

## Zaragoza presentation – The Value of Logistics

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### Slide 1

Today I would like to talk about value, and in particular the value of logistics. We all determine value from our own perspective. At VillageReach we look at value from the final segment of the value chain or the “last mile.”

In creating value, however, we all generally work to create something that is valuable not just to the person creating it but to others as well.

Everyone here values logistics. The question I would like to explore is how to get a large number of people outside this room to see the value of logistics.

Before I get to that question, I’d like to provide a quick summary of VillageReach to give you an idea of our perspective.

### Slide 2

VillageReach is a non-profit social entrepreneur. We seek to extend the reach of quality healthcare by strengthening the health system from the state or provincial level all the way down to the service delivery level.

We do this by blending two very different approaches together. The first part looks like traditional health programming. Here we design and implement logistics systems for the last mile. These systems, however, go well beyond supply chain improvements to include information management, supportive supervision, training and equipment maintenance, along with other similar activities. The second part involves establishing social businesses that fill gaps in local infrastructure. Typically we look to create businesses around generic infrastructure components such as energy and transportation which are needed to support the health system, but are also desired by the broader community.

With this two-part approach we seek to effect change by identifying the problem and creating an innovative solution with proven results. We document the results then work to convince others such as governments and private companies to adopt and absorb the solution. Finally, as required we will help them scale and sustain the solution.

Our objective is to achieve the holy grail of impact, scale and sustainability.

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Here is where we are currently working. Everywhere we go we find many, if not all, of the elements listed here on the left. It is important to remember that these problems at the last mile affect over two billion people living in remote, rural communities in low-income countries.

If you stop and think about it for a moment, there is a huge opportunity here. If I was to fall and injure myself or become sick, I am confident that here in Zaragoza I could quickly solve my problem. I wouldn't have to go far from this building to access the goods and services I need. But this list of items means that almost a third of the world's population can't access those same goods and services which may come down to some information about what they need to take to address their problem and a one euro pill. In other words, over two billion people have the same problem that this group is uniquely qualified to solve. Now I understand these are the poorest people in the world, but when that many people need what this group is able to offer, there is opportunity to add value.

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All of us here are focused on supply chain problems. Over the next two days we will talk about supply chain problems, such as procurement and forecasting, that exist at the top of the supply chain, as well as similar problems in the middle and bottom of the chain. I suspect there are other global health conferences going this week that are talking about a similar range of issues, but they are focused on information systems, human resource issues or any number of clinical care challenges such as malaria, HIV/AIDs, family planning, etc. These conferences probably are not talking about the value of logistics, although they may be complaining about it.

We are all aware of the silos that exist today in global health. But sitting at the bottom of these silos, it is hard to keep them separate. At the service delivery level, all of these silos must funnel down to pass through one health worker, giving care to patients, one at a time. At this level, we were forced to work across the silos.

We started by working with the government to redesign its vaccine distribution system in Cabo Delgado, a northern province in Mozambique. The province has a population of about 1.6 million which are served by 88 health centers. 90% of these health centers are located in hard to reach rural areas which are off the electrical grid. As a result of the health system's lack of resources, we found all of the problems listed on the prior slide.

In evaluating the distribution system, we found that although there was a system on paper represented by government policy and manuals; in practice there was no system. For the most part, the burden fell to the health worker to find a way to get to their district to collect their vaccines and other supplies. In designing a new vaccine distribution system we ventured well past supply chain into information management and human resources. In doing so, we found we could deliver greater value across the silos.

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In the new system we shifted certain tasks away from the health workers and consolidated them in a small group of specialized workers called field coordinators. In northern Mozambique each field coordinator serves between 25 to 40 health centers on a monthly basis. This slide shows what a field coordinator does as he makes his monthly circuit. With this approach, health workers are relieved of many tasks related to logistics and data collection, allowing them to devote a greater portion of their time to providing clinical care.

After designing and documenting the new, integrated system, and working with the government to implement it, we eventually turned full operational responsibility for the system over to the government. At that point, we commissioned an independent evaluation of the effort. Here are the results of that evaluation.

