It was a late dusty evening in September 2014; Dr. Raman Kataria, specialist in general and pediatric surgery, was leaving the operating theatre after having completed an emergency operation on a three-day-old baby with a congenitally absent anal opening. This kind of case is routine at the Jan Swasthya Sahyog (JSS) Referral Centre at Ganiyari, where doctors perform a wide range of surgical procedures that include very complex procedures. What is more remarkable is the fact that a complex procedure like the one described above requiring two follow-up surgeries is offered at a very affordable, all-inclusive rate of 12 000 Indian Rupees (INR)\(^1\)—a charge that covers all the expenses relating to operative procedures, hospitalization and medication.\(^2\) This amount is even less than what would be charged in a government hospital where services are highly subsidized. For the past 14 years, JSS has been consistently providing high-quality care (including surgical care) in remote, inaccessible villages surrounding Ganiyari, where thousands of poor people find themselves stranded between an overburdened and dysfunctional public healthcare system and an unaffordable private healthcare system.

As he walked along the bustling corridors of Ganiyari Referral Centre where patients were waiting patiently, Dr. Kataria was quietly reflecting on key issues discussed in an important board meeting he had attended the previous evening. With the founding doctors starting to approach retirement, the question on everyone’s mind was who would carry on their legacy. The founders had worked hard to develop an efficient, high-quality, equitable health system—one that was dedicated to providing both preventive and curative services in the tribal and rural areas of the Bilaspur district of Chhattisgarh\(^3\) state in Central India. They knew that they needed to create the right incentives to attract good doctors to their mission, especially since so many in the new generation of doctors were attracted to the high-paying urban careers, not to rural hospitals like JSS. Additionally, the meeting brought into question the sustainability of JSS’s current business model. Given the limited ability of the villagers to pay for care and the high dependence of JSS on donations, it was a unanimous concern. Who would be the new leaders, and how would they make JSS more self-sufficient?

India: A snapshot of its demographics and healthcare outcome indicators
The Republic of India has a landmass of 316 414 square kilometers and is bordered by seven countries: Pakistan, Bhutan, China, Nepal, Myanmar, Bangladesh and Afghanistan.\(^4\) The southern half of India forms a triangular peninsula bounded on the east by the Bay of Bengal, on the west by the Arabian Sea and on the south by the Indian Ocean (see Figure 1 for a map of India).

According to the 2012 census, India remains the second most populous country in the world: its population of 1·236 billion is expected to reach 1·5 billion by 2040.\(^5\) In 2012, the fertility rate was below replacement level, at 2·5 children per woman, compared to 6·4 in 1951. India’s current growth rate is the lowest in the last 20 years.

...
billion ranks second only to China’s 1.385 billion. India’s population, growing at an annual rate of 1.7%, is projected by United Nations to overtake China as the most populous nation by 2028.5 After rapidly growing between 2004 and 2011, India’s GDP growth rates have slowed sharply in recent years to a more modest rate of 5.0% in 2013.6 While India has made significant strides in economic development over the past two decades since liberalization in 1992, it still remains a laggard in its performance on various health outcome indicators (See Tables 1 and 2 for India’s performance on a number of demographic, socioeconomic and health outcome related indicators).

The World Health Organization (WHO) describes public health spending in India as “abysmally low in a country where about 26% of people living below poverty line are critically dependent on public health services and the range and complexities of health issues are substantial with the equal presence of both communicable and non-communicable diseases.”7 According to the latest statistics from WHO (World Health Organization), total expenditure (public and private) on health as a percentage of the GDP has been relatively modest at 4.1% in 2012 and the share of public expenditure on health remains one of the lowest among low-and middle-income countries (LMIC) at 1.1% of the GDP. Even more worrying is the fact that in nominal terms, India’s healthcare expenditure has grown more slowly than the country’s GDP. The Indian healthcare sector is plagued by shortages of workforce and infrastructure: it has only one doctor per 1700 citizens—well below the WHO stipulated minimum ratio of 1:1000.8 Bed density in the country is 1.3 beds per 1000 people with public beds accounting for a meager 0.47 per 1000 which falls well short of the minimum guidelines of 3.5 beds per 1000 people stipulated by the WHO.8 Given these

