The Makunda Model:
A Study of High-Quality, Accessible Healthcare in Low-Resource Settings

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ABSTRACT

Mission-focused hospitals in low-resource regions of the world face significant challenges in providing high-quality, accessible care to patients. External funding is limited and can fluctuate significantly from year to year. Additionally, attracting and retaining well-qualified healthcare professionals for more than short stints can seem almost impossible.

Over a period of 25 years, the Makunda Christian Leprosy & General Hospital has developed a unique model enabling it to provide quality care for over 100,000 outpatient visits, 10,000 hospital admissions, and 5,000 baby deliveries per year. Located in a remote region in northeast India, Makunda Hospital operates with an annual budget of approximately $2M USD and receives less than 2% of its funding from external sources. Yet, even competitive hospital administrators admit that many of their patients travel hours to seek care at Makunda Hospital's doors because of its reputation for providing excellent maternal care.

To evaluate Makunda Hospital's impact and understand how its model works, we observed its facilities and operational practices; we conducted over 30 in-depth interviews with patients and community members, Makunda Hospital employees, and competitor hospital administrators; and we analyzed years of financial documents and hospital statistics.

We found that Makunda Hospital's focus on (a) poor-centric strategies, (b) thoughtful cost management, and (c) continuous improvement have enabled it to achieve the volumes necessary to generate sufficient revenue and retain valuable healthcare professionals.

In Part I, we provide historical context on Makunda Hospital, including its 30-year strategic plan and expansion into education and agriculture. In Part II, we describe our methodology for collecting data, and in Part III we share the results of our impact assessment. In Part IV we discuss key takeaways for other mission-focused hospitals in low-resource settings. Part V concludes by suggesting broader implications for healthcare and areas of further study.

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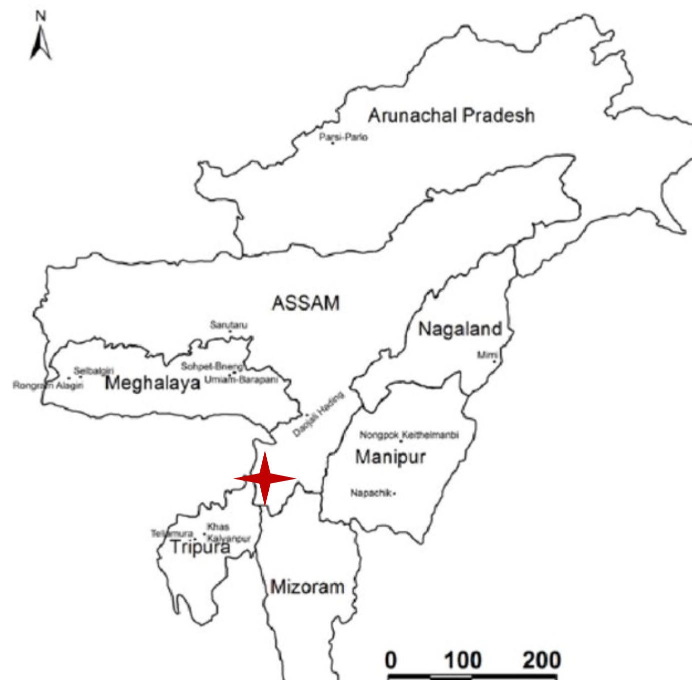
PART I: INTRODUCTION

The Makunda Christian Leprosy & General Hospital,[6] founded in 1950 by Christian missionaries, is located in a remote region in northeast India at the border of three neighboring states: Assam, Tripura, and Mizoram. Originally a leprosy colony on 1000 acres of land, the hospital became a general hospital from the late 1950s until the early 1980s, when foreign physicians running it were forced to leave India. Consequently, the hospital fell into a state of disuse until 1992, when it became a member of the Emmanuel Health Association (EHA), an association of 20 independent hospitals in India.[7]

Figure 1. Location of Makunda Hospital within Northeast India



https://www.researchgate.net/publication/319837781_Piecing_Together_from_Fragments_Re-evaluating_the_%27Neolithic%27_Situation_in_Northeast_India/figures

Prior to reopening the hospital, EHA sought reassurance that the hospital would stay open, so it asked two physicians, Dr. Vijay Anand Ismavel and Dr. Ann Miriam, if they would be willing to stay long term. When Dr. Ismavel and Dr. Miriam asked what was meant by long term, EHA specified that they should plan to stay until retirement.[8] Driven by their commitment to Christian values, the couple accepted the conditions and moved to the area in March 1993 to

[6] See http://www.makunda.in/.
[7] https://eha-health.org/eha-location-map/87-eha-locations-across-india/22-makunda-christian-hospital
[8] Interview with Dr. Vijay Ismavel, December 2018. See also https://the-sparrowsnest.net/2018/05/12/early-days-at-makunda/.

reopen the hospital despite a lack of funding, running water, or electricity for the facilities.[9] Shortly after arriving, they realized that there was strong opposition to reopening the hospital from some community members who had already made plans to divide up the land amongst themselves.