#### Slide 6

For health outcomes, the key number is the increase in the coverage rate for fully vaccinated children from 68% to 95%. Also important was the increase in public's trust in the health system reflected in some of these qualitative results. These results show that the demand for vaccines was there; we just needed to work with the Ministry of Health to address the supply problem. The bottom chart compares the results over the same period in Cabo Delgado to Niassa, the province next to and very similar to Cabo Delgado. Cabo Delgado ran the new system from 2001 to 2007, while Niassa continued to operate under the standard Ministry of Health approach.

When the results were released last December, people immediately questioned whether the new system could be sustained. Everyone, including high-level officials at the Ministry of Health and even our program officer at the Gates Foundation, assumed that because the new system produced much better results than the prior approach, it must cost much more for the government to operate. At one point, our program officer commented that if someone gave him enough money, he could get the coverage rates up that high.

We believed that the new system was cheaper to operate, but had no data to prove the point. So our next step was to compare the costs of the new, integrated system to the government's existing approach. We had detailed costs for running the new system because our management information system captures that data as part of the routine operation of the system. The problem was no one, including the Ministry of Health, knew the cost of operating the existing system.

To get that data, we sent field teams into Niassa to study the costs of running the standard government system over a three-month period. The teams collected cost data from a representative sample of ten health centers located in eight different districts.

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Here's a diagram of the districts and health centers in Niassa that were studied. Each arrow barb represents a delivery or collection of vaccines and supplies. If the barb is pointing up then someone from the lower level travelled to the upper level to collect vaccines and supplies. If the barb is pointing down, someone from the upper level distributed the vaccines and supplies to the lower level.

The Ministry of Health's policy is that every month the districts should collect vaccines and supplies from the provincial capital, then distribute to their respective health centers. Looking at the movement of vaccines and supplies between the provincial capital of Lichinga and the districts, you can see that the province to district part of the policy is working fairly well. Most of the districts went each month to Lichinga to collect their vaccines and supplies. A few of the districts missed a monthly collection and one district obtained vaccines only once during the three-month period.

At the next level down, however, the story is quite different. If the logistics system envisioned by the policy was working, we would see three barbs pointing down to each health center indicating that each month the district travelled to the health center to deliver vaccines and supplies. Instead, we see random patterns. For this supply chain, that link is the problematic last mile. In logistics, we all know that random patterns do not produce effective and efficient results. Anyone with field experience knows that the lower half of the diagram represents stock outs and other supply chain problems.

But those problems go beyond supply chain. Information systems work well when they automate an existing process. At VillageReach we are heavily involved with those working on health management information systems. All too often their solution is to throw more and newer technology at the problem. If there is no basic system to be enhanced with technology, however, all they generally do is automate chaos.

The human resources group should also see problems in the lower half of this diagram. It is very hard to manage personnel who must operate in a haphazard, disorganized environment. If workers are having to randomly assign tasks among themselves just to keep the health system going, then it will create a constant strain on human resources.

This situation is also very hard to manage by those focused on clinical care. Because the data generation is poor or non-existent it is very hard for them to see what is happening. When they don't know what is happening, they generally resort to throwing manuals with procedures at the last mile and hope they will be implemented.

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So back to the cost study. Once we had source data for each province we put it into an elaborate Excel model. We analyzed three different types of costs. The first is the total cost per year to operate each system in a province. This is the absolute cost. The Ministry of Health is most interested in this cost as it represents what they have to put in their budget each year.

The second cost analysis is the total cost per fully vaccinated child. DPT-Heb B3 is the last in the series of basic vaccinations. If a child has received that vaccination then health professionals assume the child has received the full package of vaccinations. This cost represents the cost-effectiveness of vaccinating a child. Public health experts are generally most interested in looking at costs this way.

Finally, we looked at the total cost per vaccine dose delivered. This cost represents cost efficiency. The logistics experts typically focus on this cost.

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Here are some high-level results of the study. The numbers certainly make sense given the differences in the two approaches.

