

Academy Journal No. 19



Academy of
Architecture for Health

an **AIA** Knowledge Community

2017

Contents

3

Letter from the editor

4

Designing for Invisible Injuries: An Exploration of Healing Environments for Posttraumatic Stress

18

Hospital Inpatient Unit Design Factors Impacting Direct Patient Care Time, Documentation Time, and Patient Safety

30

Applying Maslow's Hierarchy of Needs to Human-Centered Design Translating HCAHPS Results into Designs that Support Improved Care Delivery

40

The Decentralized Station: More Than Just Patient Visibility

46

An Efficient Method for High-Performing Healthcare Facilities

52

Big Growth Needs Big Data

62

Open Rooms for Future Health Care Environments

72

Songambele Stories

82

Call for papers

Mission of the *Academy Journal*

As the official journal of the AIA Academy of Architecture for Health (AAH), this publication explores subjects of interest to AAH members and others involved in the fields of health care architecture, planning, design, and construction. The goal is to promote awareness, educational exchange, and advancement of the overall project delivery process, building products, and medical progress that affects all involved in those fields.

About AAH

AAH is one of 21 knowledge communities of the American Institute of Architects (AIA). AAH collaborates with professionals from all sectors of the health care community including physicians, nurses, hospital administrators, facility planners, engineers, managers, health care educators, industry and government representatives, product manufacturers, health care contractors, specialty subcontractors, allied design professionals, and health care consultants.

AAH currently consists of approximately 6,000 members. Its mission is to improve both the quality of health care design and the design of healthy communities by developing, documenting, and disseminating knowledge; educating design practitioners and other related constituencies; advancing the practice of architecture; and affiliating and advocating with others that share these priorities.

Please visit our website at www.aia.org/aah for more about our activities. Please direct any inquiries to aah@aia.org.

***Academy Journal* editor**

Orlando T. Maione, FAIA, FACHA, NCARB

AAH 2017 board of directors

President

Tom Clark, FAIA, EDAC

President-elect/strategy

Vincent Della Donna, AIA, ACHA

Immediate past president

Joan L. Suchomel, AIA, ACHA, EDAC

Education

Brenna Costello, AIA, ACHA, EDAC

Communications

Peter L. Bardwell, FAIA, FACHA

Codes and standards

Chad E. Beebe, AIA

Conferences

Rebecca J. Lewis, FAIA, FACHA

Visibility

Tushar Gupta, AIA, NCARB

Regional and international connections

Larry Staples, AIA

Songambele Stories



Southern Ellis, AIA, SEED, LEED AP,
Associate at HKS, Inc.

ABSTRACT

Built in a region of limited resources, the new Songambele Hospital seeks to leverage its most important commodity, community, to create sustaining health in the village of Nkololo and the surrounding region. Just miles from the famed Serengeti National Park, over the last seven years, the small, overcapacity and underequipped dispensary has been transformed into a full-service hospital through the Roads to Life Tanzania team. Opened last year, the surgical building reduced the travel time for Nkololo women needing emergency C-sections by over an hour, while the Songambele lab building is transforming the way the village fights malaria.

Equally transformative, the Songambele workshop and trade school is empowering men and women in the community to trade sweat for skills training and the opportunity to transform their community through a dignified approach to job creation. The creation of the hospital master plan has impactful stories of dignity, empowerment, life, and redemption woven into it and makes a powerful case that the only path to long-term sustainability for health care systems is to invest in people.

Introduction

The dream

In 2010, as a graduate student at Texas A&M University, I was connected with Father Paul Fagan and Roads to Life Tanzania through Professor George Mann. It was a once-in-a-lifetime partnership for a young architect wanting to directly impact the world through his pen and trace paper. The dream was to expand a 10-year-old, overcapacity dispensary in the middle of a remote Tanzanian village into a full-service hospital.

FIGURE 1



Songambele Hospital Site Plan
Image credit: Southern Ellis

In an effort to truly understand the complexity of the project, I travelled to Nkololo to spend time with the dreamers envisioning the new facility and the community the project would impact. Father Paul introduced me to the village and provided valuable insight from his many years of construction experience in the region.

