaria and TB drugs alone. After a random sampling of 700 pharmacies throughout Africa, 17% of TB drugs failed basic quality control tests (Bate *et al*., 2013). The counterfeit pharmaceutical industry, by some estimates, generates around $100B a year for organized crime.

Yet, despite these well-known risks, patients and caregivers continue to look to the private sector as the more convenient and reliable option for accessing health products. Ultimately this translates into higher patient costs for basic treatments, making concerns over the affordability of essential medicines more immediate.

Affordability

Medicines account for as much as 60% of all health spending in LMICS, compared with 18% in HIC countries –with 90% of patients paying out-of-pocket (WHO, 2013). High prices for pharmaceuticals affect healthseeking behavior as many patients search out local alternatives before going to the doctor or pharmacy, thus delaying treatment, sometimes for days. This is habitually the case for the treatment of diarrhea, with caregivers, like Samnang's mother, delaying visits to the doctor until signs of dehydration and/or malnutrition render the threat more urgent. Markup practices therefore heavily influence the ability of patients and caregivers to access appropriate treatments.

Public Sector Markup Practices

High relative prices on medicines are usually the culprit for restricting access. The final cost to the patient is dictated by multiple levels of markups, which differ by service provider. National healthcare systems procure medicines directly from the manufacturer or through VPP arrangements. Drugs then meander along the supply chain to reach local care facilities and/or Community Health Workers (CHWs) (see Figure 3). At the local level, governments regularly set maximum markup rates and subsidize final cost of products to the patient. In Cambodia, any regular visit to a public clinic costs 1500KHR ($0.35) including the cost of treatment and a course of medicine. For public payer systems, statistics are hard to come by as governments are loath to publish markup practices. Cumulative data suggest that patients in a payer system generally spend 40-50% less for treatment provided in the public sector than in the private sector (Huff-Rousselle, 2002). Public sector markups at the wholesale level (CMS) are generally between 10%-20%, with intermediate and local levels tacking on an additional 30% each. More recent data have suggested that the cumulative cost of products to the end consumers in LMICs is generally marked up between 10% and 50% in the public sector (Ball, 2011).

Ghana has flipped the traditional markup model on its head, with the MOH enforcing higher markups at centralized levels of the supply chain and encouraging lower margins at the local level. This is the result of the combined effect of CMS purchasing from private sector wholesalers and further marking up prices beyond typical wholesale. In China, the government spends as much as $5B a year on pharmaceuticals with subsequent markups representing 40% of revenue at public facilities (Sussmuth-Dyckerhoff, C. and J. Wang, 2010). As a result, public sector prices may end up being higher than private sector alternatives.

Private Sector Markup Practices

Private sector markup practices are based on a number of factors including costs of storage, importation, transportation and profit margin. Wholesalers generally buy in bulk direct from the manufacturer or through an importing intermediary to reduce procurement costs. Importing wholesalers may incur additional add-on costs related to import duties and tariffs, miscellaneous government charges (*e.g.*, pharmacists' fund, standard organization), and taxes (local, regional or national). Costs vary greatly from country to country and, accordingly, so do markups. On average, the primary wholesaler markup rate hovers between 2-35% in LMICs, with many capped by regulatory authorities at 20-30%. In Cambodia, wholesalers mark up between 3% and 35% (Patouillard, 2012). Higher markups tend to occur in provinces where less competition and demand is compounded by high transportation costs, effectively ensuring that poor, rural patients will pay more for medicines.

Local social and commercial practices impact the final price of a given product. Importing wholesalers are freer to create incentives for retailers to buy product than non-importing wholesalers. The former will give discounts or bonuses for purchasing product ranging from 2%-10% with bonus schemes such as 'buy 10, get 1 free' or 'buy 30, get a fan' commonplace (Patouillard, 2012). Deals of this nature are intended to mutually increase profit margin and reduce wastage. The sheer multitude of individual shopkeepers and drug sellers at the local level implies relatively low sales of any single product. Therefore, last-mile retailers tend to apply the most severe markups of around 76% (range 8%-6,894%), depending on the class and type of product (Ball, 2011).