To cover the full time period that they planned to stay at Makunda Hospital, Dr. Vijay and Dr. Ann developed a 30-year strategic plan with three key phases. Phase I was aimed at stability: resolving tensions with local community members and generating enough revenue to cover costs. Phase II focused on local expansion, including building a secondary school, nursing school, and branch hospital to serve the community. Finally, Phase III centered on distant impact, including developing and sharing best practices with organizations in other low-resource settings. This period also included a new community college, a nature club, and a larger emphasis on agriculture.

Today, 25 years into its strategic plan, Makunda Hospital has completed two phases and is well into its third. In the 2018-2019 fiscal year, the hospital provided care for 109,509 outpatients, had 14,350 inpatient admissions, performed 3,058 major surgeries, and conducted 5,889 deliveries. It has also opened another branch in Tripura that served 7,838 of these patients in 2018-19. Makunda Hospital provides its services at very low prices per inpatient visit and provides charity to a large proportion of its patients.

Furthermore, Makunda Hospital has created various educational and agricultural businesses. It runs a K-12 school system with over 1000 students, a nursing college with 61 students, and a nurse assistant training program with 43 students. Most of the nursing college and nurse assistant program students stay in dormitories provided by Makunda Hospital. On the agricultural side, Makunda owns a farm that generates food for its primary and secondary school children for most of the year, and it owns several fisheries and a piggery. Finally, Makunda Hospital recently designated a wildlife area within its boundaries and created "Makunda Nature Club" to document and publish biodiversity records.[10]

PART II: METHODOLOGY

We primarily conducted our research through three methods: (1) in-depth interviews, (2) facility observations, and (3) document analysis.

1. In-depth Interviews

First, we conducted over 30 interviews with Makunda Hospital employees, hospital patients and community members, and competitor hospital administrators. Interviews focused on the strengths, weaknesses, changes, differentiators, and impact of Makunda Hospital. Deeper

[9] CMC Vellore "Paul Harrison Award 2016," https://www.vellorecmc.org/wp-content/uploads/2016/12/Paul-Harrison-Citation-2016.pdf
[10] https://www.youtube.com/watch?v=oRBRAsdYuTY

dives discussed poor-centric strategies, thoughtful cost management, and continuous improvement.

Interviews with the Makunda Hospital employees included Dr. Vijay Anand Ismavel (Senior Administrative Officer, Pediatric Surgeon), Dr. Ann Miriam (Correspondent training, Anesthesiologist), Dr. Roshine Mary Koshy (Medical Superintendent, Physician), James (Hospital Manager), Dr. Shajin T. (Deputy Medical Superintendent, Pediatrician), Dr. Gunaseelan P. (Psychiatrist), Dr. Jan-Henk Dubbink (Resident Physician in Global Health and Tropical Medicine from Royal Dutch Tropical Institute), Ms. Melody Lalsangpuii (Vice Principal of nursing school), Ms. Jasmine Susan Koshy (Deputy Nursing Superintendent, Principal Nurse Assistant Program), Ms. Kenningpeule D. Haikube (Nursing Superintendent), Ms. Sasomchun Halam (Nursing School Tutor), Mr. Daniel Hmar (Principal of Higher Secondary School), Daniel Anandaraj and Dani Paul (school teachers), Immanuel Manickaraj (civil engineer, construction manager) and Rejoice Gassah (Makunda High School graduate, biodiversity project employee).

In addition, we visited the following five local communities, which represent a broad cross-section of the hospital's patients, to understand how patients and their families view Makunda Hospital:

1. Tea Garden Community: Tea garden laborers are among the poorest people in Indian society, usually living in crowded primitive huts owned by the owners of the tea gardens and earning around 100 Rs. ($1.42 USD) per day. We interviewed a family with four children who had each been treated at Makunda Hospital, including one who nearly died after not being able to pass urine. The family received full charity and did not pay anything for the medical services they received.
2. Brahmin Community: Members of the Brahmin community tend to occupy leadership positions and fall among the wealthier in society, living in larger homes with electricity. We interviewed the family of a mother who delivered twins at Makunda Hospital and then was treated there for subsequent heart failure and peripheral artery embolism. The family paid around 5,000 Rs. ($71 USD) for the birth and 40,000-50,000 Rs. ($570-710 USD) for subsequent treatment including 2.5 months of inpatient hospital stay.
3. Vaishya Community: Members of the Vaishya community include skilled laborers who live in humble homes on their own land. We interviewed two families, including a man who broke his leg while working and an elderly couple who had been treated for various ailments. The families paid very little for the services received.
4. Tribal Community: Members of the tribal community often cultivate rice for work and live in more isolated communities with homes made of tin roofs and bamboo walls. We interviewed two families, one of which included a woman who had been unconscious for three days after contracting malaria before being treated at Makunda, and another who had hand surgery after an accident. These families paid nearly nothing for the services they received.

5. Muslim Community: Muslim families make up about a third of Makunda Hospital's patients. We visited a family in a relatively large home who had used Makunda Hospital for the births of their children and their children's high school education.