Most of my first trip to Tanzania was spent with Dr. Helena Sidano, a young doctor who explained the nuances of Tanzanian health care delivery, a drastic departure from health care in the western world. Equipped with notebooks of evidence-based design knowledge I had absorbed from my A&M professors, Dr. Mardelle Shepley, Kirk Hamilton, and George Mann, we sketched a master plan for the hospital. Later, renderings were created for fundraising efforts to sell the Songambele dream.

We saw the hospital as a catalyst of healing for the region. No longer would men and women die on the rough, unpredictable dirt road to the next closest hospital. We would bring health directly to the heart of Nkololo through the Songambele Hospital. Beyond health, though, the hospital would be the largest construction project ever attempted in the village. Harnessing the opportunity to positively impact the region's economy became a key project driver. Early on, construction skill building and job creation were necessities to simply get things built. As the project has continued to evolve, it's apparent that this investment in our community brings beauty and strength to the tapestry of the hospital by adding layers to the interwoven stories that make up the Songambele Hospital narrative.

Story of lights

Seven years after my initial trip to Nkoloko, I found myself standing alongside my wife in front of an idling flatbed delivery truck as its headlights shined into the Tanzanian acacia trees. Atop the truck, seven-foot-tall wooden crates stamped “Songambe Hospital X-Ray” signified a new season of healing at the village of Nkoloko. But while the arrival of new medical equipment to a remote hospital should bring excitement, there was anxious uncertainty in the air on this dark evening. There are complexities to health delivery and sustainability in the developing world, and today’s complexity was the utter lack of a forklift—a necessity for unloading the wooden crates in front of us.

Beams of light from all directions began to illuminate the crates. The spheres of light grew larger and larger, dancing on the wooden X-ray crates as a crowd of men with flashlights approached. Men from across the village had come out of the woodwork to lend a hand and assist with this important delivery. Before I knew it, we were hand in hand, lifting the prized equipment off the flatbed and into the Songambe facilities. Although I couldn’t understand a word these Nkoloko men said, their eyes and their actions spoke volumes. They weren’t there, in the dark of night, to lift an X-ray machine; they were there to lift the health and future of their beloved community.

Hours earlier, my wife and I had experienced another light-saturated scene inside the newly opened Songambe surgical building. This time, tandem beams of the theater’s new surgical lights illuminated a basketball-sized tumor growing from a young lady’s abdomen. Framed by a blue surgical cap and mask, the eyes of Songambe surgeon, Dr. Kidando, were beacons of focus, intensity, and skill, as his scalpel brought miraculous healing to this young woman from Nkoloko.

These two stories demonstrate the multifaceted impact of the Songambe Hospital. A narrative of healing has been layered with an equally powerful narrative of community investment and inclusion. Each of the stakeholders involved in the project—community members, patients, medical staff, builders, architects, and investors—is playing a role in the life, health, and empowerment stories of Nkoloko.

Story of health & community

The master plan for the Songambe Hospital is quite different than the congregated massing schemes seen in large hospital towers around the world, where mechanical and electrical resources are plentiful. In a region such as Nkoloko, mechanical ventilation and artificial lighting are a luxury. Designed as a series of narrow buildings connected with covered walkways to accommodate natural ventilation,

FIGURE 2



Southern Ellis with Dr. Helena Sidano

Image credit: Southern Ellis

access to natural light, and to allow for phased construction as fundraising milestones are met, the Songambe Hospital campus brings life and healing to a community that was once devoid of medical care. Provision for this phased construction is often a necessity in the developing world since it allows manageable fundraising goals to be set to prioritize and deliver care according to the specific health issues of the region.

Nkoloko is located about an hour motorcycle ride via rough, unpredictable dirt roads from the next-closest hospital facility. For many in Nkoloko and the surrounding regions who found themselves needing emergency care, this hour-long trip often proved deadly. Home births assisted by local midwives are the norm in this region, but when complications arise, immediate care is a necessity and access to a sterile operating suite to perform a C-section is crucial. The Songambe Hospital surgical building, which opened in the summer of 2016, provides this capability. In its first year, 326 surgeries were performed in the surgical building, including 102 C-sections. It’s easy to glaze over statistics, but in the context of impact, each successful surgery and C-section means that the story of someone from Nkoloko is forever changed.

