What Ghana has to teach US healthcare

A team of St. Louis-area physicians who call themselves MISSION:318 recently approached designers about a project in Ghana. For eight years, the physicians had been visiting a town called Yendi, in northern Ghana, for weeklong volunteer surgery trips.

The team of physicians had met a reverend named Mustapha who the locals called “Reverend Muss.” He had moved his family to Yendi only to have his daughter contract malaria and die within the first year of residence because there was no doctor nearby. The reverend threw himself into community improvement, founding a school and bringing in medical personnel as part of his role on the advisory board of the hospital.

As helpful as these trips were, the doctors could not deny the need for continued medical attention after they left. A key part of the solution was to build a more permanent structure that would have a substantial, long-term impact on the community.

The team felt they were repeating the same surgeries every year — hernias and goiters of the thyroid — which, while helpful, weren’t making an impactful change on overall health. They wanted to focus on accessing the sources of these problems through a more sustainable healthcare approach by taking the existing facility to the next level, enhancing its impact on the surrounding community.

The doctors engaged this design project team to accompany them on a trip that embodied the designers' brand — understanding that the design of a facility directly affects those who work and heal within the space. In some ways, it was less about a specific project and more about influencing community health long term. Interestingly, healthcare leaders in the U.S. are asking the same questions.

The level of healthcare in Ghana is currently very low, whereas the level of healthcare in the U.S. is considerably higher, but they are facing the same concerns.

In partnership with local stakeholders, doctors in the U.S. raised funds to support the work, packed a shipping container with equipment, and traveled to Yendi with designers for seven days, seeing patients and laying the groundwork for a new facility to serve the local populace.

Care delivery in Ghana

The first scheduled trip was postponed when the U.S. State Department said the tumultuous environment in Ghana was too dangerous. The trip was rescheduled for a smaller group with an escort close at hand and enhanced security measures in light of dangerous tribal strife. Once safely installed on the site, the medical team and designers began unpacking their shipping container. There were two surgery teams, each led by a surgeon and including an entire pre- and post-op surgical support staff. By the end of the day, they had prepared for and scheduled nearly a week's worth of surgery. The team performed and average of 75 surgeries in about four days, a remarkable feat both in motivation and passion but also from a logistical perspective.

The physicians worked tirelessly, 12 to 15-hour days, driven by their mission to provide healthcare to an underserved population. The facilities were sparse.

PREVIOUS PAGE:

During one power surge, one surgeon was performing a procedure by the light of three cell phone flashlights held above the patient while waiting for the emergency generators.

FAR LEFT:
To transport patients from the wards to the OR for surgery, they had to be wheeled 100-150 yards under a canopy outdoors

LEFT:
There is no running water in the surgery area, so they fill this can with water in the morning for hand washing.

No preoperative staging area existed. The prep was performed in the wards which consisted of a 50' x 100' building with open bedrooms containing many beds, no gas, and limited electrical connection. To transport patients from the wards to the OR for surgery, they had to be wheeled 100-150 yards under a canopy outdoors.

On a past trip, MISSION:318 had raised funds for and constructed an 8-bed ICU, which is currently serving dual purpose as an ICU and a post-op care unit. Mercy Virtual equipped the ICU with a telemedicine prototype. Mercy is an industry leader in this area and has taken on the challenge to look at how their technology impacts global health. In the past year, Mercy has been beta testing a project where – at the touch of a button – they provide 24/7 contact with a doctor in the U.S. whenever the local providers need help. The local teams have accessed this expertise 3,500 times in the past year – all at the touch of a button. One of the nurses on the trip had been involved in the "virtual ICU" efforts and had been helping the patients in Ghana virtually over the past year. She had the chance to come and care for them in person, which was impactful.

The local team has also taken the initiative to share the benefits of this system and is in discussions about rolling it out across the entire country, starting with a larger hospital system in Tamale. The hope is by resourcing and using technology, rural areas can become self-sufficient in healthcare. For Mercy Virtual, this is primarily about their mission, versus profit. The goal was to provide continued monitoring of patients and shore up the training that the team had given local practitioners/ stakeholders once they returned to the U.S.

During their visit, designers were immersed in the culture and saw many examples of systematic shortcomings in the local healthcare facilities—lack of maintenance, staff, infrastructure—elements that would be so unthinkable in the U.S. that it took creativity to address them.

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Facilities in Ghana

The local facilities were characterized by a lack of engineering and utilities, particularly water. There was a pump house that ran to a tower, which would then gravity feed plastic containers throughout the site, supplying each of the different wards.

The hospital almost never had running water and surgical staff were scrubbing in with water from a cooler. The electrical feed was unreliable as well, with the lights going out in the middle of surgery in some cases. The hospital has a generator, but it takes time to get it started, which can be critical in surgery. Airflow is also critical in a medical facility, where germs and contaminants can seriously harm vulnerable pre- and post-op patients. The facility had no outside air changes anywhere. There are large wall units in the OR that haven't worked in years and no one knows how to fix them.

Power outages were another major challenge during the trip. One day in particular, the power had been out for approximately four hours, but surgery was continuing with the help of a backup generator. During one power surge, one surgeon was performing a procedure by the light of three cell phone flashlights held above the patient while waiting for the emergency generators.

This lack of infrastructure is something that would never be encountered in the U.S. Another example includes rising humidity in the OR when the air conditioning is disrupted by power outages.