Finally, we interviewed hospital administrators from three competitive hospitals in northeast India, including two government hospitals and another mission hospital owned by EHA. Questions focused on the services and value proposition of those hospitals versus Makunda Hospital.

1. Dharmanagar Civil Hospital: Located 1-2 hours to the west, this government hospital provides full inpatient, outpatient, lab testing, and pharmacy services, mostly for free, to citizens of the North Tripura District of Tripura State. We interviewed the Chief Medical Officer and then met with several hospital physicians and staff as we toured the facility.
2. Karimganj District Hospital: Located 2-3 hours to the east, this government hospital similarly offers most hospital services and charges very modest fees (typically 5 Rs. for outpatient visits). We interviewed the Medical Superintendent and then met with various hospital physicians and staff as we toured the facility.
3. Burrows Memorial Christian Hospital: Burrows Memorial Christian Hospital is a mission hospital that is similarly a member of the Emmanuel Health Association and is located 4-5 hours to the northeast by Silchar, one of the larger cities in northeast India. With 60-70 beds, the hospital provides general surgery, maternal care, and emergency services. It also has a nursing school. We interviewed the Senior Administrative Officer, Nursing School Superintendent, Nursing Staff Supervisor, and General Surgeon.

2. Facility Observations

To understand Makunda Hospital's model, we conducted an extensive tour of the facilities. First, we followed the outpatient experience from check-in to the waiting area to physician consultation to the pharmacy. Significant time was spent observing patients and operational practices in each of these areas. Second, we toured the lab testing rooms, operating rooms, and inpatient facilities, which include over 150 beds across the female ward, male ward, maternal ward, pediatric ward, postnatal ward, high dependency unit, and NICU. Finally, we visited the other facilities surrounding Makunda Hospital, including the Makunda primary and secondary schools, nursing and nursing assistant schools, grain farms and fisheries, physician and staff dormitories, and wildlife preservation area.

For purposes of comparison, we also toured the facilities of both government hospitals and the other mission hospital.

3. Document Analysis

We met with the managerial staff of Makunda Hospital to request and review various financial and statistical documents. This included over 10 years of historical revenue and cost data and detailed patient volume statistics. We also reviewed Makunda Hospital's annual report and Emmanuel Hospital Association's annual reports and conducted various financial analyses to

understand Makunda's model and how it compares to other hospitals both in the United States and India. Finally, we reviewed the patient complaint log and statistical data on hospital complications and mortalities.

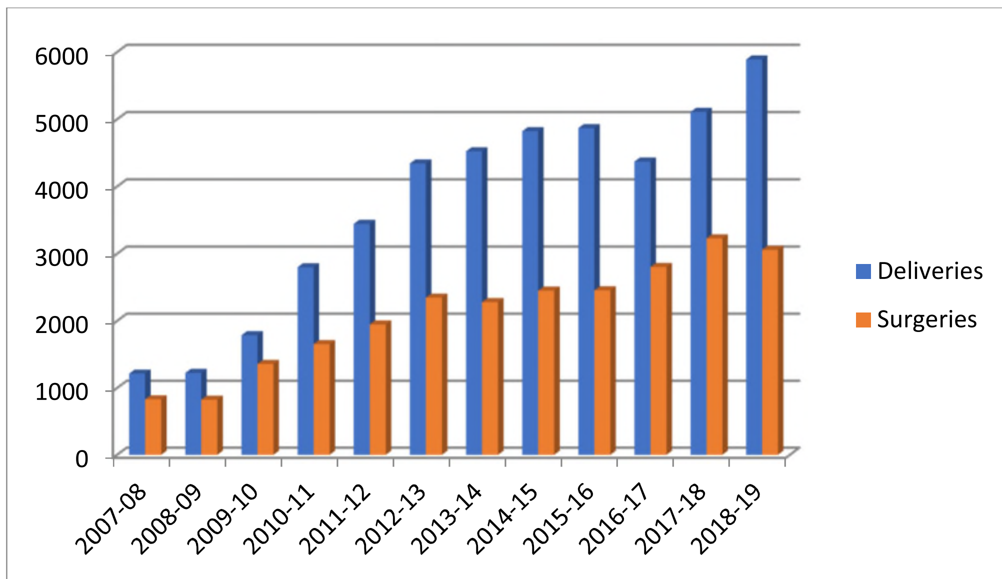
Based on these in-depth interviews, facility observations, and detailed document analysis, we feel confident that we understand the Makunda Model and its impact on the local community.

PART III. IMPACT ASSESSMENT

Below we present the results of our impact assessment of Makunda Hospital's volume, efficiency, quality, and overall community impact.

1. Volume

In the 2018-2019 fiscal year, Makunda Hospital completed 109,509 outpatient visits (a 7.7% CAGR from 2014-19); 14,350 inpatient admissions (6.0% CAGR); 3,058 major surgeries (5.7% CAGR); and 5,889 deliveries (5.1% CAGR).

