

HOW THE PRIVATE
SECTOR CAN
IMPROVE THE
DISTRIBUTION OF
ESSENTIAL HEALTH
PRODUCTS TO
REMOTE AREAS
OF SUB-SAHARAN
AFRICA



Improving Access to Essential Medicines Through Public-Private Partnerships

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PHOTO CREDITS

Cover Photo 1. Youth in Ethiopia regard an aid worker distributing topical medicines and food. Even helpful strangers are still strangers. © 2004 Wendy MacNaughton, Courtesy of Photoshare.

Cover Photo 2. Truck stalled in a creek. © 1992 Ricardo Wray/CCP, Courtesy of Photoshare.

Cover Photo 3. In the foothills of the Southern Drakensberg Mountains in KwaZulu- Natal Province, South Africa, rural residents wait to be seen at a temporary medical station. Although all South African residents have the right to free medical treatment and medication, many rural residents cannot exercise this right due to the remote locations of their homes. © 2004 Matthew Willman, Courtesy of Photoshare.

Leveraging best practices of consumer packaged goods companies to improve the distribution of health products in remote areas

“We can distribute Coca-Cola all around the world, but we can’t seem to get medication to save a child from something as simple as diarrhea”

Annie Lennox, 2008¹

I. ANECDOTE & JUSTIFICATION

Why is it that you can buy a Coke, a beer, chocolate bars or even mobile phone refill cards in a remote African village but in these same villages, you cannot consistently get basic lifesaving medicines? This anecdote rings true to many throughout the developing world and especially in Sub-Saharan Africa where 30-50% of the population lacks access to essential medicines.² Although significant efforts have been made to improve access to essential health products (EHPs) in the last decade, many people are still suffering from preventable or treatable diseases in the region. The Director General of the World Health Organization (WHO) asserted “that the lack of availability of essential pediatric medicines, including antibiotics, is one reason why countries are not making adequate progress towards some Millennium Development Goals.”³ To date, improving availability has focused on procurement and financing of EHPs and largely ignored the subsequent steps of distribution.

Consumer packaged goods (CPGs) companies often specialize in supply chain management in order to ensure the timely, consistent and efficient distribution of their products. Many CPG companies work in the same hard-to-reach markets as EHP distributors but have been more successful at overcoming the distribution difficulties of fragmented markets and poor infrastructure in Sub-Saharan Africa. Until now, there has not been a systematic attempt to compare the distribution systems of EHPs and CPGs and identify partnerships that leverage the strengths of the private sector to improve the availability of EHPs.

What are CPGs and EHPs?

Consumer packaged goods (CPGs): consumable goods such as food, beverages, tobacco and cleaning products that are replaced frequently. Mobile phone refill cards are a common CPG throughout Africa.

Essential health products (EHPs): all medicines on the government or WHO essential medicines list as well as non-medicines essential for health.

- **Broad outlets EHPs:** lightly regulated or over-the-counter EHPs that do not need skilled personnel to administer or dispense (paracetamol, sachets of oral rehydration salts, condoms, bed nets)
- **Narrow outlet EHPs:** Regulated or controlled substances only dispensed in licensed facilities and/or by skilled personnel (antiretrovirals, antibiotics, anti-hypertensives)

OBJECTIVES

This paper documents the poor availability of various EHPs in Africa and explores how to improve EHP distribution via collaborations with the private sector. Specifically, the paper aims to address the following objectives:

- Assess empirically if EHPs are less available than CPGs in Sub-Saharan Africa.
- Identify opportunities for health systems to improve EHP distribution based on lessons learned from CPG distribution practices.
- Illustrate how public-private partnerships can leverage the strengths of CPG companies to improve EHP availability by sharing knowledge or sharing infrastructure.

1. Annie Lennox, May 18, 2008, on Desert Islands Discs

2. WHO, 2004

3. Margaret Chan, WHO Director General, 120th WHO Executive Board session, 22 January 2007

II. SCOPE OF THE ANALYSIS: COMPARING THE DISTRIBUTION OF EHPS & CPGS

Our focus is on one part of the supply chain – distribution.

The supply chain involves every stage from planning and procurement to the final delivery of the product. For the purposes of this paper, we only focus on one segment in the supply chain – distribution – and the causes of bottlenecks at this stage. Distribution is not simply the transportation of goods but encompasses ordering, transportation and logistics management for distributing goods from the manufacturer to their final outlets.

Bottlenecks at any stage in the supply chain can cause stockouts.

Problems in the distribution step are a major cause of stockouts but bottlenecks at any step in the supply chain may be to blame, including supply shortages at the manufacturer, wholesaler or distributor; poor forecasting and ordering processes; or legal, political or financial constraints. When diagnosing the cause of EHP shortages, a careful analysis is first needed to identify the bottlenecks and determine if changes to the distribution system would ease them.

Measuring availability: ‘out of stock’ rate is the best available metric.

The effectiveness of an EHP or CPG distribution system can be measured most simply by the availability of products at the end outlets, as measured by the ‘out of stock’ rate. For this paper, the **out of stock (OOS) rate** is the percentage of outlets that normally carry the product but do not have it in stock at the time of visit. Other metrics on availability exist, such as the number or density of outlets where a product is sold, but were not used because comparable datasets could not be found or the metric had limited relevance when comparing CPGs and EHPs (see Appendix A).⁴

III. WHY IMPROVE EHP DISTRIBUTION PRACTICES? REDUCE WASTE, SAVE MONEY AND INCREASE ACCESS

Distribution of EHPs is big business in Africa. An estimated \$1.08 billion is spent annually on pharmaceuticals in Sub-Saharan Africa and levels are only expected to rise in the next decade.⁵ Although not all pharmaceuticals are EHPs, efficiency improvements in the distribution system can still lead to massive savings for governments and patients as well as health improvements due to increased access to EHPs (Figure 1).