Perversely, high prices wind up further limiting demand and reinforcing low levels of supply, which, in turn, drives prices ever higher. This is commonly the case with both ORS and zinc sold through the private sector. For example, in Nigeria private sector prices for a treatment course of ORS (3 sachets) are US$4.35 (FMOH, 2011) with a complimentary course of zinc (10-14 pills) costing US$3.13 (CHAI, 2011). Shopkeepers interviewed claimed that high markups were a natural response to limited demand and logistical challenges.

When markups are considered in aggregate across all distribution channels, LMIC patients are paying between 10% and 111% (but potentially up to 6894%) of the original manufacturer's price for medicines in the private sector. Comparatively, patients in the United States pay between 6% and 71% over the manufacturer's price for OTC products (Ball, 2011). LMICs also tend to have fewer legal regulations relating to capping markups than HICs and those regulations that do exist are not universally enforced at the local shopkeeper level.

Conclusion

As more and more patients look to the private sector for care, issues of rationale use become paramount. In this environment, policy-regulating management of illness can become subservient to business interests or overly determined by uninformed patient preferences. It is far less likely that a poor patient will receive the right medication, the right dose and adequate instructions at an affordable price in the private sector (Oxfam, 2009). Yet, as Samnang's story articulates, there are a number of

compelling reasons for parents to forgo the local public clinic. National health systems struggle to provide adequate levels of care while maintaining huge, multifaceted bureaucracies on limited budgets. It is unlikely that either sector would survive without the other; nor without the financial, technical and service support of NGOs and donors to fill considerable gaps. Any company hoping to reach poor and low-income families with essential medicines must navigate this occasionally treacherous terrain. Yet, understanding the complex interactions of a country's public, private and vertical supply chains is a requirement for stakeholders endeavoring to create impactful, consistent and reliable programs for the delivery of healthcare products in LMICs.

References

Ball, D. (2011). *Pharmaceutical Pricing Policies and Interventions: The Regulation of Mark-ups in the Pharmaceutical Supply Chain.* WHO/HAI Project on Medicine Prices and Availability.

Ballou-Aares, D. et al. (2008) *Private Sector Role in Health Supply Chains: Review of the Role and Potential for Private Sector Engagement in Developing Country Health Supply Chains.* The Rockefeller Foundation, Dalberg and MIT Zaragoza

Bate, R. et al. (2013) *Substandard and falsified anti-tuberculosis drugs: a preliminary field analysis.* International Journal of Tuberculosis and Lung Disease: The Union 1-4

Cameron, CA. et al. (2009) *Medical prices, availability, and affordability in 36 developing and middle-income countries: a secondary analysis*. The Lancet, Vol. 373 Is. 9659

Clinton Health Access Initiative (CHAI) (2011) *The private sector market for diarrhea treatment in Nigeria: final deliverable*. Washington, DC: Clinton Health Access Initiative

Dowling, Paul (2011). *Healthcare Supply Chains in Developing Countries: Situational Analysis*. Arlington, VA.: USAID DELIVER Project, Task Order 4

Federal Ministry of Health (FMOH) (2011) *Draft Essential Childhood Medicines Scale-up Plan.* National Primary Health Care Development Agency

Healthcare Distribution Management Association (2004) *The Vital Link in Healthcare.* Available at http://www.healthcaredistribution.org/press_room/pdf/vitallink_092705.pdf (accessed 01/17/2014)

Ministry of Public Health and Sanitation (MOPHS) (2011) *Scaling Up Strategy for Essential Treatments in Children under Five Years in Kenya: Diarrhoea and Pneumonia.* Division of Child and Adolescent Health

Oxfam (2009) *Blind Optimism: Challenging the myths about private health care in poor countries*. Oxfam Briefing Paper, February

Sussmuth-Dyckerhoff, C. and J. Wang (2010) *China's health care reforms*. Health International, 10

USAID (2012) *Getting Essential Medicines to Customers.* USAID: Deliver Project.

--- (2009) *Estimating the Global In-Country Supply Chain Costs of Meeting the MDGs by 2015: Technical Brief.* USAID, Deliver Project.

World Bank. (2012). *Trade Logistics in a Global Economy: LPI Ranking and Scores.* World Bank, Logistics Performance Index.

World Health Organization (WHO) (2013) *WHO Guidelines on Country Pharmaceutical Pricing Policies*. WHO Press

--- (2009) *Medicines use in primary care in developing and transitional countries.* WHO Press

--- (2008) *Measuring medicine prices, availability, affordability and price components: 2ND Edition*. WHO Press