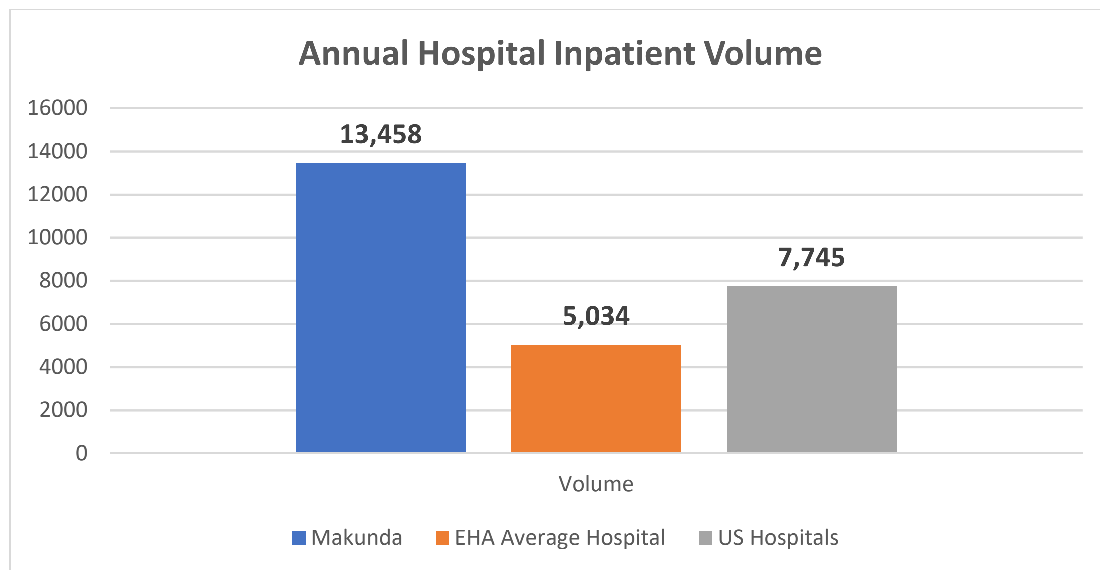


To put these numbers in context, we looked at the Emmanuel Hospital Association, the largest Christian non-profit healthcare provider in India with 20 hospitals and 40+ community-based projects.[11] The average hospital in the Emmanuel Hospital Association had 45,825 outpatient visits; 5,034 inpatient admissions; 1,542 major surgeries; and 1,245 deliveries. Of the 19 EHA hospitals reported, Makunda Hospital was the largest by number of outpatients, deliveries, and surgeries, and second largest by number of inpatients and beds. Furthermore, many of the other EHA hospitals are facing declining patient volume, as opposed to Makunda,

[11] See EHA 2017-18 Annual Report, https://eha-health.org/downloads/annual-reports.

which has seen consistent CAGR growth over the past several years.[12] Although there are many factors which affect statistics among different EHA hospitals, it is notable that Makunda has grown to become one of the highest-volume EHA hospitals despite starting off as a completely closed-down hospital 25 years ago.

For an additional point of comparison, the average hospital in the U.S. has 7,745 discharges per year, with urban hospitals hitting 11,295 discharges per year on average, and rural hospitals reaching 2,467 discharges per year on average.[13] Furthermore, U.S. hospitals tend to see about twice as many outpatients as inpatients per year, far below Makunda Hospital's numbers.[14] Overall, Makunda Hospital has achieved very high volumes, especially considering its location in a more remote area of India.



2. Efficiency

In achieving these volumes, Makunda Hospital operates on a total budget of less than $2M USD per year, which includes the total costs for the hospital, educational, and agricultural portions of its operations. Furthermore, Makunda Hospital has run efficiently enough to reinvest nearly 20% of its annual revenue in new buildings and equipment each year and to write off about 10% of its bills to charity. For the fiscal year 2018-19, the average outpatient cost was only Rs. 889 ($13 USD), and the average inpatient cost was only Rs. 5148 ($74 USD), figures we

[12] Based on analysis of EHA Annual Reports, https://eha-health.org/downloads/annual-reports.
[13] "Inpatient Stays in Rural Hospitals," Statistical Brief #85, Healthcare Cost and Utilization Project, AHRQ, https://www.hcup-us.ahrq.gov/reports/statbriefs/sb85.pdf
[14] Analysis of American Hospital Association Annual Survey data, 2014, for community hospitals. US Census Bureau: National and State Population Estimates, July 1, 2014. http://www.census.gov/popest/data/national/asrh/2014/index.html.

substantiated by examining detailed accounting and financial documents. These numbers represent very efficient costs per patient treated.[15]

3. Quality

Makunda Hospital is well-known for its high-quality services, particularly in maternal care. To make our assessment of quality, we examined the hospital's certification, key performance metrics, and qualitative interview responses.

First, Makunda Hospital has achieved entry-level certification for safety and quality from the National Accreditation Board for Hospitals and Healthcare Providers (NABH).[16] Such a certification requires passing an extensive audit process, creating a detailed quality assurance process that including continuous tracking of certain metrics, and meeting stringent standards for the treatment and disposal of medical waste products. To meet these standards—which very few mission hospitals in India have achieved—Makunda Hospital created a quality team dedicated to completing the certification process and purchased additional necessary equipment.