### Table 1: India: Basic Socioeconomic and Demographic Indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Chhattisgarh</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population (in billions) (Census 2011)</td>
<td>0.0255</td>
<td>1.2101</td>
</tr>
<tr>
<td>Decadal Growth (%) (Census 2011)</td>
<td>22.59</td>
<td>17.64</td>
</tr>
<tr>
<td>Crude Birth Rate (SRS 2011)</td>
<td>24.9</td>
<td>21.8</td>
</tr>
<tr>
<td>Crude Death Rate (SRS 2011)</td>
<td>7.9</td>
<td>7.1</td>
</tr>
<tr>
<td>Natural Growth Rate (SRS 2011)</td>
<td>17.0</td>
<td>14.7</td>
</tr>
<tr>
<td>Infant Mortality Rate (SRS 2011)</td>
<td>48</td>
<td>44</td>
</tr>
<tr>
<td>Maternal Mortality Rate (SRS 2007-09)</td>
<td>269</td>
<td>212</td>
</tr>
<tr>
<td>Total Fertility Rate (SRS 2011)</td>
<td>2.7</td>
<td>2.4</td>
</tr>
<tr>
<td>Sex Ratio (Census 2011)</td>
<td>991</td>
<td>940</td>
</tr>
<tr>
<td>Child Sex Ratio (Census 2011)</td>
<td>964</td>
<td>914</td>
</tr>
<tr>
<td>Schedule Caste population (in millions)</td>
<td>2.4</td>
<td>166</td>
</tr>
<tr>
<td>Schedule Tribe population (in millions)</td>
<td>6.6</td>
<td>84</td>
</tr>
<tr>
<td>Total Literacy Rate (%) (Census 2011)</td>
<td>71.04</td>
<td>74.04</td>
</tr>
<tr>
<td>Male Literacy Rate (%) (Census 2011)</td>
<td>81.45</td>
<td>82.14</td>
</tr>
<tr>
<td>Female Literacy Rate (%) (Census 2011)</td>
<td>50.59</td>
<td>56.25</td>
</tr>
</tbody>
</table>


Table 2: Comparison of demographic, socio-economic and health profile of Chhattisgarh with other states of India
limited resources, it is not surprising to see that India’s health outcome indicators, such as infant mortality rate and life expectancy continue to lag behind the averages of not only the developed economies but also the other emerging economies, including Brazil, China, and Russia (see Table 4a for comparison). Even more troubling is the fact that India’s performance lags behind the averages of some of the LMICs, including Bangladesh and Sri Lanka (see Table 4b for comparison).

Moreover, it is expected that India will fail to achieve the 2015 targets for infant mortality rate (IMR) and maternal mortality rate (MMR) set in the Millennium Development goals (MDG) (see Table 5).11 For example, MDGs seek to reduce the deaths of expectant mothers and newborns as well as children under five by two thirds from 2000 to 2015. While Sri Lanka, China and Bangladesh have made significant progress towards this MDG, India still struggles. Nearly one-in twenty children do not live to see their first birthday and the under-5 mortality rate (USM) — reported as 52 deaths per 1000 live births in 2013 — remains well above the goal of 42 deaths per 1000 live births. Additionally, every 10 minutes, a woman in India dies during childbirth, totaling to almost 45,000 deaths in 2013. The maternal mortality rate — 178 deaths per 100,000 live births — also fails to meet the MDG target of 109 deaths per 100,000 live births.12

Rural-Urban Divide in Health Status13

Although India’s rural population has grown slowly since 1950, it still has the largest rural population in the world (857 million) followed by China (635 million). But while this rural population, much of it below the poverty line, represents 69% of India’s total population, only 20% of India’s surgical workforce lives and works in rural India.13 The issues in delivering meaningful health care to the dispersed, isolated and impoverished populations living in the rural areas of India are further compounded by communication, transport, and climatic barriers so that,
not surprisingly, the latest census results in India reveal significant rural-urban differences in mortality indicators (see Table 6 and Appendix 2). Since its independence, India has had a goal to improve the health outcomes for its rural citizens, but the relatively small healthcare budget has proved insufficient for even the most basic services, let alone access to preventative, curative, and rehabilitative care. Disparities in access to affordable, high-quality care continue to pose daunting challenges to the Indian government and it will take a huge and persistent effort to accomplish better outcomes for its rural poor.