Sustainability enters the equation, but not in the same way as often thought of in the U.S. Instead of a focus on being "green," the focus is on solutions that can remain in place and functional for the long term. The design team visited the site along with the doctors and observed how the stakeholders worked in ICU and surgical spaces.

To design buildings that truly serve the population, architects must walk in the shoes of the people the stakeholders serve, immersing themselves in the local culture. Conversations with local families help the design team understand what day-to-day life is like, what circumstances bring them to the hospital, and

what the stakeholders' journey is like. Large-scale sustainability goes far beyond being "green" to asking how to create sustainable healthcare from the ground up, including facility maintenance, adequate utilities and staffing levels.

On a smaller scale, sustainability means how they can get the facility to stand by itself. In a resource-depleted area, how can they become independent? At the same time this trip was going on, PG&E power in California was using rolling blackouts to mitigate the risk of fire brought on by the Santa Ana winds, creating power challenges for hospitals. Interestingly the same issue was coming up in the U.S. and people were starting to ask how to make hospitals more sustainable and less reliant on the grid through power redundancy and robust backup plans. Once perfected in the U.S., those same ideas can be applied in places where the grid is weak or nonexistent.

One of the goals of the trip was to gather data the design team could bring back home and use to design a new facility. Designers scanned the existing hospital buildings using 3-D scanners creating a point cloud in order to build a REVIT model. Each scan took about three minutes, with a camera moving from room to room, or capturing 60 sf spaces at a time in a large open ward. These tools provided an incredibly valuable time savings and the stakeholders and physicians enjoyed watching the way the architects/project team worked: there was a nice synergy to the process.

During the trip, stakeholders and designers visited a 900-bed teaching facility in Tamale that could serve as a benchmark for the current project. In many ways, this was more valuable than trying to mimic the design of a Western hospital.

A main difference between Western hospitals and the rest of the world is the ward structure versus single patient rooms. While infection control is a risk, the lack of providers necessitates a ward layout so they can monitor a large number of patients. Designers and leaders met with officials from the ministry of health to develop some common ground between design plans and expectations for the project. Decision makers and architects also worked together with the U.S. ambassador to eliminate some of the roadblocks faced by the team, such as the high costs of getting their shipping container out of port in a timely fashion.

Once back in the U.S., the design team opened an inter-office competition and invited multidisciplinary teams of 4-5 people to propose ideas for their 10-year master plan at the Yendi hospital. Each team developed their idea and presented it virtually to one of the MISSION:318 Board of Directors. The winning team had 30 days to refine their idea. In the end, the results combined the best comprehensive master plan ideas of two teams. From that point, all participants returned and were included in the execution, thereby implementing all of the best ideas and optimizing the involvement of all participants.

The competition is part of the firm's charity program, in which participants can seek a donation to support their active involvement in non-profit charities. The firm focused the funds into a more centralized effort that had a greater impact. This provides motivation for the teams beyond their regular work: they are involved in something larger that supports BSA's mission statement and has a broad impact on healthcare design in general. Ultimately, the goal is to create a sustainable model of care for emerging areas in Africa that can be propagated once it is established.

Impacts + Insights

Designers learned some valuable lessons through this experience and developed an appreciation for the infrastructure that allows providers to optimize care in developed countries. It forced them to think outside the box when that infrastructure is not available, emphasizing more robust project engineering, maintenance programs, and adequate staffing. Exploring solutions that are less resource-dependent is another component to designing a facility like this. For example, the original analysis of the facility provoked questions of why the buildings were so spread out. Designers

found ways to optimize airflow and natural ventilation throughout the facility since none of the patient wards were afforded air conditioning, like a facility in the U.S.

The location was a key differentiator for this project and the project team wanted the design to be rooted in the local culture and landscape. One team's design idea incorporated a weaving concept, which was a key part of Ghanaian culture and took the idea of weaving together different aspects of the project to create a comprehensive vision. They discussed which "threads" would be linked to sustainable healthcare and woven together to result in a larger solution. To accomplish this, they focused on patterns, colors, and elements that are celebrated in the local culture and lifestyle.

For example, something unique in the culture is that friends and family often live on-site while their loved ones are receiving care, so they need accommodations. Such cultural nuances can have a huge impact on the design. In order to truly understand the users' needs, designers must leave their assumptions at the door and enter with an open mind. The opportunity to shadow providers is just as important as immersion in the culture and patient observation because it allows teams to understand how providers are working and how to help.

The project team had a close, collaborative working relationship with Dr. Ayuba, Chief Medical Officer, and the Hospital Board to address both current and future needs. For example, when designing the "phasing" aspect, the local leaders helped determine the Emergency and Accident Department should be the priority project.

There is a tendency to rush in to create solutions based on a set of assumptions (patient room sizes, available infrastructure, etc.) but a more accurate and empathetic design starts with immersion in the local environment. Living alongside the patients and community taught the design team a great deal about the types of ailments the facility was treating and the cultural norms that surrounded care — such as family members staying on site during treatment and recovery. In the US culture, healthcare leaders don't overtly discourage family participation in patient care but sometimes marginalize family members by not providing adequate accommodations. This is just one example of how many different pieces work together in the patient experience.

Care is not a single silver bullet, it is part of an integrative system that includes maintenance, staffing, infrastructure, and all the things that US healthcare leaders and project teams take for granted. The lessons learned in Ghana can help designers worldwide find ways to meet stakeholders and decision makers where they are and nurture these integrative elements so that care gets better everywhere, even finding what Ghana has to teach US healthcare.

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