\$162 million could be saved by consumers and governments.

Fuel Africa, a medical products distribution company, has shown how changes to the logistics and inventory management system can reduce pharmaceutical costs by 15 – 30% for consumers. If applied to all imported pharmaceuticals in Sub-Saharan Africa, approximately US\$162 million could be saved annually. These conservative estimates indicate that moderate improvements in the distribution system alone can have significant cost savings for health systems.

30 million vaccine doses could be saved.

Based on case studies from EHP and CPG companies, we estimated the cost and product savings from moderate improvements in the distribution systems. An estimated 30 million vaccine doses could be saved annually in developing countries via improvements in the vaccine cold chain. A study by the GAVI Alliance, a public private partnership whose aim is to save lives by improving access to vaccines in poor countries, suggested even more significant effects. For the pentavalent DTP-HepB-Hib vaccine alone, 25 – 50 million doses valued at \$80 – 160 million could be saved in developing countries by eliminating unnecessary wastage from heat damage, freeze damage or disposal of unused portions of multidose vials.⁶

4. Due to regulations on where narrow outlets EHPs can be distributed (i.e. licensed facilities with skilled personnel), a straight comparison of the number of outlets stocking an EHP versus a CPG is not informative for this analysis. Consequently there are fewer potential outlets for most EHPs than CPGs.

5. PhRMA. Industry Profile 2008: Pharmaceutical Industry, <http://www.phrma.org/files/2008%20Profile.pdf>

6. GAVI Working Group, 2003. Estimates are based on countries eligible to purchase UNICEF-procured vaccines.

FIGURE 1: Distribution improvements for EHPs Can Significantly Reduce Waste and Save Money

CURRENT SITUATION	IMPROVEMENT BENCHMARKS	POTENTIAL IMPACT
151 million vaccine doses were wasted in developing countries in 2007 due to improper refrigeration	<ul style="list-style-type: none"> Develop vaccines that do not require cold chain 10-50% reduction in heat- or freeze-damaged vaccine doses 	<ul style="list-style-type: none"> \$200 M saved in direct costs for cold chain* 30.2 M vaccines saved annually \$40.7 M saved annually (Assumption: 20% reduction)
100 million doses of DTP-HepB-Hib vaccine were distributed annually with high rates of wastage	<ul style="list-style-type: none"> Eliminate current wastage rates of 25-50% via product innovations and improved management 	<ul style="list-style-type: none"> \$80 M saved annually on DTP-HepB-Hib** vaccine (Assumption: 25% wastage currently)
In 2006, pharmaceutical sales in Africa were US \$1.08 billion***	<ul style="list-style-type: none"> Fuel Africa reduced consumer prices by 15-30% through better purchasing and supply practices of imported pharmaceuticals 	<ul style="list-style-type: none"> \$162 M saved annually in Africa (Assumption: 15% reduction)

* Based on estimates from GAVI
 ** 25 M doses served at an estimated \$3.20 per dose
 *** Based on PhRMA Industry Profile for 2008

Sources: Gates Grand Challenges: Team Analysis, McKinsey; PhRMA, 2008; GAVI Working Group, 2003

IV. PUTTING EVIDENCE BEHIND THE ANECDOTE: EHPs ARE LESS CONSISTENTLY AVAILABLE THAN CPGs IN SEVERAL AFRICAN COUNTRIES

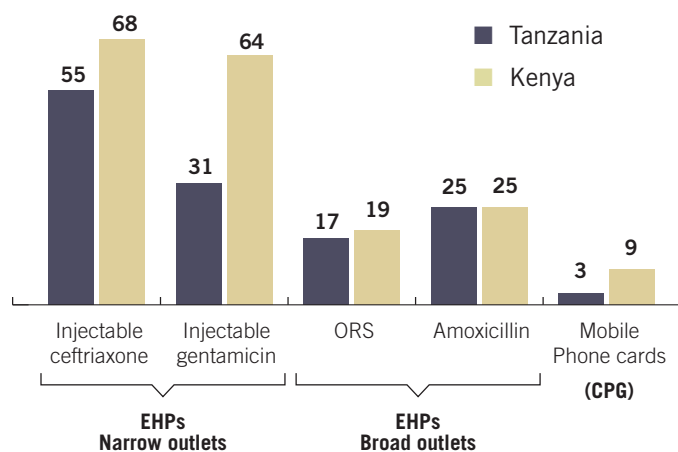
In our effort to test the extent to which the Coca-Cola vs. lifesaving medicines anecdote is true, we compared data from several African countries on the availability of three categories of products: broad outlet EHPs, narrow outlet EHPs, and CPGs. A summary of our methods is presented in Appendix A. Several key findings affirmed the anecdote that EHPs are, in fact, less consistently available than CPGs

Key finding #1: Good data on the availability of EHPs are hard to find.

Despite a concerted effort to identify and access a variety of data sources on EHPs and CPGs in Africa, we found only a few relevant datasets on EHP availability in Africa (Appendix A). For the data that could be accessed, the depth and quality of EHP data were poor. Metrics on availability were not standard, representative, comparable across settings or comparable to CPG metrics. Typically best practice CPG companies maintain 15-20

metrics to assess the performance of their distribution systems.⁷ Though exceptions exist, most distributors and vendors of EHPs, especially in the public sector, do not collect the same level and breadth of high-quality metrics.