Second, Makunda Hospital tracks favorably on key metrics for hospital quality, including overall inpatient mortality and maternal mortality rates. In 2018, the overall mortality rate in the hospital was 2.0%, down from 2.4% in 2016. The proportion of maternal deaths among mothers who delivered in Makunda similarly declined from 0.5% in 2016 to 0.1% in 2018. Considering that many community members come to Makunda Hospital only for their most complicated births, this is particularly indicative of its standards of quality. The hospital has been part of a private public partnership with National Health Mission Assam for maternal and child health services since 2008 and is recognized as a referral center for high-risk obstetrics patients in the district. Makunda's impact on local measures of health is also noticeable. For example, the MMR and IMR rates for the region dropped significantly in the district of Karimganj during the years Makunda Hospital increased its number of deliveries[17]:

Year	2009-10	2010-11	2012-13
MMR per 100,000 live births	474	342	281
IMR per 1,000 live births	87	69	69

Finally, we found near-universal respect for Makunda Hospital among both community members and competitive hospital administrators. One government hospital administrator

[15] For some comparison points in the U.S., see https://www.beckershospitalreview.com/finance/average-hospital-expenses-per-inpatient-day-across-50-states.html.
[16] See https://www.nabh.co/.
[17] Based on Annual Health survey fact sheets and Kolkata Missions – November 2016.pptx. Other hospitals in the area may have contributed to this improvement, including Karimganj Civil Hospital, which had 2,333 deliveries in 2016; and Silchar Medical College, which had 10,236 deliveries in 2016 (see www.smcassam.gov.in for more recent statistics). But Makunda certainly played a role given its relatively high and rapidly increasing patient volumes.

indicated his hospital loses "many, many patients" to Makunda Hospital despite the fact that Makunda Hospital charges for its services (as opposed to government hospitals, which are essentially free) and the fact that it is located hours away. Though he had not visited Makunda Hospital himself, he told us, "We hear from patients that the services are much better there; people tell us that it is well-managed, patient satisfaction is high, and it has good cleanliness."

Another government administrator said that Makunda Hospital was well respected by their staff of doctors, and many of this hospital's patients know it for its strong maternal services and travel hours to go there instead for baby deliveries. When we spoke to the general surgeon of Burrows Memorial Christian Hospital, he stated that Makunda is "probably the best-run mission hospital in India" and added that many healthcare professionals like to start their careers there because of the great training it provides.

We heard a similar refrain when visiting local community members. When we asked why one family decided to use Makunda Hospital rather than another hospital, one previous patient asserted that it is the "best hospital in Assam" and "we know that they will take care of us." Similar confirmations of the community's trust in Makunda Hospital were made in each of the five communities we visited. In the tea garden community, one mother said that she brought her dying son to Makunda Hospital at the urging of friends despite believing it was too late. Her positive experience with her son's recovery led her to bring back her three other children over the years and to strongly recommend the hospital to any of her friends who need services.

4. Community Impact

Makunda Hospital is unique from many private hospitals in that it was founded with the intent to help the poor, and it stands out for the hospital management's proactive efforts to ensure that all hospital policies and decisions are carefully designed to benefit them. A large proportion of its patients do not receive any bills for the services it provides; in many cases, these patients would otherwise not have received treatment at all and would have died or lived with great pain. Over time, Makunda has built a reputation for low baseline prices and charity for those who cannot afford even these prices, and more generally for taking care of anyone who comes to its doors.

While Makunda Hospital has had a substantial impact on healthcare in the local community, we also gleaned from interviews that its impact extends far beyond that to the community at large. One of the most direct and obvious impacts is in the lives of the 1000+ students that receive a K-12 education. One student we spoke with, a graduate of the high school, described how many local students used to stop attending school after 10th grade to work at home because the local schools were of such poor quality that they could not typically transfer to "college" for 11th and 12th grade. Makunda has changed this dynamic by opening a school, which has attracted educated families with young children to the region and become the go-to place for local teachers at other schools to send their own children. Last year, 100% of the 12 graduating seniors passed their board exams, and all are going to reputable colleges across India to study a variety of subjects across the sciences. In addition to its K-12 education program, Makunda

operates nursing assistant and nursing school programs to train local community members in preparation for working at Makunda Hospital and other locations.

In addition to education, Makunda provides direct employment to hundreds of people, with cascading benefits on the local economy. Some people we interviewed described the transformation in the local marketplace over the past few decades as more people with more income have stayed in the area because of the employment and educational opportunities. The government has also recognized the value of Makunda as a service provider for the local community, bestowing it with the Chief Ministers Certificate of Commendation in 2015, and has invested money in local infrastructure and provided support for new hospital construction projects.

PART IV. DISCUSSION

How has Makunda Hospital achieved such levels of impact? After delving into interviews, documents, and facility observations, we realized that Makunda Hospital's business model revolves around three key business practices: (1) poor-centric strategies, (2) thoughtful cost management, and (3) continuous improvement.

