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### **Private sector role in health supply chains**

*Review of the role and potential for private sector engagement in developing country health supply chains*

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## Acronyms

ARV	Antiretroviral
CDC	Catholic Distribution Center
CHAG	Churches Health Association of Ghana
CHAZ	Church Health Association of Zambia
CMS	Central Medical Store
DSBL	Drug Supply Budget Line
ECOWAS	Economic Community of West African States
FBO	Faith Based Organization
GHS	Ghana Health Services
GMP	Good Manufacturing Practices
GNI	Gross National Income
GoG	Government of Ghana
GSMFEL	Ghana Social Marketing Foundation Enterprises Limited
ICT	Information and Communication Technology
ITN	Insecticide Treated Nets
HAN	Health Action Network of Ghana
LLIN	Long Lasting Insecticide Treated Nets
LMIC	Low and Middle Income Country
LMIS	Logistics Management and Information System
M&E	Monitoring and Evaluation
MSL	Medical Stores Limited
MoH	Ministry of Health
MOU	Memorandum of Understanding
NFA	National Framework Agreements
NHIC	National Health Insurance Council
NHIS	National Health Insurance Scheme
OECD	Organization for Economic Co-operation and Development
OTC	Over-the-Counter (medicine)
PDA	Personal Digital Assistant
RFID	Radio Frequency Identification
RMS	Regional Medical Stores
SDP	Service Delivery Point
SEAM	Strategies for Enhancing Access to Medicines
SME	Small and Medium Enterprises
SSDM	Supplies, Stores, and Drug Management
TA	Technical Assistance
TB	Tuberculosis
USAID	United States Agency for International Development
WMS	Warehouse Management System

## Executive Summary

Strong supply chains are essential to effective health care delivery in all sectors – public, faith-based, employer-provided and private. In OECD countries, supply chains rely heavily on the private sector for supply, distribution and provision of key auxiliary services even when the health system itself is largely or exclusively public sector. These supply chains work quite well in ensuring consistent availability of high quality product. In contrast, health supply chains in many Low and Middle Income Countries (LMICs) perform poorly and have less private sector involvement. This observation leads us to ask: How might a greater role for the private sector and/or greater leveraging of private sector supply chain best practices improve health supply chains in LMICs?

This study has two objectives: 1) to provide an understanding of the current and potential role for the private sector in health supply chains; and 2) to provide recommendations regarding how national governments, policymakers, private investors, international donors and foundations should think about investment in private sector health care initiatives for LMICs. *We define health supply chain as the network of entities that plan, source, fund, and distribute products and manage associated information and finances from manufacturers through intermediate warehouses and resellers to dispensing and health service delivery points.* This paper puts a primary focus on the activities of the for-profit private sector and the deployment of for-profit best practices by other sectors in the health supply chain. It is informed by in-depth case studies of health supply chains in Ghana and Zambia, as well as interviews of over 40 supply chain and health experts in 12 countries about private sector initiatives in those countries. Over 40 private sector-oriented initiatives which seek to bring new models to LMIC supply chains were identified and reviewed. The major findings are as follows:

### Supply chains matter

Supply chains are critical in defining the ultimate cost and accessibility of medicines. A well-functioning health supply chain provides broad geographic access to affordable, high quality products. In addition, good supply chains operate with efficiency, adaptability and financial integrity. Using product availability as a measure of supply chain performance shows a clear distinction between OECD countries and LMICs. Product availability at retail pharmacies in most OECD countries is over 95% and the average for the European Union is over 90%.<sup>1</sup> In LMICs product availability is much lower. At public sector health facilities, average availability is roughly 38% and at private outlets, where products are often unaffordable to most of the population, availability is still under 60%.<sup>2</sup>

A wide range of supply chain activities are required to source, fund, move, and deliver products to dispensing and health service delivery points. These activities are enabled by availability of market and product information, efficient and timely financial flows and effective national regulation and enforcement.

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<sup>1</sup> European Pharmaceutical Wholesaler Industry, Technical Report 2006

<sup>2</sup> Averages based on HAI medicine price surveys from sub-Saharan Africa. Refer to *Appendix A* for more detail.

## **Investing in private sector supply chain initiatives can improve health system performance across sectors**

Today, health supply chains at the country level face a range of challenges, among them limited geographic reach, lack of information for reliable forecasting and supply chain planning, insufficient scale in warehousing and distribution, and poor access to debt and equity financing. On the whole, they are characterized by antiquated systems without the capacity to deliver the increasing volume and complexity of drugs now supported by donor funds, which could reach \$10b a year by 2011. Investing well in private sector initiatives can contribute to addressing these challenges by increasing supply chain efficiency among actors in all channels, and extending private sector channels to increase access for currently underserved populations.

While a diverse set of private sector initiatives were identified, a lack of performance data makes it impossible to select a clear “winner” for investment. That said, several models appear to show promise, including initiatives currently underway to build innovative distribution networks (including franchises and multi-product delivery models), and outsourced supply chain services. Several initiatives at the concept stage also showed potential, in particular those focused on increasing the availability of information using mobile phones and other information technologies, and broader access to debt and equity financing across the supply chain.

## **Country context plays a critical role in determining appropriate supply chain solutions. Identifying countries with common attributes presents the potential to build scalable models**

We created an approach for characterizing individual countries in terms of channel structure, private sector role in supply chains, and supply chain performance. We used the approach to compare Ghana and Zambia, two countries in which the role of the private sector differs markedly. In Ghana, the major supply chain challenges are 1) to improve and formalize private sector supply of product in all channels; 2) to improve financial integrity and reduce indebtedness in all channels; and 3) to improve access to high quality medicines in remote areas. Private sector initiatives are currently playing a significant role in addressing these challenges. In Zambia, the major supply chain challenges are 1) to improve performance of the public sector supply chain in support of all channels; and 2) to improve access to high quality medicines in remote areas. Financial integrity is much less of an issue in Zambia than in Ghana because medicines are transferred along the public supply chain without money changing hands. As in Ghana, private sector initiatives are focused on the challenges at hand.

The bulk of current investment in private sector supply chain initiatives is country-specific, addressing gaps in health supply chain performance in an individual country. An important area of future work will be to characterize health channels and supply chains in a broader range of countries so that opportunities to leverage private sector initiatives across countries can be identified and pursued.

## **The various stakeholders each have an important role to play**

Private investors as well as social investors and foundations are good candidates to make investment in individual initiatives, particularly early stage innovations. National governments and international donors can play a major role as enablers: improving availability and transparency of supply chain performance information and increasing access to financing for

supply chain actors. Furthermore, national governments need to take a more strategic approach to defining the regulatory environment for private actors and for actively engaging and contracting with private sector actors to strengthen their own health systems. International donors can support the creation of financing mechanisms that provide greater access to equity and debt capital to private sector initiatives. They can also support national governments in efforts to increase their capacity to regulate and contract with the private sector.

In conclusion, global health supply chains play a critical, if sometimes overlooked, role in increasing access to medicines. Lessons from the OECD tell us that the private sector has a high potential role to play in delivery of medicines, and can increase the efficiency and reliability of supply chains. Substantially greater investment is required in testing and scaling up private sector supply chain models and building the enabling environment that supports them, and this must be paired with much better information about supply chain performance. With new models, better information and greater access to a range of grant, debt and equity financing, the private sector has the potential to positively transform the delivery of medicines in the world's poorest countries.

## Chapter 1: Introduction: Supply Chains for Health Care

Supply chains underpin the entire health system and are essential for providing consistent *availability* of *affordable, high quality* diagnostic and treatment products in locations that are *geographically accessible* to the target population. In addition, supply chains carry information about supply and demand for products back to planners and policymakers and handle financial flows so that the system is adequately resourced. A broken supply chain can cripple the health system and undermine positive health outcomes.

In Low and Middle Income Countries (LMICs), where a large percentage of the population is impoverished and particularly vulnerable to disease and over \$10 billion dollars in donor-financed health commodities alone are expected to flow through the system by 2011, the stakes for effectively managing the supply chain are particularly high. Yet, supply chains in many LMICs underperform. Using product availability as a measure of supply chain performance shows a clear distinction between OECD countries and LMICs. Product availability at retail pharmacies in most OECD countries is over 95% and the average for the EU is over 90%.<sup>3</sup> In LMICs, product availability is much lower. At public sector health facilities, average availability is roughly 38% and at private outlets, where products are often unaffordable to most of the population, availability is still under 60%.<sup>4</sup> *Appendix A* compares product availability and affordability in the public and private sectors of LMICs.

A stark difference between health supply chains in OECD countries and in LMICs is the degree to which the private sector is involved in the different stages of the supply chain. In OECD countries, the private sector is leveraged in order to achieve greater effectiveness, while in LMICs, there seems to be much less involvement of the private sector. This suggests that if properly tapped into, within an appropriate regulatory framework to mitigate the potential downside effects of the profit motive, the private sector can be an important component in improving supply chain effectiveness and thus supporting better health outcomes. *Appendix B* provides details about supply chain structure in OECD countries.

This report aims to provide an understanding of the current and potential role for the private sector in health supply chains and to provide recommendations regarding how national governments, policymakers, private investors, international donors, and foundations should think about investment in private sector supply chain initiatives for LMICs. This paper puts a primary focus on the activities of the for-profit private sector, or the deployment of for-profit best practices by other sectors in the health supply chain.

### 1.1 The Four Stages of Health Supply Chains

A health supply chain is the network of entities that plan, source, fund, and distribute products and manage associated information and finances from manufacturers through intermediate warehouses and resellers to dispensing and health service delivery points. There are numerous actors involved in making supply chains work: donors and funders, government policy makers, procurement agents, program managers, regulators, suppliers, distributors, and dispensing staff from the public, private, and faith-based sectors. Throughout this process many activities are carried out including product registration, forecasting, procurement, importation, warehousing,

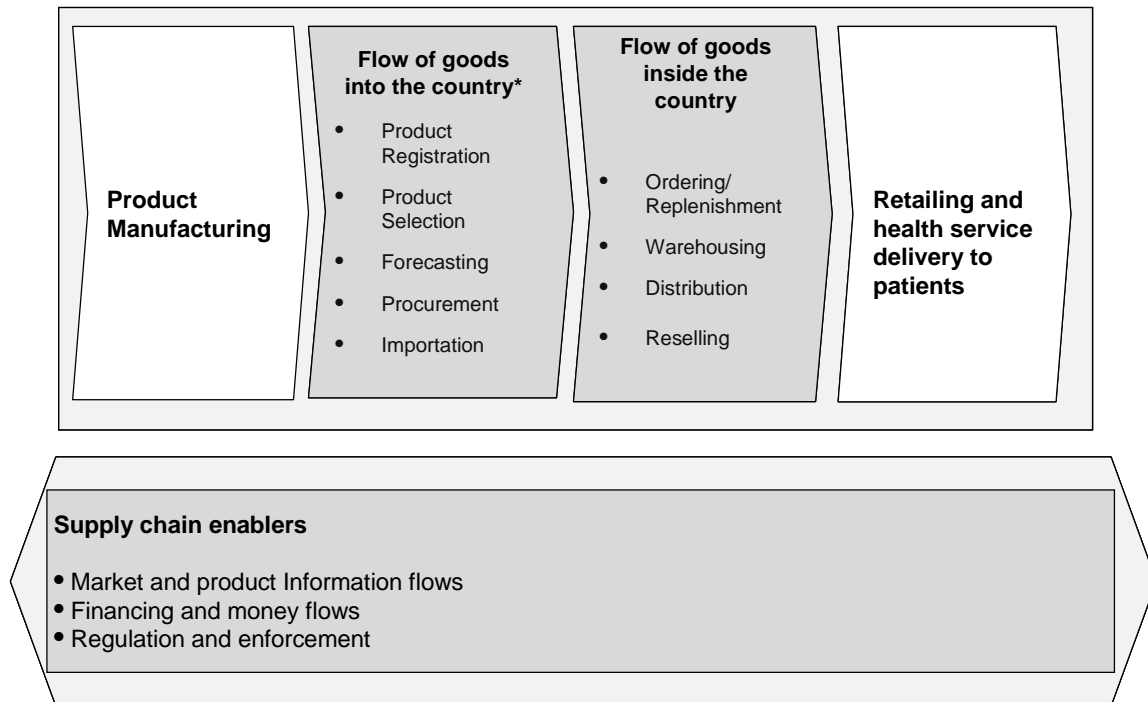
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<sup>3</sup> European Pharmaceutical Wholesaler Industry, *Technical Report 2006*

<sup>4</sup> Averages based on HAI medicine price surveys from sub-Saharan Africa. Refer to *Appendix A* for more detail.

distribution, and retailing. These activities occur at the different stages within the supply chain. *Figure 1* below depicts the activities that occur in order to manage the flow of goods both into and inside the country as well as the supply chain enablers required for a supply chain to function properly.

**Figure 1. Activities and enablers required to effectively manage product flow from entry into the country to delivery to the patient**



\*Note: In countries with significant local manufacturing importation will be smaller in scale and product manufacturing will obviously occur *within* rather than outside of the country.

As indicated in *Figure 1*, the focus of this report is the flow of goods into and within the country, and the enablers that support that flow of goods. Thus, neither manufacturing nor health service delivery are considered explicitly. However, the supply chain implications of manufacturing (i.e. local vs. international) as well as different models for service delivery provision are taken into consideration.

The supply chain enablers are a critical thread that runs through all activities and stages of the supply chain. Better information ensures better use of resources, which are often in short supply. For example, accurate information about consumption patterns that is captured at the service delivery point and flows back up the chain can be crucial for effective quantification and ordering at all tiers in the supply chain. Proper stock levels at Service Delivery Points (SDPs) should be established to determine replenishment rates at the different levels of the supply chain (e.g., central warehouses and regional stores). Maintaining desired stock levels will limit the probability of both stock-outs and excess inventory, which often lead to product expiry. Stock information flowing up through the system will, critically, inform upstream decisions about procurement quantities.

Effective financial flows are also crucial for the supply chain and for the health system as a whole to function properly. Timely financial flows between tiers in the supply chain will help ensure an

uninterrupted flow of products and a sustainable system that is able to consistently deliver products and services. All too often in LMICs, unsynchronized or delayed financial flows limit procurement of products.

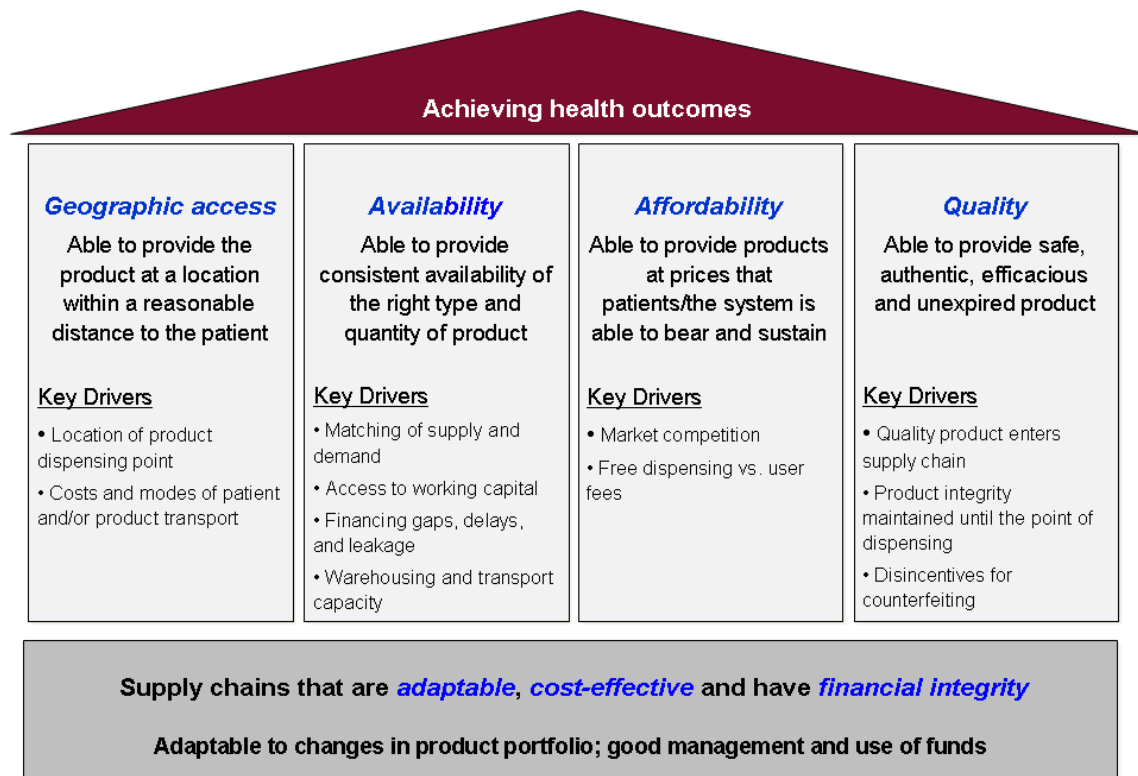
Regulation also spans the chain, incorporating product registration, thorough inspection of products at the port of entry, oversight of distribution and resale activities as well as accreditation of pharmacists and technicians, and inspection of pharmacies and drug shops. Without adequate regulation at each step in the supply chain, product integrity can be compromised, leading to unnecessary deaths and the development of drug resistance.

As logistics data becomes more widely available and accurate, financial flows become better managed, and regulation is made more appropriate and effective (i.e., both in terms of oversight and efficiency), the space will be more predictable and open up opportunities for more manufacturers, resellers, and supply chain service providers to enter the pharmaceutical markets in LMICs, thus increasing competition and ultimately driving prices down and efficiencies up.

## 1.2 Effective Supply Chains Improve Health Outcomes

As indicated earlier, achieving good health outcomes requires supply chains that provide consistent *availability* of *affordable, high quality* products in a location that is *geographically accessible* to the target population. Furthermore, these supply chains must be adaptable, cost effective, and have financial integrity in order to sustain good outcomes. *Figure 2* depicts this relationship, defines the four aspects of supply chain performance: 1) *geographic access*, 2) *availability*, 3) *affordability* and 4) *quality*, and also identifies the key drivers for each aspect.

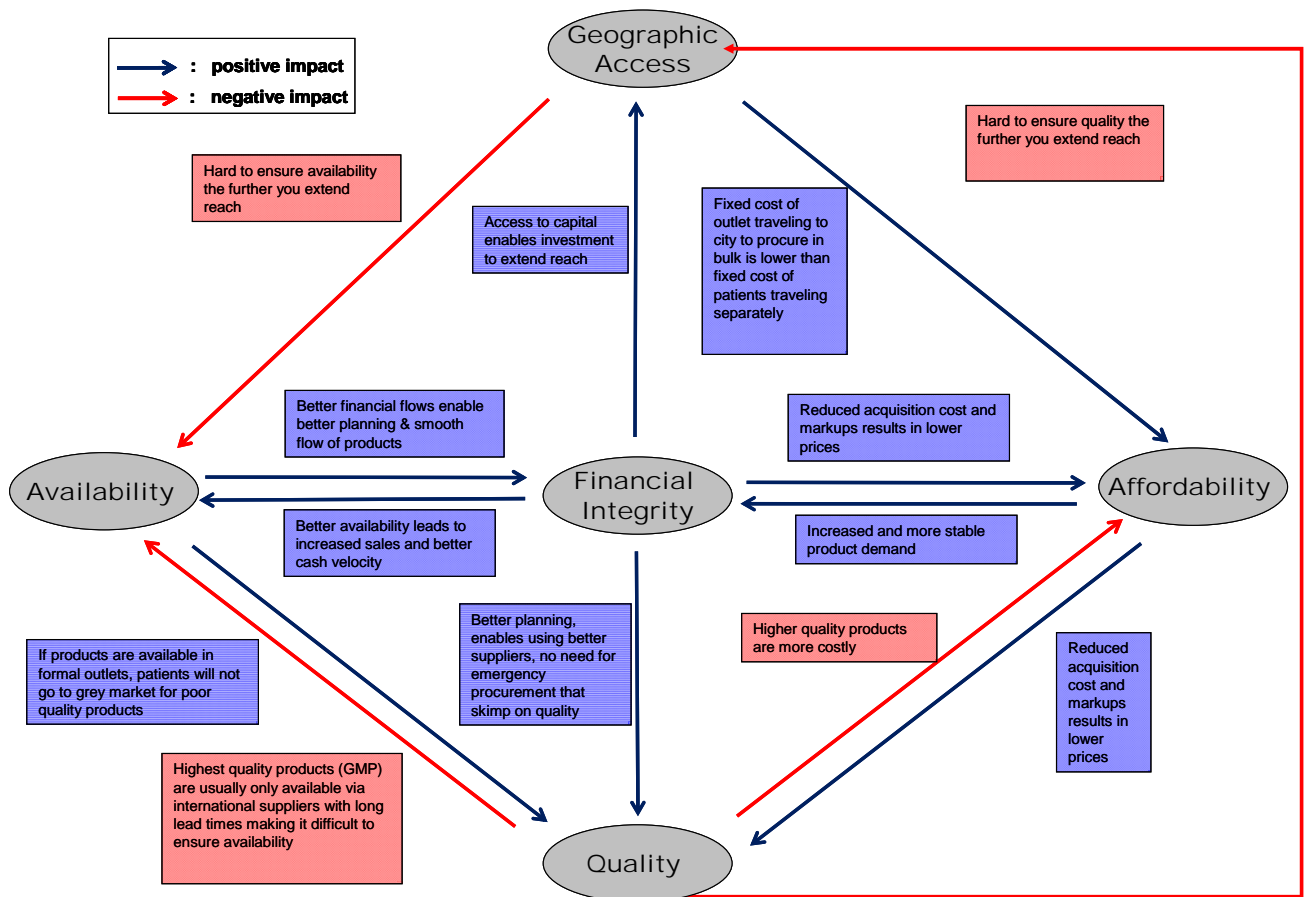
**Figure 2. How good supply chain performance contributes to good health outcomes**



The base of *Figure 2* depicts the need for supply chains to be robust and sustainable. The adaptability of health supply chains is critical in order to introduce new drugs and treatments, to effectively carry out product changeovers, and to incorporate innovations such as telemedicine or rapid diagnostic test kits. Similarly, given the resource-constrained environment, sound financial management is necessary in order to maximize health impact and keep the system functioning.

There is a great deal of interconnectedness among the five aspects of supply chain performance. Improvements made in one area can reinforce and strengthen another area. For example, improving affordability of drugs in licensed facilities will reduce the need for patients to seek cheaper medicines in the grey market and thus limit the incentives for the production and sale of low-quality products. Conversely, improvements in one area can require trade-offs in another. Extending geographical coverage to remote populations often requires leveraging distribution networks or retail platforms that have less supply chain visibility and oversight, making product integrity and quality harder to ensure. The influence diagram in *Figure 3* illustrates some of the relationships between the various areas and shows how important it is to understand the interconnectedness when deciding on the balance between success indicators.

**Figure 3. Influence diagram showing supply chain interconnectedness**



## **Recommendations for Future Research**

While supply chains are critical to achieving good health outcomes, little research has been done to assess the performance of supply chains in LMICs or to determine how poor performance (good performance) can negatively impact (positively impact) healthcare outcomes. For example, it is currently difficult to assemble information on supply chain costs as a percentage of program and Ministry of Health budgets. This lack of information makes it difficult to assess how well supply chains are working in each sector so as to make decisions on where to focus resources to improve supply chain performance.

## Chapter 2: Understanding the Role of the Private Sector

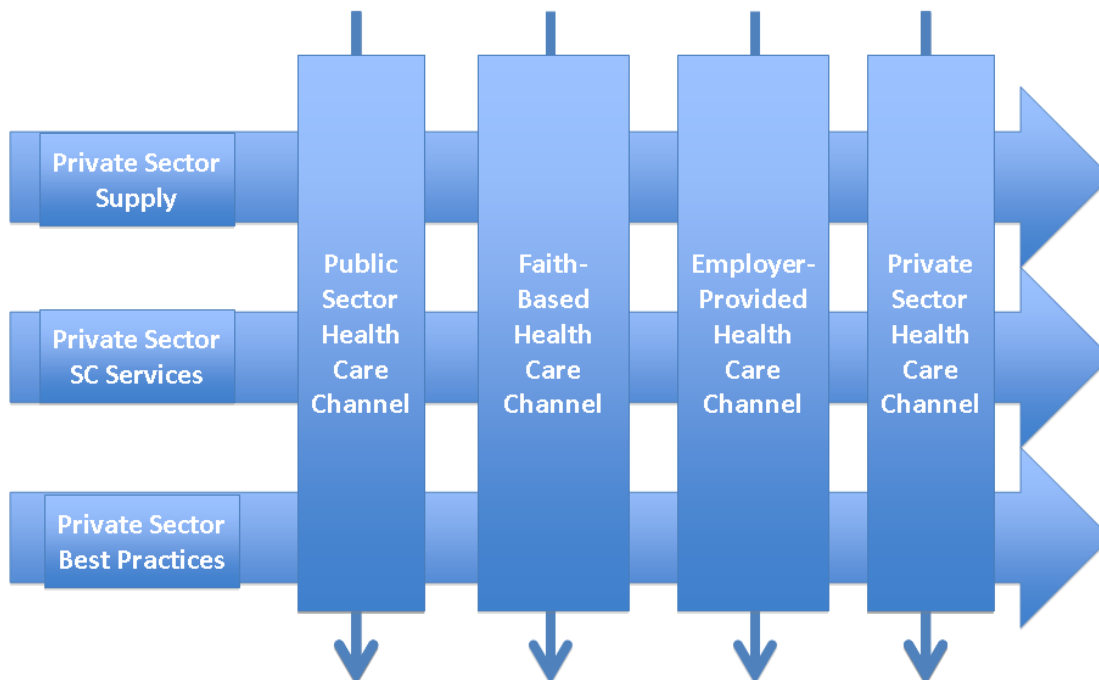
This chapter presents a framework that the team developed for understanding the role of the private sector in a country's health system and then uses the framework to compare two countries – Ghana and Zambia. The two countries differ remarkably in country context, private sector role, and supply chain performance. For investors who are evaluating private sector initiatives in which to invest, this analytical approach provides a way to categorize initiatives based on private sector role and to explore how well a particular initiative might work in a given country context to address opportunities to improve supply chain performance.

### 2.1 A Framework for Describing the Role of the Private Sector

The current and potential role of the private sector in health supply chains for a given country can be understood using the framework shown in *Figure 4*. The health care system in an LMIC is typically comprised of four sectors – public, faith-based, employer-provided and private sector – each of which acts as a channel to provide a range of services to the population in the geographic areas in which it operates. The relative share of the four sectors varies by country.

Behind each channel is a supply chain that sources and delivers medicines, supplies and equipment to dispensing points and service delivery points. While *Figure 4* suggests that these supply chains are distinct, depending on the country, there may be a high degree of interconnectedness among the supply chains – the sectors may supply product to one another and perform supply chain activities on behalf of one another. Furthermore, a given sector's supply chains may be further segmented into many specialized or “vertical” supply chains that address the unique needs of particular programs, products, or service delivery points. The degree and nature of segmentation will depend on the country.

**Figure 4. Potential Roles of the Private Sector in a Health Care System**



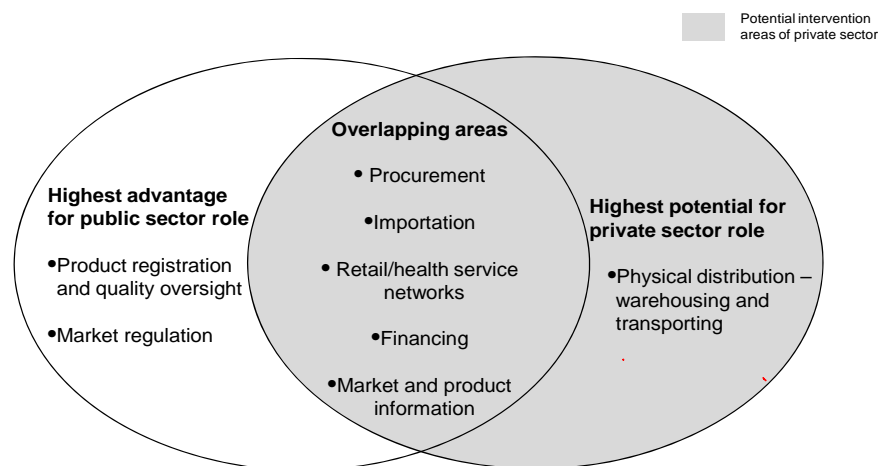
As shown in *Figure 4*, the private sector can play any of four roles in support of one or more channels within the health system. The private sector may:

- Sell medicines, supplies and equipment to one or more channels (e.g., manufacturers, wholesalers);
- Sell supply chain services, such as procurement, transport, warehousing, information and financial services, to one or more channels. Services may also be knowledge-intensive, such as supply chain design, needs quantification or Logistics Management and Information System (LMIS) system design;
- Provide a private-sector channel with a supply chain behind it (e.g., pharmacy, private health clinic, franchise network); and/or
- Act as a source of – or assist in – implementation of supply chain best practices, such as scheduled delivery networks, integrated supply chains, pay-for-performance systems, or cash-to-cash cycle time management approaches, to one or more channels (e.g., consultants, trainers, educators, change agents).

A variety of actors – government policymakers and political bodies, donors, investors, regulating agencies and consultants – influence evolution of the private sector role by creating the legal and regulatory context, setting direction and providing financing. At the same time, private sector players themselves influence the evolution of the private sector role by making choices about how to compete, how to provide products and services to customers, and eventually, as they either prosper or fail.

In deciding whether to allow or encourage a particular private sector role, the “influencers” should consider the extent to which market forces will lead private sector players to perform well their role and to what extent oversight or regulation is needed. The most appropriate areas for private sector involvement are those for which the risk of underperformance is low or can be managed through reasonable regulation so that the private sector has a clear advantage over other sectors. As shown in *Figure 5*, supply chain activities can be classified as having high potential for the public sector, high potential for the private sector, or as overlapping areas where both sectors have a potential role to play.

**Figure 5. Roles most appropriate for the public and private sector**



***Some areas seem to be intrinsically more appropriate for private sector to play a role:*** Some of these roles require a careful analysis of the policy environment, regulatory and contract monitoring capacity and other context specific factors. That said, there seems to be some low hanging fruit in reinvigorating the public sector supply chains through private sector best-practice and management approaches. Also, the use of private sector capacity for carrying out auxiliary functions or services such as LMIS design and the provision of financial transaction management services does not require a strong contracting or monitoring capacity, and these may be best-suited as starting points for private sector role in supply chains.

## 2.2 A Comparison of Ghana and Zambia

The team used Ghana and Zambia as case studies in order to validate our approach to describing country context, private sector role and supply chain performance, and to develop more generalized thinking about how to categorize countries based on their potential for private sector investment. The two countries were selected for study because while both are viewed as having relatively well-functioning health systems, yet they differ in terms of country context and the role of the private sector.<sup>5</sup>

Before delving into how the private sectors in Ghana and Zambia differ, it is useful to understand differences in country context that may influence the different private sector roles. Important differences were noted in three areas: demographics, existence of public health insurance, and business environment.

***Demographics:*** Ghana and Zambia are both relatively stable democracies with similar per capita GNI,<sup>6</sup> and both struggle with malaria as a major health issue. However, the two countries are quite different in other respects. Ghana is much more densely populated and has twice the population of Zambia, despite the fact that it covers less than one third of the surface area. Ghana is also more urbanized than Zambia. In contrast, infant and adult mortality rates are significantly higher, and life expectancy much lower (41.7 vs. 59.7 years) in Zambia than in Ghana. This is partly explained by the fact that HIV/AIDS prevalence is roughly 8 times higher in Zambia. Lastly, although the two countries have similar per capita GNI, Zambia has a much larger percentage of its population living below the national poverty line.

***Existence of Public Health Insurance:*** Patient pricing of health care products and services affects not only affordability; it has an indirect effect on financial integrity, as well. Pricing in a given channel (public, faith-based, employer-provided, private) may fall into three general categories: free to all; free or highly subsidized to health insurance subscribers, and fee-based.

In Zambia, health care services and medicines are free at public, faith-based, and employer-provided clinics. The mining industry provides health services at almost no cost to employees and eligible dependents, which may constitute up to 5% of the national population. Health care, when it is available, is therefore generally affordable. In addition, since medicines provided through the public sector are passed along the chain without money changing hands, warehouses and health facilities downstream of the Central Medical Stores (CMS) do not need to manage cash. As such, there is no risk of becoming indebted due to poor cash management associated with the purchase and resale of medicines.