The Songambe lab building is fighting to change the story of the leading cause of death in the region: Malaria. Completed in 2013, the Songambe Lab became the first lab in the extensive Shinyanga and Simiyu Regions of Tanzania to be permitted by the Tanzanian Ministry of Health to give blood transfusions. Blood transfusion capability allows the hospital to attack malaria head-on.

FIGURE 3



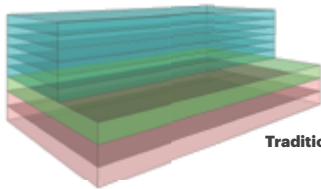
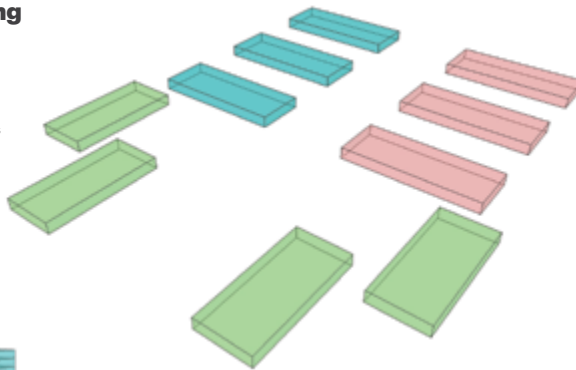
Surgeon Dr. Kidando within the Songambebe Hospital Surgical Building
Image credit: Southern Ellis

FIGURE 4

Village Hospital Massing

narrow buildings connected with covered walkways + phased construction

- increased natural ventilation
- access to natural light and opportunities to infuse gardens into the site massing
- allow for phased construction as fundraising milestones are met, prioritized according to specific health issues in region
- manageable construction scale for various labor force skillsets



Traditional "Stacked" Hospital Massing

Village Hospital Massing Concept
Image credit: Southern Ellis

FIGURE 5



Outside the Songambele Hospital Ward Building
Image credit: Southern Ellis

FIGURE 6



Songambele Hospital Ward Building Interior
Image credit: Southern Ellis

New inpatient wards supplement the lab and surgical buildings. These wards are filled with donated beds, locally manufactured side tables for patient belongings, and patients on the road to health. While limited air conditioning capabilities are provided in the operating rooms within the surgical building, the wards are designed to harness prevailing breezes through natural cross ventilation. Artificial task lighting powered by solar panels adjacent to the buildings supplement natural light flooding through the windows of the wards.

Through our work over the years, we constantly listen, observe, and adapt to cultural aspects that affect the way we deliver care. As we designed the campus master plan, we knew family was at the center of everything happening in the village. When a sick patient arrives at the hospital, they are often accompanied by multiple family members. Often, these family members act as assistant caregivers throughout the patient's stay at the hospital, which is important in a region hampered by medical staff shortages.

Outdoor seating areas with direct line-of-sight to patient beds are provided for families just outside the ward buildings, allowing these secondary caregivers to remain close to loved ones. While visual connection is maintained, this approach also provides a slight physical separation from the treatment zone to control the potential spread of infection and provide space for the medical team to work within the ward.

This year, the facility's Mother-Child Health Clinic will open its doors, providing outpatient care associated with reproductive health to the region. Adjacent to the new Mother-Child Health Clinic, a partnership with Medici Con L'Africa (Doctors with Africa CUAMM) assists with the delivery of a Center for Disease Control (CDC) building on the campus. An Italian physician with a specialization in infectious disease is already on-site in preparation for the CDC building's opening, marking a multiyear partnership to train local medical professionals to treat and counsel those affected by infectious diseases such as AIDS. This partnership also assists with improving public health, preventive health, and community outreach initiatives at the hospital.

In Nkololo and the region, hospitals are often seen as a last resort for the very sick, rather than a place of health promotion. Many villagers choose to avoid the hospital during times of illness or pregnancy complications until it is too late. While all of these programs are great, they will not be utilized without community buy-in.

A critical factor in community outreach has been the fact that the campus has been embraced by the community. An entry courtyard bordered by the Mother-Child Health Clinic, the CDC, the lab building, and the old dispensary, invites the community of Nkololo into the facility. Every day, men,

women, and children flood into the hospital's courtyard to sell fruit, catch up, and watch the ongoing construction. Some are there with patients; most are there because they see the hospital as the new epicenter of village activity.