Jan Swasthya Sahyog, Ganiyari (JSS/People’s Health Support Group)

History

In the late 1990s, Raman Kataria was part of a highly selective cadre of physicians at the prestigious All India Institute of Medical Sciences (AIIMS) in New Delhi. A fully-trained pediatric surgeon, he had hit the faculty job-search jackpot—a position at the nation’s premier academic medical institution. But he passed up the opportunity to pursue his dream: “To start a health programme in villages that will give genuine healthcare to the poorest of poor and to start a hospital from which no patient will ever be turned down for their inability to pay for treatment and medicines.” Elaborating more on why they targeted rural India, he says: “Just as two Indias exist everywhere, especially in healthcare, we see a glaring difference in what is available for the rich versus that for the poor. On one hand, you have world class, state-of-the-art healthcare facilities available for the rich while there is little or no access to proper healthcare for the poor. We wanted to see greater equity in health care provision as well as in the health outcomes for people.”

Yogesh Jain, another JSS co-founder, shares Dr. Kataria’s philosophy: “The battles against diseases will have to be fought and shall be won or lost in the vast varied expanse of rural India, the most marginalized area of all. The problem is that the foot soldiers are absent or poorly equipped with ammunition, supplies, communication system and backup. Where the need is highest, the support systems are the least adequate. If diseases and illnesses were due to deprivation, then as German anthropologist Rudolf Virchow once said, we as physicians have the responsibility to be the ‘natural attorneys of the poor’ and it is easy to see why we decided to tackle their social problems ourselves.”

Dr. Kataria further clarifies that it was particularly important for him to start an organization that provided comprehensive health services that included surgical care. “A health system cannot be considered a ‘health system’ without the provision of surgical services for common and yet life-threatening conditions. Consider something as ‘simple’ as getting pregnant. In the high-income world, this is largely a joyful moment, as it should be. Research studies have shown that at a population level—regardless of race, ethnicity or socioeconomic status—5–15% of pregnancies typically develop some sort of a complication requiring a caesarean delivery. Now imagine someone living in remote rural India, and being unable to access or afford surgical care. Getting pregnant can mean a potential death sentence. These issues transcend any one procedure or conditions. In populations without access to surgical services, you will see old men who die from urinary obstructive disease that could have been prevented with a prostatectomy, children and young adults die or face lifelong disability from easily treatable surgical conditions like appendicitis and open fractures, and working-age men remaining idle, unable to perform physical labor due to untreated hernias,” explained Dr. Kataria.

In 1996, their dream was realized. A small group, many of whom were classmates at AIIMS founded Jan Swasthya Sahyog (Translated: People’s Health Support Group). The core team consisted of 9 physicians (8 of
whom were couples) and a research scientist: Raman and his wife, Anju Kataria, Yogesh and Rachna Jain, Biswaroop and Madhuri Chatterjee, and Anurag and Madhavi Bhargava, Dr. Sathyamala (who was 9 years senior and was invaluable in her knowledge of patient needs), and Pramod Upadhay (a research scientist) (see Figure 3 for a photo of the founders). “We decided to pool our energies and expertise in gynecology, pediatrics, epidemiology, medicine, surgery and microbiology to start JSS aimed to provide genuine healthcare to the rural poor,” said Dr. Kataria.

When asked whether they had considered teaming up with an NGO, Dr. Kataria jokingly responded that they engaged in what they internally termed as “NGO tourism”—scoping out places of the country that were notoriously deficient in healthcare delivery. “We had met with so many NGOs with whom we had explored the possibility of partnering. However, we ended up never quite feeling the match was right. Some were too laid-back about progress for our tastes, while others were too rich.”

Why Bilaspur district in Chhattisgarh state?

“After an exhaustive search, in 1997, we had come to Bilaspur (then a part of the State of Madhya Pradesh and now belonging to the newly formed Chhattisgarh state) for a meeting. A chief administrative member of the ruling government in Madhya Pradesh, Mr. Harsh Mander, IAS, having heard of our aspirations, invited us to visit some of the surrounding villages near Ganiyari,” says Dr. Kataria. “While we knew the state of rural healthcare was rather unsatisfactory in large parts of India, we were quick to realize that it was virtually nonexistent in Bilaspur district. Boasting a large tribal India, we were quite clear from the outset that we wanted to contribute to the health, happiness and wellbeing of the people by:

1. Providing appropriate rational and low-cost health care services delivered with empathy and love. We shall endeavour to make them holistic.
2. Identifying problems during our work which demand scientific scrutiny, and working on them on a long-term basis.
3. Being part of the process of development and rejuvenation of village communities by facilitating efforts to improve education, the environment and the level of sustenance of the people.