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<sup>5</sup> Case studies of each country are included in *Appendices D and E*.

<sup>6</sup> GNI from 2007 calculated using PPP Atlas Method

In Ghana, health care services and medicines are covered by the National Health Insurance Scheme (NHIS), which was launched in 2004 with the intent to provide universal coverage and to replace the “cash and carry” system that had made health care costs prohibitive for a large portion of Ghana’s poor. In order to make coverage available to all, subsidies are provided for children under 18 with both parents enrolled in NHIS, pensioners, individuals over 70 years old and individuals classified as indigent. As of 2007 roughly 55% of the country was enrolled in the NHIS, with 64% of those enrolled were within the subsidized group.

Health care and medicines received under the NHIS are therefore affordable. However, medicines are sold and resold along the chain in all sectors. The final price received is set by the NHIS. Thus, facilities within the chain face three significant risks that are not present in Zambia.

- Since medicines are purchased and resold, facilities handle cash and must manage their cash well to avoid indebtedness.
- Because prices are fixed at the end of the chain, problems can arise if these prices do not cover the prices paid for medicines and associated logistics.
- If there are delays in reimbursement by the NHIS, working capital for all players in the supply chain- including service delivery points- will increase, and can lead to indebtedness that strangles the system.

***Business environment:*** While not the only driving factor, favorable national laws and regulations in Ghana have contributed to the development of a larger private sector, particularly in local manufacturing and in retailing. While these parts of the supply chain are not of direct interest to this study, they do give an indication of the business climate in the two countries. Furthermore, procurement law in Ghana has been more supportive of wholesaling than in Zambia.

The market for pharmaceuticals in Ghana is larger than that in Zambia, encouraging actors to enter the space. Furthermore, trade policy and import duty structure is more favorable to local manufacturers in Ghana than it is in Zambia. As a result, the 35 local manufacturers in Ghana produce roughly 30% of total medicines (prescription and over-the-counter), while in Zambia, the 6 local manufacturers account for a much smaller fraction of the supply.

Ghana has a more developed retail drug sector, with 1000+ private sector pharmacies and 10,000+ private sector chemical sellers. Chemical sellers, which serve mainly rural areas and are only allowed to sell over-the-counter (OTC) drugs, are often the first point of contact when a patient is seeking treatment. In contrast, the number of pharmacists in Zambia is very low – fewer than 100- so there are only 59 pharmacies. Similarly, the lack of pharmacy technicians in Zambia keeps the number of drug shops low.

In Ghana, the Procurement Act of 2003 allows public clinics and hospitals to procure from private sector suppliers when products are not available at the public Regional Medical Stores (RMS). Similarly, it allows each RMS to procure from the private sector if the CMS cannot supply the necessary products. Lack of availability at the CMS has led to extensive private sector buying. In some regions, as much as 85% of all products are purchased from the private sector<sup>7</sup>. Similarly, there is a substantial amount of private sector procurement that occurs at the health facilities, especially larger hospitals. In contrast, Zambian health facilities are dependent on supplies through the public system. Procurement of products is done by the CMS and channeled down to the service delivery points.

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<sup>7</sup> Presentations from Health Supply Chain Practitioners Retreat- Kumasi, Ghana 3/2007

## Channel Structure and Private Sector Role

Channel structure and private sector role in Ghana and Zambia can be analyzed and compared using the framework shown in *Figure 4*. While all four channels exist in both countries, and the public, faith-based and employer-provided sectors serve similar segments of the population in the two countries, the private sector channel is more developed in Ghana. As discussed above, the private sector channel has yet to play a significant role in Zambia.

In both countries, population segments reached by each of the channels tend to be defined by geography and economics. The public sector channel is most active in more densely populated areas, which are also relatively more affluent. The faith-based channel is an important source of health care to less affluent or poor people in far-flung areas. The employer-provided channel serves employees of copper mines (Zambia), cocoa plantations (Ghana), and gold mines (Ghana) in areas where large-scale employers operate. The private sector channel in Ghana operates both in urban areas (clinics and pharmacies) as well as in more remote rural areas (chemical sellers).

There are several notable similarities and differences between the supply chains and the private sector roles in the two countries. First, the ***public sector distribution structure*** differs markedly. The public sector supply chain in Ghana diverges farther downstream than it does in Zambia. In Ghana, the CMS distribute to 10 regional medical stores that in turn distribute to roughly 2200 service delivery points. In Zambia, the CMS distribute to 72 district medical stores that then distribute to roughly 1500 service delivery points. The presence of a larger number of secondary distribution points in Zambia necessitates stock planning and order management capacity at each of these 72 district medical stores. Given the scarcity of such planning capacity, the less divergent distribution model as seen in Ghana seems to be more suitable for resource-limited settings.

Second, as shown in *Figure 6* and discussed above, ***private sector supply*** plays a greater role in Ghana than in Zambia. In Ghana, wholesalers constitute a substantial portion of sales and delivery of medicines to public RMSs and hospitals, as well as to faith-based facilities. In Zambia, virtually all of the supply to the public system and much of the supply to faith-based facilities comes from international suppliers and procurement agents and is distributed through the public sector supply chain. While in Ghana, the public sector has acknowledged the extent of private sector buying and is making adjustments to accommodate it, in Zambia, there is no intention to increase the use of private sector supply.

Third, in both countries, there is limited use of ***private sector supply chain services*** for procurement, transport, warehousing, information and financial services. An exception is the outsourcing of senior operational management of the CMS in Zambia to Crown Agents, Ltd. Both countries rely on Technical Assistance (TA), funded by donors, for knowledge-intensive services such as supply chain design, LMIS design, product forecasting, and needs quantification. This TA, however, is provided by international consultants and private sector in-country expertise, to the extent that it exists, has rarely been used.

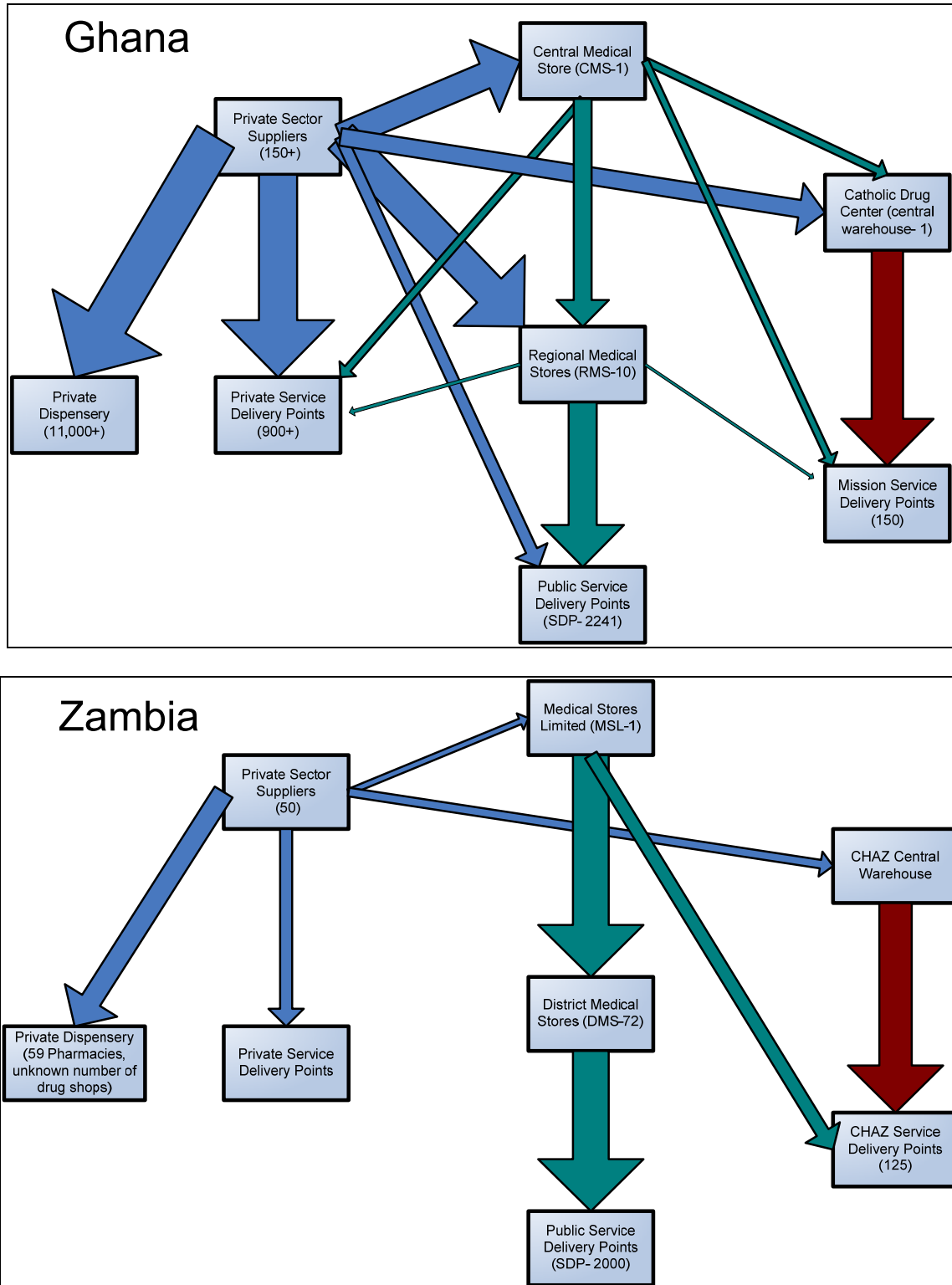
Fourth, direct implementation of ***private sector supply chain best practices*** – e.g., within-country pooled procurement and scheduled delivery – is being pursued in the two countries. While in Ghana the planned scheduled delivery network has yet to be fully implemented (after many years), in Zambia, it is operating successfully. In Ghana, pooled procurement approaches are being explored by the public sector, through the idea of National Framework Agreements and also by the faith-based sector.

Lastly, in Ghana, the ***private sector channel*** is executed through private sector hospitals,

pharmacies and chemical sellers. Chemical sellers serve poor people in both urban and rural areas. Recently an initiative envisioned and implemented by international consultants has worked to create a franchised chemical seller network of “CareShops” that serve rural areas. The concept of CareShops has been to standardize and improve the service and range of products offered by chemical sellers, and to reduce supply chain costs, through franchising.

*Figure 6 depicts in country product flows within and between supply chains. The thickness of the arrows represent estimates of the relative volume of products flowing between tiers. One clear distinction is that the degree of interconnectedness between sectors is greater in Ghana than in Zambia.*

**Figure 6. Supply Chain Flows for Ghana and Zambia**

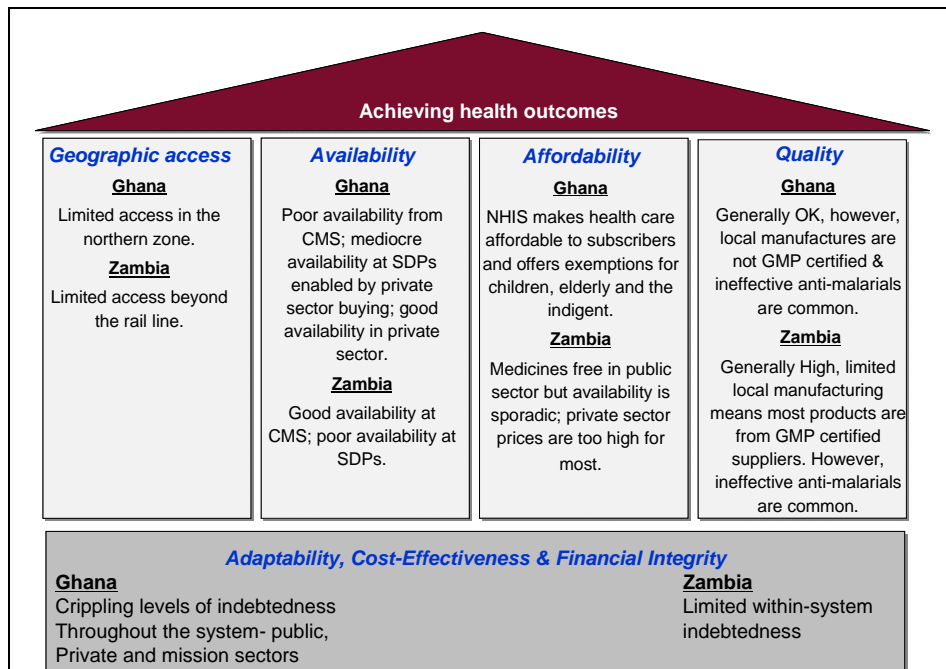


## Health Supply Chain Performance and Gaps in Performance

When the performance of each supply chain is mapped along the dimensions of supply chain performance (*affordability, availability, quality, geographic access* and *financial integrity*) important differences between the two countries are noted. These arise from the differences in country context in both countries and are summarized in *Figure 7* below.

- In both countries, geographic access for less affluent people in rural areas is a problem with access being limited to the southern part of Ghana and along the rail line in Zambia.
- In Zambia, products are largely available at the CMS but don't quite make it out to the facilities where availability is poor. The inverse applies in Ghana where facilities tend to have good availability since they can buy from private sector directly while the CMS are poorly stocked, creating a self-reinforcing cycle as facilities have to depend on private sector sources.
- As stated above, the NHIS in Ghana offers affordable services to subscribers with exemptions for children, the elderly and the indigent. Zambia, on the other hand, offers free services in the public facilities, but availability is sporadic. Private sector providers cater to only a small, affluent proportion of the population
- Quality of products in Zambia tends to be high, given most products are purchased from GMP-certified suppliers, while in Ghana, the local manufacturers are not GMP-certified so the 30% of medicines bought locally can be of variable quality.
- In Ghana, indebtedness within the supply chain is a significant problem. This arises from a variety of situations, including delays in operating funds released from the Government as well as delays in insurance reimbursement by NHIS to facilities. In Zambia, since all products are provided by the CMS and no money travels through the supply chain, the flow of finances is not an issue at the facility level. It becomes a challenge at the national level where funding shortfalls for procurement of products leads to shortages and stock-outs.

**Figure 7. Health Supply Chain Performance in Ghana and Zambia**



### Recommendations for Future Research

The approach presented here works well in describing channel structure, private sector role and gaps in health supply chain performance. The understanding gained is helpful in evaluating the magnitude of potential impact of current and proposed private sector initiatives.

While the analysis of Ghana and Zambia suggests several factors that may be useful in categorizing countries, further research in additional countries is required in order to develop a comprehensive country categorization or segmentation criteria that can be used universally. Developing country segmentations would enable context-specific supply chain strategies to be developed. These strategies could then be used by other countries to inform policy decisions about how to best manage and/or stimulate development of different supply chain channels in order to improve overall health outcomes.

## **Chapter 3: Recent Private Sector Supply Chain Initiatives in Ghana and Zambia**

In order to understand how current private sector supply chain initiatives are shifting the role of the private sector in LMICs, the team combined in-depth examinations of initiatives in Ghana and Zambia with a broad scan of notable initiatives across the developing world. While the in-depth cases allowed the team to look closely at both the initiative and that country's context, the broad scan allowed the team to develop a perspective on areas that offer potential space for private sector involvement.

This chapter presents examples of initiatives from Ghana and Zambia in order to illustrate the various factors that come into play. For each country, we have chosen private sector initiatives that seem to have high potential for impact – improving performance of the supply chain, and thus of the health care system - in a particular sector. The multi-country scan of initiatives is presented in Chapter Four.

### **3.1 Ghana Initiatives**

Ghana has a vibrant private sector with the capacity to supply medicines and auxiliary supply chain services. Despite this capacity, structural bottlenecks have limited the private sector from playing a role in the health supply chain. In this section, we describe recent initiatives that are changing the private sector role in Ghana's health supply chain in significant ways.

#### **National Framework Agreements (NFA)**

An important impediment to the use of the private sector as a source of product supply and of auxiliary supply chain services is that the Ministry of Health (MoH) lacks the capacity to create contracts that are robust and can be monitored. This lack of contracting capacity is far more severe at the decentralized level and results in either high prices or poor adherence to delivery terms when the private sector is used as a source for medicines and health commodities. One way to overcome this problem is to use the contracting capacity at the central level to create and negotiate contracts with the private sector for supply or service provision with the actual usage and ordering of products or services occurring at the decentralized level.

The Ghana Health Service (GHS) is in the process of establishing framework agreements with local private sector suppliers. Two year agreements will be awarded to Ghanaian companies to supply the 10 RMS with a comprehensive list of products. By aggregating demand for the entire country, the GHS will be able to negotiate better prices and favorable contract terms. The suppliers will be required to fulfill orders made by the RMS within the lead time established in the contract and would likely enter into vendor-managed inventory arrangements with the 10 facilities. The NFA exemplifies two roles in the framework, adopting private sector best practices and increasing private sector supply.

The initiative addresses two key issues of quality, availability, and affordability. By having standing contracts with suppliers, RMS will be able to obtain products quicker when there are stock-outs at the CMS and, in turn, to provide higher service levels to the hospitals and clinics in their district. Also, the NFA is expected to lead to more favorable prices as well as solving the problem of different RMS stores paying vastly different prices for the same product.

The NFA project is led by the Supplies, Stores, and Drug Management (SSDM) unit within the GHS and the project requires relatively small external funding. If successful, the NFA will be a powerful testament to the potential benefits of leveraging the private sector to improve public sector performance. It will shift the dialogue in Ghana about the private sector and could potentially shift the way other governments think about sourcing arrangements. A successful NFA will also have implications for how Ghana and other countries with a sufficiently developed local pharmaceutical market think about the role of CMS. It is unclear whether the CMS will compete with the NFA by conducting more International Competitive Bids and improving availability, or if it will focus its activities on importing products that aren't available on the local market.

### **National Health Insurance Scheme (NHIS)**

The existence of health insurance schemes directly affects the behavior of health supply chains. Insurance pools the purchasing power of those paying out-of-pocket for drugs, thus creating a single entity that can contract on behalf of multiple end-users. If executed well, this aggregation leads to significant improvements in the delivery of products by the supply chain. The aggregation means engaging with players who have scale and can thus develop useful scale efficiencies, as well as having more contractual control over them. Similarly, the aggregation can lead to a dramatic improvement in the quality of information gathered on supply and demand of products moved by the supply chain, one of the key enablers highlighted in Chapter One. A precondition to achieving these outcomes is that the insurance entity manages its contracts effectively and also systematically collects useful market data.

In Ghana, the implementation of the National Health Insurance Scheme has led to a rapid scale up in health services coverage and thereby put a burden on claims processing. Currently the reimbursement time for facilities averages 3 months. This delay has caused problems for public, private, and faith-based facilities and led to severe indebtedness problems as noted in Chapter Two. Currently, there are discussions within the National Health Insurance Council (NHIC) about moving claims processing from the district to the regional level as well as considerations to outsource claims processing to a private enterprise. The NHIC has received bids from three different companies to carry out the claims processing. The goal of the NHIC is to reduce the reimbursement time from 3 months to 6-8 weeks. Insurance claims outsourcing would be categorized as private sector services that improve the performance of all channels, although the services would be directly supplied to the public sector.

By speeding up the reimbursement process and improving cash flow at the facility level, the initiative is clearly targeted at the financial integrity and sustainability measures of performance for the supply chain. If pursued, it would also be an important indication of outsourcing services to the private sector being considered as a viable solution to some of the public sector's biggest challenges.

However, concern has been raised about the effect that centralizing claims processing would have on the relationship between the district level mutuals and health providers. Having the claims processing occur at the district level enables interaction between providers and processors that leads to greater understanding of treatment behaviors and a lower likelihood of gaming the system. Moving the processing to the regional level would eliminate this important relationship and could lead to an "us vs them" mentality more conducive to cheating. Such a shift would require a higher level of monitoring and oversight.<sup>8</sup>

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<sup>8</sup> Interview with Andreas Seiter, World Bank 7/15/2008

### **Scheduled Delivery**

In Ghana, the distribution between tiers is done largely in an ad-hoc fashion. Facilities are responsible for obtaining transportation and traveling to the next highest tier to place their order and collect their products. Advanced ordering is rare and a great deal of time and money are spent traveling to and from warehousing facilities and waiting for orders to be filled.

Scheduled delivery is primarily intended to reduce costs and increase efficiency and as such, is considered to be an *affordability* and *availability* enhancing measure. It can be categorized as private sector best practices being used to improve the public channel, particularly since a private firm could be involved in the development of the policy or its actual execution.

In 2002, USAID sponsored DELIVER PROJECT proposed a system of scheduled deliveries between RMS and SDPs to address this issue. The proposal was part of a larger effort that included revised requisition forms and a clearly defined role for the district medical stores that had previously served as stocking points. Despite the proposal's being embraced by the Government of Ghana (GoG), the system has yet to become fully operational. Although it has been six years since the scheduled delivery policy was put into place, only 3 of the 10 regions (Brong Ahafo, Central, and Western) are currently implementing it. The remaining regions cite lack of funding, appropriate trucks, proper procedures, adequate staff, and poor service levels at the CMS for failing to implement the system. It is unclear what is at the root of the problem and whether or not it would be possible to move it forward.

### **Outsourced Procurement for the Faith-Based Sector**

The Catholic Health Association of Ghana (CHAG), the biggest player in the faith-based sector, caters to 35-40% of the population,<sup>9</sup> focusing on rural areas. Product for this supply chain has in the past been procured internationally by the Catholic Distribution Center (CDC) warehouse in Accra and then supplied to four autonomous regional distribution centers that are run by independent dioceses. Lack of capacity in procurement has led in recent years to cash flow problems (lack of funds) that have in turn increased the cost of supply. The problem has been aggravated by late reimbursements by the National Health Insurance System and by the dramatic increase in working capital requirements related to the substantial increase in the number of patient visits since the introduction of the NHIS.

The Health Access Network of Ghana (HAN), an NGO, has proposed to CHAG that HAN do international procurement for the CDC and also arrange for distribution of the drugs. HAN intends to apply private sector best practices in the areas of procurement, distribution and funds management to improve product supply and financial sustainability in the CHAG supply chain. HAN intends to provide these supply chain services on an ongoing basis.

HAN recently completed a pilot, funded by a private foundation in the Netherlands. The pilot involved setting up a small revolving drug fund and running it for a year. At the end of the year, the money was still there, providing a preliminary indication of financial sustainability for this approach. HAN has written a business plan that seeks to scale up this fund, with the intention of approaching donors like the World Bank or USAID for funding. The goal is to demonstrate and create a sustainable system.

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<sup>9</sup> Christian Health Association of Ghana, 2006

### **Insecticide Treated Nets (ITN) Voucher Schemes**

The national malaria control program has formed alliances with private sector players in the distribution of ITNs. These are distributed using the distribution strength of the private sector distributor. Discount vouchers are given to pregnant women when they first visit an antenatal clinic. The voucher allows them to buy discounted ITNs at a private retail outlet. The retailer removes a 'proof-of-purchase' sticker from the ITN as it is sold and attaches the sticker to the voucher. The retailer then exchanges the voucher (with the sticker) for cash from a private sector agency who is managing the entire program.

### **Franchised Chemical Seller Network**

Approximately 66% of Ghanaians visit a private chemical seller as their first point of care and treatment seeking. However, most chemical sellers in Ghana have little or no training in healthcare or pharmaceutical dispensing. In addition, chemical sellers are small single owner-run operations with high overheads and poor management capacity leading to high prices for end patients.

A franchise of chemical sellers can ensure the provision of high-quality drugs at lower costs in the rural and peri-urban communities where the reach of licensed pharmacies and public health clinics is poor. The benefits of a franchise model include periodic and coordinated training for the franchisees and scale efficiencies in purchasing and operational management. The Strategies for Enhancing Access to Medicines (SEAM) Program<sup>10</sup> was set up in Ghana in 2002 to improve access to essential medicines and commodities by establishing a franchise of chemical seller shops that provide essential medicines and health supplies and by strengthening the Pharmacy Council's capacity to regulate chemical seller shops in Ghana. A franchise network of chemical sellers – branded as CareShops was set up first in the Volta Region. A logistically sound distribution network was established by Ghana Social Marketing Foundation Enterprises Limited (GSMFEL) to serve the CareShops. However, operational problems prevented the network from reaching the level of success required for sustainable operation.

More recently, a private company named Curatio is starting a similar venture in Ghana that aims to create a new private sector channel of supply. The business plans to leverage the fine mesh distribution network of Unilever in order to reduce cost, ensure quality and extend reach to franchised dispensing points throughout the country. Thus, Curatio intends to address all dimensions of performance – geographic access, affordability, availability and quality.

The financial viability of the model rests on Curatio's ability to implement best practices from the Fast Moving Consumer Goods industry to reduce logistics costs and also to improve the margin mix at the point of purchase. Implicit in the economics of the business plan is a need to have *high availability* and *diligent financial management* to ensure that the venture remains profitable. Their current plan is to distribute to over 6000 outlets by 2010, which represents roughly 50% of the current outlets in Ghana. If successful, Curatio could change the landscape of drug retailing in rural areas and have a substantial health impact in Ghana, and then expand into other countries within the ECOWAS region. As such, the potential for impact is even greater.

Curatio, however, faces two major challenges: managing the relationships with the various partners involved in this process, and sourcing financing for the planned rapid expansion.

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<sup>10</sup> The SEAM project also had a component to enhance supply in the mission sector in Ghana

## 3.2 Zambia Initiatives

Compared to Ghana, the private for-profit sector in Zambia currently has a relatively insignificant role in drug distribution or provision of supply chain services. Except for the Faith Based Organizations (FBOs) and some employer-provided health care, the role of the private sector in health service delivery in general and health supply chains in particular has been relatively minor in Zambia. The reasons cited for limited use of the private sector for any of the roles outlined in the framework presented earlier in Chapter Two include lack of knowledge about the private sector strengths and capabilities by the policy makers in the MoH and lack of institutionalized policy instruments for interacting with the private sector. In some areas, there is a clear absence of significant private sector supply of medicines primarily due to a very a limited market size, i.e., a lack of buyers able to pay the prices needed to drive private sector distribution to expand reach. Even for provision of auxiliary supply chain services the capabilities in the private sector in Zambia are fairly limited – or non-existent in many cases.

We will now describe key supply chain related initiatives that involve the private sector in the predominantly public sector-led health supply chain of Zambia.

### **Quasi-Private CMS and Leveraging Private-Sector Best Practices**

Typically, managers of government-owned central medical stores confront different challenges in improving operational performance. They have difficulty hiring people with business experience and skills because of poor wages and incentive systems in the public sector. Similarly, the lack of shareholders results in a lack of accountability and thus compromises the ability to remove incompetent workers. In Zambia, the warehousing and distribution of all drugs for the public facilities is carried out by a para-statal agency called Medical Stores Limited (MSL). Although financed by a government budget, MSL is an independent entity with its own management and board. This allows MSL to act like a quasi-private enterprise with the associated benefits that result from it. By making the central medical store a quasi private entity, Zambia has been able to overcome some of these problems. For example, MSL is able to create performance incentive schemes for its staff and workers; retain some of the flexibility of hiring and staff selection typically found in the private sector; and make significant investments in technology (WMS, GPS fleet tracking, etc.), a practice also typical of the private sector. Additionally, the senior operational management of MSL is outsourced to Crown Agents Ltd under a limited time contract in order to allow private-sector practices to be brought into the public health distribution system. The Crown Agents team has the mandate to build local management capacity using global best practices in warehousing, inventory management, and distribution.

This is a clear example of creating governance structures within the public sector supply chain that mimic the best practices from the private sector.

### **Long-Term Framework Contracting With Suppliers**

In order to procure drugs and medical supplies in a coordinated manner, the resources of the Ministry of Health and various donors are pooled into a single drug supply fund called the Drug Supply Budget Line (DSBL). The buying of drugs typically occurs through an international competitive bidding process often supervised by the Zambia National Tender Board. However, the MoH and the DSBL have recently started creating flexible long-term framework contracts with national suppliers that have not only reduced the procurement lead-time but also led to price stability, especially in cases where emergency procurement has to be carried out. This practice of long-term framework contracts is being extended to other suppliers and would increase the involvement of the local private sector sources of supply to the MoH. This policy, if expanded in

a careful and transparent manner, will lead to the development of a healthier and stronger private sector role in Zambia's health supply chain.

#### **Employer Based and FBO Health Care and Medicine Provision**

Some employers in Zambia, particularly the mining companies, run private health schemes for employees and their families. These clinics and hospitals, often referred to as mining hospitals, tend to be concentrated in the Copperbelt province where they contribute to a large portion of the health care provided. These private hospitals and clinics procure their medicines from large private wholesalers in Lusaka and Ndola who distribute to these health facilities using their own, or in some cases, third party contracted private transport. The availability of medicines at these facilities tends to be high and the prices paid by the buyers are also reasonable because of the large volume that these mining hospitals purchase.

Faith-based Organizations such as the Churches Health Association of Zambia (CHAZ) are another important source of health care especially in far-flung areas. These organizations procure their drugs both from the Ministry of Health and private suppliers. A large number of clinics operating under the CHAZ umbrella are recognized as quasi-public clinics under a memorandum of understanding (MoU) with the Ministry of Health in an example of a Public Private Partnership for health care and medicine provision. The distribution network of the public sector (namely, Medical Stores Limited) also supplies drugs and health commodities to CHAZ hospitals. In addition CHAZ also operates its alternative distribution network.

#### **Information Communication Technology (ICT) Services to MoH from the Private Sector**

The current ICT network for logistics and financial information for the MoH is weak and not based on a consolidated central management system. Previous attempts at automating financial and accounts management have not been successful due to the lack of a clear operation and maintenance strategy of the systems. The Ministry of Health is therefore considering outsourcing the provision of basic ICT services to a private third-party agency with the end goal of upgrading to more sophisticated systems architecture for procurement, distribution, and financial management. The technical committee and the tender board have approved the idea and final selection of a partner is underway. This is a clear example of borrowing best practices from the private sector and contracting the private sector to provide auxiliary supply chain services.

#### **Provision of Public-Sector Procured Drugs in Private Sector Health Clinics**

Zambia aspires to provide universal access to antiretroviral (ARV) therapy using a multi-sectoral approach. Realizing that provision of free or subsidized ARV therapy only in public hospitals may not be the best strategy to enhance access to ARVs, the government has started a scheme of providing free ARVs to certain accredited/selected private clinics. The model is such that the private sector acts as the point of dispensing and the public sector as the procurement agency. These clinics are required to provide these drugs to end patients at extremely low pre-determined prices and to provide robust proof of dispensing in order to continue being eligible to receive free ARVs from the public sector. Similar approaches are also being used for TB medicines although on a smaller scale. Such an approach relies on the national ARV program's ability to contract with the private clinics and monitor the price/dispensing outcomes frequently.

### **3.3 Summary**

The range of examples detailed in this chapter provide a picture of how recent private sector supply chain initiatives are changing the role of the private sector in health supply chains and strengthening health system performance in Ghana and Zambia. In the public sector, private

sector supply is increasing and becoming more formalized in Ghana. The use of private sector supply chain services is increasing slowly in both countries, with best practices coming into the public sector, either through direct implementation by consultants to the public sector or through outsourcing of supply chain services to providers who have implemented private sector best practices. While in Ghana HAN has proposed provision of private sector supply chain services as a means to strengthen the faith-based supply chain, in Zambia, the faith-based supply chain is provided by the public sector, and therefore, a strengthening of the public sector supply chain also strengthens the faith-based sector. In Ghana, a new private sector channel based on drug franchising appears to be a potential path forward to improving health care in rural areas. In both countries new private sector supply chains are being created to extend reach and product breadth of existing private sector channels.

## Chapter 4: Scan of Current Private Sector Supply Chain Initiatives

In addition to the in-depth assessment of Ghana and Zambia, we also conducted a scan of supply chain initiatives worldwide that are currently being implemented. This scan included a range of initiatives being driven by both the private for-profit, as well as not-for-profit sector, but with an emphasis on deploying innovative models from the for-profit sector. While not exhaustive, the scan aimed to identify key parts of the supply chain that were being targeted and successfully executed by private sector players. These are summarized in the *Table 1* below and more detail on each initiative is available in *Appendix F*.