FIGURE 2: Comparison of CPGs and EHPs in Tanzania and Kenya, Average out-of-stock (Percent)



Note: Straight national average of stock-out rates for all EHP products. Facilities surveyed: n=619 in Tanzania, n=405 in Kenya. OOS rates averaged by region.

Source: Service Provision Assessment, DHS Tanzania, 2006 & DHS Kenya, 2004; Telecom Industry, 3rd Party Research, 2008

7. McKinsey analysis

Key finding #2: The CPG products we examined had consistently lower OOS rates than EHPs.

Figure 2 illustrates that mobile phone refill cards were less likely to be out-of-stock than any of the EHPs examined. Among the narrow market injectable drugs, the OOS rates were 10-18 times higher than CPGs in Tanzania and over 7 times higher in Kenya. The OOS rates for broad market EHPs were markedly better (17-25% OOS) but still higher than mobile refill cards (3-9% OOS).

Key finding #3: OOS rates for EHPs have greater variability across regions than CPGs.

Distribution systems for EHPs are significantly less effective than CPGs at delivering products to where they are needed. Figure 3 illustrates that the OOS rates are well over 50% in certain regions for some EHPs whereas the highest regional rate for mobile phone cards is 6%.

Because averages can mask the variability of performance, a distribution system should be judged on the average availability as well as the range of availability of its products. In Tanzania, mobile phone card companies have low absolute OOS rates and low variability in OOS rates across regions (0-6%). In contrast, OOS rates of gentamicin are both high and highly variable across regions (18-50%). One of the most basic health products, oral rehydration salts (ORS), had OOS rates ranging

from 9 - 38%. In Kenya, regional variability for both CPGs and EHPs are slightly worse than Tanzania but the same trends exist with higher regional variability among the EHPs. These findings demonstrate that CPG companies have better and more consistent distribution systems than that of EHPs.

Key finding #4: Hospital OOS rates for life-saving medicines often exceed acceptable levels.

As a benchmark, CPG companies aim to maintain stockout rates below 10%. Even in highly fragmented markets in Sub-Saharan Africa, brand name soda companies and mobile phone card companies achieve stockout rates of 2-10% and 2-9%, respectively.⁸ In contrast, we could not identify one example of an EHP in Kenya or Tanzania with OOS rates below the 10% benchmark.

Although hospitals tended to have lower OOS rates than other types of facilities (e.g. health clinics or dispensaries), even hospitals had excessively high OOS rates for medicines considered to be essential (Figure 4). In Kenya, over half of hospitals did not have injectable gentamicin or ceftriaxone available.

Vaccines are perhaps the most essential health product, which every citizen should be able to access. However, in Tanzania and Uganda, a quarter of facilities dedicated to giving immunizations did not have the full set of basic child vaccines in stock (Figure 5).

FIGURE 3: Regional Variability in out-of-stock rates is higher for EHPs

TANZANIA (Out-of-stock, Percent)

Region	Narrow outlet EHPs*		ORS	Broad outlet EHPs		Mobile Phone Cards
	Ceftriaxone	Gentamicin		Amoxicillin		
Dar es Salaam	60	45	24	20	1	
Arusha/Moshi	52	39	22	18	5	
Mbeya	36	18	9	24	0	
Shinyanga	75	50	28	19	3	
Mwanza	58	33	38	21	6	
NATIONAL **	55	31	17	25	3	
Intra-country variability***	39	32	29	6	6	

* For injectable drugs, dispensaries were excluded from analysis because they do not normally supply injectable drugs

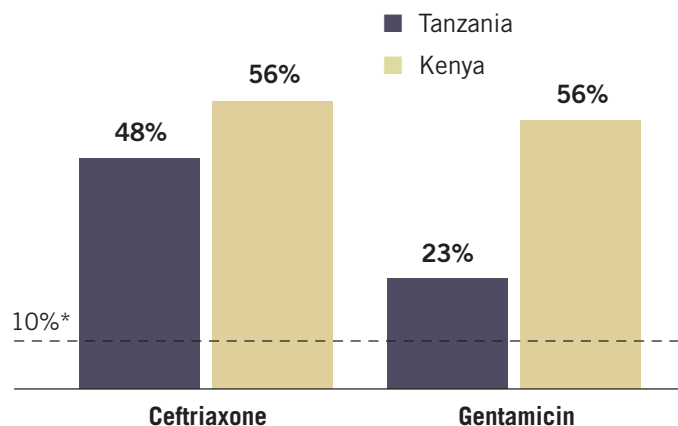
** National average for EHPs represents all regions, but only a subset of regions corresponding to CPG data are presented here

*** Range of regional OOS rates, in percentage points

Sources: Service Provision Assessment, DHS Tanzania 2006, DHS Kenya 2004; Telecom Industry 3rd Party Research, 2008

FIGURE 4: OOS rates for life-saving antibiotics in hospitals are excessively high

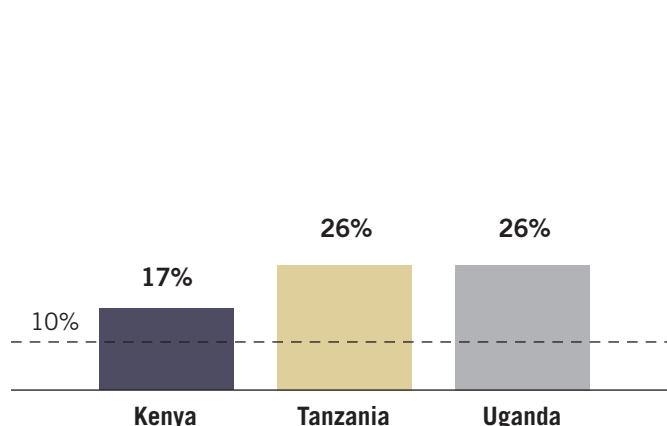
Out-of-stock Rates at Hospitals in Tanzania and Kenya (Percent)



Source: Service Provision Assessment DHS, Tanzania 2006 and Kenya 2004
* CPG companies aim for OOS rates of 10% or less.