First, transport was 4% higher with the new, integrated system. When we shifted tasks away from the health workers and consolidated them in the field coordinators with full-time distribution responsibilities, we needed to allocate full rather than shared transportation resources. One benefit of this approach which is captured in the costs is the field coordinators were each trained to maintain their truck. They became very good at it, which reduced equipment downtime and lowered maintenance costs over the shared resource approach of the existing system.

The standard government distribution system in Niassa where everybody does a little bit of everything cost 16% more in personnel costs than having the field coordinators. This came as a big surprise to the Ministry of Health and others. Note also the rather substantial differential in personnel time required to operate the two approaches. The additional 210 staff days required to run the Niassa system falls almost entirely on the health workers. The new system frees up that time and reallocates it to health workers providing healthcare rather than collecting supplies and filing inventory reports.

In the end, the absolute cost of running the new system vs. the existing system was a little less than \$40,000. In other words, the government would have to budget about \$40,000 per year more to run the new system. But that higher cost is more than due to higher vaccine and related supply costs as the system is running at a much higher throughput.

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Here is another way to look at the results. The key numbers for cost per child vaccinated or “cost effectiveness” and for cost per dose delivered or “cost efficiency” are shown at the top. The new approach to logistics we used in Cabo Delgado is better in both categories than the current government approach.

The pie charts show the mix of costs relative to each other for each approach. . . . This week I was struggling with how best to explain these charts and then it came to me. I spent last weekend in San Diego, California watching my teenage daughter play in a very important football tournament. They won the tournament, so I was preparing for this presentation I couldn't stop thinking about football. So it was obvious to me that these two pie charts are just like sporting events. In any sporting event there are players and referees. We want the referees to do their job applying the rules so the game moves along smoothly. A bad referee calls a lot of attention to himself along with the screams of the fans; while a good referee goes largely unnoticed allowing the players to come to forefront and really shine.

So for me these components (transport, cold chain and personnel) are the like the referees. They are the support functions. Vaccines and supplies are the players. We want the vaccines and supplies to be the most prominent and have the support functions represent as small a share of the costs as possible.

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Our cost study also identified a number of non-cost advantages with the new system. Data collection and use of information showed huge improvements with the new system. At one

point we had seven field coordinators in two provinces doing the data collection for 261 health centers. Those seven staff members did data collection as a key part of their full-time job. Their work replaced having 261 or more health workers collecting data as a very low priority task among many in their work day.

Recurrent training and the supportive supervision became routine in the new system. The result was health workers that were more effective and had much higher morale.

Finally, there was increased knowledge of and trust in the public health system. When the public gains trust in the system and is more willing to take advantage of the health care offered, communities will be healthier.

I would be happy to send a full copy of the cost study to anyone who would like it.

## Slide 12

To summarize, because VillageReach focuses on strengthening health systems at the last mile where all of these disciplines come together and pass through a single health worker, we were forced to design holistic solutions across the various silos. We may have stumbled onto this approach, but we learned that it is absolutely necessary at the final segment of the value chain. Without an integrated approach, it is very difficult, if not impossible to create enough efficiency at the narrow part of the funnel, so that all the value up above can pass through to those needing healthcare. By thinking beyond the question of the right product, at the right time, in the right condition, etc., we found we could solve problems and create value not just for the supply chain experts, but for those interested in information management, human resources, clinical care and ultimately, health impact.

So in conclusion, I would like come back to the title of my presentation and pose it as a question for this group to consider over the next two days: What is the value of logistics? I want to challenge this group to think broadly --- beyond the comfort of our supply chain silo. How can we create value and become more relevant for the people sitting in those other seminars? It is probably easier to think across silos at the last mile where all of them come together in a very small space, but I believe it is possible to take this approach at all levels, even at the top of the funnel.

Earlier I used the analogy of referees in a sporting event to describe the relationship between support functions, such as transport, to the real star of supply chain: the medical supplies. I believe this group may perform a task similar to the referee in a professional sporting event where there are also a large number of spectators participating in the event. Applying the analogy more broadly, I am asking this group to consider whether our job is

not just to focus narrowly on making sure the supply chain works, but to make sure the entire health system moves along smoothly so that the health workers can shine and the communities who are participating in health workers' performance receive the full benefits of a strong, high-quality health system.

Thank you.