**Table 1: Summary of Supply Chain Initiatives Identified in the Scan**

Initiative	Brief summary of initiative	Geographic focus
VillageReach	Addresses last-mile issues by building and managing own supply chain (transport networks, dedicated fleets, and inventory systems); cross-subsidizes with revenues and infrastructure from a profitable parallel supply-chain business	Mozambique
ITC E-Choupal	Network of rural kiosks that co-operate with the local doctor (in this case, CARE Healthcare Network) through kiosk operators, providing a number of information and communication-related services for rural population	India
Curatio	Combines the reduction of cost of delivery to rural pharmacies by leveraging existing private sector distribution networks, as well as aggregating demand and ensuring quality through a franchising model. Also aims to improve margins through optimizing the mix of generic, branded and private-labeled products	Ghana
Equipment-reagent agreements for diagnostic services (BD)	Agreements for diagnostic services provided on a per-test basis to MoH. This removes the burden of managing the reagent supply chain as well as equipment maintenance from the MoH	Mozambique
Leveraging mobile technology for payments	Enable payments without physical transfer of cash; accelerates cash movement between supply chain players, reducing delays.	Concept stage
Pharmacy-in-a-box	Provide basic training to “bazaar shop” owners on OTC medicines and use the daily distribution network of bread trucks to the “bazaar shops” to deliver a box of self-prescription drugs in a pre-arranged mix.	Concept stage
Disease monitoring/control hub	Monitor disease prevalence from a central hub that can identify outbreaks rapidly so as to address them effectively via engaging health providers and linking with supply chain players to provide relevant drugs and products faster.	Concept stage
Agent model for product registration	Provide product registration services for new products across African countries, reducing lead-time between product launch globally and legal use in a country.	Concept stage

Allpay	Increase access by enabling patients to receive products at a private pharmacy that then gets directly reimbursed by the state (and other) health insurance schemes.	South Africa
Sample transportation	Improve logistics efficiency for transportation of samples for early infant HIV diagnosis using DHL for transportation and faxing results rather than moving patients around.	Botswana
Chile Compra e-procurement	Consolidate government contracting into a single, online portal for smooth business contracting between the government and private enterprise.	Chile
Online sharing of information for procurement	An effective and accountable system to jointly procure drugs.	Rwanda
Track and trace system-Project Jumpstart	Enables tracing of products from point of manufacturing, through distribution, to the end consumer using a combination of bar codes, Radio Frequency Identification technology (RFID) and GPS.	
Regional distribution centers	State-of-the-art facilities for warehousing and distributing pharmaceuticals and medical equipment for multiple countries; aggregation reduces transaction costs and allows for faster response times to demand; maintain product integrity and limit expiry.	Ghana, Kenya and South Africa
Roll Back Malaria (RBM) Partnership-ExxonMobil	Initiative to accelerate the introduction and uptake of long lasting insecticidal treated net (LLIN) in different countries across Africa.	Africa
Low Cost Standard Therapeutics (LOCOST)	Promotes production and distribution of essential drugs at affordable rates, by countering the market monopoly of brands that are typically beyond the purchasing capacity of the poor.	India
Drug shop franchising (e.g., Mi Farmacita Nacional/CFW shops)	Franchising improves product access, increases quality and reduces cost of product via demand aggregation.	Mexico, Kenya
NICE Foundation	Supports a health program in public schools, covering 60,000+ children in Hyderabad which increases access as well as reduces supply chain costs by encouraging uptake of generics.	India
Medicine Shoppe - Sehat (India)	Focused on low-income areas, combines community outreach program with clinicians who identify and prescribe products, with rebates for clinical service for those that purchase product at Sehat shops. Aggregates demand, reduces self-diagnosis, encourages use of generics, all of which reduce cost.	India
Mission for Essential Drugs and Supplies (MEDS)	Provides drugs and medical supplies to the non-government sector, primarily the not-for-profit (e.g., mission hospitals), but also services the for-profit private sector.	Kenya
Distance Health Advancement (DISHA) initiative	Public-private sector initiative for providing distance healthcare, including supplies of drugs and other medical supplies to rural communities that are typically underserved.	India

Social Marketing- PSI Society for Family Health (SFH) project Nigeria	A comprehensive social marketing program where emphasis is placed on affordable pricing and extensive branding/marketing.	Nigeria
Micro-insurance: CARE and Allianz/ServiPeru	Health insurance programs that target underserved, poor communities thus improving access to health services and products	Southern India/Peru
Vovixa HealthNet	Information management system that allows real time data collection from the field on supply and demand of health products; aggregates patient-level data up to district, regional and national level.	Rwanda
Health data systems	Program to build local capacity in data collection, aggregation, reporting and analysis via electronic technology (e.g., PDAs).	Kenya, Zambia
HealthNet Uganda	Pioneering the use of Personal Digital Assistants (PDAs) in the African healthcare sector to provide practitioners with real-time access to vital clinical information. The technology also allows for easier consultation, real-time ordering of medicines, and access to medical journals.	Uganda
Capacity development- DHL/TRANSAID	Capacity development initiative that aims at training public sector actors in supply chain issues.	Zambia, Malawi
Tanzania's private sector initiative	Broad development initiative that focuses on the private sector, including health supply chain small and medium enterprises (SME); large corporations invest capital, expertise and technology to improve quality and speed of delivery of local products, as well as act as a market for the products during the early stages of development.	Tanzania, Angola, Malawi

While the scan was not comprehensive and the data available did not enable a complete, independent assessment of the impact of each initiative, four initiatives appeared to show particular promise: Curatio, ITC E-Choupal Health, VillageReach, and the Equipment-reagent rental agreements by BD. We believe these models deserve further investigation and consideration for investment and scale-up potential. Further details can be found in *Appendix F* as indicated earlier.

To supplement the information gathered through the scan, we also analysed five unique product supply chains (which can be found in *Appendix G*), as well as interviewed a range of experts and in-country practitioners to further identify opportunities for private sector involvement. These conversations, coupled with the scan above confirmed that while the exact nature of private sector activity is largely dictated by local conditions, private sector players have the ability to carve unique niches for themselves and can add significant value to supply chain operations on the ground. This becomes important when one considers whether the role of the private sector can and should be scaled up in a meaningful way.

The information gathered also confirms that there is a growing level of innovation in private sector solutions for health supply chains. As is suggested in the framework (*Figure 4*), private sector initiatives are affecting all four channels (public, faith-based, employer-provided, and private itself) and have the potential to improve supply chains by bringing some new level of capability across the four aspects of performance (geographical access, affordability, availability, and quality).

## Implications

In general, and despite all the activity noted in the scan, there tends to be a piecemeal and opportunistic approach to private sector involvement in health supply chains. Very few have captured significant market share in their respective countries, and it is also unclear whether most have a viable model and the capabilities to scale up significantly and become self-sustainable. Though exact details are unfortunately scant, we learned of previous attempts at establishing similar entities have failed due to a combination of lack of access to affordable financing, limited business skills of entrepreneurs, changes in the local competitive environment as well as changes in regulation.

These factors mirror those heard in conversations about various initiatives on the challenges they faced. At the top of the list is poor access to capital and the prevailing structure of financing being one that leans towards a dependence on grants instead of access to professionally managed debt and equity. In addition, there is a general lack of clear evaluation processes to measure performance. This seems to reinforce the current financing structure because demonstrating results/success to investors is very difficult to do. Similarly, the role of regulation was viewed as both an enabler and as a potential detractor to private sector investment and activity in health supply chains. This underscores the importance of having a good grasp of both the type of model in operation and also a thorough understanding of the current local environment and ways in which changes therein could affect one's initiative.

While the initiative scan is inconclusive in terms of which single type yields greatest impact per dollar invested, it yields a valuable typology of investment areas that have the potential to address some of the significant supply chain challenges faced by actors and investors. *Table 2* details these challenges as well as the initiatives observed that are addressing them.

**Table 2: Overview of Challenges and Opportunities**

Major supply chain challenges	Initiatives Observed	Other Opportunities Not Observed or in Concept Phase only	Key opportunity characteristics relevant to investors
<p>Lack of access to financing and financial services</p> <p>Fragmented financial transactions especially when serving the poor</p>	<p>Micro-insurance schemes (e.g., Care + Allianz)</p>	<p>Capital for distributors to expand and/or diversify their line of services</p> <p>Basic financial services offering (book-keeping, projections etc) to supply chain actors</p> <p>Leveraging growing mobile-based payments for financial transactions</p>	<p>Main systems already in place, just not targeting the health supply chain market</p>
<p>Lack of reliable demand forecasts at central level</p> <p>General lack of information or poor information flow</p>	<p>Leveraging telecommunication for capturing / disseminating / analyzing supply chain information (e.g., UN Foundation + Vodafone)</p> <p>Voxiva HealthNet</p>	<p>Development of information systems for monitoring (e.g., Disease Monitoring/Control Hub)</p> <p>Development of services for drug registration (e.g., Agent model for product registration)</p>	<p>Both opportunities currently being discussed for South Africa</p>

Major supply chain challenges	Initiatives Observed	Other Opportunities Not Observed or in Concept Phase only	Key opportunity characteristics relevant to investors
<p>Poor product/ service availability at public service delivery points</p> <p>Difficult access to points of service delivery</p>	<p>Integrated product delivery models, including:</p> <ul style="list-style-type: none"> <li>- Franchised dispensing points (e.g., ITC e-choupal, Curatio)</li> <li>- Shared product delivery platforms (e.g., Curatio, VillageReach)</li> </ul> <p>Equipment-reagent rental agreements (e.g., BD)</p> <p>Sample transportation systems</p>	<p>Low cost multiplication of access points (e.g., “Pharmacy in-a-box” concept)</p> <p>Easy access for chronic patients (e.g., Allpay fingerprint/smart card technology)</p>	<p>Key infrastructure already developed for other services/products</p>
<p>Lack of scale and efficiency in warehousing and distribution (e.g., excessive freight and insurance costs, drug leakages/ losses)</p>	<p>Multi-country shipping coordination (e.g., SCMS initiative)</p> <p>Capacity development through rotating fellowships of other supply chain specialists (e.g., DHL + Transaid)</p> <p>IT investments for warehouse management (e.g., bar code reader)</p> <p>Outsourcing of distribution (e.g., sample movement by DHL)</p>		<p>Regulatory frameworks and product handling requirements in each country differ so need to have a firm grasp of them</p>
<p>Lack of systems to provide transparency to higher priced suppliers</p> <p>Lack of scale / volume aggregation</p> <p>High cost of contracting</p>	<p>Pooled procurement (e.g., Rwanda, Eastern Caribbean countries)</p>	<p>E-procurement</p> <p>Capacity building on contracting and negotiating effectively</p>	<p>Drug procurement market is extremely attractive in terms of its size; small margins can be offset by large volumes of product</p>
<p>Lack of quality of products and services (e.g., counterfeiting of drugs)</p>	<p>Regulation definition and enforcement</p> <p>IT investments for product validation (e.g., Track-and-Trace system that uses RFID)</p>	<p>Clinical services training and accreditation</p>	

## Recommendations for Future Research

As mentioned before, a basic evaluation of the impact of an initiative, as well as a comparative evaluation of whether a public or private sector entity are best suited to carry out particular functions is lacking.

Similarly, it would be quite informative to understand why previous attempts at scaling up the role of the private sector in health supply chains have failed. While there is mention of them, very little to no information is available. Such an understanding would be important to inform current and future attempts and would help to prevent similar failures.

In addition to this, it seems that overall these initiatives are happening in a sort of haphazard way, without being framed within a strategy that is well defined. Countries need a strategy for understanding and engaging the private sector and including a supply chain perspective in the current planning for health. This strategy should use the results of the evaluation to inform both the Ministry of Health and the Government's policy and action; in fact, a continuous link between the two elements above is needed to allow updating of the strategy based on evaluation through a feedback loop.

## Chapter 5: How Private Sector Supply Chain Investment Can Improve Supply Chain and Health System Performance

Numerous opportunities exist to improve health outcomes through investments in supply chain activities that currently or potentially could employ the private sector. Leveraging the private sector to improve the efficiency and effectiveness of the health supply chain in LMICs will require a sustained dialogue within and among the relevant Ministries of Health, international donors, and private sector actors. This dialogue has to be rooted in a deep understanding of how the private sector operates, its incentive structures, and evidence on its core areas of strength. Investments in private sector supply chain initiatives should both strengthen such a dialogue and lead to developing a better understanding of private sector strengths and roles.

As a strategic priority, investments should aim to strengthen the institutional contracting capacity of Ministries of Health to work closely with the private sector to procure supply of drugs and health commodities or to procure auxiliary supply chain services. The prevailing lack of trust between these two sides is counter-productive, and does not allow for each to learn and leverage the best of the other. Eradicating distrust will go a long way in beginning to solve the challenges that face health supply chains.

On a more granular level, investments in private sector-led supply chain initiatives can improve health systems by:

- Increasing efficiency and effectiveness of supply of products or services
- Fostering adoption of private sector best practices in one or more sectors and/or
- Creating or extending the reach of private sector channels.

Within each of these areas there is a diversity of potential interventions that vary in size, objective, potential return, target population, and so forth. This is further layered with the local context within which an initiative will exist. As such, there are opportunities for many different actors to play a role.

### Opportunities for Different Actors

*Private investors:* A number of initiatives scanned included ideas that have been implemented in a self-sustained way and are making a profit, so private investors can obtain a financial return while at the same time contributing to improved health care delivery. Investments in such opportunities also tend to open up new markets and bring efficiency to the system and thus enhance the potential for profit and well-being in the long term.

*Social investors:* Depending on the exact goal of the social investor, there is significant potential to transform a critical sector in developing countries that directly impacts the well-being of the citizenry, while also encouraging new models of businesses that are self-sustainable.

*Foundations and International Donors:* Foundations and International Donors can enable investment by contributing to the development of public goods like policy, financial, and information enablers that are essential for locally effective supply chains. Similarly, given the existence of vertical programs that are largely managed and executed outside the system, critical changes in approach can be made that bring the private sector into them as a starting point of engagement. In addition, alignment between approaches of different sectors should be made with

health supply chain actors also being considered for the range of private-sector enterprise development programs that are executed. This can be in the form of providing financing, secured orders, and capacity building.

*National governments:* National governments can benefit from engaging and/or stimulating the private sector in health. The public sector can leverage private sector services in areas that the public sector is weak in and also where the private sector can be more efficient and generate cost savings for the government. Furthermore, developing a private sector that has strong positive externalities (jobs, income, taxes, etc.) will have wide ranging benefits. In order to protect consumers, national governments need to play a strong regulatory and enforcement role that reduces the downside of private sector profit motive.

It is important that each of these actors focuses on its areas of comparative advantage over the many other actors involved in the field. Different mechanisms for financing and intervention are better suited for one actor over another based on their financing flexibilities and the risk/return profile they are seeking.

### **Strategically selecting priorities and types of investment**

In trying to define strategic investment priorities, it is important to bear in mind that the performance of health supply chains and the resulting health outcomes will be determined by many factors, a good number of which are locally specific, and so should not be generalized. Thus, a portfolio of investments that vary in nature, size, and financing can provide important insights. Similarly, it would be advantageous to select investments that reinforce each other and lead to greater collaboration with the public sector for supply and service provision.

One way of prioritizing investments is to base it on the currently observed gaps in the level of performance on each of the indicators (i.e., access, availability, affordability, quality, etc.) influenced by supply chain activities (See *Figure 2*). However, poor performance on a given indicator is often due to lack of appropriate performance in an upstream/supporting segment as illustrated in the influence diagram (See *Figure 3*). In this case, an investment improving the enabling activity may be necessary before an investment in the worst performing area results in improved health outcomes.

A variety of different initiatives are highlighted in Chapters Three and Four. Depending on the level of implementation and commercial viability, each of these initiatives may be financed through a range of different financing options. The evidence for which financing option will best maximize efficiency and effectiveness is very limited.

However, it is important to consider that many of the efficiencies of the private sector stem from strong ownership and shareholder return requirements. Thus, private sector-led models may be more suited to equity and debt financing than conventional grant making. Investing in private sector supply chain initiatives may require a stronger emphasis on additional financing types than are conventionally used in global health. Some may argue that if private sector supply chain models are truly self-sustaining they should seek financing through the traditional banking system. However, sustainability of many of the initiatives depends on rapid scale-up and slow initial access to capital may often limit that scale-up, thus rendering the model unviable thereafter. Similarly, traditional lenders do not have a good grasp of the dynamics of the health supply chains, and thus are hesitant to avail financing. This highlights the need and potential for specialized debt and equity financing that can stimulate a stronger private sector in health supply chains.

Additionally, it is also important to consider the stage of funding of any given initiative. Depending on the level of implementation and the existence of commercial viability, initiatives can be roughly divided into four segments that will fulfill different roles, as presented in *Figure 8* below.

**Figure 8. Matrix of Commercial Viability and Stage of Implementation**

<b>Existence of commercial viability</b>	<b>High</b>	<b><i>Seed/ early capital investment (“proof of concept” stage)</i></b>	<b><i>Invest in expansion of commercially viable (but likely low return) business</i></b>
	<b>Low</b>	<b><i>Grant to new initiatives</i></b>	<b><i>Ongoing support to expand reach of initiatives</i></b>
		<b>Initial / prospective</b>	<b>Already running</b>
		<b>Level of implementation of initiative</b>	

Each actor (private investor, social investors, national governments, international donors) should thus consider multiple factors before creating an investment strategy for a private sector role in health supply chains. In the final chapter, we lay out specific recommendations about how each actor can contribute to improving health outcomes by engaging and/or investing in the private sector.

## Chapter 6: Recommendations: Making Supply Chains Work Requires Action by National Policymakers, Private Investors, and Donors

While a full understanding of the performance of the supply chains in LMICs is lacking, we can say with certainty that they are not sufficiently serving the needs of patients nor are they playing the critical enabling role in supporting the achievement of health outcomes.

A wide range of efforts is needed, both to directly support the most promising supply chain models and actors, as well as to provide the enabling environment for the positive evolution of supply chains. We define practical actions for three primary groups of actors: 1) national governments and policy makers; 2) private investors, including foundations, equity/debt providers and “social impact investors,” who seek investments with a mix of social and financial returns; and 3) international donors and foundations.

In summary, these recommendations, seek to:

- Increase the overall scale and sophistication of investments in private supply chains.
- Create a national policy environment that effectively sets the rules of the game for private actors in the supply chain, while maintaining incentives for their increased provision of service in this area of health delivery.
- Improve transparency and quality of information on supply chain performance.
- Increase access to finance (including debt and equity) for supply chain actors.

### National governments and policy makers

National governments and policy makers need to take into consideration the role of the private sector actors in the supply chain, and create an enabling environment that allows for complementarity of their respective skills. As detailed in earlier chapters, the private sector can directly play a role in the supply chain, as well as develop and support the enablers with flow of financing and information.

Governments and policy makers should therefore:

- 1) *Develop strategies for using private sector supply chain actors to provide products and services to the public sector*
  - a. Sourcing arrangements
  - b. Deliver direct services, in particular, distribution and logistics
- 2) *Develop policies and regulation toward private sector actors in supply chains, including but not limited to:*
  - a. Accreditation schemes
  - b. Quality standards
  - c. Contractual terms between government and private actors

These should take into consideration the unique in-country distribution channel structure, distribution of population, and the overall health system strategy.

- 3) *Enforce guidelines and regulations for the private sector, while maintaining sufficient incentive for continued engagement.* Regulation must find a balance between encouraging

positive contributions by private actors and putting in place the necessary standards and terms for their participation. For example, accreditation schemes for retail pharmacies can be highly valuable in ensuring quality of distribution; however, they can also put smaller local players out of business if too restrictive.

- 4) *Support efforts to substantially improve the quality and quantity of information available on supply chain performance.* Information is essential to enable good decisions on health supply chains (including both Government-led and third party independent); existing monitoring and evaluation systems are weak and have limited capacity to collect, analyze and disseminate information.
- 5) *Develop forums for greater coordination.* Each developing country faces similar challenges in having multiple donors, fragmented implementers and disjointed funding streams for health products. Coordination then becomes an important aspect that Governments and policy makers should invest in.

### **International donors, foundations and policy makers**

International actors can contribute substantially to the policy, financial, and information enablers essential for locally effective supply chains. Interventions therefore include:

- 1) *Facilitate the building of trust and spur engagement between the public and private sectors in supply chains.* The public and private sectors, particularly in health, tend to have little trust between them, a factor that significantly contributes to limited collaboration between the two. Building an environment that supports collaboration is critical for the two sectors to begin working together and thus leverage each other's strengths.
- 2) *Monitor supply chain performance of donor-funded programs with a substantial drug delivery component to determine the role of private sector and ways it can be increased.* Given the discretion inherent in programs that tend to be vertically-executed, it is possible to use these opportunities as platforms to develop and support the growth of private sector players in the supply chain. This can be an important pre-cursor to a greater involvement of the private sector in the national supply chain
- 3) *Develop an infomediary<sup>11</sup> to collect and distribute key supply chain performance information* In particular information about price, availability, quality at key service delivery points, as well as stock and inventory levels. Only with this type of information can the effectiveness of money spent on drug delivery be measured; today there is very little data available.
- 4) *Provide funding to supply chain actors.* Ultimately, supply chain actors need investment to grow and thrive. Today, this investment is often too costly or simply unavailable through traditional channels, particularly for new innovative models that are not yet commercially viable.
- 5) *Support local entrepreneurs in the supply chain.* This would be on a case-by-case basis but could include elements such as training on business and financial management, as well as linkages with experts and other entrepreneurs for best practice sharing.

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<sup>11</sup> The concept of an infomediary was first proposed by the Demand Forecasting Working Group (Center for Global Development) to collect detailed product shipment and forecast data to enable effective planning and investment by buyers and suppliers of pharmaceuticals in developing countries

- 6) *Support further research and best practice sharing on supply chain performance and innovation.* With so little known today about supply chain performance and the potential of new models to address significant supply chain needs, further research is essential. Several areas present particular opportunities:
- a. Evaluation of current supply chain performance
  - b. Examination of innovative distribution models
  - c. Formulation of appropriate policy frameworks
  - d. Sharing of best practice and knowledge platforms
  - e. Understanding the failures of previous initiatives

### **Private investors investing directly in supply chain models**

Direct investments in supply chains will be essential to test new models and enable the best supply chain interventions to grow and increase in sophistication. Private investors – particularly at a local level – will ultimately become the most important source of capital, but international private equity investors, as well as foundations, can play a catalytic role in getting new players and models off the ground. “Impact investors” can play a pivotal role in providing initial lower cost equity investments in innovative models that deliver both social and financial returns.

Opportunity/need for investor engagement exists in the following areas:

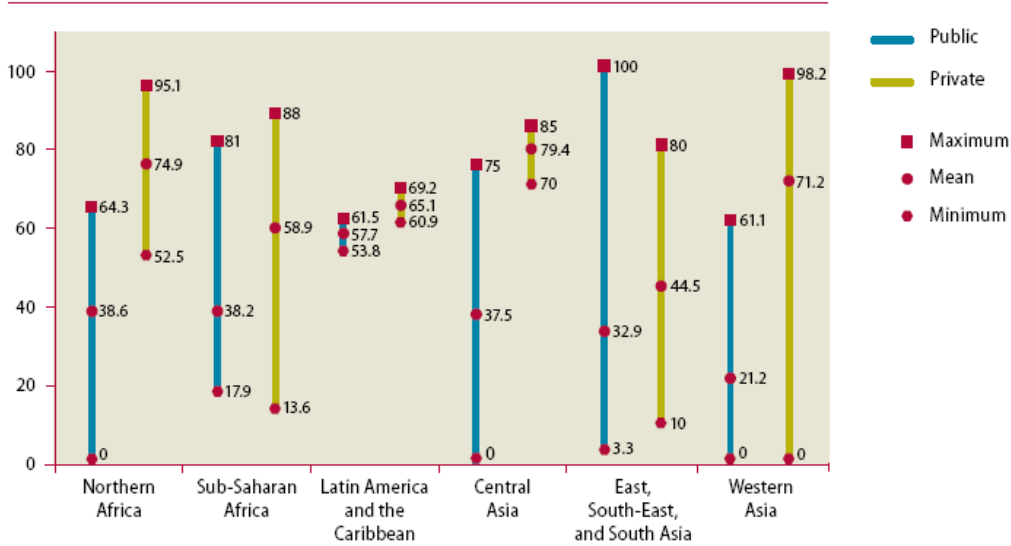
- *Early stage and expansion capital (equity) for new/innovative supply chain models*
- *Low cost debt*
- *Development of valuation models for supply chain investments*
- *Increased sharing of information on supply chain investment performance*

In conclusion, global health supply chains play a vital but sometimes overlooked role in increasing access to medicines. Lessons from the OECD tell us that the private sector has a potentially critical role to play in the delivery of medicines, and can increase the efficiency and reliability of health supply chains. Significantly greater investment is required to build out private sector supply chain models and the enabling environment that supports them; however, this must be coupled with better information about supply chain performance. With new models, better information, and greater access to a range of grant, debt and equity financing, the private sector has the potential to positively transform the delivery of medicines in the world’s poorest countries.

# Appendix A: Public and Private Sector Availability and Affordability of Medicines in LMICs

## Availability of medicines is consistently lower in the public sector

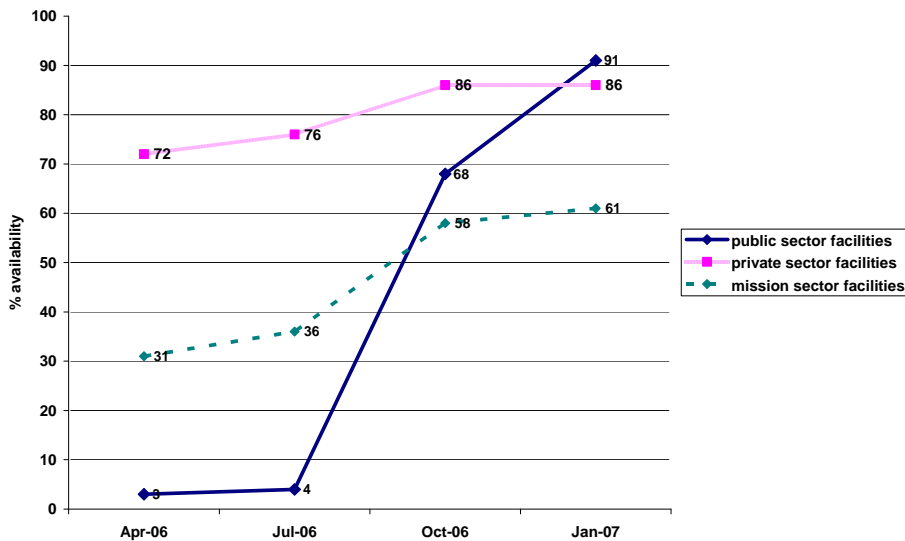
Availability of selected medicines in public and private health facilities between 2001 and 2007 (percentage)



Average availability was only 34.9% in the public sector and 63.2% in the private sector

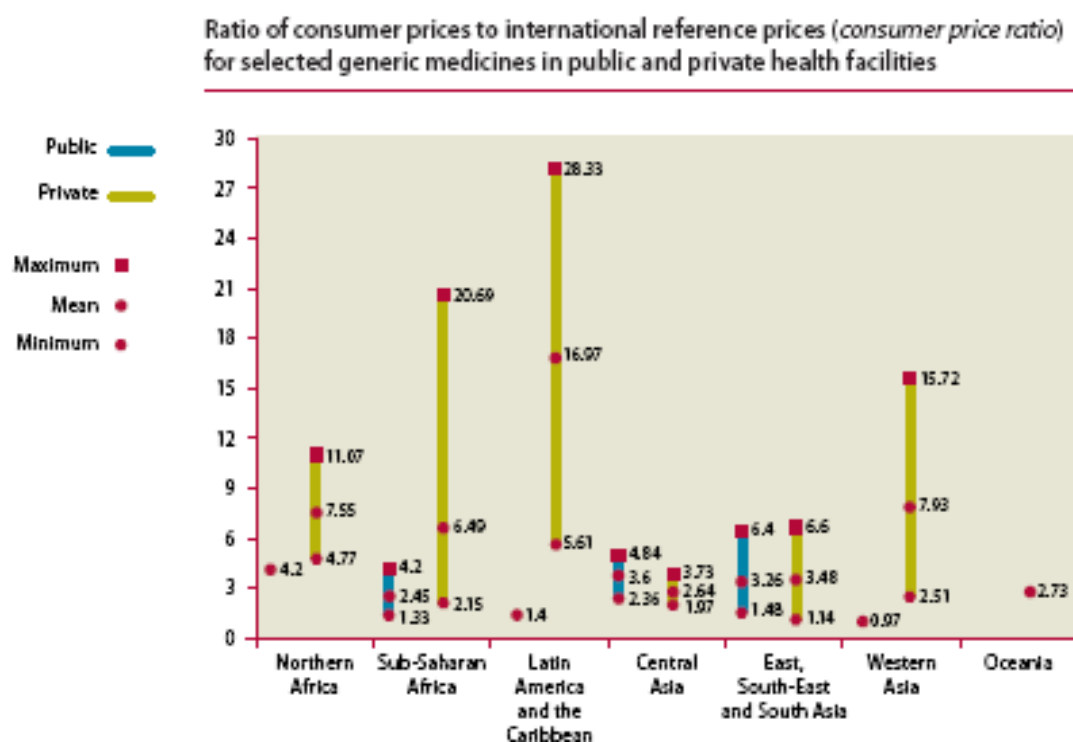
Source: WHO, Health Action International, United Nations MDG8 Report

## Availability of Artemether Lumefantrine in Kenya (percentage)



Source: Hans V Hogerzeil, WHO

## Affordability of medicines is consistently lower in the private sector



Source: WHO, Health Action International, United Nations MDG8 Report

## Markups along the Supply Chain are high in the Private Sector but are also not insignificant in the Public Sector

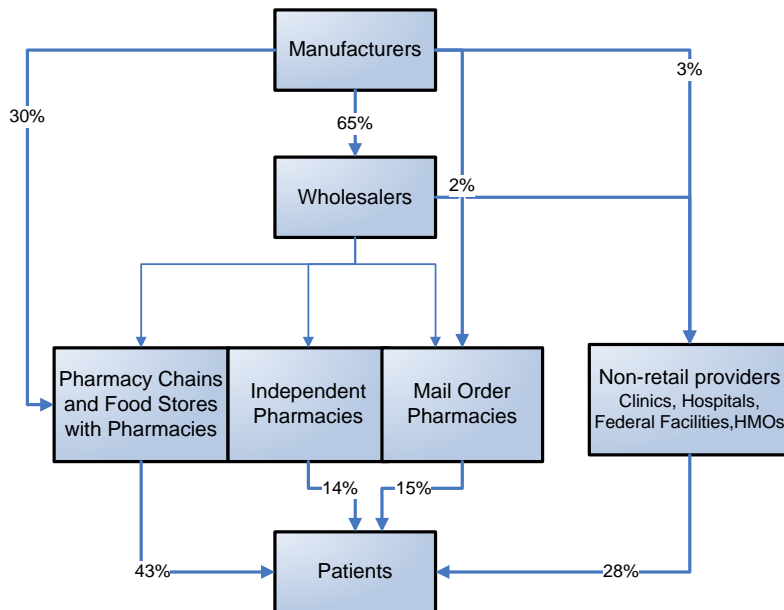
Margins between producer and consumer prices in the public and private sectors (*percentage*)

Country	Public sector markup	Private sector markup
China	24-35	11-33
El Salvador		165-6 894
Ethiopia	79-83	76-148
India		29-694
Malaysia	19-46	65-149
Mali	77-84	87-118
Mongolia	32	68-98
Morocco		53-93
Pakistan		28-35
Uganda	30-66	100-358
United Republic of Tanzania	17	56

Source: WHO, Health Action International, United Nations MDG8 Report

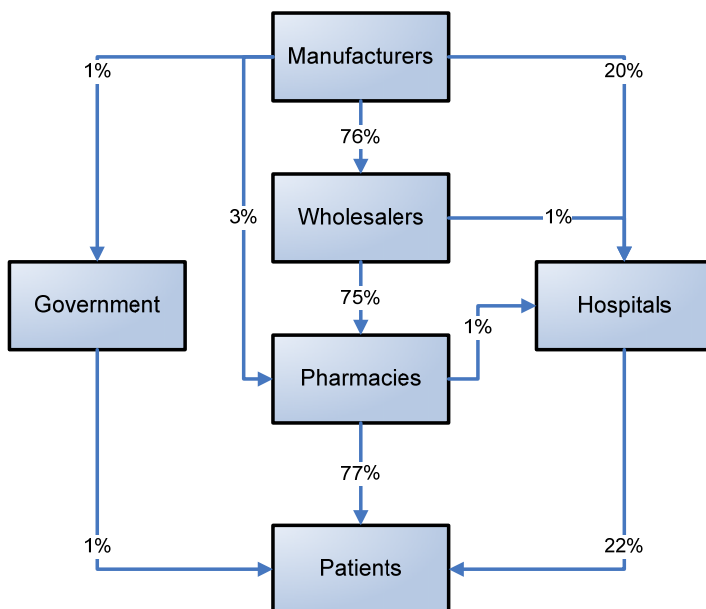
## Appendix B: Supply Chain Structure in OECD Countries

### Physical flows in United States supply chain for medicines



Source: Prashant Yadav, Kaiser Permanente, US Government Accountability Office

### Physical flows in supply chain for medicines in Spain



Source: Prashant Yadav, FarmaIndustria, European Wholesaler's Association

### Key characteristics of the supply chain for medicines in UK and US

	US	UK
Health care financing	Largely private or employer based	Primarily government
Health care service provision	Private + VA	NHS + Private
Prescription dispensed	3.4 B	800M
Value of prescriptions dispensed	\$275 B	£6 B
Number of pharmacies	57,490	12,600
Number of full-line private wholesalers	>100	45
Number of private wholesalers with 85% market share	3	3
Frequency of deliveries to each pharmacy	1-2/day	1-2/day
Average distance travelled by patient to pharmacy	2.36 miles	Unknown

Source : Prashant Yadav + various

## Appendix C: Ghana and Zambia Comparison

The comparison of Ghana and Zambia in chapter 2 is based on the following detailed case studies from each country. The case studies are based on interviews with over 80 individuals conducted during multiple field visits. A summary comparison of the demographics of the two countries is provided in *Table 1* below.