FIGURE 5: The package of child vaccines are not consistently available

Out-of-stock rates for the complete set of basic child vaccines (Percent)



Source: Service Provision Assessment DHS, Tanzania 2006 and Kenya 2004

IV. ASPECTS OF EHPS THAT COMPLICATE THEIR DISTRIBUTION

A key reason why CPGs are more widely and consistently available than EHPs is that they are often less complicated to distribute. Five aspects of essential health systems make distribution of EHPs more complex than that of CPGs.

1. Product characteristics make distribution more complex for EHPs

Distribution of EHPs can be more complex due to the characteristics of the product itself. Temperature or humidity restrictions, product value, product complexity, and the need for skilled personnel to administer certain types EHPs limit how an EHP can be transported and to where it can be delivered.⁹ In remote areas of Sub-Saharan Africa, foods that must remain refrigerated or frozen are a luxury and rarely reach remote areas. Yet, essential medicines that require refrigeration, like most antiretrovirals, are not a luxury and systems are needed to ensure they reach these areas. Unlike CPGs, many EHPs require a nurse or pharmacist to manage or administer them. Consequently, special equipment, increased security and sophisticated tracking systems are needed for EHPs, which can drive up costs and limit the ease of distribution.

2. EHPs are distributed through a mix of public and private channels

From the manufacturer to the final outlet, CPGs are distributed primarily by private companies through private channels. For EHPs, the system is a more complex mix of public and private players including manufacturers, distributors, governments, NGOs and bilateral and multilateral institutions.¹⁰ The percentage mix of public vs. private distribution depends on several factors including the characteristics of the product, size of the country, existing distribution networks and structure of the health system. For EHPs systems to apply the best practices from the private sector, governments and EHP companies will need to adapt the CPG models and incentive systems to a mixed public/private approach.

3. EHPs generally have weaker ordering and inventory systems than CPGs

Unlike most EHP systems, CPG companies prioritize maintaining constant inventory levels and achieve it via frequent and responsive deliveries. On average, retailers replenish supplies of soda every 7 to 14 days in South Africa and every 4 days in the fragmented markets in Nigeria. In contrast, public sector facilities in Zambia and Tanzania replenish EHPs on average every

9. Detailed description of product characteristics that limit EHP distribution in Appendix B

10. The percentage of medicines distributed privately varies by country and by product – Zambia distributes 10% of antiretrovirals through the private sector whereas in Nigeria it reaches nearly 60% through private channels (Schroeder K, personal communication; Kindermans, Vandenbergh and Vreeke et al., 2007).

90 days.¹¹ Vaccine replenishment is more frequent than other EHPs but still half of the facilities in Tanzania only replenish vaccine stores every 30 days. If EHP ordering systems achieved the same level of efficiency as CPGs, there would be substantial reductions in product wastage, storage space requirements as well as a reduced risk of stockouts.¹²

4. Fewer incentives or financing options for the EHP supply chain

CPGs companies create incentives at nearly every step in the distribution system to encourage broad, consistent and expeditious distribution of their products. To encourage efficiency, many CPG companies have developed profit opportunities and cleverly aligned incentives for each player in the supply chain. Less effort has been made among EHPs to develop and align incentives, especially for publicly distributed EHPs, leading to inefficiencies or a breakdown at one or more stages in the supply chain.

5. Stocking EHPs constrains the working capital of small retailers

In the African setting, small shop owners operate with very small amounts of working capital, which limits their capacity to lower costs and maintain large inventories. Retailers report they are not willing to stock EHPs with high value or slow turnovers because they tie up their limited capital. A leading global beer company overcame these challenges and increased its customer base by three fold in Sub-Saharan Africa by increasing the number of deliveries and the flexibility of the delivery schedule to meet the space and capital limitations of small retailers.¹³ While CPG companies have devised innovative financing and billing systems to work with small-scale retailers, little has been done by EHP suppliers and manufacturers to ease working capital constraints.

IV. CALL TO ACTION: HOW PARTNERSHIPS CAN LEVERAGE STRENGTHS OF THE PRIVATE SECTOR TO IMPROVE THE DISTRIBUTION OF EHPs

Despite the known differences, there are enough similarities between CPG and EHP products to borrow lessons from one industry to the other. CPG companies have demonstrated that they can overcome the distribution challenges in Sub-Saharan

Africa via efficient systems and innovative solutions. The challenges of distribution are common to many industries, including but not limited to CPG companies. A wide range of companies can leverage their strengths and skills to support distribution systems for EHPs. Our call to action for the global health community and private sector is develop partnership that prioritize the following four initiatives for improving EHP distribution in Africa:

CALL TO ACTION

- A. **Standardize data for monitoring performance** of EHP distribution systems
- B. Develop partnerships to **share knowledge on distribution practices**
- C. Develop partnerships to **share infrastructure for distribution**
- D. **Encourage research and product innovation** to lower the distribution barriers for EHPs

It is important to clarify that our call to action goes beyond donations and aims to develop sustainable, mutually beneficial partnerships that build on the institutional strengths, skills and infrastructure of companies to improve the quality and reach of EHP distribution systems. Dozens of successful public-private partnerships already exist for EHPs (e.g. DHL's partnership to prevent malaria, Merck's Mectizan or Novartis's Coartem donation programs). We encourage new partnerships that broaden the scope of collaborators and expand the types of collaboration.