These three business practices enable Makunda Hospital to operate a business model similar to Walmart, the leading U.S. big box retailer. While no longer the Wall Street darling it was in the 1980s to 2000s, Walmart remains a behemoth in the retail industry, commanding 26% of U.S. retail sales and employing 1.5 million people across its nearly 5,000 U.S. stores. Walmart's operating model works by generating large amounts of total profits through the practice of selling very high volumes of very low-margin products. Producing high volumes allows Walmart to achieve economies of scale and lower prices, drawing in more price-sensitive consumers, which in turn creates more scale and enables them to further lower prices—creating a virtuous cycle.

In a similar fashion, Makunda Hospital has attracted high volumes of patients over time by charging very low prices. Through the high volumes of patients, Makunda Hospital has been able to achieve scale efficiencies and attract talented young professionals seeking good training opportunities at a high-volume facility. These three business practices—poor-centric strategies, focused cost management, and continuous improvement—are keys to this virtuous high-volume, low-margin strategic advantage.

1. Poor-Centric Strategies

Makunda Hospital employs a range of innovative poor-centric strategies that have enabled it to drive high patient volume in a low-resource setting, including (a) an ability-to-pay based pricing approach, (b) equal services for all, (c) hyper-tailored charity, and (d) addressing cultural barriers to usage through community engagement. These elements drive demand in Makunda's model.

(a) Ability-to-Pay-Based Pricing Approach. Rather than deciding on a set of services to offer and then retroactively identifying the right price point for those services, Dr. Vijay and Dr. Ann first asked themselves "What can the poor afford to pay?" and then figured out how to provide services that fit within that price point. This decision—to start with consumer's ability to pay—drove all of the other decisions that they made about their business as it defined the upper bound of the cost they could incur to provide services. We noticed, in speaking with many Makunda Hospital patients and employees, that many hospital patients are already hard pressed to pay for a car ride to the hospital, which often costs more than the actual hospital services. The decision to make the hospital's price points more accessible was the difference between touching only a wealthier subset of the population and reaching nearly the full local population—with important implications for a high-volume, low-margin strategy.

(b) Equal Services for All. Another key decision made early on was to provide equal services to all patients regardless of wealth. Dr. Vijay noted that many mission-driven hospitals utilize what amounts to a freemium-like model, in which wealthy individuals pay much more for much better services in order to subsidize services to the poor. In these models, the wealthy are placed in a separate, shorter queue; receive private rooms; and have a private consultation with a physician of their choice. In contrast, the poor are placed in the longer queue and in general inpatient wards.

The problem with the freemium-like model is that the wealthy expect better services because they know they are paying more and thus demand more attention from physicians and staff. In addition, to keep their business, hospital administrators must cater to the needs of wealthier patients by providing what they want, when they want it. Over time, the organization and processes of the hospital become increasingly oriented towards providing services for the wealthy at the expense of the poor—often unintentionally. As this occurs, the poor feel more and more out of place in the hospital and come to see themselves as second-class citizens, so they come less and less often and refer their family and friends less and less often. At the end of the day, this reduces volumes, which reduces scale and increases costs, which requires higher pricing to compensate—creating a vicious cycle.

In contrast, Makunda Hospital has held to its philosophy of providing equal services to all patients, regardless of wealth. The hospital is unique in that it has no private wards, only general wards with reasonable privacy. According to Makunda administrators and employees, this practice is probably the most glaring evidence of equal treatment for the poor when they come to the hospital. This has served to bolster Makunda Hospital's brand as a place for the poor to go, which drives volumes and revenue up while simultaneously upholding the ideals that led Dr. Vijay and Dr. Ann to reopen the hospital in the first place.

(c) Hyper-Tailored Charity. In fulfilling its mandate to help the poor, Makunda Hospital—like many other mission hospitals—frequently provides services to poor patients for free. Doing so exposes mission hospitals to both type I and type II errors; that is, they may fail to provide aid to those who truly need it, or they may provide aid to those who do not actually need it and lose the corresponding revenue they could have earned to support their hospital.

What makes Makunda Hospital unique is the hyper-tailored methods it uses to both identify those who truly need charity and provide it to them in the most effective manner. Historically, Makunda Hospital has identified the poor primarily through a set of behavioral observations, and more recently, it has experimented with more formalized diagnostic tools. Two notable examples of behavioral observations—the "*shared meals test*" and "*vital assets test*"—merit specific mention.

First, in the *shared meals test*, physicians and nurses (who spend the most time with patients) are instructed to pay attention to the meal habits of family members and friends who accompany a patient at the hospital. If family members and friends frequently skip meals or share a single meal among multiple people, physicians and nurses are instructed to provide that family with charity.