<b>Table 1. Health and demographic indicators- 2006 estimates</b>		
	<b>Ghana</b>	<b>Zambia</b>
Population (millions)	23.0	11.7
Surface area (thousands of sq. km.)	238.5	752.6
Percentage of population living under the national poverty line	28.5%	68%
Urbanization rate (percentage of population living in urban areas)	49%	35%
Percentage of urban dwellers living under the national poverty line	11%	53%
Percentage of non-urban dwellers living under the national poverty line (calculated)	45%	76%
GNI per capita, Atlas method (current US\$)	510.0	640.0
Life expectancy at birth (years)	59.7	41.7
Mortality rate, infant (per 1,000 live births)	76.0	102.0
Prevalence of HIV (percentage of population aged 15-49)	2.2	15.6
Percentage of population living with < \$US1 per day	44.8%	63.8%
Percentage of population living with < \$US2 per day	78.5%	87.2%

Source: World Bank Data & Statistics Portal, UNDP Human Development Reports

## **Appendix D: Ghana Case Study**

### **Analysis of the Public, Private and Mission Sector Supply Chains for Essential Drugs in Ghana**

## Acknowledgements

The author gratefully acknowledges the contributions of the individuals listed below who provided insights through extensive interviews. Any errors, inaccuracies or omissions are, however, entirely the responsibility of the authors.

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<b>Mr. Charles Allotey</b>	Health Access Network Ghana
<b>Ms. Vera Amon</b>	Supply Chain Management System
<b>Mr. Francis Ashagbley</b>	USAID   DELIVER Project, Ghana
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<b>Mr. Divine Azameti</b>	Regional Medical Store, Volta Region
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<b>Mr. Ekow Biney</b>	Public Health Reference Laboratory (PHRL)
<b>Mr. Samuel Boateng</b>	Procurement & Supply Division (P & S Division)
<b>Dr. Frank Bonsu</b>	National Tuberculosis Program (NTP)
<b>Mr. Rik Bosman</b>	Curatio
<b>Mr. Dan Braimah</b>	Regional Medical Store, Ashanti Region
<b>Mr. Egbert Bruce</b>	USAID   DELIVER Project, Ghana
<b>Mr. Richard Burns</b>	Exp Ghana
<b>Ms. Susan Burns</b>	Exp Ghana
<b>Mr. Dan Amaning Danquah</b>	Ghana Pharmacy Council
<b>Mr. Lazarus Dery</b>	Regional Medical Store, Upper West Region
<b>Mr. Alex Dodoo</b>	Ghana Pharmaceutical Association
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<b>Mr Kwesi Eghan</b>	National Health Insurance Council
<b>Mr. Ashifi Gogo</b>	Mpedigree
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<b>Ms. Phyllis Ocran</b>	National Aids Control Program (NACP)
<b>Dr. Gloria Quansah-Asare</b>	Reproductive Child Health Unit (RCHU)
<b>Mr. Andreas Seiter</b>	The World Bank
<b>Ms. Gina Teddy</b>	University of York
<b>Mr. Gopal Vasu</b>	M & G Pharmaceuticals

Also, staff from the following facilities contributed through interviews and facility tours

Atua District Hospital  
Central Medical Stores (CMS)  
CHPS Zone Community Clinic, Central Region  
Kasoa Health Center, Central Region  
Koforidua Government Hospital, Eastern Region  
Kokrobite Health Center, Central Region  
Korle-Bu Teaching Hospital, Accra  
Regional Medical Stores, Eastern Region  
Ridge Hospital, Eastern Region  
Tema General Hospital

## Acronyms

API	Active Pharmaceutical Ingredient
ARV	Antiretroviral
BMC	Budget and Management Center
CDC	Catholic Distribution Center
CMS	Central Medical Store
CHAG	Churches Health Association of Ghana
DC	Distribution Centers
EDL	Essential Drug List
FDB	Food and Drug Board
GHS	Ghana Health Services
GMP	Good Manufacturing Practices
GoG	Government of Ghana
ICB	International Competitive Bid
IDA	International Dispensary Association
MDG	Millennium Development Goal
MoF	Ministry of Finance
MoH	Ministry of Health
NCB	National Competitive Bid
NFA	National Framework Agreements
NHIC	National Health Insurance Council
NHIS	National Health Insurance Scheme
OTC	Over The Counter
PEPFAR	US President's Emergency Plan for AIDS Relief
RMS	Regional Medical Stores
RIRV	Requisition, Issue and Receipt Voucher
SDP	Service Delivery Point
STG	Standard Treatment Guidelines
SSDM	Supplies, Stores, and Drug Management
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VAT	Value Added Tax
WHO	World Health Organization

## 1. Overview of Health Sector in Ghana

Located in West Africa, Ghana is bordered by Cote D'Ivoire to the west, Togo to the east, Burkina Faso to the north and the Gulf of Guinea to the south. The population of 23.46 million (est 2007) is spread among ten regions and 166 (2008) districts. The country is divided into three major zones or belts, the northern zone of Upper West, Upper East and Northern, the central zone of Brong Ahafo, Ashanti, Eastern & Volta, and the southern zone of Western, Central, and Greater Accra. Population density is highest in the southern and central zones and is lowest in the northern zones.

Despite a per capita GNI of \$590 in 2007<sup>1</sup> Ghana is on track to meet the Millennium Development Goal (MDG) of halving poverty by 2015. As of 2005, poverty stood at 28.5%, down from 52% in 1992. However, this poverty reduction has not been equitably distributed across the county and in both the Upper East and Upper West regions over 70% of the population remain impoverished.<sup>2</sup>

Ghanaians have a life expectancy of 59, an under 5 mortality rate of 120 per 1000, and a maternal mortality rate of 210 per 100,000,<sup>3</sup> ranking 135<sup>th</sup> (of 177) in the UN Human Development Index and 11<sup>th</sup> in Sub-Saharan Africa (6<sup>th</sup> if small island nations are not included). Communicable diseases including malaria, tuberculosis, yellow fever, meningococcal meningitis, and upper respiratory tract infections continue to comprise a large share of the total cases treated by health workers. HIV prevalence is under the general epidemic threshold of 5% and has been fluctuating between 2.2% & 3.6% since 2001. With economic development and the lifestyle changes accompanying it, non-communicable diseases like hypertension, diabetes, cancer, mental disease, and drug and alcohol abuse have also been on the rise.<sup>4</sup>

### Geographic Inequity

Economic opportunities are more abundant in the southern regions and inhabitants of the northern regions tend to be worse off economically and exhibit lower levels of health than those in the south. *Figure 1* below illustrates the high poverty levels in the northern zone and also that much of the progress in reducing poverty over the past 25 years has occurred in the central and southern zones.

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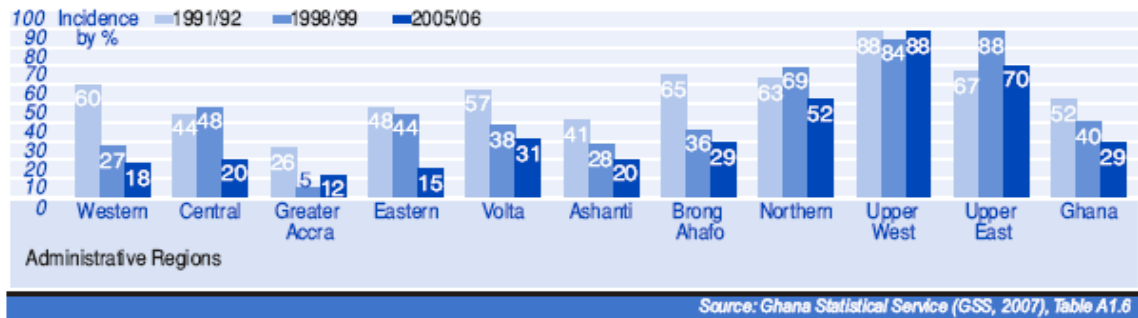
<sup>1</sup> World Bank GNI Rankings 2007,  
<http://siteresources.worldbank.org/DATASTATISTICS/Resources/GNIPC.pdf>

<sup>2</sup> World Bank Ghana Country Brief Webpage

<sup>3</sup> UNICEF Ghana Statistics Webpage [http://www.unicef.org/infobycountry/ghana\\_statistics.html](http://www.unicef.org/infobycountry/ghana_statistics.html)

<sup>4</sup> World Health Organization Country Cooperation Strategy At a Glance Webpage  
<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/GHANAEXTN/0,,menuPK:351962~pagePK:141132~piPK:141107~theSitePK:351952,00.html>

**Figure 1: Incidence of Poverty by Region 1992, 1999 and 2006**



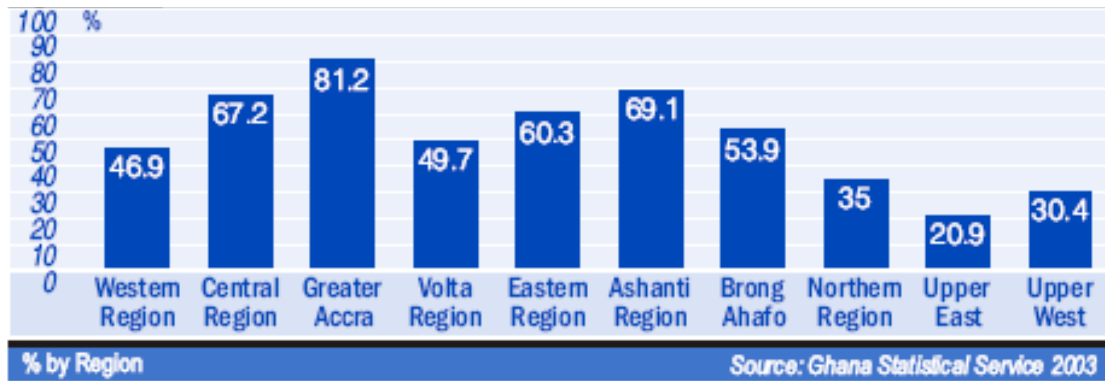
Due to the relative isolation and lack of services in the northern regions employee turnover in public health facilities is very high. The government has put together incentive packages to encourage workers to relocate to these areas but the problem persists. As such the ratio of public healthcare workers to the regional population is lower in the north than in the rest of Ghana. This is illustrated in *Figure 2* below.

**Figure 2: Ratio of Public Health Workers to Population by Region**

<i>Region</i>	<i>Doctors per 1000</i>	<i>Nurses per 1000</i>	<i>Pharmacists per 1000</i>
Greater Accra	3.00	12.00	2.60
Volta	0.40	6.30	0.10
Central	0.40	5.90	0.20
Western	0.50	4.40	0.20
<b>Southern Average</b>	<b>1.08</b>	<b>7.15</b>	<b>0.78</b>
Eastern	0.50	6.60	0.20
Brong Ahafo	0.40	3.40	0.10
Ashanti	1.00	4.10	0.60
<b>Central Average</b>	<b>0.63</b>	<b>4.70</b>	<b>0.30</b>
Northern	0.10	3.40	0.10
Upper East	0.40	7.10	0.10
Upper West	0.20	5.60	0.03
<b>Northern Average</b>	<b>0.23</b>	<b>5.37</b>	<b>0.08</b>
<b>National Average</b>	<b>0.69</b>	<b>5.88</b>	<b>0.42</b>

Additionally, easy access to public healthcare facilities is lower in the north than in other areas. *Figure 3* shows the percentage of households with access to public health care facilities within 30 minutes. On average only 28.8% of people in the northern regions have easy access to a public health facility compared to the average of 61.2% for the other regions.

**Figure 3: Proximity to Health Facility by Region**



### National Health Insurance Scheme

The National Health Insurance Act 650 was passed in 2003, and in 2004 the president launched the National Health Insurance Scheme (NHIS). The NHIS was intended to replace the “cash and carry” system which had made health care costs prohibitive for a large portion of Ghana’s poor. The goal of the NHIS is to provide universal coverage to affordable high quality healthcare and ultimately to improve the overall health status. In order to make coverage affordable to all subsidies are provided for the following groups:

- a) Individuals employed in the formal sector who contribute to the Social Security and National Insurance Trust
- b) Children under 18 with both parents enrolled in NHIS
- c) Individuals over 70 years old
- d) Pensioners
- e) Individuals classified as indigent- those having no income, no fixed residence, and do not live with nor receive support from another person

As of 2007 roughly 55% of the country was enrolled in the NHIS but enrolment levels vary a great deal from district to district. Recently a study showed that while 64% of those enrolled in NHIS are within the subsidized group only 2.3% of those covered by NHIS are classified as indigent. In fact, registration with NHIS is strongly correlated with socio-economic status. Only 40% of those in the lowest quintile were registered with NHIS, yet roughly 70% of those in the highest quintile were enrolled. As such, it seems that the NHIS has yet to extend to the poorest of the poor. Furthermore, the large percentage of members covered by subsidies is feared to be threatening the financial viability of the system.

The NHIS has a decentralized structure with claims processing occurring at the district level. The current average processing time from when a claim is submitted until full payment is received is 3 months. 40% of the claim is paid immediately upon receipt and the remaining 60% after the claim is approved. The delay in receiving the balance of the reimbursement has caused problems at the service delivery point (SDP) level and contributed to the problem of facility indebtedness. There have also been reports of facilities no longer accepting NHIS because of the difficulties with timely reimbursement.

Currently there is discussion within the National Health Insurance Council (NHIC) of moving claims processing from the district to the regional level and has also considered outsourcing claims processing to a private enterprise. The NHIC has received bids from three different companies to carry out the claims processing. The goal of the NHIC is to reduce the reimbursement time from 3 months to 6-8 weeks. This is particularly important for the private

sector pharmacies because 6-8 weeks is the average cash to cash cycle and longer reimbursement time causes cash flow problems.

However, concern has been raised about the effect that centralizing claims processing would have on the relationship between the district level mutuals and the health providers. Having the claims processing occur at the district level enables interaction between providers and processors that leads to greater understanding of treatment behaviors and a lower likelihood of gaming the system. Moving the processing to the regional level would eliminate this important relationship and could lead to an “us vs them” mentality more conducive to cheating. Such a shift would require a great deal of monitoring and oversight<sup>5</sup>.

Regardless of whether claims continued to be processed at the district level or are moved to the regional level another option for addressing indebtedness issues is to increase the upfront payment of claims from 40% to 80 or 90%. This option has reportedly been raised but it is unclear whether a decision has been made at this time.

### **Interconnectedness Between Public, Private, and Mission Sectors**

Purchasing between sectors occurs at many different levels. The Ministry of Health (MoH) has had difficulty conducting international competitive bids (ICB) and as a result the central medical store (CMS) procures a large percentage of its products on the local market from private sector suppliers. Similarly, up to 1/5 of CMS sales are to non-public sector entities. Of these, private hospitals, mission hospitals, and NGOs respectively are the biggest customers.<sup>6</sup>

At the facility level, there is a great deal of interaction between the public health facilities and local private sector suppliers. In accordance with the National Procurement Act, health clinics are authorized to purchase directly from private sector suppliers as long as the value is within the established threshold and the product is not available from the public sector supplier. Since service levels at the regional medical stores (RMS) can be low, health facilities commonly buy directly from the private sector. Similarly, low product availability at the CMS leads to high levels of private sector procurement by the RMS. In fact, some RMS procure over 85% from the private sector.<sup>7</sup>

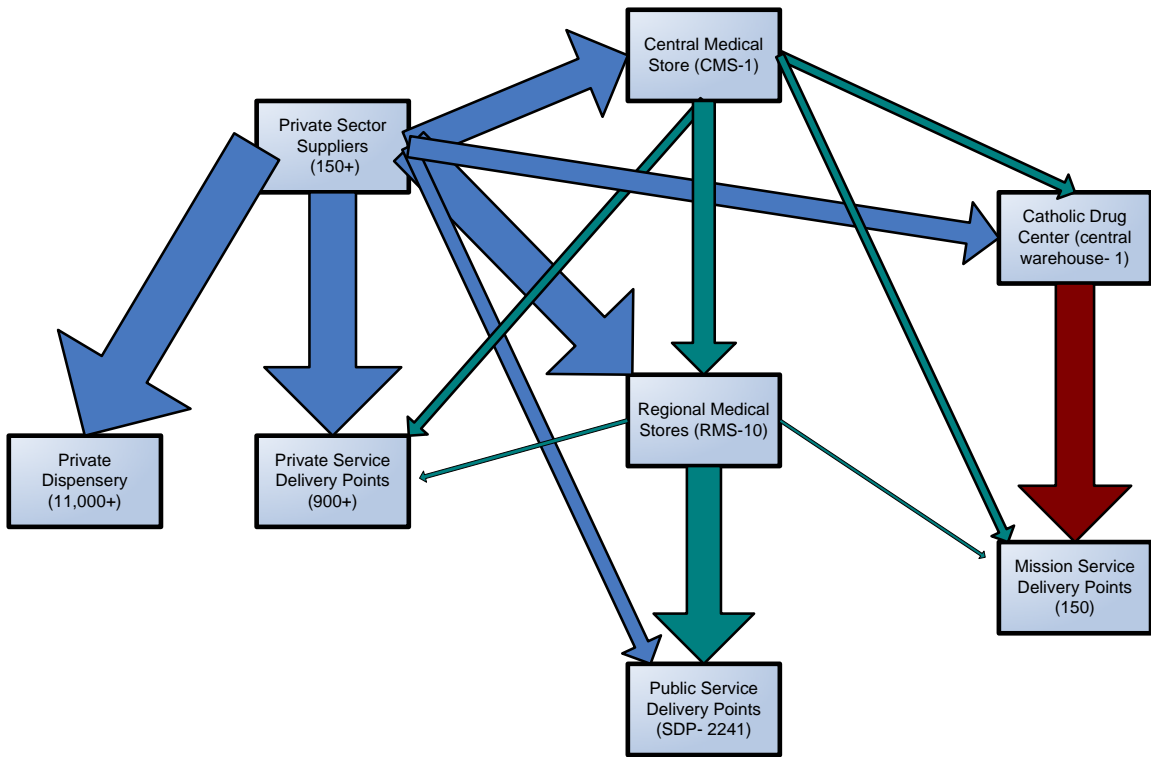
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<sup>5</sup> Interview with Andreas Seiter, World Bank 7/15/2008

<sup>6</sup> Interview with Peter Gyimah, CMS 3/3/2007

<sup>7</sup> Presentations from Health Supply Chain Practitioners Retreat, Kumasi 3/2007

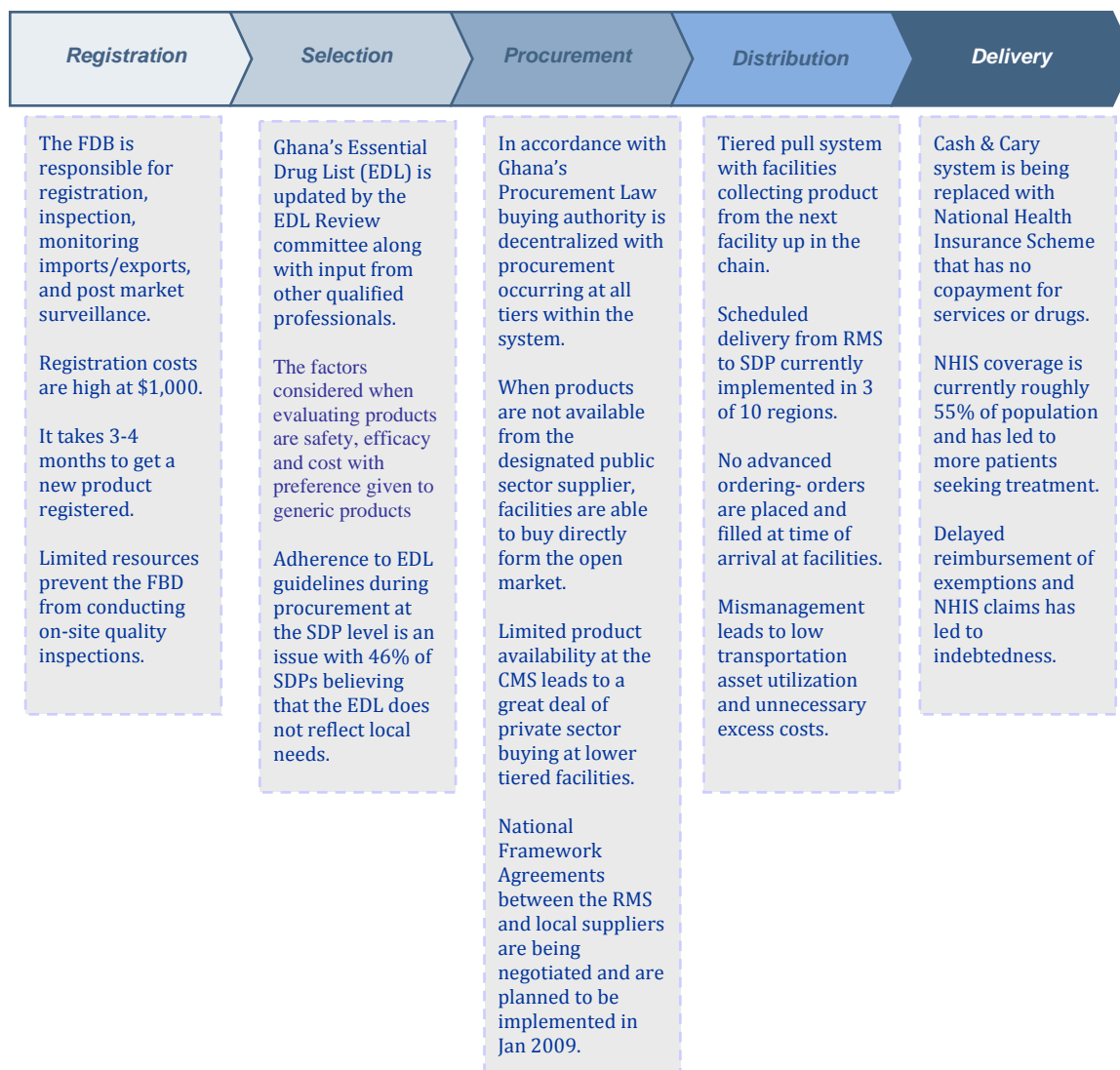
**Figure 4: Product Flows between Private, Public and Mission Sector**



## 2. Public Sector Supply Chain

The public sector handles about 40% of total health services in Ghana. Ghana's ten regions are divided into 166 districts, and each district is subdivided into four to six sub-districts that serve a catchment population of 20,000-30,000 people. There is a facility hierarchy (in terms of the sophistication of service provided) consisting of health clinics, district hospitals, regional hospitals and teaching hospitals. The 2041 public facilities are served by 10 regional medical stores and the central medical store located near the capital. *Figure 5* below provides an overview of the public health supply chain and highlights some of the key issues.

**Figure 5: Overview of Public Sector Supply Chain**



### Registration

The Drug Evaluation and Registration Department of the Food and Drug Board (FDB) has a staff of 10 and is responsible for registering all pharmaceutical products. Product registration forms are based on the World Health Organization (WHO) recommended format and it takes at least 3

months and sometimes over a year to receive approval. Of applications submitted 99.99% are not approved on the first submission and must be revised before approval.<sup>8</sup> The cost is roughly \$1,000 and every product must be re-registered (for an additional \$1,000) every 3 years. In addition to registering products from both local and international sources the mandate of the FDB includes: 1) inspection and regulation of local pharmaceutical manufacturers; 2) inspection of suppliers and warehouses; 3) monitoring of drug imports/exports; and 4) post market surveillance. The extent to which the FDB is able to carry out its mandate is unclear.

## Selection

Ghana's Essential Drug List (EDL) and corresponding Standard Treatment Guidelines (STG) are two of the basic tools for providing effective healthcare throughout the country. The EDL and STG are updated based on input from professionals serving on the EDL Review Committee, STG Expert Committee, Regional Directors of Health Services and Health Program Managers as well as staff from teaching hospitals and individuals from appropriate professional associations. The factors considered when evaluating products are safety, efficacy and cost and preference is given to generic products. At the SDP level, procurement decisions are supposed to be informed by the EDL and local morbidity patterns. However, 46% of surveyed facilities believed that the EDL does not address local realities and did not adhere to the EDL when making ordering decisions.

## Procurement

Procurement is the responsibility of the MoH procurement unit. The physical supply of pharmaceuticals is managed by the Central Medical Stores. The Regional Medical Stores and the health facilities are managed by the Ghana Health Services (GHS),<sup>9</sup> which also has a procurement unit.

Donor agencies such as PEPFAR, USAID, UNFPA and UNICEF are involved in the procurement process. MoH and GHS staff repeatedly cited delays by donors and/or supranational procurement agents that lead to major disruptions in supply.<sup>10</sup> The release of funds and/or delivery of goods are routinely delayed and often little information is available about the cause of the delay or the projected release date. Funding delays within the government itself have also created challenges. With move towards basket funding, the MoH has struggled to receive timely disbursements from the Ministry of Finance (MoF) and has also complained that it is not receiving the full amount of money that was intended for health.

In 2003, Procurement Act 663 established clear organizational divisions between the various procurement groups within the public health sector. Within all stages of this hierarchical structure clear processes and guidelines were set forth. The act reinforced the policy that Budget and Management Centers (BMC) should only buy from the private sector when the appropriate RMS or CMS cannot supply the necessary products. Clear monetary thresholds were established both for the type of procurement required (i.e. ICB vs NCB<sup>11</sup>), and the decision making authority for units at various levels within the system. These thresholds are outlined in the *Figure 6* below:

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<sup>8</sup> Harper, 2007

<sup>9</sup> An exception to this is the 4 teaching hospitals that are managed by the MoH.

<sup>10</sup> UNICEF was mentioned specifically as repeatedly delaying shipments

<sup>11</sup> National Competitive Bid (NCB)

**Figure 6: Procurement Thresholds & Categories**

**Procurement Thresholds (in Ghana Cedi) based on Procurement Act<sup>12</sup>**

Procurement Method	Limit (US\$)
Pre-Qualification	Over GHC 35 billion
ICB	Over GHC 15.0 billion
NCB	between GHC 200 million and GHC 2.0 billion
Shopping	less than GHC 200 million

**BMC Categories**

<u>Category</u>	<u>BMC</u>
1	Health Centre
2	District Hospital Polyclinic District Health Administration
3	Regional Hospital Specialised Institutions Training Institutions Statutory Bodies Sub-vented Organisations Regional Health Administration
4	Teaching Hospital Ghana Health Service Headquarters Ministry of Health Headquarters

**Approval Authority Thresholds for BMC Tender Committee (in Ghana Cedis)**

<u>Authority</u>	<u>Limit (\$)</u>			
	<u>Category 1</u>	<u>Category 2</u>	<u>Category 3</u>	<u>Category 4</u>
Goods	Up to 5m	5m to 25m	25m to 50m	50m to 1.0b
Works	Up to 25m	25m to 50m	Up to 100m	100m to 2.0b
Technical Services	Up to 5m	5m to 25m	Up to 50m	50m to 1.0b
Consulting Services	Up to 5m	5m to 25m	Up to 50m	50m to 500m

Due to low service levels at the CMS, the regional medical stores have been buying a great deal from private sector suppliers. In some regions, as much as 85% of all products are purchased from the private sector. While non-availability certificates stating that the products is out of stock

<sup>12</sup> Ghana Ministry of Health Procurement Procedure Manual  
[http://www.moh-ghana.org/moh/docs/procurement/PROC\\_MANUAL.pdf](http://www.moh-ghana.org/moh/docs/procurement/PROC_MANUAL.pdf)

at the CMS are supposed to be obtained before buying on the open market it is unclear how strictly this policy is enforced. Similarly, there is a substantial amount of private sector procurement that occurs at the health facilities, especially larger hospitals.

The Supplies, Stores, and Drug Management (SSDM) unit within the GHS is reported to be establishing framework contract agreements with local suppliers. The two year agreements will be awarded to Ghanaian companies to supply the 10 RMS with a comprehensive list of products. By aggregating demand for the entire country the GHS will be able to negotiate better prices and favorable contract terms. The suppliers will fulfill orders by the RMS within the lead time established in the contract and would likely enter into vendor managed inventory arrangements with the 10 facilities. The National Framework Agreements (NFA) policy has recently been approved and is scheduled for implementation in January 2009.

### **Distribution**

The CMS was recently renovated and the physical infrastructure was significantly upgraded. It is located just outside of Accra in Tema. The facility is within 4km of the port and 30km of the airport. On average, RMS order products on a quarterly basis and SDPs order monthly. It is not uncommon, however, to have out of cycle ordering by SDPs.

Overall, the current distribution scheme is a tiered pull system. The regional medical stores travel to the CMS to collect products and the SDPs travel to the RMS to pick up products. It is very rare that a facility will place an order in advance and usually submits the order upon arrival and waits until the order is fulfilled. The described structure is very inefficient and also very costly.

In order to address this problem, the MoH approved a new policy in 2003 to implement scheduled delivery service from every RMS to the SDPs. Although it has been six years since the scheduled delivery policy was put into place only 3 of the 10 regions (Brong Ahafo, Central, and Western) are currently implementing it. The remaining regions cite lack of funding, appropriate trucks, proper procedures, adequate staff and poor service levels at the CMS for failing to implement the system.

One component of the scheduled delivery policy that was approved by the Government of Ghana (GOG) was the use of a newly designed Requisition, Issue and Receipt Voucher (RIRV) to simplify ordering, receiving and invoicing of all products. The form was designed to minimize complexity by replacing the requisition voucher, stores issue voucher, stores receipt advice, and certificate of non-availability. Unfortunately, the RIRVs have not been implemented and the above mentioned forms are still in use.

### 3. Private Sector Supply Chain

#### Local Manufacturers

There are 35 local manufacturers registered with the food and drug board.<sup>13</sup> Of these 6 are major players and 14 are medium scale producers.<sup>14</sup> Most of the manufacturers focus on antibiotics, vitamins, tonics, analgesics and anti-malarials. However, two local companies also have plans to begin API production and one company is producing ARVs. Among the smaller producers intermittent production is common with manufacturing ceasing for months at a time before starting up again.<sup>15</sup>

Of these local firms only 1 or 2 are considered capable of achieving international good manufacturing practices (GMP) certification. There is significant variation within the FDB classification of GMP and it is said that the leniency granted by the FDB has led to moral hazard with some companies making concerted efforts to improve processes and others benefiting from the lax enforcement. As a result the perceived quality of locally manufactured products is lower than that of products that are imported.<sup>16</sup>

Local production accounts for roughly 30% of total drug demand (estimate includes both prescription products and over the counter (OTC) items).<sup>17</sup> Forty-four (44) drugs are protected and are reserved exclusively for local production. Also, 66 of the 200 basic materials required for production are exempt from value added tax (12.5%) and the national health insurance levy (2.5%). Despite these incentives local manufacturers face many challenges in competing with imported products on both price and quality. A few of these factors are listed below:

- 1) The value added tax (VAT) exemption process is lengthy and complex with some considering the time and effort required for reimbursement is not worth the effort. Offsets the benefit.
- 2) Limited access to affordable capital severely hampers business operations. Local interest rates are usually over 20% making it very expensive to finance inventory, capital investments and other day to day operations.
- 3) Long and variable lead times from suppliers (mostly in China and India) create a need to hold a great deal of inventory in order to satisfy orders.
- 4) Utilities (water and electricity) are both expensive and unreliable. This makes it very difficult to ensure quality throughout the production process.