A. Standardize data for monitoring performance of EHP distribution systems.

CPG companies collect more data on the performance of their distribution system than EHPs and use the data more effectively to improve their performance. The EHP industry needs to collect a standard set of data on availability, stockouts, market penetration and performance of the distribution systems. Resource constraints limit how much data could be realistically collected. Nevertheless, to begin to address the fundamental problems in the EHP distribution system, performance goals for the distribution system need to be developed and the relevant indicators need to be collected to monitor performance toward these goals.

11. Schroder K, personal communication; DHS Service Provision Assessment, Tanzania 2006.

12. Public systems are also less likely to use a pull system, in which orders are based on actual need at the outlet. The DELIVER project and other initiatives have provided important technical support to many African countries to develop more responsive 'pull' systems for ordering.

13. McKinsey analysis.

B. Develop partnerships to *share knowledge* on distribution practices.

Knowledge sharing covers a broad set of interventions to which any type company could contribute. Essential health systems can benefit from technical guidance on developing logistics management systems, improving transportation systems and strategic planning. Opportunities can be short-term projects or long-term partnerships in one of the following suggested areas:

1. Consulting on how to reduce costs and improve efficiencies in transportation or inventory management.

Most companies working in Sub-Saharan Africa face similar transportation and inventory management challenges. Public and private EHP distributors can directly benefit from collaboration with CPG and non-CPG companies working in similar settings. Consulting projects are needed to identify inefficiencies in the existing EHP distribution networks and to develop cost-saving solutions. Fuel Africa, a medical products distributor, piggybacked on successful CPG models to vertically integrate the distribution system, which resulted in a 15-30% reduction in consumer prices for pharmaceuticals (Figure 6).

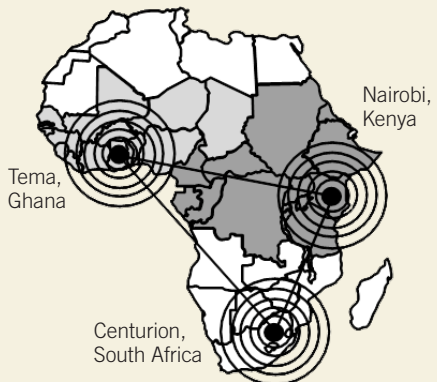
The lack of horizontal integration is a major cause of inefficiency for EHP distribution systems in Africa. Due to the multitude of HIV/AIDS, malaria, tuberculosis or other vertical programs, parallel and often redundant distribution systems exist. Countries would benefit from strategic and technical assistance from the private sector on how to integrate them into a more streamlined system.

2. Technical assistance to develop logistics management information systems.

CPG companies tend to have more responsive delivery systems in part because they monitor and forecast distribution needs through sophisticated information systems. In the past two decades, largely through the support of USAID's DELIVER program, government health systems have begun using similar logistics management information systems (LMIS).¹⁴ However, more work is needed to improve integration and develop more frequent and flexible delivery systems. Logistics managers should capitalize on the penetration of mobile phones in remote areas to communicate with local vendors and suppliers to monitor and restock EHP supply.

FIGURE 6: Fuel Africa lowered prices by consolidating distribution systems

Fuel Africa, a medical products distributor, reduced consumer prices for imported pharmaceuticals by 15-30% by streamlining its distribution model.

Regional distribution method	Integration	Key Success Factors
<ul style="list-style-type: none"> Regional hubs aggregate volume Replace wholesalers but outsource final-mile to local SMEs* Provide high-quality inventory management to improve overall efficiency and reduce obsolescence 	<p>Vertical</p> <ul style="list-style-type: none"> Reduces importer & distributor mark-ups by vertically integrating most stages of supply chain Coordinates carefully with final mile distribution partners through information tracking systems and technical support <p>Horizontal (future potential)</p> <ul style="list-style-type: none"> Currently distribute only pharmaceutical medical products May distribute other products through pharmaceutical distribution infrastructure and onsite medical suppliers servicing 	<p>Scale</p> <ul style="list-style-type: none"> Hub-and-spoke model aggregates volumes Virtuous cycle of volume growth and mark-ups Infrastructure investment enabled by multi-year, large-volume PEPFAR* commitment <p>Management</p> <ul style="list-style-type: none"> Parent company had logistics expertise and experience operating in Sub-Saharan Africa <p>Innovative Resource Use</p> <ul style="list-style-type: none"> Partnered with local distributors for last mile distribution, potentially providing SME loans and strategic guidance

* SME, Small and Medium Enterprises; PEPFAR, USA President's Emergency Plan for AIDS Relief

Source: Interviews; McKinsey analysis

14. DELIVER project, <http://deliver.jsi.com/dhome>

FIGURE 7: Case Studies



Summary: DHL partnered with UNICEF Kenya to reduce childhood mortality in Kenya by providing logistics expertise, in-kind donations and technical support to improve the medical supply chain.