Second, in the *vital assets test*, Makunda employees pay attention to how patients act with regards to their medical bills. The poorest of patients will frequently ask how much an additional service will cost and may try to limit their stay in the hospital when they feel they have exhausted their budget even when a doctor recommends that they stay longer. Interestingly, Dr. Vijay found that the poorest patients are actually much less likely to ask for charity than the moderately well-off patients, who are more likely to try to negotiate on hospital bills to get them reduced even though they can afford to pay. In contrast, the poor typically go to great lengths to pay a bill, including selling so-called "vital assets" that they need for basic living (such as their home) or to maintain their livelihood (such as a work animal or farming equipment). One technique Makunda employees use is to ask how a patient will pay for a planned or billed medical expense. If the patient says they have the money, will be able to borrow the money, or will sell some non-essential items, they are not typically given much charity. However, if they mention a "vital asset" that is specially mentioned on a list created by Makunda, they receive charity. Furthermore, if Makunda Hospital finds out after the fact that a patient has sold a "vital asset," it goes out into the community and repurchases the asset on behalf of the patient.

Once it has identified the poorest patients, Makunda Hospital has been able to provide charity care in a very targeted and effective manner. For example, if a patient responds that they will need to sell a vital asset in order to pay for services, they are asked how much they could pay if they do not sell the vital asset. They are then asked to pay that amount, and the rest is written off as charity. Many poor people have a strong sense of dignity and often ask for the pending amount to be kept as "due" rather than ask for charity. One practice Makunda engages in is to write off all "due" amounts at the end of the financial year.

Another way Makunda Hospital provides charity in a targeted way is to write off large medical expenses related to unexpected complications. As Dr. Vijay explains, because complications happen so infrequently, writing them off is a relatively small cost for the hospital to incur when spread across many procedures, while not doing so would impose a huge financial burden on a single individual. In effect, Makunda Hospital is providing a form of informal insurance to make healthcare more accessible to the poor.

From a business perspective, Makunda Hospital's unique focus on identifying and providing tailored charity enables it to retain revenues from those who can afford to pay—essentially operating as a form of efficient price discrimination—and drives patient volume by reinforcing Makunda Hospital's brand as a hospital for the poor, by retaining patients, and by encouraging referrals.

(d) Removing Cultural Barriers to Usage Through Community Engagement. During the early years of Makunda Hospital, it sought to expand its labor and delivery services but initially faced slow growth. At the time in northeast India, most villages had an informally designated woman to help with childbirth within that village. Based on local infant and maternal mortality rates, Dr. Vijay and Dr. Ann knew that many mothers and babies were dying during childbirth, but when they asked the de facto village midwife in each of the villages if they had seen any deaths, each of them indicated that they had not. However, by digging deeper, the doctors realized that the village midwives were witnessing significant infant and maternal mortality but were afraid to admit it and were secretly terrified of complicated deliveries—such as malpresentation, haemorrhage and eclampsia—but did not know what to do about them because their communities looked to them as the experts.

In response, Makunda Hospital began to encourage village midwives to send only their most complicated cases to the hospital. However, they did not stop there—when a preventable death happened in a community, they would also reach out to the village midwife and explain that such a death was preventable, and that the midwife should refer future cases with similar characteristics of high-risk births to the hospital. Over time, the midwives began doing so and actually felt relieved to pass their most complicated cases to the hospital. By seeking to understand the barriers to usage and building community partnerships, Makunda saw large growth in the number of deliveries performed, helping it to achieve its strong reputation within maternal care as a hospital for everyone, including the poor.

In summary, each of these four poor-centric strategies—an ability-to-pay-based pricing approach, equal services for all, hyper-tailored charity, and addressing cultural barriers to use through community engagement—play into the success of Makunda's high-volume, low-margin approach.

2. Thoughtful Cost Management

Given its commitment to providing care to the poor, Makunda Hospital has by necessity always been intensely focused on cost management—the "supply side" of their operating model. To succeed in providing low-price services, it has primarily reduced costs through two innovative methods: (a) implementing a "revised gold standard" of care that reduces unnecessary testing and procedures for patients, and (b) recruiting and retaining individuals who are willing to accept lower salaries and heavier work obligations because of the training opportunities it provides or their commitment to Makunda Hospital's mission.

(a) "Revised Gold Standard." Medical students are often taught the "gold standard" approach to medicine: a broad set of tests and procedures that should be done to maximize

diagnostic accuracy and patient health in an ideal world. Unfortunately, physicians in low-resource settings typically do not have the luxury of running all of the tests and procedures outlined under the "gold standard" of care for two reasons: first, their facility may lack the necessary medical equipment; and second, the patients they treat may simply not be able to afford such full-scale services.

To deal with these realities, Makunda Hospital has developed a set of "revised gold standards" to provide services that are affordable to its patients. These standards serve to impact both how physicians make clinical assessments and what lab tests, procedures, and drugs they recommend to patients. One of the physicians we interviewed indicated that physicians at Makunda Hospital must rely more on their clinical judgment to make judgement calls than do doctors in higher-resource settings, who are more likely to order a test to aid them in making a diagnosis.