From a public health standpoint, we have ideal access to the very population we are trying to serve and can build familiarity and trust among our patient population. With the walls of the hospital open, we have access to seamlessly educate future mothers on healthy delivery practices and young mothers on potential infant-health danger signs. We have the ability to educate the community on nutritious eating habits or disease prevention practices. Most importantly, with people flooding daily into the hospital's courtyards, we know the community feels a sense of ownership towards the facility.

Helena's story

Born into a country where education for young girls is an afterthought, the story of a woman named Helena is one of the beautiful threads woven through the Songambebe tapestry.

FIGURE 7



A mother and daughter wait within the Songambebe Clinic
Image credit: Southern Ellis

Due to the cost of education, many families in rural villages like Nkololo can't send all their children to school. This hardship is often coupled with a prevailing cultural view in the region that when married, girls become the property of their husband. This leads many families to view investing in the education of their sons as a smarter investment than paying to educate their daughters. This leaves many young girls uneducated beyond minimal primary schooling.

Seeing this phenomenon, Roads to Life Tanzania began to combat the issue by raising money to send young girls like Helena to upper levels of education. It turned out to be a great investment. Seven years ago, when I travelled to Tanzania for the first time to begin designing the hospital, it was Dr. Helena that returned to her home village to teach a young architecture student about Tanzanian health care. Today, Dr. Helena leads the medical team as head physician of the Songambe Hospital. Empowerment and redemption are at the core of the project and the goal behind everything that we do.

Story of dignity

The bricks of the Songambe hospital are formed on-site, steps away from the hospital's construction. The team collects sand from the river that runs through the village. Onsite, the sand is mixed with a little cement, water, and a secret ingredient for added strength: Sweat from men and women of Nkololo. It's this local sweat, rooted in job creation and empowerment that serves as an agent of dignity.

Perhaps one of the most impactful stories interwoven into Songambe is the story of the construction workshop and trade school, which has employed hundreds of men and women over the course of the hospital's construction. In remote agriculture communities like Nkololo, the only available career choice was that of a small-scale farmer struggling to make ends meet. The Songambe construction trade school provides a dignified approach to job creation that allows people to not only invest in themselves, but also in the future of their community. The Songambe workshop provides on-the-job training, creating the master welders, carpenters, and masons that will continue to go forth and transform the community of Nkololo long after the hospital is finished. This is the story of development as a portal for sustained economic growth and that meets the needs of a community, while also creating the framework for the community to continue to transform itself.

Investing in people to sustain growth isn't limited to the construction process; it also filters into the programmatic elements of the master plan. Many developing countries suffer from a shortage of trained medical professionals, and Tanzania is no exception. This shortage is compounded in rural tertiary hospitals, which struggle to compete with district hospitals in larger cities for qualified doctors and nurses.

For physicians like Dr. Helena, returning to her home village and lifting her community might provide enough incentive to practice in this remote region. For others, though, more incentive is needed. Anticipating this, several beautiful staff houses have been built on the grounds of the hospital to incentivize the best and brightest in Tanzania to bring their talents to Songambe. The hospital has also invested in several village houses, outside the walls of the hospital, to house key medical personnel and provide temporary housing for visiting doctors from abroad.

Beyond housing, the Songambe master plan includes provision for the creation of a nursing school on-site, which will attract students from across the region and ensure a steady stream of nurses available to treat the hospital's growing patient population. Detailed design for the school and associated nursing student housing will begin later this year, with the goal of adding another cord of sustainability to the Songambe arsenal of impact.

Through design, we are trying to create a facility where physicians and nurses want to work. Healing gardens filled with blossoming red flamboyant trees provide a place of respite for staff members, and help reduce stress from the chaos of the hospital. The campus of narrow buildings allows for a multitude of exterior windows to bring natural light deep into staff work areas and patient treatment areas. Between the buildings, flourishing flora and fauna, immaculately manicured by the local groundskeepers, provide opportunities for patients, staff, and visitors to access nature, reducing stress and shortening healing times. This commitment to bring nature onto the campus reflects a direct investment in caring for our staff and the patients that enter our walls. It brings dignity to the healing process and dignity to the lives of the medical professionals that choose to spend their days serving others.