Activities

- **Donations:** 50,000 insecticide-treated mosquito nets; helped finance solar-powered refrigerators, coolers and motorcycles to enable vaccinations in the most remote areas
- **Share infrastructure:** Installed a cold chain refrigerated unit in DHL's central warehouse in Nairobi to safely store vaccines. Assisted in distributing 3.5 million bed nets
- **Share information:** Analyzed EHP logistics system in Kwale district and made recommendations for improving public sector distribution

Results*

- 10-fold increase in the number of Kenyan children sleeping under bed nets in 2006
- 44% decline in under-five children dying from malaria
- Full immunization coverage rose from 59% – 90%

* Results are not necessarily a direct impact of the program



Summary: Coca-Cola developed a network distributors on bicycles, bullocks carts, and rickshaws known as Manual Distribution Centers (MDCs) to deliver Coke products to previously inaccessible communities.

Activities

- Develop a network of over 3,000 MDCs in Eastern Africa to transport Coke products on roads and paths that could not be accessed by trucks
- **Support for MDCs:** Assisted MDC owners to run an efficient business

Results

- >95% on company sales in many areas from MDCs
- Create an estimated 1,300 – 2,000 new distribution businesses, 5,300 – 8,400 new jobs, and generated revenues of US \$320 – \$520 million

Implications: The MDCs model could be used for distributing broad outlet or lightly regulated EHPs



Tielman Nieuwoudt



Tielman Nieuwoudt

3. Consulting on strategies to expand distribution networks.

Maximizing access to essential medicines is a core objective of the WHO and government health systems. CPG companies usually penetrate new markets through carefully planned strategy. EHP systems could gain valuable insight from these companies on the how to extend distribution networks to maximize access in a sustainable way.

In the most remote settings, distribution networks break down in the 'final mile' with impassable roads and isolated villages. Because these areas tend to have the worst poverty and health indicators as well, it is particularly important for EHP systems to overcome distribution barriers in the 'final mile.' Lessons can be learned from the CPG companies that successfully reach these markets through creative local solutions. Coca-Cola, for example, invested in local entrepreneurs

to develop a network of 'manual distribution centers' that deliver Coke products by foot and cart to previously inaccessible villages (Figure 7).

4. Consulting to develop flexible financing and incentive systems.

CPG companies in Africa have been successful in overcoming financial barriers for retailers by creating flexible credit schemes for retailers (Appendix C). Similar schemes could be applied to EHPs to reduce costs and increase access among rural pharmacies and clinics.¹⁵ For example, distributors in Tanzania now offer a variety of incentive programs and flexible financing opportunities to the small private medicine vendors known as ADDOs. For example, ADDOs are not required to purchase medicines in bulk, which enables them to supply essential medicines and make a profit without tying up as much working capital (Appendix C).

15. Potential financing schemes include: extending the duration of payment cycle for products sold infrequently, not requiring upfront payment upon delivery and subsidizing costs for facilities in remote locations

CPG companies have also developed successful incentive schemes to reward performance at each stage in the supply chain. EHP companies and public health distribution systems in particular could gain from guidance on how to align incentives to reach their distribution goals. Consulting opportunities include designing incentives to: improve quality and consistency of distribution; expand the breadth of the distribution network; and influence retailers/distributors to correctly display, dispense and price EHPs. In addition, support from the private sector to institute performance-based compensation systems could greatly improve efficiency for publicly distributed EHPs.

5. Health messaging via CPG products.

An interesting twist on the sharing knowledge objective is for companies working in the same locations to provide health information on their products or advertisements. Food products might add nutrition messages to their labels, television or print advertisements could include a public health message, and mobile phone companies could send free text messages with vaccination reminders and other health information. With over 250 million mobile phone subscribers in Sub-Saharan Africa, small interventions could have a wide and powerful impact at a small cost to the collaborator.¹⁶

C. Develop partnerships to share infrastructure for distribution.

The other major opportunity to collaborate with EHP systems is for the private sector to *share their distribution infrastructure* with EHP companies. In the remote areas of Africa, the private sector – and especially CPG companies – has developed a delivery infrastructure to overcome isolation, poor roads, and fragmented markets. Essential health systems need to piggy-back on the private sectors' innovative adaptations. Although the private sector could *share knowledge* on how to adapt their systems, both collaborators may gain more by actually *sharing their infrastructure* with EHPs.

Share transportation, storage and distributor infrastructure with EHPs. Companies with similar distribution routes as EHPs can help to reduce overhead costs and logistics infrastructure for EHPs by providing space for EHPs in their warehouses or on their transport fleet. UNILEVER, Procter & Gamble, and other personal care and foodstuff manufacturers are ideal candidates to collaborate with EHP systems because they already successfully operate in the villages that are most difficult to reach for EHPs.

Several companies have already developed these partnerships. Exxon Mobil distributes free insecticide-treated bed nets to pregnant women and mothers at many of their gas stations across Ghana and Zambia.¹⁷ The Cola Life campaign is lobbying for Coca-Cola to add oral rehydration salts sachets to beverage crates distributed throughout Africa. DHL, the worldwide delivery company, provides refrigerated space in their warehouses and offers their plane and truck fleets to distribute vaccines and bed nets to remote areas of Kenya (Figure 7). Sharing infrastructure will be especially useful for products requiring refrigeration or high security during transport and storage.

Because of the high costs, it is critical that initiatives to share infrastructure are sustainable and mutually beneficial to both collaborators. Many short-term campaigns and donation programs exist, but developing long-term collaborations between the private sector and EHPs will require careful planning and commitment. Efforts need to go beyond donations and philanthropy to an environment where EHP distributors are seen as equal partners and integration with them is seen not as charity but as a potential to reduce costs and increase flexibility for both distribution systems.