For a more in depth assessment of challenges and opportunities for local manufacturing in Ghana refer to the assessment conducted by Harper for GTZ.

#### Importers/Wholesalers

There are 60 importers registered with the FDB. This number includes both manufactures that are licensed to import as well as “pure” importers. Most generics are imported from India and China and innovators from Western Europe.

Products imported into Ghana are subject to the following charges and mark-ups:

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<sup>13</sup> Call with Ghana FDB (Ana) 9/8/08

<sup>14</sup> Harper, 2007

<sup>15</sup> Interview with Gopal Vasu of M&G 3/4/2007

<sup>16</sup> Harper, 2007, p 44

<sup>17</sup> Ibid

**Figure 7: Pharmaceutical Mark-up Structure**

Import Duty	10%
VAT+NHIL	15%
Port Inspection	1%
ECOWAS levy	.5%
Export Development levy	.5%
Network Charges	.5%
Wholesale Markup	30-40%
Retail Mark-up	30-40%

Source: Health Action International (HAI), “Medicine Prices in Ghana”

In addition to importers (who are also wholesalers), there are 150 wholesalers registered with the Ghana Pharmacy Council.<sup>18</sup> The large number of intermediaries limits supply chain visibility and makes it very difficult to ensure product integrity. As a result many companies have moved towards vertical integration and organized their own distribution networks.

Also, most of the wholesalers maintain offices on/around Okaishie road in central Accra. Owners of pharmacies and chemical sellers travel to Accra to stock up on products from the various suppliers then travel back to their stores.

Illicit cross border flows of pharmaceuticals are a problem in Ghana. The FDB estimates that between 5-10% of products available in Ghana are unlicensed but it is not clear what this estimate is based on. Currently, offices in border towns in the north and in the east are being established by the FDB to prevent these illegal product flows.

Interestingly, the Indigenous Pharmaceutical Business Association has recently petitioned the President of Ghana to intervene in what is perceived as consolidation of the distribution business by foreign firms. Apparently Gokals, a Ghanaian-Indian importer/ wholesaler has purchased 3 local distributors causing fear of a larger consolidation effort. As of now the President has vowed to look into the matter but no legislation has been drafted.

### **Pharmacies and Chemical Sellers**

The private retail sector has a multitude of players. There are roughly 1,592 licensed pharmacies of which 87% are located in either the Greater Accra or Ashanti regions. Only 20 registered pharmacies operate in the three northernmost regions. Each pharmacy must have a registered superintendent pharmacist assigned to it.

In addition to the pharmacies there are roughly 10,016 chemical sellers. Chemical sellers are typically smaller than pharmacies, are staffed by sales associates and by law are allowed to sell only over the counter medicines. In addition to these registered chemical sellers there are also reports of unregistered drug peddlers that have little or no pharmacy training buying products in large quantity from local suppliers and selling the drugs to unsuspecting patients. The problem has been getting worse and the Ghana National Chemical Sellers association has made an appeal to the various government regulatory agencies to crack down on the practice because it is damaging the reputation of the legitimate chemical sellers.<sup>19</sup>

<sup>18</sup> Email from Ghana Pharmaceutical Council 9/8/08

<sup>19</sup> <http://www.modernghana.com/news/176536/1/chemical-sellers-unhappy.html>

The number of pharmacies and chemical sellers is increasing slowly over time, at a rate of < 10% per year. The Pharmacy Council approves new pharmacies and chemical sellers. Most pharmacies are located within the regional capital areas; new pharmacies also are located in the regional capitals. Unlike pharmacies, chemical sellers are often located in the remote areas; new ones are located in ever more remote locations. By law, you cannot open a new pharmacy within 400 meters of an existing pharmacy nor can you open a chemical seller within 1 kilometer of an existing chemical seller.

The Pharmacy Council guarantees the level of pharmaceutical care in the country. The Council does continuing training of personnel by region. The Council maintains a staff of regional Inspection Managers and sets targets for the number of shops to be inspected each year by region; the target is at least 60% of shops. The inspectors do both routine surprise inspections and scheduled formal inspections. They also do investigative inspections, e.g. in response to complaints.

During monitoring and inspection visits, inspectors examine the shelves for counterfeit products and confiscate any that are found. The underlying assumption is that any box that an inspector picks up may contain counterfeit product. The inspector looks at the brand name and determines whether or not it is a standard brand name, the colors and packaging are standard and checks for disparities in batch numbers. It is unclear whether the Pharmacy Council is able to achieve its target inspection rate or the degree to which it is able to carry out its mandate.

## 4. Mission-Sector Supply Chain

There are two mission sector organizations in Ghana: the Churches Health Association of Ghana (CHAG) and the Muslim Ahmadiyya Movement. The focus of the missions is on primary and secondary care in rural areas. The Muslim program includes six hospitals in five regions (Upper West, Brong Ahafo, Ashanti, Central and Western)<sup>20</sup>.

CHAG's stated purpose is to serve the marginalized and the poorest of the poor. CHAG represents roughly 152 institutions (56 hospitals, 83 primary health care bodies and 8 health manpower training centers) catering to 35-40%<sup>21</sup> of the population and accounting for roughly 30%<sup>22</sup> of health care in Ghana with this fraction being significantly higher in the remote rural areas of Ghana. CHAG treated 40% of the 599,000 patients treated at CHAG and Government district hospitals in 2005. A comparison of CHAG vs. Government district hospital beds by region is given in *Figure 8*.

**Figure 8: Regional Comparison of CHAG vs. Government District Hospital Beds**

Region	Population (millions)	CHAG Beds	Government Beds	CHAG Share	Thousands of people per bed
Greater Accra	2.91	67	683	9.81%	3.88
Ashanti	3.61	1,084	932	116.31%	1.79
Eastern	2.11	930	1,180	78.81%	1.00
Central	1.59	387	678	57.08%	1.49
Western	1.92	474	756	62.70%	1.56
Volta	1.64	967	1,137	85.05%	0.78
Brong Ahafo	1.82	1,119	252	444.05%	1.33
Northern	1.82	324	340	95.29%	2.74
Upper East	0.92	253	575	44.00%	1.11
Upper West	0.58	336	493	68.15%	0.70
<b>Total</b>	<b>19.87</b>	<b>5941</b>	<b>7,026</b>	<b>84.56%</b>	<b>1.53</b>

Source: CHAG 2006 Annual Report, Population figures from Pharmacy Council, Dec 2007

CHAG runs a central warehouse in Accra called the Catholic Distribution Center (CDC). In the past, the Catholic Distribution Center (CDC) warehouse in Accra procured internationally, stocked the goods, and supplied 4 autonomous distribution centers (DC) in Accra, Kaoshing, Wa (Upper West region) and Tamale. The 4 DCs are run by independent dioceses. They had been doing international procurement from International Dispensary Association (IDA), but due to financial problems the CDC is no longer doing so. Currently, they are relying on availability through local suppliers, which is expensive. They procure through 1) local manufacturers, 2) wholesalers (who import), and ad hoc purchasing. They also buy from the CMS, but low availability of products, leads to most buying occurring on the open market.

Transport works via a variety of means. Local suppliers may either deliver to the DCs or the DCs may pick up the goods. Transport may also be done directly from the local suppliers to the institutions.

<sup>20</sup> Miralles, 2003

<sup>21</sup> Christian Health Association of Ghana, 2006

The CDC and other mission sector institutions have had cash flow problems in recent years. The problems have stemmed from three causes: 1) institutions are not paid on time by the National Health Insurance System (NHIS); 2) the operations are not run in a business-like manner, (inflation, devaluation of the Cedi have been issues) and 3) the dramatic increase in the number of patient visits since the introduction of the NHIS has increased working capital requirements. Some mission institutions report that they can't pay their employees because of lack of funds. A report by the SEAM project stated that monies obtained through reimbursement for sale of medicines had been used to fund non-medicine expenses, contributing significantly to the cash crunch, and that institutions have taken the attitude that CHAG should give them the medicines, rather than expecting them to pay for them.<sup>23</sup>

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<sup>23</sup> Miralles, 2003

## References

Annan I. and Essuman S., Ghana Baseline Survey: Maximizing access to essential medicines for church health services and their clients, Ecumenical Pharmaceutical Network, 2005.

Asante F. and Aikins M., Does the NHIS cover the poor?, Institute of Statistical Social & Economic Research and School of Public Health at the University of Ghana supported by Danida Health Sector Support Office, 2008.

Christian Health Association of Ghana, Annual Report 2006, Theme: Witnessing Christ in the Healing Ministry II, Christian Health Association of Ghana, 2006.

Harper J. and Gyansa-Lutterodt M., The viability of pharmaceutical manufacturing in Ghana to address priority endemic diseases in the West Africa sub-region, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn, 2007.

Health Association International Africa (HAI), Medicine Prices in Ghana: A comparative study of Public, Private and Mission sector medicine prices, Health Association International, Kenya, 2006.

Miralles M.A. et al, Access to Essential Medicines: Ghana, Center for Pharmaceutical Management, Virginia, 2003.

World Health Organization (WHO) Ghana Country Office, Annual Report, WHO Ghana Country Office, Ghana, 2005.

World Health Organization (WHO) and Health Action International Africa (HAI), Medicine Prices in Ghana Summary Report, Health Action International Africa (HAI), Kenya, 2008.

## Appendix E: Zambia Case Study

### Analysis of the Public, Private and Mission Sector Supply Chains for Essential Drugs in Zambia

**Note: This study was initially carried out as a part of the Medicines Transparency Alliance and sponsored by DFID. This version includes revisions that have been made based on subsequent visit during the course of this project.**

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<b>Ngoza Phiri Yezi</b>	Transparency International, Zambia

## Acronyms

ARV	Antiretroviral
CHAZ	Church Health Association of Zambia
CP	Cooperating Partner
DFID	Department for International Development
DRC	Democratic Republic of Congo
DSBL	Drug Supply Budget Line
EDL	Essential Drugs List
GFATM	Global Fund to fight AIDS, Tuberculosis and Malaria
GMP	Good Manufacturing Practices
GRZ	Government of the Republic of Zambia
GWP	Good Wholesaling Practices
HAI	Health Action International
IDA	International Dispensary Association (procurement agent)
LIC	Low Income Country
MeTA	Medicines Transparency Alliance
MoF	Ministry of Finance
MoH	Ministry of Health
MSH	Management Sciences for Health
MSF	Medicines Sans Frontiers
OTC	Over-the-Counter (medicine)
PEPFAR	President's Emergency Plan for AIDS Relief
PRA	Pharmaceutical Regulatory Authority
WB	World Bank
WHO	World Health Organization
ZNAN	Zambia National Aids Network
ZK	Zambian Kwacha (1 US\$ = 4050 ZK)

## 1 Overview of Health Sector in Zambia

Zambia is classified as a low income country and has a population of 11.6 million. The public sector is the largest provider of health care in Zambia followed by the Churches Health Association of Zambia (CHAZ) member institutions and the mine hospitals. The for-profit private sector is relatively small in Zambia as compared other countries in the region such as South Africa. Interestingly, Zambia is also one of the most urbanized countries in sub-Saharan Africa, with approximately 38% of the population living in urban areas.

Malaria is the primary public health problem in Zambia with an estimated 3.5 million cases in 2004-05. HIV/AIDS also is another key public health problem with approximately 1.1M people living with HIV/AIDS of which only 75,000 are on antiretroviral therapy.

**Table 1 : Health and Demographic Indicators (Source: UNAIDS, MoH Annual Report 2005)**

Population	11.6 Million
Per Capita Government Health Expenditure (Intl dollar rate)	\$ 26
Percentage of people living with less than US\$2 a day	87.4%
Number of people living with HIV	1.1 Million
Provinces	9
Districts	72

The MoH annual report released in September 2006 lists erratic supply of drugs and inadequate logistics for health services delivery as two of the six main challenges facing the health system. The report also states that the need for pharmaceuticals in Zambia is roughly \$21 million. Health care in Zambia is provided through a network of public sector facilities, complemented by mission facilities in the rural areas, mine hospitals in the Copperbelt province and a small but growing private sector largely in Lusaka and other urban areas.

### Public Sector

Primary health care in the public sector is provided by primary health centers that service a catchment population of between 30,000 and 50,000 (urban areas) or a designated catchment area of 29km (rural)<sup>24</sup>.

The public sector system consists of one general hospital in each provincial center and a district hospital in each district. There are many primary health centers (typically 20+) under each of the district hospitals but their number varies from region to region. Some areas also have health posts that offer a very limited range of health care. In urban areas there is a small user fee to access the public health system but access is free in rural areas. Drugs are dispensed free of charge in both rural and urban centers in the public sector.

### Mission and mine hospitals

Mission and church hospitals are usually located in the rural areas of the country. According to estimates, between 20-30% of health care in Zambia is obtained through the mission hospitals and clinics (this fraction is much higher in the rural areas). The Churches Health Association of

<sup>24</sup> Source: Global Fund background paper on Zambia

Zambia (CHAZ) is an organization which collectively represents these hospitals and health centers (approximately 97 member institutions + 28 non member institutions) and does procurement and storage for them. CHAZ works in close partnership with the MoH and with Zambia National Aids Network (ZNAN) to procure, store and distribute drugs to certain public facilities.

In the Copper-belt province there is also a strong presence of mine hospitals. These health facilities are for the mine employees and are funded by the mining companies. These hospitals often have a quasi public status and many of them are supplied drugs by the public system.

In addition, organizations such as MSF operate their health facilities in the border areas with Congo (DRC) to cater to the health needs of refugees from DRC. Similar clinics exist around other orders of Zambia and are operated by different NGOs.

### **Private (for-profit) facilities**

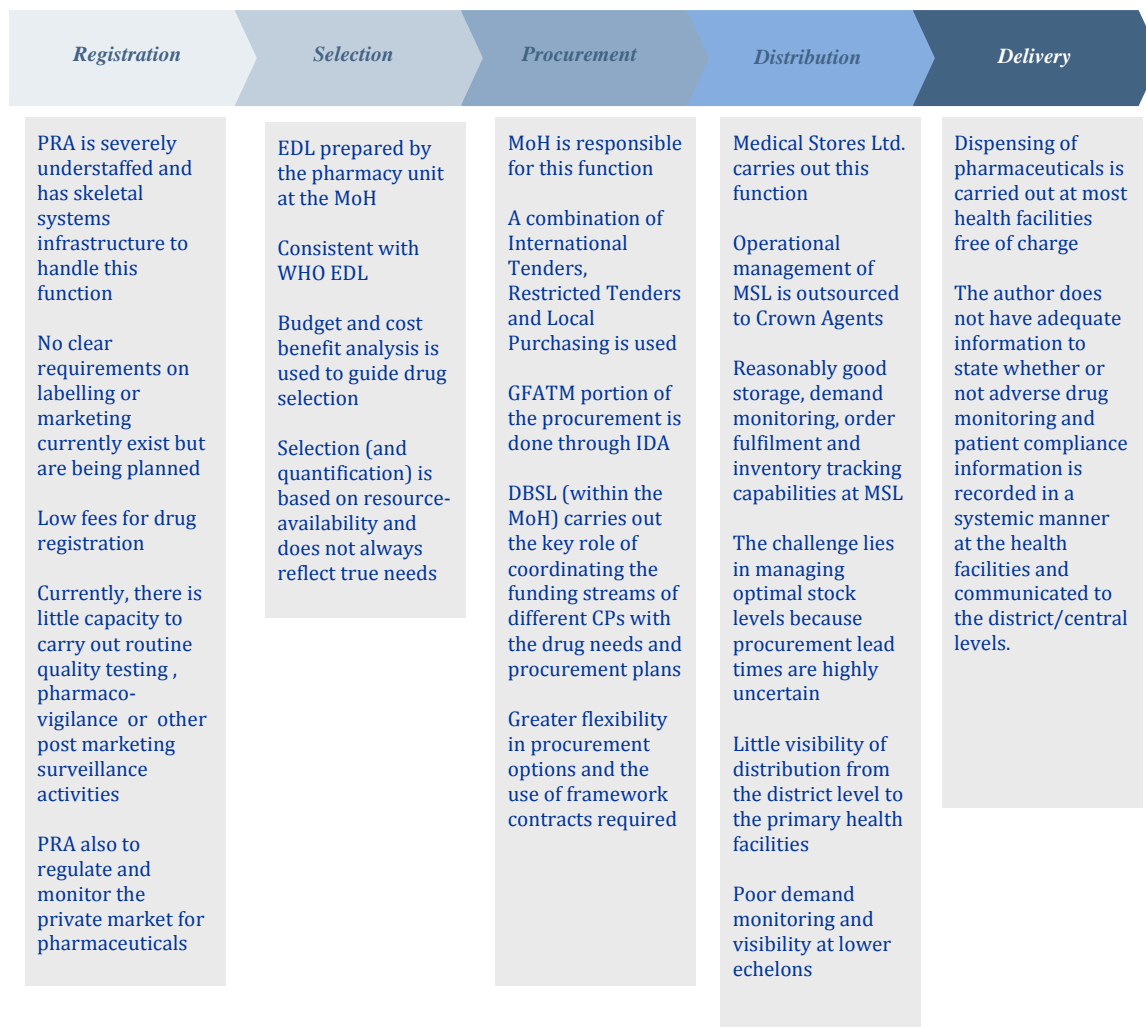
Private-for-profit health facilities are limited to the urban areas either around Lusaka or in the Copperbelt province and occasionally in Livingston. Some private clinics also dispense drugs. There is no clear distinction between a private clinic and a private hospital. Patients seeking treatment in the private sector purchase drugs primarily from retail pharmacies which are again concentrated in Lusaka and the Copperbelt and very few (most respondents said none) in the rural areas. In addition to registered pharmacies, drugs are also sold in drug stores as over-the-counter (OTC) medicines. There is also a small market for drugs that are sold in non-fixed structure stores that are located either in far flung rural areas or in the shanty compounds neighboring Lusaka.

In the following sections we provide sector-by-sector maps of the supply chains and analyze the key issues and challenges.

## 2 Public-Sector Supply Chain for Medicines

The public sector contributes to over 60% of health care obtained in Zambia. In *Figure 1* we provide an ‘at-a-glance view’ of the public sector supply chain with salient characteristics pertaining to Zambia. Each of the functions is then analyzed in detail.

**Figure 1 : Characterizing the Public Sector Supply Chain for Medicines in Zambia**



### Registration

The Pharmaceutical Regulatory Authority of Zambia (PRA) has the responsibility to register all drugs before they can be imported or sold in Zambia. The PRA is still in a state of transition as it was formed in 2004 from the former Pharmacy and Poisons Board (PPB). Its responsibilities include i) product registration, ii) licensing of pharmaceutical establishments and iii) post marketing surveillance.

Approximately 500 new drug applications are received every year in Zambia. The fee for registering a new drug is only \$150 as compared to \$1000 in some other countries in the region. Despite that, many unregistered drugs can be found on the market. These include drugs whose

registrations have expired or drugs that were never registered. In addition, herbal medicines are also found on the market. The PRA wants to include these herbal and traditional medicines under its purview but currently has very little capacity to do that.

The time required to register a new drug can vary significantly although prioritized registration is carried out in special circumstances. There is no two-tiered system for product registration to differentiate between products that have received regulatory approvals by other regional or global regulatory authorities and those that have not. The variability in the approval time is attributed to the lack of people and skills to evaluate the dossiers. The PRA relies on quality and safety data provided by the manufacturers and has virtually no capacity to do its own tests and quality checks. It has 3 quality mini-labs that were provided by the WHO and MSH and plans to have a medium sized quality control lab by 2010.

The PRA currently has very little capacity to carry out its other two roles of licensing pharmaceutical establishments and post-marketing surveillance. There is lack of a fleet for the inspectorate and a lack of trained GMP/GWP inspectors to successfully monitor the private pharmaceutical market in Zambia. Also, it is not clear if policy decisions will mandate the PRA to be actively involved in regulating or monitoring wholesaler and retailer markups

### **Selection**

Cost benefit analysis and other efficacy data are used to update the Essential Drug List periodically. This activity is carried out primarily by the pharmacy unit within the MoH. WHO recommendations on Essential Drugs List (EDL) in resource constrained setting are used to update the list. The author did not have enough time to ascertain other details of the selection process during the visit.

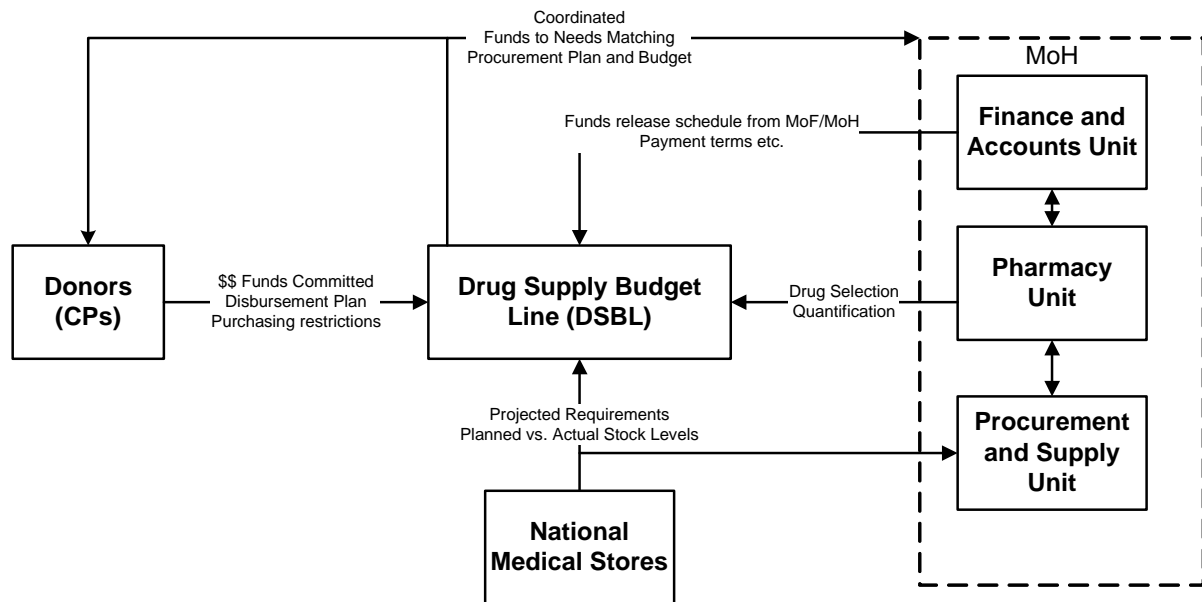
### **Procurement**

Before delving into the procurement function in detail it is important to understand the financial flows for procurement in Zambia (many of which are typical for low income countries). The MoH relies extensively on external donors (Cooperating Partners or CPs) for the national drug needs. The CPs can be categorized into three types

- i) those who buy drugs and provide in-kind assistance with drugs (e.g. CIDA, PEPFAR)
- ii) those who bring money in-country to purchase drugs (e.g. GFATM)
- iii) those who provide budgetary support to the MoH (e.g. DFID)

In the past this led to a coordination problem across programs that were buying drugs. It led to flooding of some drug and shortages of other drugs as CPs would not purchase a certain drug assuming others were buying it. The shortages led to emergency procurement by both the MoH and at times by the CPs. Also, this had on various occasions resulted in CPs bringing in drugs into the country that were not even on the essential drug list. Those who procured from the country are now asked to contribute to the drug-basket (SWAp) and others who provide drugs in-kind now play the role of filling in any gaps or short-tem shortages. The drug supply budget line (DBSL) within the MoH plays the role of coordination across multiple CPs and the MoH budget and procurement plans.

**Figure 2 : Coordination Role of the DSBL in Zambia Public Sector Supply Chain** (adapted from a slide by Bonface Fundafunda, head DSBL)



The drug procurement function in Zambia requires many institutions to be involved and can often be a coordination challenge. The MoH receives funds for health financing from both the Ministry of Finance (MoF) and the bilateral and multilateral Cooperating Partners. Some CPs channel their funds directly to the MoH and others channel it through the MoF. *The MoF makes the funds available to the MoH for drug purchasing based on a quarterly/monthly disbursement schedule. This often leads to purchasing in fragmented quantities some of which are too small to even float an international tender. Thus the MoH pays a higher price for drugs that could have been procured cheaper if international bulk procurement was carried out. The MoF often cites poor accountability as the reason for controlled and staggered disbursement of the budgeted funds to the MoH.*

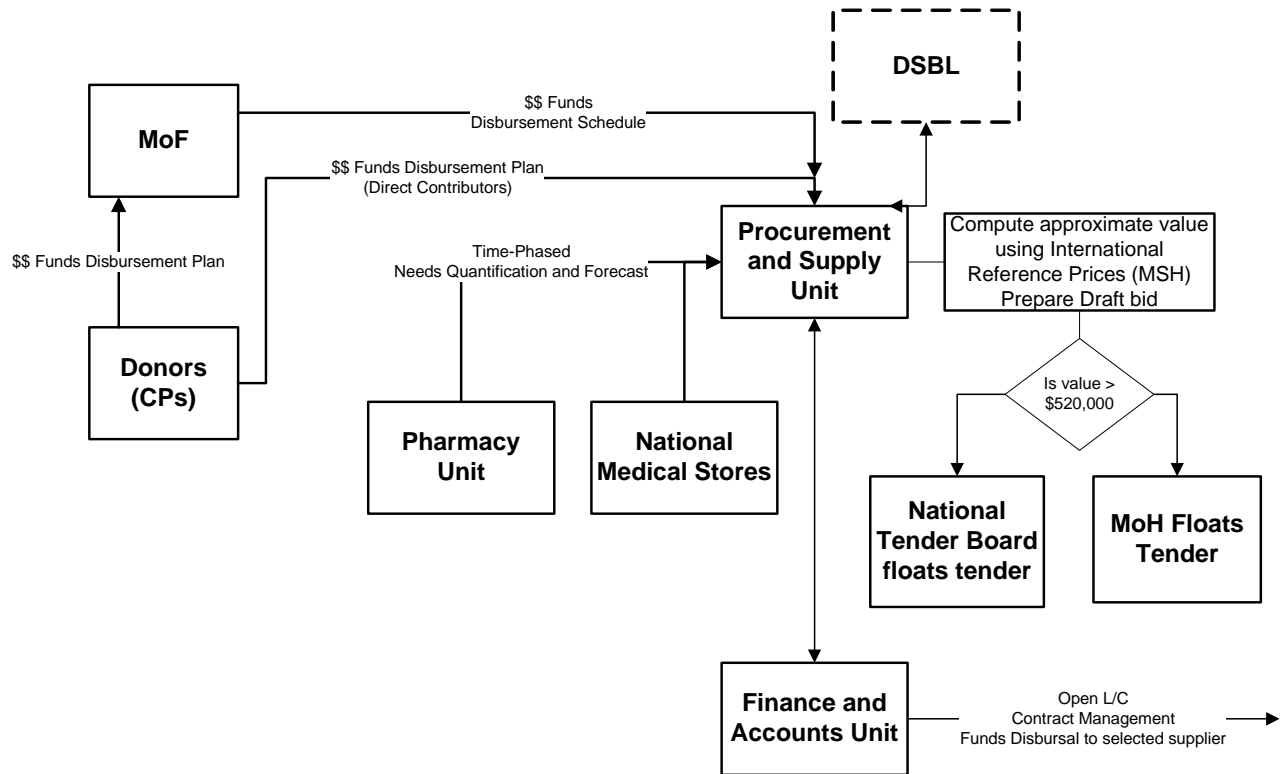
The pharmacy unit at the MoH carries out the quantification and forecasting and this in conjunction with the needs communicated by the national medical stores and availability of resources is used to create a procurement plan. The required quantities are then converted into a \$ value based on international reference prices available from the MSH price survey. If the value of the bid is higher than ZK 2.5 Billion, the tender is floated by the Zambia National Tender Board (ZNTB). For smaller value bids the MoH is authorized to float the tender. In practice however most tenders go through the ZNTB as the MoH threshold is very small.

In the event of a stock-out, emergency purchases in smaller quantities are made by the MoH which do not follow the above outlined process. Private in-country importers are awarded the contracts for such emergency procurement. Additionally, the districts and provincial hospitals are permitted to spend a tiny fraction of their total budget (between 4%-10%) for emergency drug purchases when the national medical stores cannot supply them.

*In the event of a severe shortage of essential drugs (crisis) some CPs tend to support the MoH by expedited purchasing of the required drugs. This however leads to the consequences of a stock-out not being perceived as severe by the MoH procurement staff because over a period of time*

they may have become conditioned to the fact that if the delivery or procurement drastically fails, they can always depend on the CPs as a ‘measure of last resort’.

**Figure 3: Public Sector Procurement Process in Zambia**



The MoH procurement unit has started to utilize framework contracts with a few local suppliers to avoid the long lead-times (2 months to 8 months) associated with procuring through the regular international open-tender process. Such framework contracts also need to be setup with a few large international suppliers where the price and lead-time terms are set per a long-term contract and quantities to be shipped are communicated periodically. However, currently large donors do not permit such arrangements or it is viewed as a competition limiting measure by various others.<sup>25</sup>

### Distribution

Medical Stores Limited (MSL) is the national medical store and it manages the storage and distribution of drugs for the MoH. The government has contracted out the management of MSL to Crown Agents. The MoH pays Crown agents a management fee to run the efficient working of MSL. Operating expenses are paid directly into the MSL account. Capital investments that were recommended by Crown Agents have been implemented and better physical infrastructure for storage and distribution now exists at the MSL. MSL currently has a staff of 85 including Crown Agents management personnel.

<sup>25</sup> Purchases made through the GFTAM funding stream have to use a procurement agent (IDA).

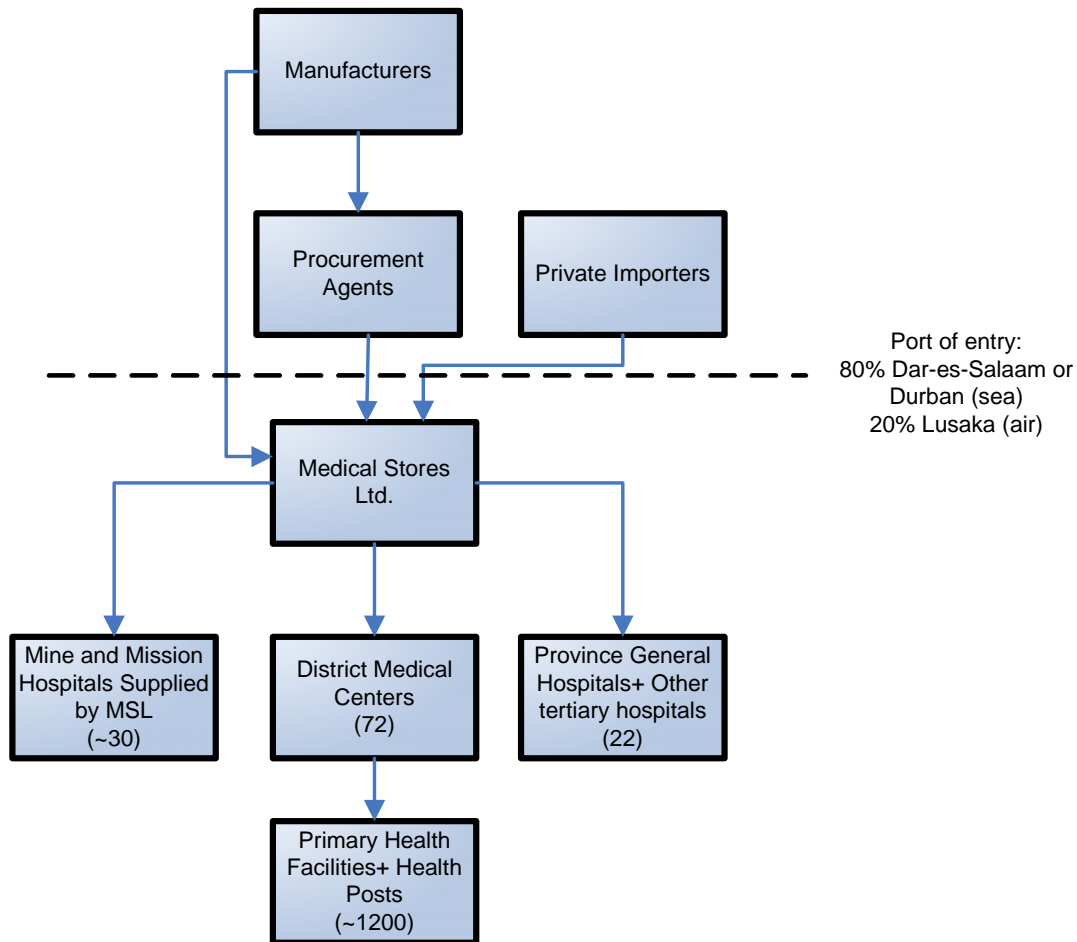
Each district is served once a month by MSL (some may require additional deliveries) in compliance with a preset schedule. All districts are required to place their orders before a preset date each month (hand-delivered or faxed) and then MSL prepares and ships the orders usually within a week if in stock. MSL has a fleet of 14 ten-ton trucks for delivery and fixed route plans for the deliveries are made every year and updated based on any new demand/ route information. The distribution system follows a pull-logic wherein shipments are based on actual demand off-take (or stock levels) at the districts and not a centrally developed forecast for each district. However medicine kits are supplied in a push manner and each district receives a certain number of kits every month.