Our story

If you are reading this article, you probably understand the role architects play in the creation of effective healing environments. But I believe architects also have a responsibility to serve adjacent roles for our projects. One such role is narrator for our projects, speaking to and pointing out underlying storylines that can be missed by the casual observer. In the narrator role, architects become play-by-play announcers, interpreting the action from the field to an audience of potential donors or investors. This role is critical for projects in the developing world, where funding is tight. We advocate for the stories we see, and our enthusiasm can spark change.

FIGURE 8



Nkololo women within the Songambebe Hospital community courtyard
Image credit: Southern Ellis

FIGURE 9



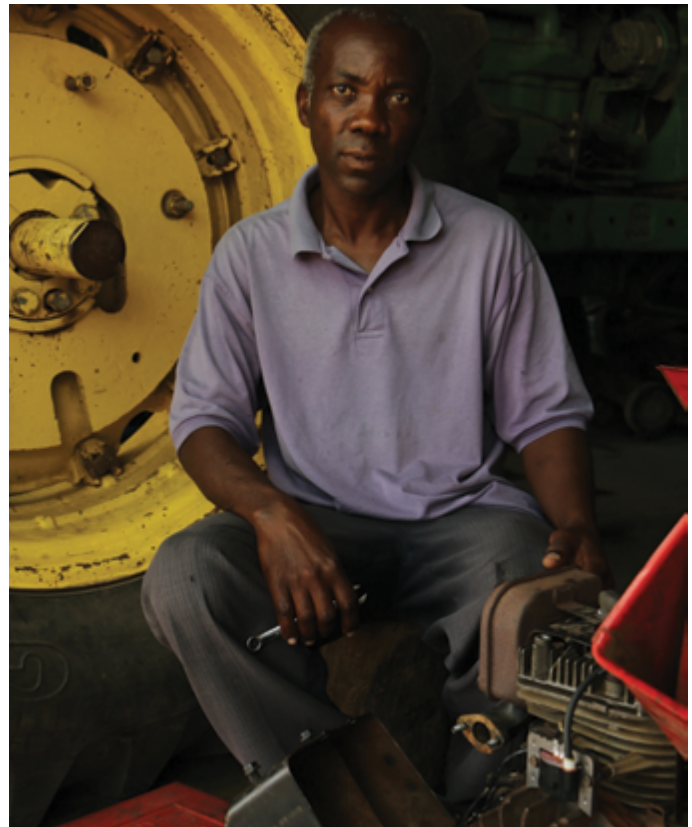
Dr. Helena Sidano with a patient at Songambebe
Image credit: Southern Ellis

We also need to remember that we are not merely narrators; we are also participants. Our stories are interwoven into the communities we interact with and the clients we serve. My story changes every time I experience evenings like the night our X-ray arrived or as I begin to understand a different facet of Dr. Helena's story of redemption. I'm changed every time I see a mother nestled next to her newborn child or the faces of the Songambebe construction crews as they create a brighter and healthier future for their children. I'm a different designer, listener, and person because my story is stirred into these stories.

But our most important role is not as narrator or even participant. We are also influencers of stories. We have the ability, duty, and responsibility to not only tell stories and be changed by stories, but also to impact stories.

The pieces of the Songambebe Hospital tapestry create a story that is about more than bricks and architecture; it's about people. The Songambebe story is about healing, life, empowerment, job creation, dignity, and redemption. These are stories that echo in communities for decades, and teach us that sustainability is forged by investing in people.

FIGURE 12



Songambebe Workshop and trade school
Image credit: Southern Ellis

FIGURE 11



Welder within the Songambebe Workshop and trade school
Image credit: Southern Ellis

FIGURE 10



Brickmakers within the Songambebe Workshop and trade school
Image credit: Southern Ellis

FIGURE 13



Peter, a patient in the Songambebe ward, and his mother
Image credit: Southern Ellis

Academy of Architecture for Health

an **AIA** Knowledge Community



**The American
Institute
of Architects**

1735 New York Avenue, NW
Washington, DC 20006

aia.org

© 2017 American Institute of Architects