D. Encourage research and product innovation to lower the distribution barriers of EHPs.

Beyond innovations to the distribution system, innovations to the products themselves could ease the challenges of distribution. Milk companies, for example, overcame the need for refrigerated transportation systems by developing ultra-high temperature (UHT) treatment for milk, which does not require refrigeration during transportation or storage. Alluvia, a heat-stable 2nd line antiretroviral, obviates the need for temperature-controlled transportation and storage, which allows more African facilities – especially ones without electricity – to supply this HIV/AIDS medicine.¹⁸

In settings where infrastructure and the quality of the health system are unlikely to improve, investments in product innovations are needed. The Bill & Melinda Gates Foundation has spearheaded investment for innovations in vaccines - from thermo-stable formulations to needle-free vaccine delivery systems. Similar innovations are needed for essential medicines and medical devices. Technology and engineering companies are well positioned to partner with other EHPs to develop products that are easier and safer to transport, store and administer.¹⁹

16. McKinsey analysis

17. <http://www.netmarkafrica.org/Communications/FINAL%20NetMark%20Case%20Study%20102505.pdf>

18. Alluvia also reduced the daily dose from six to four pills, which contributed to a reduction in bulk for drug storage and transportation.

19. Innovations include vaccines that do not require needles and vaccines that do not require cold chain, <http://www.gcgh.org/ImproveVaccines/Pages/default.aspx>.

V. LIMITATIONS

Despite clear opportunities to draw lessons from CPG distribution systems, several limitations in the comparison need to be considered. First, this paper does not address the demand side of distribution. Large-scale reforms will need to consider both the supply and demand sides of distribution system. Second, the goals of the EHPs and CPGs distribution systems are not the same. For CPG companies, the primary goal is to maximize profits, and outlets are selected strategically to achieve this goal. In contrast, essential health systems seek to maximize both profit and access for the population – in other words, they have the dual goals of saving lives and saving money.²⁰ In settings where saving lives is at the expense of saving money, the CPG model may not be instructive or applicable to EHP systems. Thus, in drawing lessons from CPG systems, it is important that essential health systems take into account their dual goals of access and cost savings.

Second, it is important to note that the consequences of stockouts for EHPs versus CPGs are very different. Stockouts of CPGs cause an inconvenience or delay but stockouts of a critical health product can cause unnecessary morbidity and mortality. Undersupplies or improper distribution practices may lead treatment failure, a delay in care or antibiotic resistance. Moreover, patients will stop going to clinics that do not have the medicines in stock that they need. Thus, essential health systems have a greater responsibility to ensure health products are *consistently* available and accessible to the population they serve.

Lastly, it is critical to envisage the unanticipated consequences of modeling EHP distribution from CPG models. Strengthening distribution systems in the private sector has the potential to undermine the public health system unless careful oversight is maintained. Another risk is that expanding the distribution network without expanding regulatory capacity could lead to excessive use of drugs, a rise in counterfeit drugs, and even antibiotic resistance. A balanced and cautious approach based on the rational use of medicines should be employed when applying CPG models to the essential health distribution systems.

VI. CONCLUSIONS

In the most remote villages of Africa, a person is more likely to find a kiosk with mobile phone cards in stock than a clinic with the basic antibiotics in stock. A store is more likely to have soda in stock than lifesaving oral rehydration salts. In general, CPG companies have been more successful at reaching distant locations under difficult conditions than distributors of EHPs. Although simple empirical data in the paper suggest that EHPs are less consistently available than CPGs, the quality and comparability of data leaves many gaps in our understanding of why and where the distribution systems breaks down. To better inform policy decisions, significant investments are needed to standardize indicators of availability and to improve the quality and depth of this data.

A key difference between the EHP and CPG distribution processes is that the private sector for CPGs has cultivated unique skills and systems to overcome many of the distribution challenges in Sub-Saharan Africa. Essential health systems should capitalize on these skills and partner with the private sector to improve the efficiency and consistency of their own distribution systems. Partnership opportunities between EHP stakeholders and CPG companies fall into four general categories: **sharing knowledge, sharing infrastructure, generating appropriate performance monitoring metrics, and investing in product innovation**. Since distribution systems involve a wide range of capabilities, many different types of companies – from UPS to UNILEVER – could contribute skills, experience and even infrastructure to support struggling distribution systems for essential health products.

20. For public or non-profit systems, instead of maximizing profits the main goal is to use fixed set of resources most efficiently.

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APPENDICES

APPENDIX A: Data on availability were scarce but we identified comparable CPG and EHP data in Kenya and Tanzania

Despite a concerted effort to identify and access a variety of data on sources on EHPs and CPGs in Africa, we found only a few representative and comparable datasets on EHP and CPG availability. Consequently, we focused our analysis on two countries – Kenya and Tanzania– where there was comparable out of stock data for one CPG and a set of EHPs.