*Over 50% of the essential drug lines are usually in-stock at MSL.* Every month MSL sends a stock-status report to all the districts. Also, many districts call MSL to confirm availability before placing an order. *If an item has been out-of-stock for a long period of time, panic over-ordering occurs whenever stock becomes available.* In such instances, the MSL planners often choose to deflate the order based on their discretion and estimates of more realistic demand levels. Specifying a budget for how much each district can order in a given month can help partially resolve the problem associated with panic over-ordering. On the other hand as the districts have access to the stock availability report, they choose not to order those items which they know are out-of-stock. This leads to censored demand information at the MSL and very gross estimates are then required to quantify the monthly need for those drugs.

Tom Brown at the MSL remarked “Orders are based on what people think they can get and not what they think they need. If they don’t have a chance of getting it, they don’t include it in their order”.

Upon receipt of drugs and medical supplies each district or hospital is supposed to send a Goods Received Note (GRN). However, this notification is not always received in time and systems to track this are weak. The districts are required to update their stock-control cards upon receipt. For ARVs many facilities are running JSI’s inventory and stock tracking system but its design features are suited only for ARVs.

**Figure 4: Public-Sector Distribution Chain in Zambia**



There is poor visibility of the supply chain after the product is delivered to the districts. Periodic visits to the districts are made by the customer service teams of MSL. However, field audits on stock availability and product storage etc. are not in the mandate of MSL. Pilferage and wastage is reported to have occurred on many occasions at the district or primary health centers. Expired product does not return back to MSL and there is very little traceability to ensure that it is destroyed.

*However, the biggest challenge in managing the distribution chain is that lead-times are highly unpredictable and long. The overall lead time to MSL includes the procurement lead time of MoH and the delivery lead time of supplier. High variability in lead time can be buffered only by holding higher safety stock at MSL. However budgetary constraints and the mandate for MSL to reduce operating costs prevent them from holding higher buffer stocks. The result is a higher frequency of stock-outs of essential drugs at the MSL.*

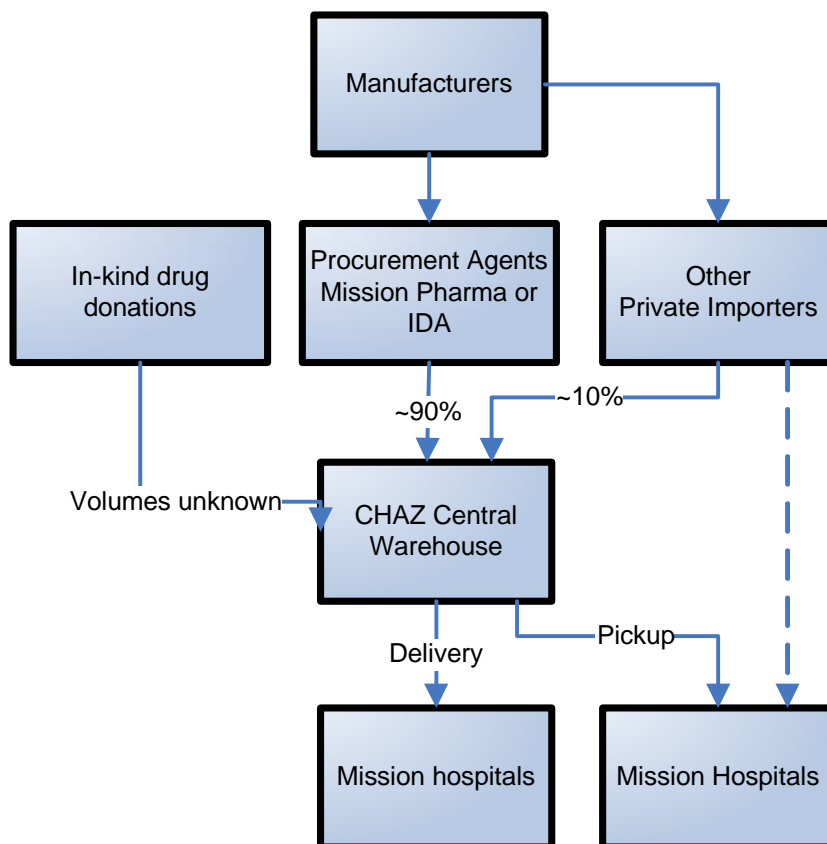
### 3 Mission-Sector Supply Chain for Medicines

The Churches Health Association of Zambia (CHAZ) represents over 125 health facilities (97 member + 28 non-member) accounting for between 20-30 %<sup>26</sup> of health care in Zambia with this fraction being significantly higher in the remote rural areas of Zambia.

CHAZ carries out its own procurement, has its own central warehouse and arranges the distribution of its products for its member institutions. Many hospitals and clinics that purchase from CHAZ arrange to transport the drugs themselves from the central CHAZ warehouse in Lusaka.

CHAZ procures its drugs mainly from international non-profit procurement agencies. It floats restricted tenders to its pre-qualified suppliers for procuring drugs and medical supplies. Most of the purchases are obtained from either Mission Pharma or International Dispensary Association (IDA)<sup>27</sup>. CHAZ does not offer quantity discounts or credits to its buyers. It usually receives a 30 day credit from IDA or Mission Pharma on its purchases.

**Figure 5: Mission-Sector Distribution Chain in Zambia**



<sup>26</sup> WHO report puts this number at 33%.

<sup>27</sup> WHO report states 98% international and 2% local purchasing for CHAZ

**Table 2:: CHAZ supply chain figures (Source Farmasøyter 2006, Wehrens 2007, CHAZ)**

Number of member tertiary hospitals served	34
Number of member primary health centers served	58
Number of member health posts	5
Non member health facilities	25
Total health facilities served	125
Number of warehouses	1 (in Lusaka)
Number of staff	34
Number of staff in warehousing and distribution	6
Vehicle Fleet	4+1 trucks
Variable costs	75%
Staff costs	8%

**Table 3 : Cost structure of drugs in the mission sector (CHAZ)**

Cost element	Drugs purchased	Drugs donated
Landed Cost (including handling+ freight)	100	0
Service Fee (15-30% depending on product)	15-30	30
Transport (borne by buyer) 3-10% <sup>28</sup> of original	3-10	3-10
Landed cost	125-140	40
Price relative to MSH median price	75%	-

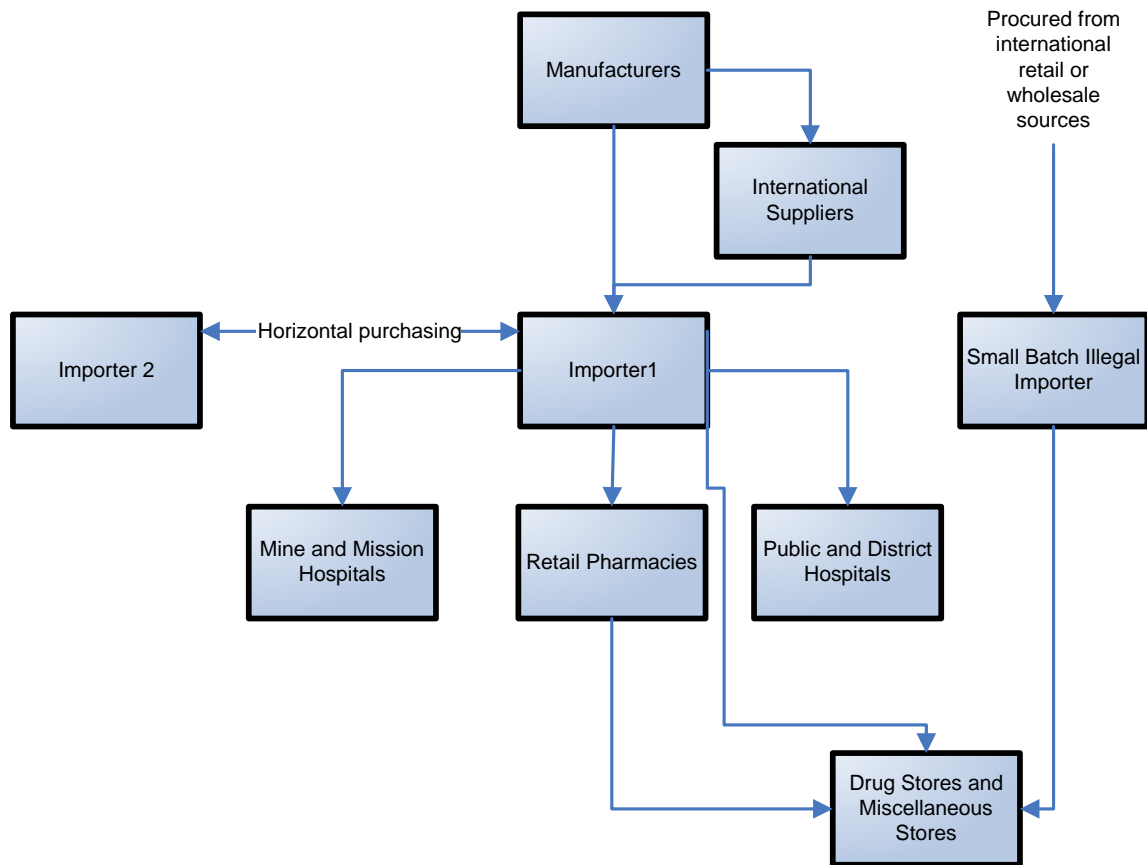
**Table 4 : CHAZ roles and functions**

Activity	Remarks
Supplier selection and price negotiation	CHAZ selects from the two or three different procurement agents. It procures using a restricted tender from its pre-qualified suppliers.
Credit terms from suppliers	Receives 30 days credit from its suppliers
Credit terms to buyers	No credit provided
Inventory risk	Borne by CHAZ
Exchange rate risk	Passed on to customers
Transportation	Transportation is carried out by buyer
Quality Inspection	Carries out quality inspection

## 4 Private-Sector Supply Chain for Medicines

Between 10-30% of the health care provided in Zambia is obtained in the private sector. Estimates varied considerably from respondent to respondent. The structure of the private sector supply chain is similar to that observed in most Low Income countries (LIC) with a few large importers and wholesalers bringing in drugs from international manufacturers or suppliers and selling them to retail pharmacies or drug outlets. In Zambia all wholesalers, importers and retail pharmacies must be registered with the PRA. The author does not have sufficient evidence to comment on whether or not this is strictly adhered to.

**Figure 6: Private-Sector Distribution Chain in Zambia**



### Local manufacturing

There are 6 bonafide manufacturers with one or two that claim to have basic GMP compliance. Many of them have encapsulation and tableting capabilities. *Finished pharmaceutical products, Active Pharmaceutical Ingredients (API) and Intermediates can be imported into the country duty free; whereas excipients, inactive materials and packaging materials such as bottles, containers, ampoules etc. may carry an import duty up to 50%.*

There is also an import duty on machinery and capital equipment. *All of these factors lead to the cost of locally manufactured (or locally encapsulated or tableted) product much higher than imported finished product. The rationale behind the government's import duty policy is that some of the inactive ingredients are also utilized in the manufacture of non-pharmaceutical products*

(e.g. Lactose is a common inactive ingredient that finds uses in many consumer items) and there is little ability to trace and ensure the flow of a material once it has entered the country. The local manufacturers are under-capitalized and have poor access to working capital to be able to execute large orders. They engage mostly in make-to-order production and work on a cash-to-cash cycle that minimizes working capital needs.

There are no multinational pharmaceutical companies that have any manufacturing operations in Zambia, and some of them are represented by local agents who register and distribute their products. Mission Pharma is known to have contracted out some of its manufacturing to a local company before.

### Importers/Wholesalers

There are about 50 companies<sup>29</sup> that engage in the business of importing drugs into the country. Around 80-90% of these are wholesalers based in Lusaka who also import pharmaceutical products into Zambia. The remaining 10-20% are based in the urban centers of the Copperbelt province and some also have operations in Livingston. Many of the large importers are former manufacturers that have turned into importers due to poor profitability of local manufacturing in Zambia. *Although the number of players is large, almost 80% of the volume moves through 6 main importers/wholesalers.*

All companies that register themselves at the PRA as wholesalers and importers of pharmaceutical products are required to have suitable storage facilities in which the pharmaceutical products can be stored before distribution. PRA requirements also stipulate that all registered pharmaceutical establishments should have a professionally qualified pharmacist. *All pharmaceutical products imported into Zambia should be declared to the PRA and an approval of the proforma-invoice is required.* Again, the author does not have adequate information to validate if this is adhered to in entirety or the lack of policing and inspection staff at the PRA leads to importers with inadequate facilities/ staff; unregistered importers; or product being imported without proforma-invoice approval from the PRA.

*The majority of the pharmaceuticals imported by the private sector come from India, followed by UK<sup>30</sup>, Germany, South Africa, Holland and Belgium.*

Often times, the importers trade among each other leading to large horizontal flows within the supply chain. For example a particular importer/wholesaler may have good relationships with one private hospital or a mine hospital. All product enquiries originating from this hospital naturally are routed to the importer/wholesaler with which they have an existing relationship. If this particular importer/wholesaler does not have the product in stock or does not have a relationship with the manufacturer of that product, he in turn procures it from his competition and fulfills the order. Similarly, since many importers/wholesalers are also owners of more than one retail pharmacy, they end up buying from each other for different product needs. Most importers have relationships with specific manufacturers for high volume products (e.g. one importer stocks anti-malarials from Aurobindo Pharma, another from Ajanta Pharma or Novartis etc.). *For low volume therapeutic categories, some importers do not source from a manufacturer but instead buy from another importer within Zambia who may specialize in importing that product category. This leads to purchasing and in-bound logistical efficiencies for low volume therapeutic categories. Hence, there is no clear differentiation between wholesalers and importers as these roles are product category dependent.* Sole distributorship does not work for many products because each distributor may have strong unclear relationships with one type of buyer.

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<sup>29</sup> Some respondents put this number at 60.

<sup>30</sup> Suppliers from UK consist of international distributors of multinational pharma companies

Most of the large importers receive at least 30 day (sometimes 45 days) credit from their suppliers. 20% upfront payment + 30 days credit for the remaining portion were stated as the credit terms obtained from their suppliers by some importers. One importer/wholesaler (who also owns over 3 retail pharmacies) described having a sourcing company established in Mumbai, India to buy on his behalf at local prices and then import the product to Lusaka, Zambia.

The importers/wholesalers make deliveries to retail pharmacies and private hospitals (also dispensaries?) in Lusaka and in the urban centers of the Copperbelt province. For such deliveries they bear the transportation costs and some of them have their own vehicular fleets (some others use third-party delivery companies). Private hospitals and drug stores from smaller towns come to Lusaka to buy drugs from the private importers/wholesalers. Missionary hospitals come to Lusaka to buy from the CHAZ facility and many end up buying those products that are not in stock at CHAZ (or are not on their supply list) from the private importers/wholesalers. Some mine hospitals that buy from the importers/wholesalers require delivery which is often outsourced to a third party transport company.

Most importers hold some inventory to either create in-bound logistics efficiency or to have a competitive edge in quoting lead times to fulfill orders from their clients. Large volume orders however require them to purchase from their supplier as their in-stock inventory is usually very low. 15-20% of the input cost is freight and handling charges. Typical markup in the wholesale/import business varies between 10-40%<sup>31</sup>. It is highly dependent on the product category (insulin vials vs. antibiotic capsules) as the range of services and transport options depend on that. One respondent<sup>32</sup> mentioned the existence of cross-subsidies across clients wherein a wholesaler has to supply cheap to maintain its relationship commitments with a client and compensates it by higher markups with another.

*The importers/wholesalers provide 30 days credit to their large clients. This is often done using the system of post-dated checks. For smaller customers they do not offer credit terms and require upfront payments.*

The importers/wholesalers do not provide any structured or formally stated quantity discount to the retail chemists or hospitals that purchase from them. They claim that the payment records of the retail chemists and hospitals are very bad to offer them any form of quantity discount. However, product pricing negotiation does get influenced to some extent with the quantity purchased.

*Wholesaler//Importers can strongly influence prescribing behavior of the retail chemists. One importer cited the example of how their company engaged in educating the doctors about use of new forms of Insulin. "Supply capacity is in our hands so we can undoubtedly influence the retailers" remarked a large importer.*

*In addition to the registered importers and wholesalers, drugs are also brought into the country in small batches by some who travel frequently to South Asia. These drugs make their way quickly to the retail outlets in the outlying rural areas or peripheral areas of Lusaka. There are also some drugs that enter Zambia from South Africa, Tanzania and Zimbabwe through one of its many borders. This parallel market is however mostly restricted to cheap over-the-counter (OTC) drugs and anti-malarials<sup>33</sup>.*

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<sup>31</sup> See Figure 8 later in this document

<sup>32</sup> Not directly from the import/wholesale industry

<sup>33</sup> ACTs are technically still prescription only drugs in Zambia.

## Pharmacists and Retail Chemists

There are around 59 retail pharmacies in Zambia. Out of which 40 are in Lusaka. Many of these pharmacies are owned by wholesalers/importers but some continue to be independent pharmacies that purchase from the wholesaler/distributors. These “pure-play retail” pharmacies are at a natural disadvantage (vertical integration advantages of their competitors) and try to counter the competition by greater involvement in the community and by offering value-added services to their customers.

Apart from retail pharmacists there are drug stores that are allowed to dispense OTC drugs but in reality they also dispense various prescription drugs. In addition some private hospitals and clinics also dispense medicines.

There is no pricing control on drugs and prices at the retail level are determined by the market forces. A markup of 30% is minimal at the retail level. Bulk-breaking (for example tablets in jar) leads to extremely high markups as high as 300%. A few examples of markups are provided in Tables 4 and 5. *The key determining factors for retail markups are the intensity of competition in the region* (e.g. Cairo Road Lusaka has higher intensity vs. peripheral Lusaka) and *origin/quality perception of the drug* (Asian drugs fetch a lower retail price than European manufactured drugs). Pharmacies employ one or two pharmacy technicians who are salaried employees. This along with real-estate cost forms the largest portion of the overhead cost for the pharmacy. Except for the price paid to the wholesaler, *variable costs are very small fraction of the cost structure at the pharmacies*. A typical pharmacy technician makes anywhere between 1.2M to 5M ZK a month. There is some presence of sales reps from either the pharmaceutical company (Novartis, Ajanta Pharma, CIPLA were mentioned more than once) to do product marketing and training. Sales reps from the distributors visit the pharmacies when they calculate the pharmacy would be close to stocking-out on their products.

Due to the wide range of products in pharmacies, it was not possible to ask the wholesale source of individual products.

**Table 5: Examples of high markups observed in the supply chain**

	Product type (anti-biotic vial)	Product type (anti-rabies vaccine)
Input price	1200 ZK	100,000 ZK
Wholesaler price	3000 ZK	150,000 ZK
Retail price	7000-9000 ZK	600,000-800,00 ZK

**Table 6: Retail prices of anti-malarials purchased/observed by author**

Product	Manufacturer	Retail Price1	Retail Price2	Retail Price3
Coartem® 20/120 AL	Novartis (Beijing, China)	37,000 ZK	50,000 ZK	40,000 ZK
Co-Arinate® (3 day dosage) AS+ SP	Dafra Pharma(Belgium)	43,000 ZK	-	
Novidar Plus® (3 day dosage) AS+ SP	Pharmanova Ltd, (Lusaka, Zambia)	-		
Pharmadar® SP	Glumex Pharma (India) (marketed by Pharma Plus , Lusaka)	1,000 ZK		
Artefan® AL	Ajanta Pharma (Mumbai, India)	18,000 ZK	25,000 ZK	
Artesunate	Denk Pharma, Germany	35,000 ZK		

*If the price (of Coartem®) falls too much, after a certain point they(customers) will stop buying it thinking it is fake. – Pharmacist in Lusaka*

**Figure 7: Volume dependence of costs in the private sector supply chain**

Volume Dependent vs. Volume Independent Costs In the Private Sctor Supply Chain					
Player	Cost Element	Fixed → Variable			Remarks
Importer/Wholesaler	Unit FOB Price				Manufacturer's FOB price is usually quantity dependent bt higher volumes allow better price negotiation
	Sea/Air Freight				For medium to small volume shipments freight costs are not strongly dependent upon volume
	Insurance				Insurance is on value of shipment
	Duties/VAT				Duties and VAT is on value of shipment
	Clearance Fees				Fee paid to agent for Port Clearance.
	Administrative Cost				Staff involved in negotiation and processing of paperwork
	Transport				Transport Costs for Port to Primary Warehouse transport
	Warehousing Costs				Rent (including utilities),maintennace, salaries, pilfrage
Pharmacies					
	Taxes and Misc.overheads				Activities and cost directly attributable to filling a prescription
	Warehousing Costs				Rent (including utilities),maintennace, salaries, pilfrage
	Administrative Costs				Costs for staff involved in Negotiation,Ordering, Pricing, Marketing & Stock Mgt

**Table 7: Roles and mark-up assessment for the private sector supply chain**

Player	Activities Carried Out	Average markup
Importer/Wholesaler	Forecasting/Order Consolidation Supplier identification based on lead time, price, brand Price negotiation with suppliers Facilitate product clearance at point of entry Warehousing at primary location Distribution to secondary locations Stock management Pre-financing (pays supplier but does not receive advance from buyer) Quality control Assume risk of overstock and expired product	25%
Pharmacies	Wholesaler Selection ( where no fixed contracts or backward integration exists) Develop marketing materials Advise/Prescribe/Dispense appropriate of drugs Inventory levels, stock control (e.g losses) Assumes risk of overstock and expired product	120%
General Stores	Identify supply source Process order with supply source Transport ACTs to store Credit Terms to Customer Assumes risk of overstock and expired product	?

## References

- Arthur Andersen, Pharmacy Activity Cost and Productivity Study”, Arthur Andersen LLP, NY, 2000
- Attridge, C.J. and A. S. Preker,(2000) “Improving Access to Medicines in Developing Countries Application of New Institutional Economics to the Analysis of Manufacturing and Distribution Issues” HNP Discussion Paper, The World Bank,. Washington, USA.
- Banda M, et al, Multi-Country Study of Medicine Supply and Distribution Activities of Faith-Based Organizations in Sub-Saharan African Countries, World Health Organization , Geneva, 2007
- Brugha R, Zwi A: Improving the quality of private sector delivery of public health services: challenges and strategies. Health Policy Plan 1998, 13:107-120.
- DELIVER. 2003. On Track: Analyzing Transportation Costs: Uganda, April 2003
- DELIVER. 2007. Zambia: Final Country Report. Arlington, Va.: DELIVER, for the U.S. Agency for International Development (USAID). March 2007
- Farmasøyster Uten Grenser .Fact Finding Mission In Health Institutions. Under The CHAZ Umbrella. Zambia November 6th - 24th 2006. FUG
- Fundafunda B. The Drug Supply Budget Line: Coordination, Accountability and Transparency in PSM for Essential Drugs and Medical Supplies .Briefing Document, undated (2007)
- Mussa M., Rosen S. (1978), Monopoly and Product Quality, Journal of Economic Theory, 18, 301-317.
- Pratt, John W., David A. Wise and Richard Zeckhauser, "Price Differences in Almost Competitive Markets," The Quarterly Journal of Economics, 93, 2 (1979), 189-211.
- Preker A.S. and Harding A, (2000), The Economics of Public and Private Roles in Health Care- Insights from Institutional Economics and Organisation Theory, HNP Discussion Paper, The World Bank,. Washington, USA
- Public-private roles in the pharmaceutical sector. Implications for equitable access and rational drug use. World Health Organization, Geneva, 1997.
- Republic of Zambia - Ministry of Health, Health Sector Annual Review Report 2005, March 2006
- Sorensen, Alan T., "Equilibrium Price Dispersion in Retail Markets for Prescription Drugs," Journal of Political Economy, 108, 4 (2000), 833-850.
- Stern LW and El-Ansary A (1992) Marketing channels, 4th ed. Prentice-Hall, Englewood Cliffs, NJ
- Smith, Mickey C. 1983. Principles of Pharmaceutical Marketing. Philadelphia
- Wehrens, R. “Distribution model study for EPN Drug Supply Organizations”, EPN, 2007

## Appendix F: Global Supply Chain Initiatives Scan

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Rwanda	Bangladesh
Ghana	Nepal
Vietnam	Zambia
Zimbabwe	Tanzania

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Acumen Fund	Health portfolio manager
Broadreach	Founder/Chairman
Care Hospitals	Chief- Community Health & Wellness Program
Clinton Foundation	Technical consultant Botswana Harvard AIDS Institute
Curatio	President / CEO
ITC E-Choupal	Manager-Rural Health & Education Services
Management Sciences for Health (MSH)	Vice-President
MTN	Manager Sales division, Ghana
PHD	CEO
Praekelt Consulting	Director / Founder
Population Services International (PSI)	Deputy Director, Global Malaria Department
VillageReach	President, COO, Program Officer

## F.1. Initiatives Already Operational

### VillageReach

#### **Overall description:**

- VillageReach partners with the Ministry of Health (MoH) and other local organizations to deliver two interconnected parts of the model:
  - a) programs to strengthen the logistics and infrastructure support services that expand access and enable healthcare at the last mile and,
  - b) social businesses that deliver one or more of those services in a manner beneficial to the health system.
- In Mozambique, the program partners started a propane gas distribution enterprise that provides energy for the cold chain thus enabling the health program to reliably keep temperature-sensitive vaccines cold, and also provide the health centers with lighting for night-time emergencies and propane to sterilize medical equipment. The propane company also serves households and businesses, and is now the largest propane distribution company in northern Mozambique.
- The program portion of the model has translated into a health program encompassing transport and logistics, cold chain, data management, and supportive supervision of health workers for 251 public health centers covering over 5 million people.
- VillageReach is working with the Mozambique Ministry of Health on a national expansion plan to serve the country's remaining 8 provinces, which would raise the total population covered to over 19 million people and has also been engaged by the Government of Malawi as is currently fundraising for this expansion.

#### **Rationale/potential benefits:**

- Partially self-sustaining model through VidaGas, its partnering social business
- Improved management, reliability, and quality of medical care by ensuring the timely delivery of essential equipment and medical supplies, supply management and supportive supervision activities
- Emphasizes appropriate system design, rigorous data collection and analysis, and the entrepreneurial drive of the private sector.
- Activities have contributed to a 40% increase in the number of children fully immunized in one province of northern Mozambique.

#### **Factors to consider:**

- There has been no external monitoring and impact evaluation of Village Reach's service levels, delivery frequencies, availability and other outcome measures.
- It is difficult to assess how much buy-in they have from the MoH in Malawi. They may find it challenging to work in an environment with multiple local stake-holders, donors and cooperating partners
- There are other initiatives such as government's outsourced distribution of ARVs using a third party logistics company (SDV) in Malawi which may complicate the eco-system

## ITC E-choupal Health: Overview of initiative

### Overall description:

- ITC's International Business Division has championed the E-Choupal model across the country. It follows a three-pronged strategy aimed at engaging local human resource, creating IT networks and operating delivery centres
- E-Choupal is a simple V-Sat linked computer in a villager's ('sanchalak') house used as a rural information centre, catering to roughly five villages. Approximately 40 e-choupals are connected to a single hub called Choupal Sagar.
- The district hub serves as an administrative co-ordination centre for ITC. It is a large building of about 10,000 square feet with all modern amenities, with three rooms earmarked for a clinic, pharmacy and laboratory with a fully-equipped automated lab and pharmacy stocking quality medications
- Village Health Champions (VHCs) located in an E-Choupal area coordinate with the choupal sanchalaks, and deal with community mobilisation, common ailment treatment, household survey, monitoring health profiles, public education and awareness. They are equipped with medicines and first aid, a kit for basic diagnosis, and a bicycle. They are screened and trained in social skills and communication skills, use of handheld devices, basic clinical services, recording and reporting protocols and conducting public health intervention either independently or by advocacy, local responsibility creation and facilitation of government schemes.
- Patient fees and subscriptions/donations from partners and government primarily provide the required inflow of cash to run the program
- The E-choupal initiative results in marginal additional fixed cost, which can be recovered easily by scaling up operations

### Rationale/potential benefits:

- Engages and empowers communities at a grassroots level, enabling trust and buy-in
- The programme aims at designing a solution that uses the power of telemedicine and yet operates on a low cost, uses very low bandwidth, uses rugged hardware and software that is user friendly for semi-literate people and works in local languages .

### Factors to consider:

- Focus on programs for training and accreditation/ certification for healthcare service in rural areas
- Changes and modifications in the pharmacy regulation.
- Create standards for health data exchange.
- Proper regulation and protocol for leveraging modern technology like telemedicine.
- Provide concessions to players contributing in the rural healthcare segments.

## Curatio: Overview of initiative

### Overall description:

- Curatio's business model is based around reduction in the logistics cost of delivering to rural pharmacies (through leveraging fine-mesh distribution networks) in Ghana and using high control over Point of Purchase (through franchising) and better margin-mix management (through private label, generic and branded products as used in consumer product retailing) to gain efficiencies at the point-of-sale.
- Primary distribution from the warehouse (near Accra) will be carried out using a fleet, leased or outsourced, to private distributors who currently distribute consumer products (i.e. Unilever Ghana); the secondary distribution will be using the distribution capabilities of these private distributors utilizing their fine mesh network to reduce secondary distribution costs.
- The chemical sellers that will be served would be under a franchise arrangement and would require some training.
- Margin mix management within the portfolio of drugs will be effectively used to ensure recovery of fixed and variable costs in different ways.
- Curatio has teamed up with critical partners in the value chain to deliver the right product in the right place, and create the communication at PoPto educate the communities serviced by its franchisees

### Rationale/potential benefits:

- Reduction in the distribution cost of delivering to rural pharmacies
- The model is envisaged as being self-sustaining.
- Extensive training and branding activities are carried out for the franchisees

### Factors to consider:

- It is unclear how a for-profit model would leverage a grant and what it would imply for the grant provider (equity, loan, one time fixed cost)
- The role of chemical sellers and second tier pharmaceutical outlets is a contentious issue within the ministries of health
- Issues around combining pharmaceuticals with other products on the same van/truck (good working practices).