We wish to contribute to the health, happiness and wellbeing of the people by:

• Creating a system of primary health care which builds on a continuing and mutually enriching dialogue with the people and derives its strength and long-term sustenance from this
• Providing appropriate rational and low-cost health care services delivered with empathy and love. We shall endeavour to make them holistic.
• Identifying problems during our work which demand scientific scrutiny, and working on them on a long-term basis.
• Being part of the process of development and rejuvenation of village communities by facilitating efforts to improve education, the environment and the level of sustenance of the people.

We wish to contribute to the sphere of public health in India by:

• Adding to the discourse on public health in India by our experiences in rural Chhattisgarh and our technical, social, and political understanding of them.
• Doing research, which clarifies understanding, examines appropriate solutions which can then be applied by other groups.
• Providing our technical and training skills to people who need them.
• Generating technical literature appropriate to the practice of rural medicine.

We hold dear the following values:

• Honesty, integrity.
• Respect for the poor, the village folk, an understanding of their problems, and an unfailing commitment to them shall inform and permeate all our work
• Compassion and respect for the wholeness of human beings

*Source: "Jan Swasthya Sahyog: Healthcare rooted in rural reality," A Report by Bharat Dogra, Social change papers, New Delhi

JSS’s mission, vision, values and strategy

Articulating their vision and strategy, Dr. Yogesh Jain of JSS said: “We were quite clear from the outset that we wanted to contribute to the health, happiness and wellbeing of the rural people (see Exhibit 1 for a statement reflecting their mission, vision and values). We were interested in looking at the ‘whys’ and ‘hows’ of illness, the socioeconomic angle to ill health and, finally, the political issues involved in the rural healthcare field. Hence, we chose a three-pronged approach as our strategy to achieve our objectives which involved: (i) Doing everything possible to contain costs without compromising on quality of care and at the same time, making care available and accessible (ii) Encouraging a scientific enquiry approach to problem-solving and facilitating learning, and lastly, (iii) use force multipliers such as training, research and advocacy to amplify our effort to improve the healthcare outcomes of the rural citizens.”

External support and early days

Dr. Kataria shared details of how they generated external support for their initiative: “While fundraising has been a yearly problem for JSS, getting grants has not been the...
Teaching Case

Poor. First, facilities are few and far between. Patients' inability of our health facility infrastructure to reach the traditional healers. Seldom discussed is the basic medical care and faith in traditional beliefs about health reluctance to seek care on ignorance about modern long to decide to seek care. We are quick to attribute their among the medical establishment that patients take too Explains Dr. Kataria, “There is a common misperception Strategies to enhance referrals into the hospital

The transformation was not an easy one. Dr. Kataria and his team had to struggle to address issues on three fronts simultaneously to make this happen. First, most of the people in the area in the region did not know about the clinic; those who did know had no idea of what to expect and how much the service would cost. They had to encourage people to seek care, and make them aware that the new clinic was available and affordable. Second, the facilities were primitive, and the basic infrastructure had to be created; this was challenging, despite the fact that funding issues were resolved relatively easily. And the second day was no different. Then on the third day, we had our first patient. Then the numbers steadily increased by the day and before long, we were inundated with work.”

The biggest hurdle. In the beginning, we received generous amounts from friends in Germany (INR 270,000) and from a grant through the Department of Science and Technology (INR 450,000 for 3 years). But it wasn't enough. On the day we secured a grant of INR 2700000 from the Ministry of Health (MOH) in 1999, most of us put in our papers* at our home institutions. The next year, we received a much-needed donation (INR 1200000), this time from the Sir Dorabji Tata trust; they would continue to be a valued supporter over the years. We also received generous support through grants from Oxfam, Netherlands, from fellow AIIMS alumni who live in the U.S. and from another organization of Indian professionals in the U.S. called Association for India's Development (AID).”