When recommending lab tests, procedures, and drugs, physicians also take into account the affordability of treatments. Rather than test for every possible diagnosis, a physician at Makunda Hospital might simply prescribe a medication when a certain diagnosis is 80% likely to be correct or when multiple diagnoses result in the same recommended course of treatment. In the case of surgical procedures, surgeons at Makunda might look to older methods that are nearly as safe but much cheaper for patients. For example, Dr. Vijay performs choledochoduodenostomies as an alternative to ERCP in patients with calculi in the common bile duct. He has published several articles on interventions that are as safe and effective or nearly as safe and effective as much more expensive alternatives commonly used today.[18]

In terms of drugs, Makunda Hospital's pharmacy and physicians focus on generic drugs and other less expensive versions of drugs that produce most of the effect at a significantly lower cost. Considering the affordability of drugs is particularly important for prescriptions that require long-term adherence and/or particularly strict compliance, because if a drug is not affordable, patients will simply not comply, which results in more health complications and high long-term costs for poor patients. In other words, it may be more impactful to achieve 80% compliance on a drug that is 80% as effective than to achieve 10% compliance with a drug that is 100% effective.

Makunda Hospital's "revised gold standard" approach has enabled it to lower the cost of providing health care services so it can in turn lower prices, which drives greater volume.

(b) Recruitment and Retention of Efficient Labor. In addition to practicing its "revised gold standard" practices, Makunda Hospital has lowered costs for patients by recruiting and retaining individuals who are willing to accept lower salaries and heavier work obligations because of the training opportunities it provides or their commitment to Makunda Hospital's mission.

[18] See, e.g., https://www.researchgate.net/publication/12040333_Pneumonostomy_in_the_surgical_ management_ of_bilateral_hydatid_cysts_of_the_lung, and https://www.researchgate.net/publication/281792341_Use_of_plastic_ material_from_a_urine_drainage_bag_in_the_staged_closure_of_gastroschisis

According to our interviews, government hospitals tend to pay physicians and nurses nearly twice as much as Makunda Hospital, and many government physicians work in their own private practice in the evening after leaving the government hospital, further boosting their salaries. Makunda Hospital also gets much more leverage from employees by asking them to multitask throughout the day and work longer hours to meet the high patient load. A typical nurse at Makunda Hospital works 8 hours a day, 6 days a week, but may also voluntarily work overtime during a particularly busy shift transition. Because salaries make up the largest expense category for Makunda Hospital, being able to reduce that cost translates to significant savings for patients and contributes to the hospital's low-price approach.

Despite the heavy obligations and lower salary, many employees choose to work at Makunda Hospital either because of the training it provides or their commitment to the mission of Makunda Hospital. For example, because Makunda has a nursing school on site, skilled physicians, and high patient volume, many aspiring nurses come to Makunda Hospital to get their training and meet certain curricular requirements before moving on to other hospitals. Even more striking, however, is the strong commitment to Makunda's mission that starts with Dr. Vijay and Dr. Ann and extends to employees in both the hospital and the school system. Most, if not all, of the people we interviewed cited their commitment to Christian service and Makunda's focus on the poor as the driving force in their decision to work at Makunda Hospital. Furthermore, despite the heavy obligations, these employees tend to find great satisfaction in their work; or in the words of one supervisor, they leave their shift "tired, but happy and content," knowing their work is full of purpose.

Makunda Hospital leaders reinforce the culture of commitment by focusing on service in the mantras they repeat during the workday and the sermons that they give outside of it. At the same time, Dr. Vijay and Dr. Ann's efforts to develop the school system have helped to retain young professionals with families who might have left sooner but now have viable local educational opportunities available for their children.

3. Continuous Improvement

The final element of Makunda Hospital's success is its unending commitment to continuous improvement. There is a culture of staff members continually keeping an eye out for areas where they can step in to help or make improvements. In addition, quality control systems in place help to identify potential issues and to troubleshoot them until they are eliminated. This approach to improvement extends beyond the doors of the hospital itself as Makunda Hospital has expanded into other areas such as education, agriculture, and biodiversity efforts.

PART V. CONCLUSION

We believe that many of the principles identified above can be used by mission-focused healthcare providers in low-resources settings around the world. For example, hospitals can drive volume by utilizing poor-centric strategies such as setting prices according to ability to pay,

creating equal services for all patients, tailoring charity according to observable indicators of true need, and engaging with the community to overcome cultural barriers to usage. They can also reduce costs (thus enhancing their ability to lower prices and virtuously drive up volumes even further) by creating customized "revised gold standards" and decrease labor costs by providing a work environment conducive to training and a strong commitment to service.

We do believe that some factors may limit the transferability of this model. For example, Makunda Hospital's model requires sufficiently high volumes in order to generate sufficient profits on low-margin services. This may require a certain level of population density and/or a lack of closely situated competition. In addition, hyper-tailored charity only works if a mix of incomes exists in a region such that the wealthier can be charged to offset charity for the poor.

Nonetheless, we believe that this study illuminates several extremely promising and innovative approaches to providing high-quality, accessible care in low-resource settings that can be applied elsewhere. Indeed, some of the general principles warrant further evaluation in the context of discussions about healthcare costs around the world and particularly within the United States, which faces overutilization of healthcare and the highest healthcare costs as a percent of GDP in the developed world. In conclusion, we believe that the "Makunda Model" painstakingly developed by Dr. Vijay and Dr. Ann offers encouragement for those seeking to provide high-quality, accessible healthcare in low-resource settings across the world.