OUR IDEAL DATASET

Our ideal dataset would have had:

- CPG and EHP data from **at least 3 of the same countries in Africa**
- **Comparable metrics on availability**
- A set of EHPs and CPGs **representative of the range** of product characteristics and end markets

WHAT DATA WE COULD GET

We sought data from a wide range of sources, but only a few were available:

EHP data

- ✓ DHS Service Provision Assessments
- ✓ STI/HIV study in South Africa
- ✓ Condom availability data from PSI*
- ✗ Distributor or manufacturer data
- ✗ Wholesaler data
- ✗ Ministry of Health surveillance data
- ✗ Third party research data

CPG product data

- ✓ Manufacturer data for brand name soda and beer**
- ✓ 3rd party research data for mobile phone refill cards***
- ✗ Wholesaler data
- ✗ Other survey data on retailers

✓ Data available ✗ Attempted but could not get data

* Population Services Intl (PSI) data from Nigeria, Swaziland, Tanzania, and Uganda

** Soda data from Nigeria and South Africa; beer data from South Africa

*** From Kenya, Tanzania, Nigeria, DRC, and Uganda

FOCUS OF OUR ANALYSIS

Consequently, we focused on analysis on:

- **Out of Stock rates**
- Data from **Kenya and Tanzania** on:
 - **Narrow outlet EHPs*** – injectable ceftriaxone & gentamicin
 - **Broad outlet EHPs*** – ORS, oral amoxicillin
 - **CPG** – mobile phone refill cards

* Narrow outlet EHPs are regulated products only dispensed in licensed facilities and/or by skilled personnel. Broad outlet EHPs are over-the-counter products that do not require skilled personnel to administer or dispense. EHP data from DHS Service Provision Assessments

APPENDIX B: Many essential health products have characteristics that add complexity to their distribution

Characteristic	Description	Essential health products examples
Environmental Concerns	<ul style="list-style-type: none"> What environmental conditions (i.e., temperature or humidity constraints) are required to properly distribute the product to ensure stability, manage expiration, etc.? 	<ul style="list-style-type: none"> Vaccines require complete cold chain Some pharmaceuticals require heat stability Exposure to extreme heat or sun reduces shelf life for condoms and many pharmaceuticals
Product Value*	<ul style="list-style-type: none"> What precautions are required in distribution due to high product value? How bulky** is the product as this will partially determine the vehicle for distribution? 	<ul style="list-style-type: none"> Vaccines and some high-cost pharmaceuticals must be distributed in secured vehicles
Product traceability	<ul style="list-style-type: none"> Are products required to be traced along the supply chain and then to the final end seller to ensure the chain of custody or to safeguard potential recalls? 	<ul style="list-style-type: none"> Vaccines and some controlled pharmaceuticals (e.g., anti-retrovirals, TB medicines) require a secure chain of custody along the supply chain
Product complexity	<ul style="list-style-type: none"> What characteristics of the product add to the complexity of distribution, e.g., seasonal products, products with a short shelf-life, products that require multiple components (e.g., vaccines and syringes or IV fluids and IV tubing)? 	<ul style="list-style-type: none"> Some malaria medicines are seasonal Vaccines and syringes or IV fluids and IV tubing should be distributed together Products such as vaccines or blood have a short shelf life
Human Resources	<ul style="list-style-type: none"> Is someone required to distribute or administer the product? 	<ul style="list-style-type: none"> Vaccines require a nurse or doctor to administer Some pharmaceuticals such as anti-retrovirals require a trained health practitioner to prescribe and dose appropriately TB DOTS medicines should be monitored only to ensure adherence

* Product value is also critical for financing as high value products are difficult for those distribution points with limited working capital

** Inverse metric – the more the product is bulky the less the value

Source: Team analysis

APPENDIX C: Beverage company’s new credit scheme permits vendors to use most of their available credit and lower costs

Current credit parameters

7 days credit

Parameter	Value
Credit Limit	100%
Utilized Limit	73%
Actual Weekly Sales	93%

Current purchasing behavior

- Outlet orders 73% of their credit for a weekly delivery
- He does not fully utilize his credit because he is afraid he won't sell all the product within 7 days
- Outlet purchases top-up quantity from independent distributor in the weekend on the basis of actual sales

Revised credit parameters

14 days “flexible” credit

Parameter	Value
Credit Limit	140%
Utilized Limit	140%
Actual Weekly Sales	93%

Expected purchasing behavior

- Outlet orders 1.5x expected weekly sales for a weekly delivery
- Outlet does not go to wholesaler to top-up
- Outlet pays 70% within 7 days, and gets 2.0% discount on this amount

Benefits to customer

- Allows cover for demand peaks at low cost (cost of credit vs. cost of fetching/being delivered product from independent distributor)
- Rewards early payment

Benefits to company

- Allows for schedule ordering and delivery cycle in a more stable way (i.e. optimize capacity utilization/ productivity of delivery, telesales, credit resources)

APPENDIX D: Accredited drug dispenses outlets expand access to essential medicines

Description	
Overview	<ul style="list-style-type: none"> Accredited Drug Dispensing Outlets (ADDOs) expand access to quality medicines and pharmaceuticals services by dispensing a limited set of prescription medicines to underserved communities in Tanzania.
Description	<ul style="list-style-type: none"> ADDOs, also known in Swahili as “Duka la Dawa Muhimu (DLDM)”, are a network of upgraded Duka la Dawa Baridi (DLDBs) that provide nonprescription and a limited list of approved prescription essential medicines in licensed retail outlets in Tanzania ADDOs set up through a public-private initiative between Ministry of Health and Social Welfare, the Tanzania Food and Drug Authority and Management Sciences for Health Offers business incentives to owners To address the limited working capital of owners, ADDOs are not required to purchase drugs in bulk
Expected achievements	<ul style="list-style-type: none"> By 2010, ADDOs aim for more than 80% of rural and semi-urban areas in mainland Tanzania to have an opportunity to purchase quality basic medicines from well-regulated and properly operated private medicine outlets

Source: Takand, Eric, Susan Duberstein, Time Rosche, Josephine Nyonyi, and Winna Shargo, 2008. Tanzania: Quantification and Supply Planning for Anti-Malaria Medicines. Arlington, Va.: USAID I DELIVER PROJECT, Task Order 3.



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