## Reagent rental agreements for diagnostic services

### Overall description:

- Becton Dickinson, a global medical technology company manufactures and sells a broad range of medical supplies, devices, laboratory equipment and diagnostic products, has introduced reagent rental agreements with the MoH in Mozambique
- These agreements include transport, preventative maintenance and upgrading of the laboratory equipment they sell, as well as training of the lab personnel  
As a result, maintenance and transport is no longer a preoccupation of the MoH
- A driving factor behind BD's decision to change their contracting formats was the realization that of the machines don't work, they don't sell the reagents to the labs
- Provision of this service is done through private sector vendors (exclusive representatives) in countries where BD does not have an office; BD trains the vendors in all aspects of maintenance so that the vendors can be competitive using this approach

### Rationale/potential benefits:

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- Allow laboratories and MoH to avoid the tremendous capital outlay associated with the purchase of new instruments
- With the average contract lasting between 3 and 5 years, it allows laboratories to keep up with the latest advancements in diagnostics technology since when a contract has expired, laboratories get older equipment replaced with new instruments that offer them more updated technology
- Improved health service provision through constant access to well-functioning equipment
- Savings for the laboratory in terms of service/maintenance expenses

### Factors to consider:

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- Program implementation required push from organizations such as the Clinton Foundation, despite the existing natural incentives for the private sector companies to offer it

## Capacity development for SC management - BD

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### Factors to consider:

- Program implementation required push from organizations such as the Clinton Foundation, despite the existing natural incentives for the private sector companies to offer it

## Sample movement

### Overall description:

- Early infant HIV diagnosis requires complex and expensive tests with significant logistical requirements, such as blood refrigeration and transportation. By collecting infant blood on dried blood spots (DBS), samples can be created that are both easy to transport and stable for relatively long periods without refrigeration.
- Samples were transported by DHL ; testing was done at national HIV reference laboratory (dedicated technician doing all testing - 48samples/day) and results were returned by fax
- Average turnaround time = 9 days from collection to receiving result in clinic
- Nurses, midwives, doctors were trained in DBS collection:
  - 1 day classroom training (review of HIV testing, data collection, infant test counseling, paperwork, new child health card, slide show of DBS collection)
  - Several days hands-on training
  - Providers usually proficient after collecting DBS on 4-5 infants
- Botswana began its national program for prevention of mother-to-child HIV transmission (PMTCT) in 1999; CDC's Global AIDS Program has provided critical technical and financial assistance to the program since its inception.
- Only 930 infant infections occurred in Botswana in 2005, compared to 4650 infections which would have occurred without the program.

### Rationale/potential benefits:

- Substantial reduction of rates of HIV infection in infants by enabling them early access to appropriate care and treatment

### Factors to consider:

- One-on-one training required for proficiency
- Infants tested often received early therapy, but there was a high rate of loss to follow up

## Interchange of Data Between Administrations (IDA)

### Overall description:

- IDA (Interchange of Data Between Administrations) is a European programme using advances in information and communication technology to support electronic exchange of information between public administrations across Europe.
- Its objective is to set-up and manage networks and services enabling administrations in the Member States and at EU level to exchange data electronically in order to implement European policies and legislation.
- By providing essential tools supporting secure communications across Europe, IDA plays a decisive role in the fulfilment of EU policy objectives and the efficient management of the Internal Market. In particular, IDA is a major contributor to reaching the eGovernment objectives of the eEurope Action Plan.
- IDA is managed by the IDA Unit in the European Commission's Enterprise Directorate General..

### Rationale/potential benefits:

- E-procurement offers more transparency as it allows for easy and timely dissemination of contract information and reduces opportunities and incentives for fraud.
- It also improves the quality of government procurement management, including monitoring and decision-making.

### Factors to consider:

- Practices for disseminating contract related information may differ among Member States as well as requirements for traceability and auditing of e-procurement operations.
- The Public Procurement Network could play an active role in exchanging information and practices on those issues.

## Online sharing of information for procurement

### Overall description:

- **RHInterchange;** The RH Interchange is a free, web-based tool that provides accurate information on past, present, and future supply orders and contains information for 144 countries, on contraceptive order and shipment information from the IPPF, UNFPA and USAID.
- **Global Fund price reporting mechanism;** The Global Fund's purpose is to attract, manage and disburse resources to fight AIDS, TB and malaria. They work with partners in providing important technical assistance during the development of proposals and implementation of programs
- **Pooled procurement :** In 2004, the Rwandan Government and its international and implementing partners pioneered an effective and accountable system to jointly procure antiretroviral drugs (ARVs) for Rwanda. Project partners include the U.S. Government, the Global Fund, the World Bank, and others.

### Rationale/potential benefits:

- Cheaper prices are available through pooled procurement and money is also saved through lower management costs and reduced transportation costs.
- The coordination also has a clinical benefit: since drugs are packaged with different shapes, quantities and inscriptions, leading to confusion and potential non-adherence, the coordinated procurement program reduces the risk of confusion.
- E-procurement offers more transparency as it allows for easy and timely dissemination of contract information and reduces opportunities and incentives for fraud.
- 

### Factors to consider:

- Practices for disseminating contract related information may differ among Member States as well as requirements for traceability and auditing of e-procurement operations.

## Track-and-Trace system- Project Jumpstart (2004)

### **Overall description:**

- Project Jumpstart was formed in 2004 by Accenture, to promote pilots of RFID technology in the pharmaceutical industry supply chain. Participants included consumer goods and pharmaceutical manufacturers, distributors, retailers and associations.
- The 8 week trial tracked 13,000 products from multiple manufacturers through 16 business scenarios and the main focus was to determine how unit-level item serialization could improve supply chain security
- RFID Enables tracing of products from point of manufacturing, through distribution, to the end consumer using a combination of bar codes, Radio Frequency Identification technology (RFID) and GPS; each product is assigned a unique serial number at individual package level and the information is stored in a database enabling the tracing of the product throughout the supply chain

### **Rationale/potential benefits:**

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- Enhancing the safety and security of the pharmaceutical supply chain : when used in conjunction with secure printing, increases protection against counterfeiting of drugs and improves efficiencies in product recalls)
- Increasing the efficiency of distribution operations: when used with asset management software can help reduce shrinkage and theft of stock, improves distribution and gives manufacturers control over storage and transportation of their goods

### **Factors to consider:**

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- Tags can be counterfeited, resulting in erroneous entry of information
- Significant cost per pill
- A track-and-trace network may not be widespread limiting other stakeholders from taking advantage of the system when needed
- RF noise from other RF sources may affect the read quality

## Regional distribution centres - SCMS

### **Overall description:**

- These are state of the art facilities for warehousing and distributing pharmaceuticals and medical equipment
- RDCs are stocked on the basis of anticipated demand from the countries each serve. The inventory plans are based on forecasts and demand history. SCMS has RDCs located in Ghana, Kenya and South Africa, where they distribute ARVs.
- RDCs pool inventory across region, reducing the quantity that needs to be carried at a time and reducing the risk of products expiring before they reach the client
- RDCs are also able to supply clients in consolidated, mixed shipments, thereby reducing the number of inbound shipments to clients and the space required to receive and process deliveries at the client's facilities
- RDCs can significantly reduce the lead time for procurement. Items can be delivered within a month versus the three to six months it takes to order from a supplier

### **Rationale/potential benefits:**

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- Efficiency and cost
- Smaller, regular shipments to protect local systems
- Timely, accurate and safe transport including cold/cool chain
- Delivery of drugs and commodities door-to-door
- Physical security
- Chain of custody from supplier to recipient
- Rapid response to emergency requests

### **Factors to consider:**

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- Requires reliable system and technology for forecasting demand
- Non-availability of records on drug consumption in certain countries hampers the efficiency of RDCs
- Drug leakage distorts information that is fed into the forecasts

## Roll Back Malaria (RBM) Partnership- ExxonMobil

### **Overall description:**

- The Roll Back Malaria (RBM) Partnership, is a partnership between ExxonMobil and Acumen Fund, UNICEF, Sumitomo Chemical (a Japanese chemicals company) and A to Z Textile Mills(an African bed-net manufacturer) to introduce a new mosquito net technology - the long lasting insecticidal treated net (LLIN)- in different countries across Africa
- Sumitomo Chemical transferred the technology to A to Z royalty free and delivered the raw materials, while Acumen Fund provided US\$325,000 of initial debt financing to fund the technology transfer and invested US\$675,000 to establish alternative channels to develop a commercial market. ExxonMobil contributed technical and project management assistance, granted US\$250,00 to UNICEF to support purchase and distribution of the nets, and introduced voucher subsidized bed nets to be distributed at their 410 service stations across 4 countries in Africa
- The A to Z plant now has capacity to produce 3 million nets; market driven scale-up to 7 million nets was planned for 2007

### **Rationale/potential benefits:**

- Vouchers reduce cost of nets by US\$2.75 to at least US\$3
- Currently 1million people have bought the nets

### **Factors to consider:**

- Without adequate monitoring, vouchers could potentially be misused.
- Careful planning and management may overcome these obstacles

## Low Cost Standard Therapeutics (LOCOST)

### Overall description:

- LOCOST is promoting production and distribution of essential drugs at affordable rates, thus countering the market monopoly of brands that are typically beyond the purchasing capacity of the poor.
- While LOCOST started by contracting for the use of spare capacity in the drug industry, it moved into direct production so it could provide affordable medicines to some 300 purchasing NGOs.
- Its direct distribution model through NGOs is ideal for carrying out the educational component critical to LOCOST's operations: awareness-building around the issue of essential drugs and irrational prescriptions.
- As sales volumes climb, LOCOST is expanding its product line, aiming to offer more than 80 percent of India's listed essential drugs.
- LOCOST's location at the centre of the pharmaceutical industry gives it a comparative advantage.

### Rationale/potential benefits:

- Through its network of client NGOs and by fixing a maximum retail price, LOCOST was able to cut production costs by eliminating highly priced marketing campaigns, fancy packaging and middleman.
- LOCOST holds its profit margin to 10 percent profit, which compares to an industry average of 50 to 60 percent.

### Factors to consider:

- The company seems borderline activist against big pharmaceuticals, and the activism may not work in their favour to keep this sustainable

## Drug shop franchising: Mi Farmacita Nacional (Mexico)/ Heathstore (HS) Foundation's CFW shops (Kenya)

### Overall description:

- Franchising is a business relationship in which the franchisor assigns to the franchisees the right to market and distribute the franchisor's goods or service, and to use the business name for a fixed period of time.
- In the case of Mi Farmacita and CFW shops, the franchisor provides franchisees with business infrastructure such as brand, training, dependable supply of products, a proven business model and ongoing marketing and promotional activities
- Inventory is ordered directly from the franchisor and is identical for every pharmacy; once franchisees are set up they have complete autonomy as to how they run their business
- Mi Farmacita is jointly owned by the owners of a major pharmaceutical distributor in Mexico and a major manufacturer of generic medicines; franchisee must provide an upfront franchise fee, annual franchise contributions and capital investment all totaling up to US\$50,000; currently 57 outlets nationwide with sales totaling US\$2.9million in 2007 and hoping to have 500+ outlets by 2009
- The CFW franchise is wholly owned by the HS foundation; franchisee must provide US\$2,000 , 88% of which is subsidized by the HS Foundation ; currently 64 HS shops have served a total of over 750,000patients since inception in 2004 and a network of 200+ locations will be built by 2008 serving between 1.5 and 2 million patients per year

### Rationale/potential benefits:

- Convenient, affordable and high quality primary care to low-income and rural communities (each outlet has a resident physician who sees patients and prescribes medicine)
- Convenient, affordable and high quality generic medicines to low-income and rural communities (pricing is very competitive)

### Factors to consider:

- Franchising thrives in areas where health regulations are not strongly enforced; strict quality control by franchisor is essential for success of franchise chain (risk of franchisees selling fake drugs which may damage franchise brand)
- Communities must have a population of at least 10,000 people or 2,500 families and outlets should be located within a one or two kilometer distance from communities
- Difficulty attracting doctors/nurses because income is less attractive than private sector
- Lack of affordable financing for potential franchisees

## Saafwater

### Overall description:

- SaafWater is a for-profit social enterprise whose mission is to provide affordable clean water to the urban poor in developing countries
- SaafWater is a water treatment solution. The solution is packaged in small cartridges which contain a dose of dilute liquid chlorine and are sufficient to treat one family's water for one day.
- Through the SaafWater loyalty program, end users collect the packaging from their daily cartridges and redeem them for items such as bottles for children to carry clean water, towels, or soap.
- This service is provided by SaafWater sales persons who go door-to-door, educating and selling the SaafWater product to their communities

### Rationale/potential benefits:

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- SaafWater's innovation is in developing a distribution model and selling format that takes this life-saving technology and makes it profitable and rapidly scalable.

### Factors to consider:

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- Because of their high-touch sales and distribution model, SaafWater seeks to work in urban settings.

## NICE Foundation

### Overall description:

- NICE Foundation is a voluntary, non-profit, charity that equips, enhances and partners with NGOs, Community Based Organisations, and Civil Society Organisations in India by implementing need-based social care and development projects, training, research, publication and consultancy services.
- NICE Foundation runs a school health program in public schools in India with clinics in the schools, awareness programs and everything from outpatient visits to cardiac surgery for \$5 per child per year.
- They cover 60,000 children in Hyderabad, are now rolling out the program in Rajasthan and the State's Planning Commission has now included the program in their national plans.
- They are exploring different models of procurement and distribution of pharmaceuticals and health commodities for their school clinics.

### Rationale/potential benefits:

- NICE would benefit from an independent partner to work on a procurement/supply chain management plan when they are scaling up across the country.

### Factors to consider:

- One of the major challenges is dealing with pharmaceuticals because they want to keep costs of drugs low.
- IT solutions for procurement, leveraging buying power for better prices, outsourced distribution with TPL are various elements that need to be built into their PSM strategy
- They are afraid that the government will take over the procurement and distribution of pharmaceuticals and that the price would increase from \$5 per child and year.

## Medicine Shoppe - Sehat (India)

### **Overall description:**

- Medicine Shop, an Indian pharmacy chain has developed a new store format called Sehat (meaning Health) for low-income areas
- The clinic has a qualified doctor who does check ups for patients at a nominal cost - in case the patient also buys from the store he gets a doctor fee as rebate on the medicines he bought, there by getting the check up for free; Sehat also has a community outreach program where health workers visit neighboring households, look for disease symptoms and guide patients to clinics; The medicines prescribed by the Sehat doctor are generic versions of branded drugs, further lowering the cost of medical care to the consumer
- To build awareness of their products and services at the village level, Medicine Shoppe India hopes to partner with one or more rural ICT network orchestrators
- Medicine Shoppe currently operates over 130 stores in 6 states across India and it has successfully piloted 8 low-cost health centres that serve poor communities where more than 6,000 people were served in about 9 months; it plans to open close to 1000 Sehat locations in low-income and rural areas by 2010
- Sehat shops are co-funded by Acumen

### **Rationale/potential benefits:**

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- Improved access to primary care and medicines in low-income areas by providing health consultations at nominal cost, and the appropriate medicines at affordable prices
- Partnering with an existing pharmacy chain lowers the barriers for entry since the cost of real estate is a deterrent in setting up medicine shops in cities

### **Factors to consider:**

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- Scalability depends in part, on the availability of doctors who are willing to work in the Sehat shops and get paid less than in the private sector
- Medicine shops should be located in a residential area to have a sufficient market

## Distance Health Advancement (DISHA) initiative

### Overall description:

- Public-private sector initiative between a government agency (ISRO), the largest healthcare service provider in Asia (Apollo), one of the most respected NGOs in the country (DHAN) and a global leader in imaging and medical diagnostics (Philips) for providing distance healthcare to the underserved people
- Philips has custom-built a tele-clinical van complete with diagnostic equipment, including an ultrasound machine, X-ray machine, a defibrillator and an ECG machine. This van, with dedicated doctors and other paramedical staff, will travel to identified locations once a week and it is expected to cover a population of 500,000 in the areas around Theni district
- ISRO is providing the connectivity through VSAT and allocating the required bandwidth on its INSAT satellite free of cost
- The Apollo Specialty Hospitals, Madurai, is the referral hospital for the DISHA mobile tele-clinical van. Apollo will make available to Philips the required doctors and paramedical staff in the van, as also train the medical and paramedical manpower.
- DHAN will provide counselling (through domiciliary follow-ups) to the patients on nutrition and hygiene as well as train volunteers from the villages in counselling.
- Many states are introducing the technology in India

### Rationale/potential benefits:

- Cost savings of up to 81%
- Gain access to qualified physicians, high quality diagnostics, and specialized healthcare
- Get faster and reliable diagnosis
- Increase visibility of diagnostic healthcare and referral base
- Facilitate diagnosis, and pre- and post-operative care
- Reduce crowds at hospitals (tertiary care)
- Spread knowledge, educate

### Factors to consider:

- Technical issues included diagnostic and connectivity equipment installation and testing, and guaranteeing the necessary maintenance support
- Healthcare regulations and licensing

## Social Marketing- PSI Society for Family Health (SFH) project Nigeria

### Overall description:

- A comprehensive social marketing program where emphasis is placed on affordable pricing and extensive branding/marketing: (1) products and services are sold at subsidized prices, (2) effective peer education and behaviour change communication are done by brand-specific advertising as well as by generic educational campaigns for various reproductive, HIV AIDS and malaria products
- Following research into country context, PSI establishes an office and distribution system in country of operation and sells the products through the wholesale and retail network (using NGOs to distribute products in remote and difficult-to-reach areas), primarily to lower-income persons; Products and services are branded, attractively packaged, widely marketed, effectively promoted to the poor and selected target groups, and sold at low prices affordable to the poor
- SFH has distributed more than 3.7 million pre-packaged treatments to children under five ; in January 2006, SFH launched the first social marketed ACT on the commercial sector in Africa and expects to see this pilot program rapidly expand nationwide
- Products are donated to PSI by foundations, multilateral international organizations, or the overseas development agencies of donor governments; alternatively, donors provide funds to PSI, which procures products at favorable rates on the international market

### Rationale/potential benefits:

- PSI operates mainly in the private sector, and often has a formal agreement with the host government
- PSI is able to recover a percentage of operating costs through sales revenues, sale of multiple products to spread overhead and high sales volume to reduce per unit cost.
- Products and services are sold at subsidized prices rather than given away in order to motivate commercial sector involvement
- Communications approach improves treatment seeking behavior and compliance

### Factors to consider:

- Research into country context is essential for success of initiatives
- Social factors act as an access constraints on women, young and old in many countries

## Mission for Essential Drugs and Supplies (MEDS)

### Overall description:

- MEDS is a Christian, non-profit making organization based in Nairobi that seeks to provide a reliable supply of essential drugs and medical supplies at affordable prices, and to improve the quality of patient care through training in all aspects of health and general management
- It is funded by non-profit NGOs and charities including: Actionaid, Interchurch organization for Development Cooperation of the Netherlands, Cordaid and Ecumenical Pharmaceutical network
- Over 700 different types of essential drugs, medical & surgical supplies, laboratory reagents and publications are stocked at the warehouse

### Rationale/potential benefits:

- Includes a 2% mark-up in its prices to cover distribution, and strongly recommends to clients that prices should not exceed an additional 5% to the health facility
- Provides a training program on clinical management of HIV/AIDS

### Factors to consider:

- A similar distribution centre , KEMSA, serving both the private and public sector, exists in Kenya.

## Micro insurance: CARE + Allianz (India)

### Overall description:

- CARE international is an aid agency which, together with global insurance company, Allianz , is offering community health insurance in the southern Indian region south of the city of Chinnai
- Packages covering natural catastrophes and accidents will be available for 16 cents a month and are customized according to the needs and requests of local communities who are themselves involved in designing policies
- Villagers pay monthly insurance premiums into a community fund or mutual; the Community fund retains 65 % of the premiums to be used for medical treatment up to an agreed-upon ceiling and the remaining 35% is given to Allianz's India branch, Bajaj Allianz, to be used to cover ceiling excess
- In case of an illness, a doctor appointed by Bajaj Allianz and CARE treats the villagers and, if necessary, sends them to partner hospitals in the region; Most medical treatment is covered by the Mutual fund up to a ceiling, agreed in advance by the community itself; Bajaj Allianz covers any costs above that amount, such as surgery or other complex procedures
- Within a year, there is an expected market of 200,000 clients between the ages of 18-70 while in the long run market potential is up to 250 million

### Rationale/potential benefits:

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- Healthcare micro-insurance has the potential to reduce malaria morbidity and cost of care through early treatment

### Factors to consider:

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- Pricing is often focused on what people say they can afford rather than being linked to the cost structure of the benefits
- In many countries there is no legal framework for communal funds

## Servi Peru

### Overall description:

- ServiPeru is a cooperative and insurance brokerage firm in Peru which focuses on two services: funeral services and preventive health care for low-income clients who are insured through a separate firm, the ServiPeru insurance brokerage. ServiPeru is a cooperative and its target clients are people who work in the informal economy and insure themselves through the alliance with the ServiPeru insurance brokerage.
- The basic insurance policy is called "Previsión Familiar" [Spanish for Family Foresight]. Clients make monthly payments on their policies and they or their family members may access funerary services or basic health care at facilities operated by ServiPeru.
- The fact that the benefits of the insurance are offered as services rather than as cash payments or reimbursable expenses has been a factor that has encouraged low-income sectors to buy into the plan.

### Rationale/potential benefits:

- This approach overcomes some of the market's inherent aversion to insurance, permits greater control over the quality of services, and helps accommodate specific characteristics of the micro-insurance market.

### Factors to consider:

- Setting up a medical center is costly, which has limited the number and variety of medical services the program offers and restricts the client base to people who live within a reasonable distance of the medical facility
- Focusing the policy on people with unstable incomes causes frequent policy lapses or cancellations and higher premium collections and renewal fees

# Voxiva

## **Overall description:**

- Voxiva HealthNet™ is an information management system that allows governments, international organizations and NGOs by facilitating real time data collection from field workers and health care staff and supporting program monitoring, drug and critical supply tracking, supervision and training, and lab reporting , as well as incorporates an electronic record of patient data
- Initial deployment was implemented to support the Rwandan Government's rapid scale up of its ARV treatment program, under the leadership of the MoH, the Treatment Research and AIDS Centre (TRAC), and the Centers for Disease Control.
- In Rwanda, system was designed to collect, store, retrieve, and disseminate critical program, drug, and patient information related to HIV/AIDS care and treatment, and is deployed in all 94 health facilities offering ART in Rwanda (approx. 6,000 individual case records are monitored)
- More than 200 site level users have been trained to submit monthly program indicator reports and weekly consumables (drug) reports
- Most users (more than 90%) access the system via a toll-free telephone interface
- Acumen Fund has an equity investment in the project

## **Rationale/potential benefits:**

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- Providing a central repository of HIV/AIDS program information
- Delivering real-time information for decision-making , transforming a largely paper-based one way information flow that took several weeks, into a bi-directional data exchange completed in seconds to support feedback and supervision

## **Factors to consider:**

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- Success is dependent on availability and efficiency of Information and Communications Technology in the country of operation

## Health data systems (Kenya/Zambia)- UN Foundation/ Vodafone Partnership

### Overall description:

- The Health data system platform consists of handheld PDAs donated by Palm and open-source software called EpiSurveyor created by DataDyne that supports unique user-modified surveys. Through training funded by UNF-VGF, this model builds local capacity and allows WHO and Ministry of Health officials to adapt the technology to meet their needs
- A total of US\$2,084,467 was used to fund the project
- The program was piloted in Kenya and Zambia with the collection of health supervisory data and is being expanded to 10 additional African countries in 2008.

### Rationale/potential benefits:

- In Kenya data collection is now done using an integrated survey that collects data for multiple health applications (e.g. malaria, nutrition, child health) and is overseen by a single cross department champion – a change since program inception

### Factors to consider:

- Little capability to conduct analysis in the field and little evidence of decision-making that used the data:
- Limited resources for logistics restrict health facility visits
- Program structure reaches only 10% of possible facility visits
- Palm platform increases equipment and training costs.  
“Important to have it connected to regular GSM” – CDC/WHO Public Health Official

## HealthNet Uganda

### Overall description:

- HealthNet Uganda was started in 1998, and is pioneering the use of Personal Digital Assistants (PDAs) in the African healthcare sector to provide practitioners with real-time access to vital information. The technology also allows for easier consultation, real-time ordering of medicines, and access to medical journals - all of which improves the quality of Uganda's health care system.
- HealthNet Uganda's leadership and strategic planning have allowed it to successfully transition from a grant-funded project to a stand-alone non-profit organization, in part due to its ability to secure support from the Ugandan government.
- By introducing cutting-edge technology within an innovative business model, HealthNet Uganda is successfully working to improve the health of millions of citizens.

### Rationale/potential benefits:

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- PDAs enable the user to increase time efficiency in data collection. Customized forms are available on the PDA to effectively manage the collection of information
- PDAs allow for instant and constant flow of information between health workers

### Factors to consider:

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- PDAs are very expensive (US\$75) especially to rural folk in developing countries. This limits the scalability of the technology.
- Wireless technology is an enabler of PDAs and has to be available and this is not available in most developing countries

## Capacity Development- DHL/ TRANSAID partnership (Zambia/Malawi)

### Overall description:

- Initiative includes provision of professional training to commercial vehicle drivers and development of relevant legislation in Malawi and Zambia
- In addition to the development of the curriculum Transaid is focusing on training existing trainers and training staff from the Zambian Road Transport and Safety Agency (RTSA) and Malawian National Road Safety Council (NRSC) to enable them to disseminate the new curriculum to the various training establishments which will be responsible for training the public
- Governments of Zambia and Malawi developed with Transaid a set of professional driving standards to improve the efficiency and driving safety in the transport sector
- Once these mechanisms are in place Transaid will help government authorities create a system to monitor the quality of training in the driving schools and to set up a registry trained drivers
- Transaid intends to scale up the project and apply these standards across the SADC region
- Funded by the Exel Foundation, which is in turn part-funded by DHL

### Rationale/potential benefits:

- More efficient operations of the commercial transport sector and safer roads
- Ultimately, the cost of everyday goods and services will fall and their availability will increase

### Factors to consider:

- There are no internationally recognized professional driving standards across Southern African borders

## Tanzania's Private Sector Initiative

### Overall description:

- Large corporations invest capital, expertise and technology thereby improving the quality and speed of delivery of local products, and then act as a market for products of local SMEs during the early stages of development
- SME linkages transactions doubled in 2 years from US\$21m in 2002 to US\$45m by 2004
- The PSI is based on a similar program in South Africa, the Small Business Project, which provides links between 80 corporations and resulted in the creation of 3000 jobs and investment of over 1 billion Rand between 1998 and 2003
- With funding from the UK's Department for International Development Business Linkages Challenge Fund, 8 companies started the PSI Tanzania in 2001
  - 2001-2003: focus in improving budgetary decision-making and supply chain development, investing US\$21m in local SMEs
  - 2003-2005: focus on local ownership of the initiative. PSI doubled its membership to 17 corporate members
  - 2005- : creation of a web-enabled intranet-based database inclusive of on-line supplier ratings and recommendations available to members. Each member also adopted one high potential supplier for mentorship
- The project has been rolled out in Angola and Malawi

### Rationale/potential benefits:

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- Increased technology flows, improved supply chain management capacity and access to markets for smaller firms

### Factors to consider:

---

- Assumption by SMEs that quick monetary support will be provided by the PSI
- Raising awareness of existence and benefits of PSI to other corporations

## F.2. Initiatives at the Concept Stage of Application to Health Supply Chains

### Cell phone assisted payment: Overview of initiative

#### Overall description:

#### **Leveraging cell phones for financial payments:**

- Cell phone payments have been used in some areas (e.g. Ghana – political party fundraising, lottery, Kenya – M-PEFA), but is still in the conceptual stage in the areas of health supply chains
- Working capital requirements have increased as demand for health services has grown. Cell phone assisted payment is an opportunity for the private sector to enable people or organizations to make local or international payments without having to transport money
- Credit transmitted by phone may either be used as credit or cashed out at a local cash dispensing point; Geographical coverage depends on cell phone coverage and cash point network coverage
- Once a payer sets up an account, he/she may pay any participating organization by dialing their phone number, then entering the amount and a PIN number. The fee for service of 1-2% may be paid by the patient or the pharmacy.
- This could be used between any health care supply chain entities (patients, pharmacies, hospitals, national health insurance, warehouses, government). The payment provider is also able to provide an information system to track transactions.
- Cash points could be bank outlets, microfinance institutions, gas stations, merchants... The cash point must have reasonable security and enough cash on hand.

#### **Leveraging cell phones for information Collection:**

- Cellphones can provide information for monitoring and fighting communicable diseases (serving as an early warning system for epidemics) or as tool to send information on levels of stock of drugs.

#### **Rationale/potential benefits:**

- Insures that cash is used as intended (e.g. to pay “Mom’s” hospital bills);
- Reduces cost and/or effort and improves speed of payment. International payment fees may run as much as 10%;
- Reduces working capital requirements;
- Reduces facility indebtedness;
- Improves discipline and budget management along the supply chain by monitoring and reporting on financial flow timeliness and status. There may also be opportunities to extend credit appropriately.

#### **Factors to consider:**

- This is an emerging area
- Highly dependent on regulatory environment
- Dependent on co-operation of banks
- Dependent on infrastructure and technology availability
- This problem is likely to exist in many countries, and may be exacerbated when the country moves to decentralized budget management and multi-echelon payment flows, as is the case when the country establishes a National Health Insurance system
- Indebtedness may limit purchases from both public sector and private sector supply sources

## ChileCompra- e-procurement

### **Overall description:**

- As part of its “Digital Agenda”, Chile initiated an electronic procurement portal, ChileCompra. It was established in 1999 to consolidate government contracting into a single, online portal for smooth and equitable business contracting between the government and private enterprise.
- The ChileCompra started by mandating that all federal contracts be fulfilled through ChileCompra
- Chile began the digital readiness campaign by building out broadband capacity, promoting digital literacy and encouraging businesses to use ICT for global competitiveness.
- Greater national productivity, social equity and public sector transparency are among the objectives
- ChileCompra is managed by the private sector and handles 18% of public procurement
- By 2006 the portal incorporated the buying power of nearly 900 government agencies, collectively accounting for \$3.4 billion in contracts and 4000 suppliers were registered in 75 areas
- ChileCompra recently added an electronic catalogue for business to business and government purchases. In 2006 it included 74,000 products with transactions worth over US\$120 million

### **Rationale/potential benefits:**

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- Provides list of state providers to public agencies
- An opportunity to access the purchase demands of the state
- Reduction of barriers to access for smaller businesses
- Transparency in the bidding process
- Increase efficiency and reduction in management and mail and courier costs. Taxpayers in Chile are saving approximately \$60million a year

### **Factors to consider:**

---

- Lack of availability of internet systems and computer technology in remote or rural areas limits the scalability of e-procurement
- E-procurement is mostly beneficial to larger business, who reduce costs by centralizing their procurement processes

## Allpay

### **Overall description:**

- Objective is to make drugs for critically ill people more easily accessible, while at the same time decreasing traffic at hospitals and generally making the process of treating critically ill people more cost effective
- Currently, critically ill people have to regularly join waiting lines at hospitals to get the prescriptions for their day-to-day drugs; the solution being considered is to introduce the Allpay system (developed by a PPP between ABSA Bank and South Africa Revenue services and currently utilized for the pension payouts) in pharmacies as the system to identify the critically ill patients. With the exception of HIV patients, critically ill patients tend to be elderly people, who are also the ones familiar with the pension payout system. The system uses a fingerprint reader to identify the person (as well as a smart card to where the pension money is downloaded and can then be used at several ATMs).

### **Rationale/potential benefits:**

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- Make process for prescribing drugs for critically ill people more efficient
- Decrease traffic at hospitals
- Improve monitoring of programs for critically ill people (such as distribution of ARVs)

### **Factors to consider:**

---

- Cost charged by ABSA to operate system (since they won't have the benefits that the current Allpay system provides in the form of new banking customers)
- Younger critically ill patients don't have yet their data on the system

## Agent model for product registration

### Overall description:

- Objective is to support large pharma companies in starting real scale operations in Africa by assisting them for product registration abroad
- Solution being considered is for Broadreach to set up an arm to work as a trusted broker/coordinator on the ground for large pharma companies who don't want/know how to initiate scale operations in Africa.
- First step will focus on product registration (having one person who knows and is regularly in contact with all the regulatory organizations to contact and builds a relationship with them and can help push through product registration down from 2-3years to 6 months.
- Second step is to develop into a trusted broker between the pharma company and the local players in terms of distribution , etc, while at the same time providing accountability and tracking (e.g., using technology from IBM) for the shipped products so that they don't end up back in the US black market.

### Rationale/potential benefits:

- Access to drugs and medical supplies currently not being commercialized in some developing countries
- More efficient management of complex distribution networks

### Factors to consider:

- Initial investment in recruiting, training and systems
- Business model relies heavily on achieving scale per step investment

## Disease Monitoring/ Control Hub

### **Overall description:**

- Objective is to identify trends and hot spots for specific diseases to better identify disease breakouts and address them in a more effective manner by engaging both the 50% of private sector health providers in SA as well as the public ones
- Solution being considered is to set up a disease monitoring and control hub ("war room") in South Africa, with centralized intelligence data gathering through an interface that feeds of the different and already existing databases in the country, and with sufficient resource mobilization power to address the trends/outbreaks identified (e.g., will incorporate a health economist to cost the different approaches being discussed, and thus make the necessary funding request to Treasury faster, as well as incorporate an implementation team).
- Idea has strong support from the government and some donors. Set up being planned is for the organism to sit outside of government but linked to government, with a clear mandate and power to consolidate all the players.
- Concept to be piloted in SA and then slowly to be made regional, incorporating the neighboring countries.

### **Rationale/potential benefits:**

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- Reduction in healthcare costs associated with lower spread of outbreaks that are caught early on
- Improved quality of health for citizens living in areas likely to be most affected
- More efficient allocation of scarce healthcare resources for monitoring and evaluation
- Systematic learning with regards to what activities and projects work and what doesn't, so that future decisions can build on success

### **Factors to consider:**

---

- How to engage and link the private sector providers to the Hub so that they play a relevant role

## “Pharmacy in-a-box” concept

### Overall description:

- Objective is to make self-prescription drugs and knowledge accessible to the poor, in places that are convenient for them (the “bazaar shop” at the taxi rank rather than the pharmacy at the shopping centre), at the same time decreasing the traffic at hospitals and costs for the people who end up going to private practitioners with no real justification. Currently the poor spend money they can’t afford going to private practitioners or join waiting lines at hospitals because they don’t have the minimum knowledge about simple conditions and self-medication
- Solution being considered is to give basic training to “bazaar shop” owners with regards to self-medication and use the daily distribution network of bread trucks to the “bazaar shops” to deliver a box of self-prescription drugs (in a pre-arranged mix). Demand data for the limited number of drugs available in the box would be taken down by the truck driver, who would replenish the stock as needed on his daily trips.
- Once the shop owner realizes the value he could be making out of selling drugs, start the “pharmacy in-a-container” concept, in which the owner allows for a portion of the shop space to be allocated to sell schedule 1 and 2 prescription drugs.
- All players involved have incentives to contribute to the initiative:
  - PHD would distribute more drugs
  - Bread trucks would share their transportation costs
  - Shop owners would make more revenues

### Rationale/potential benefits:

- Make self-prescription drugs and knowledge around its use more accessible and convenient
- Decrease traffic at hospitals
- Decrease costs for the people who end up going to private practitioners with no real justification

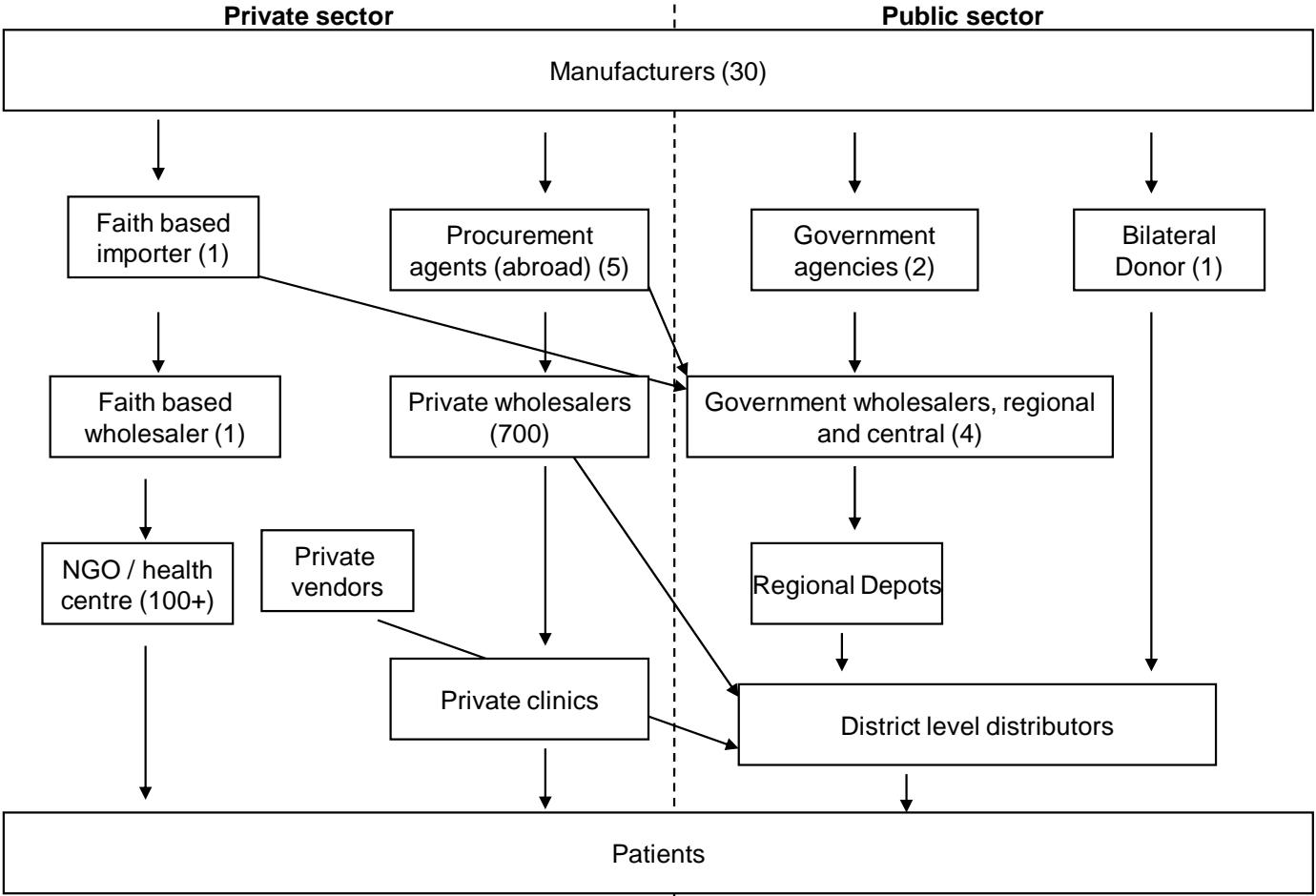
### Factors to consider:

- The idea requires a basic level pharmacist to be there. A potential solution would be to give a bursaries for the 2 year training

## **Appendix G: Examples of Country and Product Specific Supply Chains**

# ARV Supply Chain – Kenya

## Mapping of players



## ARV Supply Chain – Kenya

### Supply chain characteristics

#### **Supply chain characteristics:**

- Complex network of parallel channels, AIDS drugs are expensive due to royalties that should be paid to patent holders, and limited research in the field
- Highly competitive

#### **Supply chain structure:**

##### *Regulation:*

- Companies require licensing to process drugs
- Ministry of Health regulates all Government hospitals and procures drugs on their behalf
- Parallel importation of generic pharmaceutical products
- weak enforcement of regulations

##### *Importer / national wholesaler structure:*

- The Kenya Medical Supplies Agency (KEMSA) is the national wholesaler for government hospitals and clinics as well as some private health facilities
- KEMSA purchases about 30% of the drugs in the Kenyan market through an open-tender system
- Local Manufacturers compete with MNCs
- Kenya is the largest producer of pharmaceutical products in the COMESA region, supplying 50% of the region's market. Of the region's 50 recognised pharmaceutical manufacturers, 30 are based in Kenya

##### *Regional wholesalers / shops:*

- Pharmaceutical products are channeled through pharmacies, chemists, health facilities and shops
- There are 700 wholesalers and 1,300 retailers
- KEMSA, MEDS (Church-based organisation) and private wholesalers compete as suppliers
- Most private sector suppliers do not reach remote areas due to high distribution costs
- Most NGOs contract transporters to deliver goods to specific destinations where they support programs

##### *Public supply chain:*

- Supply to public hospitals based on a 'push' system
- KEMSA has a regular distribution system which covers the entire country and delivers monthly to government hospitals and quarterly to Gvt rural health facilities. Part of the supplies are distributed using the kit system

Source: Kenya's Pharmaceutical Industry Report 2005

# ARV Supply Chain - Kenya

## Enabling environment

### **Basic information (2007):**

- Population: 36.9 million
- GDP/capita: \$1,600
- GDP growth Rate: 7%
- Area: 582,650 sq km
- Urban:Rural population: 39%:61%
- Healthcare spending as % of GDP: 4.1%
- Health expenditure/capita: \$20.1
- Doctors per 100,000 people: 15

### **Regulatory context:**

- The patent protection of pharmaceuticals is based on the African Regional Industrial Property Organisation patent system
- The Kenya Industrial Property Bill (2001) allows Kenya to import and produce more affordable drugs
- Pharmacies are accorded a 25% mark up on retail drugs

### **Infrastructure characteristics:**

- Public service personnel are poorly remunerated, have poor attitudes toward work and very low morale
- Most health facilities are dilapidated and in need of renovation
- Kenya's road networks consists of 63,000km, 7,500km of which are paved, and most major roads are of mixed quality.
- Networks offer good coverage but some parts are not directly linked

### **Disease prevalence:**

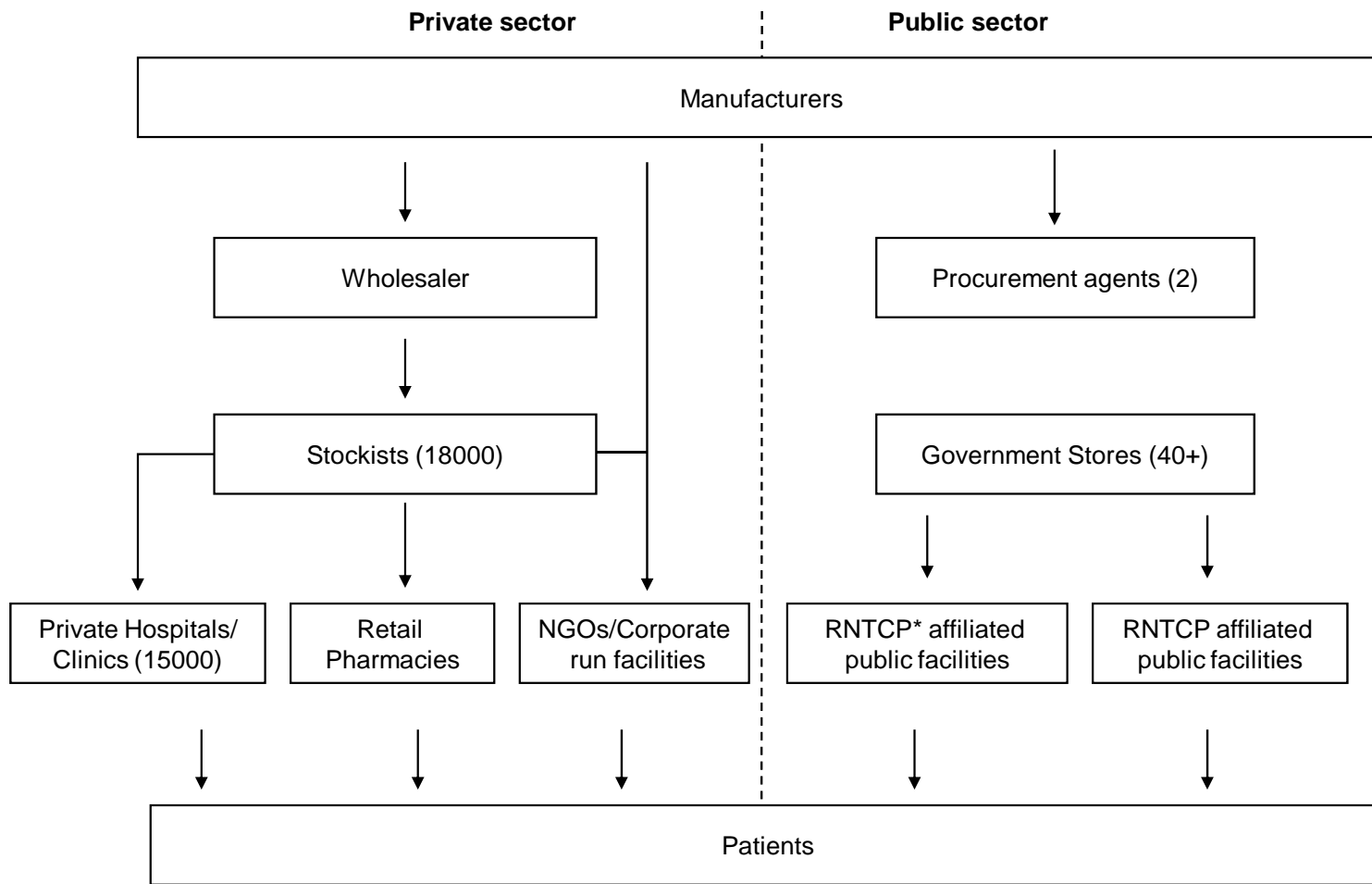
- Estimated 1.2 million people living with AIDS
- Adult Prevalence rate: 6.7%
- Approximately 140,000 deaths annually
- Approximately 65% of adults living with AIDS are women
- HIV prevalence rates are much higher among urban residents

### **Financing**

- Out of pocket expenditure accounts for 53% of total cost of healthcare, 25% from Government, 15% from Social health Insurance and 5% from private prepaid plans and 2% from non-profit institutions
- The National Hospital Insurance Fund is the largest financier of health services apart from government, with over 400 hospitals accredited
- There are 10 Health Management Organizations that support about 200,000 medically covered persons

# TB drugs Supply Chain – India

## Mapping of players



Source: Global Alliance for TB Drug Development, Country specific case study of TB Distribution Channels 2006  
 \*Revised National TB Control Program

# TB drugs Supply Chain – India

## Supply chain characteristics

### **Supply chain characteristics:**

- Private sector estimated at USD69.7m or 74% of total TB drug market
- Parallel supply chain network
- Small divergence ratio

### **Supply chain structure:**

#### *Regulation:*

- Government de-regulated TB drugs as a result causing prices to soar

#### *Importer / national wholesaler structure:*

- Private manufacturers work with a series of wholesales who sell drugs at the ex-manufacturing price to private stockists (distributors)
- Government manufacturers are selected via a centrally run bid and tender process

#### *Regional wholesalers / shops:*

- Stockists sell at a predetermined marked up price of 8% while retail pharmacies add a mark up of 16%
- The pharmaceutical sector is almost exclusively in the private sector and drug stores are mostly run by pharmacy-qualified individuals.

#### *Public health supply chain*

- The government recently launched a National Rural Health Mission to improve the availability of and access to quality health care by the people, especially those residing in rural areas, the poor, women and children. Under this scheme, each village will have a female Accredited Social Health Activist (ASHA) who will be the interface between the community and the public health system
- India has one of the largest private healthcare sectors in the world, with an estimated 8 million private practitioners. In addition, there are a large number of voluntary organizations providing health care.
- Shortage of funds has been primarily responsible for the non-availability of facilities per norms; provision of inputs such as drugs, equipment and facilities remain inadequate.

# TB drugs Supply Chain – India

## Enabling environment

### **Basic information (2007):**

- Population: 1,130 billion
- GDP/capita: \$2,700
- GDP Growth Rate: 9.2%
- Area: 2,973,190 sq km
- Urban:Rural population: 28%:72%
- Healthcare spending as % of GDP: 5%
- Health expenditure/capita: \$31.4
- Doctors per 100,000 people: 58

### **Regulatory context:**

- While drugs and pharmaceuticals are regulated by the Ministry of Chemicals and Fertilizers, the standards for new drugs are enforced by the Central Drug Standard Control Organization under the Ministry of Health & Family Welfare.
- A series of policies have been formulated since 2000. Important among them are the revised National Health Policy (2002), National Policy on Indian System of Medicine and Homeopathy (2002), and National Pharmaceutical Policy (2002).

### **Infrastructure characteristics:**

- There is sub optimal utilization of health centres due to inadequate human resources, lack of drugs and laboratory.
- Increased urbanization has resulted in increased slums and as such urban health has become an issue of great concern
- Much of the rural population does not have access to common infrastructure like connectivity, electricity, health and drinking water
- Complex characteristics of rural India include inaccessible terrain and geographically dispersed hamlets/villages. (many of whom have populations between 1000-1500)
- Despite many IT initiatives taken up, India stands as 37th among 82 nations with network readiness index (NRI) as 3.89 (7 Point scale), 70th for ICT infrastructure. This indicates that a lot of improvement is needed in the national scenario.
- Challenges in deploying land-line connectivity in rural areas

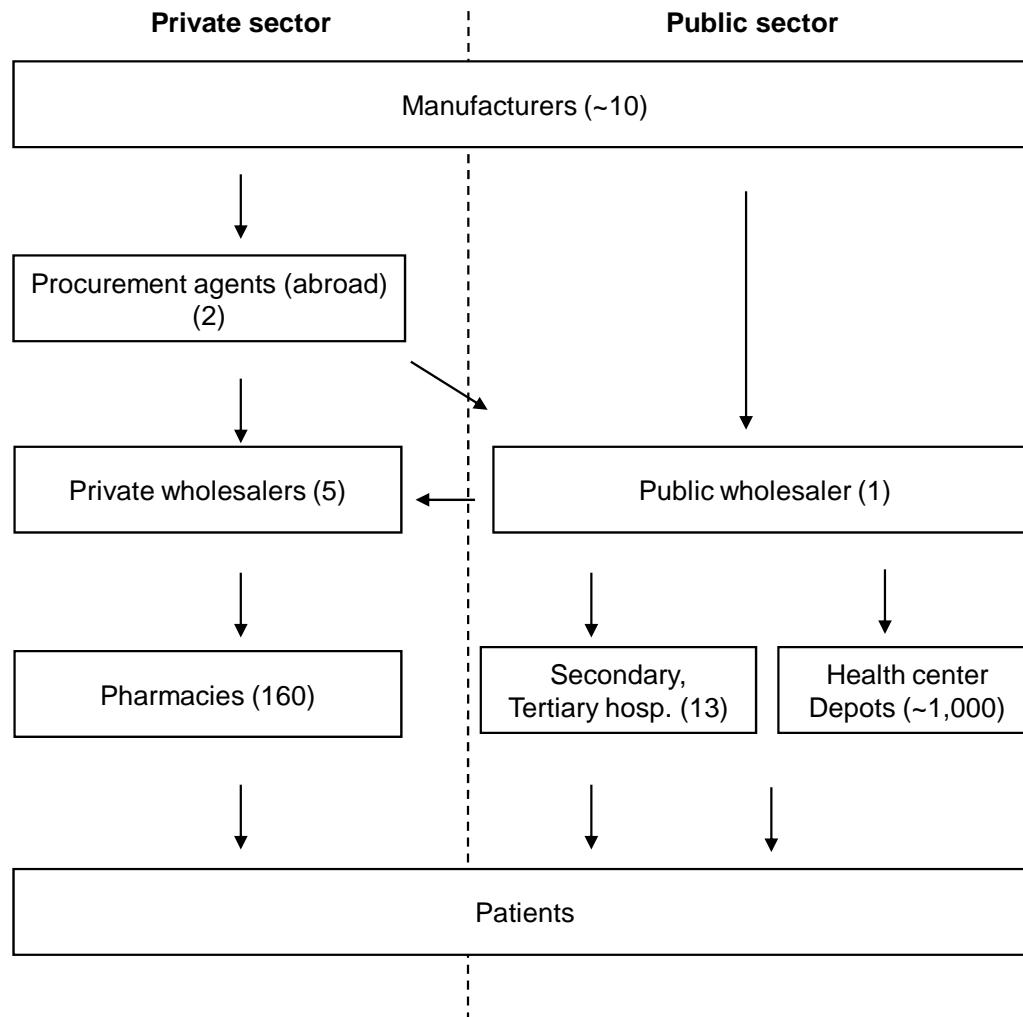
### **Disease prevalence:**

- Estimated 1.8 million new cases annually
- Approximately 40% of population living with TB
- 370,000 deaths due to TB each year
- Over 1000 deaths a day
- 2 deaths every 3 minutes
- India has the highest TB incidence and accounts for one-fifth of the global incidence

Source: CIA World Factbook; HIV/AIDS policy fact sheet, Kaiser Foundation, [www.nationmaster.com](http://www.nationmaster.com), WHO Statistics

# ACT Supply Chain – Burkina Faso

## Mapping of players



Source: Country visit April 2007

# ACT Supply Chain – Burkina Faso

## Supply chain characteristics

### **Supply chain characteristics:**

- Highly technically regulated
- Low channel choice
- Low number of outlets
- Strong leadership by public sector (e.g. against counterfeits)
- *Francophone 'archetype'*

### **Supply chain structure:**

#### *Regulation:*

- Strict mark-up regulation at all levels – government prescribed mark-ups for importers/wholesalers and pharmacies (~29%)
- Separate mark-up structure for low cost generics (~75%) at retail level
- Private sector distribution only to private pharmacies and health centers

#### *Importer / national wholesaler structure:*

- Approx. 5 national wholesalers – some wholesalers are sister companies of Cameroon wholesalers (regional integration)
- Most purchases are through procurement agents abroad (Europe), who integrate orders for wholesalers
- Private wholesalers are also allowed to purchase essential medicines from the central medical store (generics)

#### *Regional wholesalers / shops:*

- No regional wholesalers exist, distribution is directly to pharmacies and private health centers
- Few private sector pharmacies, most in urban areas

#### *Public supply chain:*

- One central level medical store, with distribution fleet
- Provide medicines to hospitals and health centers – cost of transportation is included in wholesaler mark-up
- Public sector institutions only official distributors of medicines in rural areas – no drug shop format as in TZ
  
- In addition to the public sector, there is the army's health services system, as well as a private health sector flourishing in urban centres, offering a patchwork of more or less qualified practitioners. As in other countries of this region, the private sector is largely made up of the private practice of professionals on the state's payroll, a practice that is technically illegal but tolerated.

Source: Country visit April 2007

# ACT Supply Chain – Burkina Faso

## Enabling environment

### Basic information (2007):

- Population: 15,264,735
- GDP/capita: \$1,300
- GDP Growth Rate: 4.2%
- Area: 274,200 sq km
- Urban:Rural population: 19%:81%
- Healthcare spending as % of GDP: 5.6%
- Health expenditure/capita: \$19
- Doctors per 100,000 people: 6

### **Infrastructure characteristics:**

- Access to clean water: (urban 82%, rural, 44%)
- Access to electricity: (urban 40%, rural 0%)
- Telecommunications - fixed-line connections stand at less than 1 per 100 persons; mobile-cellular usage, fostered by multiple providers, is increasing rapidly from a low base
- Landlocked country
- In 2004 not even one in ten people had access to computers and mobile phones or access to the Internet.

### **Regulatory context:**

- Laws regulating the private sector are not applied, and there are no constraints on who may offer services on the market, nor on the quality or safety of their treatments. The fact that most establishments are not listed anywhere and that no one in authority has an up-to-date listing of providers in the private sector is a good indication of the extent to which the regulatory function has been abandoned and of the extreme disorganization of this sector.

### **Disease prevalence:**

- 43 out of every 100 000 people are infected with malaria
- Only two percent of children under five sleep under treated mosquito nets and only 12 percent of the population uses adequate sanitation facilities
- Estimated deaths (in 1000s) 25.710

Source: CIA World Factbook; World Health Organisation Statistics, International Development Research Center

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# ACT Supply Chain – Cameroon

## Supply chain characteristics

### **Supply chain characteristics:**

- Highly technically regulated
- Limited channel choice
- Low number of outlets
- Weaker public sector role (e.g. illegal imports from Nigeria prevalent)
- *Francophone 'archetype'*

### **Supply chain structure:**

#### *Regulation:*

- Strict mark-up regulation at all levels – government prescribed mark-ups for importers/wholesalers and pharmacies (~33%)
- Private sector distribution only to private pharmacies and health centers

#### *Importer / national wholesaler structure:*

- Approx. 10 national wholesalers, 3 with large operations
- Most purchases are through procurement agents abroad (Europe), who integrate orders for wholesalers
- Private wholesalers are also allowed to purchase essential medicines from the central medical store (e.g. subsidized ACTs)
- Large share of illegal imports (est. 40% of market)

#### *Regional wholesalers / shops:*

- No regional wholesalers exist, distribution is directly to pharmacies and private health centers
- Most pharmacies in urban areas

#### *Public supply chain:*

- One central level medical store, 10 regional medical stores distribute to hospitals and public health centers
- Secondary, tertiary hospitals often directly supplied from CMS
- Faith based organizations often have their own supply chain and also access public sector supply chain for essential medicines

# ACT Supply Chain – Cameroon

## Enabling environment

### **Basic information (2007):**

- Population: 18,467,692
- GDP/capita: \$2,100
- GDP growth rate: 3.3%
- Area: 475,440 sq km
- Urban: Rural population: 53%:47%
- Healthcare spending as % of GDP: 5.2%
- Health expenditure/capita: \$49
- Doctors per 100,000 people: 19

### **Infrastructure characteristics:**

- Cameroon's road system is partially developed, but many rural roads are heavily eroded and poorly maintained
- Most provincial capitals are accessible through decent roads, but many rural areas are more difficult to reach, while mountainous terrain and annual torrential rains seriously degrade the road system in many areas.

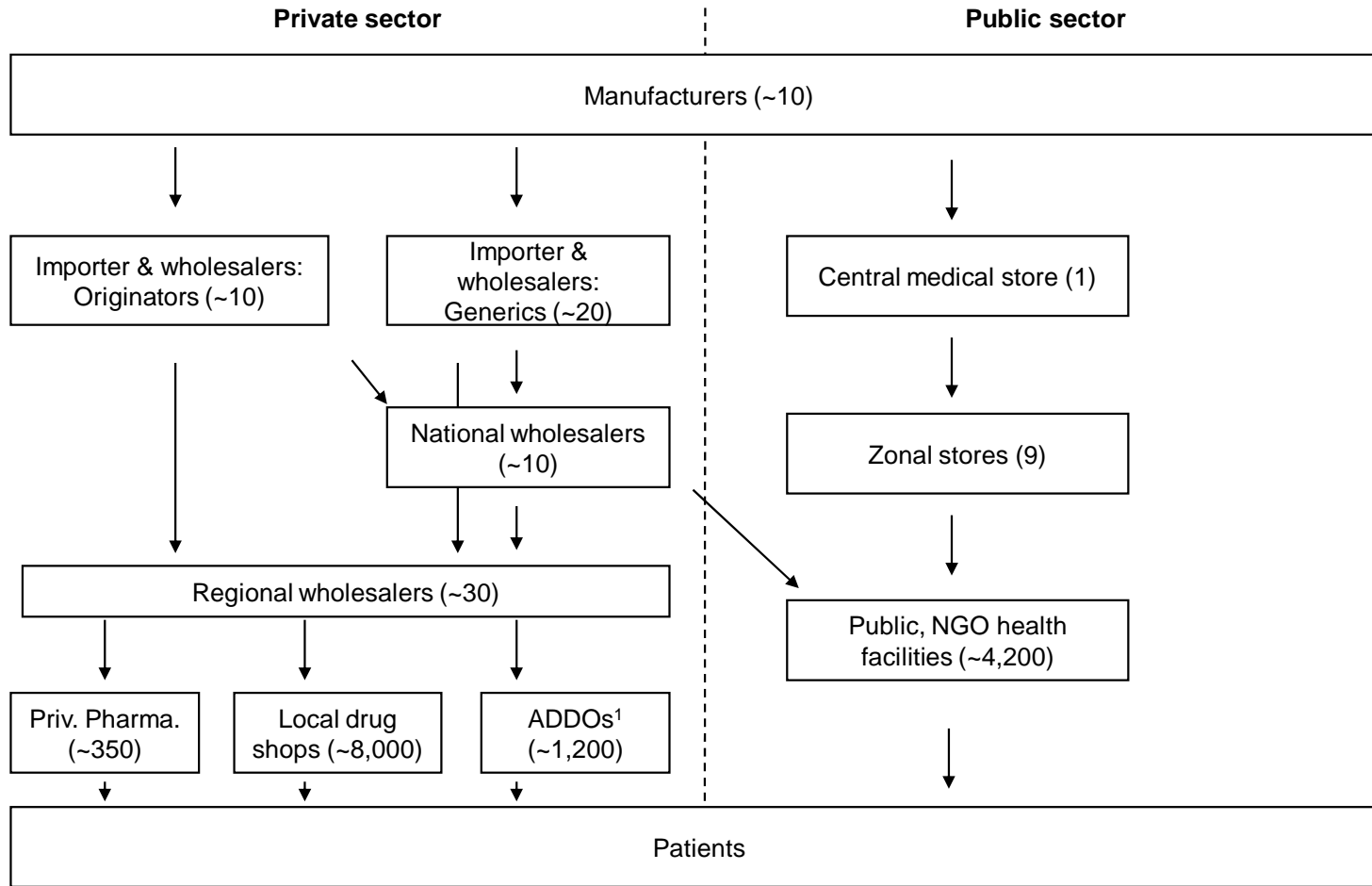
### **Disease prevalence:**

- The estimated number of malaria cases ranges from 14 to 19 million per year, with the number of deaths estimated at between 100,000 and 125,000, of which about 80,000 are children under five.
- There are 179 cases for every 100,000 people
- Malaria accounts for 40 to 45 percent of doctors' visits, 50 percent of morbidity and 40 percent of deaths in children under five, 30 to 40 percent of deaths in health institutions, 26 percent of sick leave absences and consumes 40 percent of the health budget for a household

Source: CIA World Factbook; World Health Organisation Statistics

# ACT Supply Chain – Tanzania

## Mapping of players



<sup>1</sup> ADDO: Accredited Drug Dispensing Outlet – in pilot phase in 4 / 21 regions – national scale up planned for 2010

Source: Expert interview April 2008

# ACT Supply Chain – Tanzania

## Supply chain characteristics

### **Supply chain characteristics:**

- Limited regulation
- Wide variety of channels
- Large number of private sector outlets
- Limited public sector role, focus on market mechanisms
- ‘Anglophone archetype’

### **Supply chain structure:**

#### *Regulation:*

- No price or mark-up regulation at any level
- Quality regulation for wholesalers / importers by TFDA
- Regional wholesalers regulated by TFDA or regional health team (varies)
- Recommended retail prices exist for most social marketing (PSI) products

#### *Importer / national wholesaler structure:*

- Originator companies tend to work with 1-2 importers exclusively, in total approximately 10 importers work with originators
- Approx. 20 companies import generics – less exclusivity
- Importers also act as wholesalers
- Approximately 10 wholesalers do not import, but only distribute
- Only one integrated wholesaler with regional wholesale points

#### *Regional wholesalers / shops:*

- At least 1 wholesaler in each of the 21 regions, more in populous regions
- Mostly national wholesalers organize distribution, but regional wholesalers also organize ‘pick up’
- Frequently regional wholesalers are also private official pharmacies
- Cross selling between pharmacies and shops is common (small quant.)
- Transport through dedicated full trucks (% of product cost), pre-arranged shipping agent, or through public bus system (small quant.)

#### *Public supply chain:*

- One central level medical store, 9 zonal stores distribute to public and NGO facilities for essential drugs
- ARVs and ACTs are distributed for free (ACTs for <5), \$0.25 for adults
- NGOs buy other products from private wholesalers

Source: Expert interview April 2008

# ACT Supply Chain – Tanzania

## Enabling environment

### **Basic information (2007):**

- Population: 40,213,162
- GDP/capita: \$1,300
- GDP growth rate: 7.3%
- Area: 945,087 sq km
- Urban:Rural population: 38% 62%
- Healthcare spending as % of GDP: 5.1%
- Health expenditure/capita: \$17
- Doctors per 100,000 people: 2

### **Regulatory context:**

- The government regulates the provision of health services for profit, but the restrictions have been loosened since 1991

### **Infrastructure characteristics:**

- Critical infrastructure challenges related to the transportation network, secure reliable supplies of energy and access to clean and safe water, have been an obstacle to growth and development
- Unreliable and expensive electricity, poor telecommunications and high transport costs

### **Disease prevalence:**

- 93 percent of the population is at risk for malaria
- This disease is responsible for more than one-third of deaths among children under age 5 and for up to one-fifth of deaths among pregnant women.
- Nationally it accounts for 30 percent of the total disease burden.
- Up to 80 percent of Tanzania's malaria deaths occur among these children
- Growing resistance to first-line anti malaria drugs in recent years has greatly diminished the government's ability to treat the disease

Source: CIA World Factbook; World Health Organisation Statistics, The President's Malaria initiative (<http://www.fightingmalaria.gov/countries/tanzania.html>), Center for Global Development