Continuing about their early days, Dr. Kataria reminisced: “When we first go to the future site for JSS, it was an old, abandoned irrigation colony lying unused for over 20 years. Nonetheless, with a 30-year lease (just INR 1000 per month) through the government, it was ours. There were about 5 brick buildings—none of them with any doors or roofs—that had been used by cattle, gamblers, and drunkards. Immediately it struck us that this could be the ward and the OR and the OPD. With some renovation work arranged by our friends, we started our first OPD day. The clinic site is in Ganiyari village—20 kilometers from Bilaspur—and on our first day at work, not even a single patient turned up. The second day was no different. Then on the third day, we had our first patient. Then the numbers steadily increased by the day and before long, we were inundated with work.”

The transformation was not an easy one. Dr. Kataria and his team had to struggle to address issues on three fronts simultaneously to make this happen. First, most of the people in the area in the region did not know about the clinic; those who did know had no idea of what to expect and how much the service would cost. They had to encourage people to seek care, and make them aware that the new clinic was available and affordable. Second, the facilities were primitive, and the basic infrastructure had to be created; this was challenging, despite the fact that funding issues were resolved relatively easily. And finally, making healthcare affordable meant cutting costs and creating innovative alternatives to standard practices without compromising quality.

Strengthening access to care for the poor

Strategies to enhance referrals into the hospital

Explains Dr. Kataria, “There is a common misperception among the medical establishment that patients take too long to decide to seek care. We are quick to attribute their reluctance to seek care on ignorance about modern medical care and faith in traditional beliefs about health and traditional healers. Seldom discussed is the basic inability of our health facility infrastructure to reach the poor. First, facilities are few and far between. Patients typically need to travel long distances to reach these facilities. Second, the costs of undertaking such a journey—both in lost wages and in transportation—are enormous. Lastly, impoverished communities have years of collective experience that teaches them that even if they reach such a facility, there is no guarantee that they will receive timely or effective treatment. Rural facilities are generally underfunded, understaffed and may have precious little to offer.”

In light of this, the JSS leadership decided to tackle the issues relating to access and availability head-on with a robust community outreach component of its health services. Dr. Anurag Bhargava,9 another cofounder of JSS, elaborated: “Our main idea was to work on two to three levels. We not only wanted to run a hospital which would provide low-cost, good, quality curative care of a fairly wide and comprehensive nature, but we also wanted to work with village communities and bring about lasting changes in their health status. In a system of public healthcare in a village, we need to have village-level health workers and not doctors alone. And the potential of these health workers must be to deliver not only curative care but also look at other aspects of health.”

Their approach revolved around a three-tiered approach: (i) The first level focused on offering preventive and curative services in tribal villages through the training of village health workers (VHWs) elected by their respective villages. (ii) The second level of service is offered through the Village Health Centers where outreach clinics are held on a weekly basis. (iii) Finally, outpatient clinics are held at the Ganiyari clinic three times every week. In addition, the clinic had facilities for treating in-patients and surgeries for a range of ailments. Asked whether this three tiered approach was aimed at replacing the government’s existing 3-tiered referral system (see more on Indian Government’s rural health initiatives in Appendix 2), Dr. Yogesh Jain was quick to clarify: “Very clearly, right from the outset, our intention was never to replace the public health system, but rather to strengthen it through technical inputs along with being a watchdog too. Our relationship with the state, especially with the public health system, has been a dynamic one of mutual support. They have been wary that they have to perform well or else we might raise a few uncomfortable questions. At another level, they have asked us periodically for technical assistance in running their programmes more effectively and for training their personnel in skills relating to malaria control, cancer screening, and child nutrition.”

JSS Village Health Workers—First tier of the community health program by JSS

JSS provides preventative and curative services through their training of VHWs who are elected by the villagers. In 2001, JSS initiated a community health program in a cluster of 8 villages that has now spread to more than 70 tribal villages in three clusters in the Kota and Lormi
blocks of Bilaspur district. These villages are located in forests or at the forest-fringe with many of them lacking access to all weather roads.

More than 110 VHWs have been trained under the Village Health Programme. “Our biggest challenge was to evolve a comprehensive community health programme with the participation of local villagers,” says Dr. Rachana Jain, another founding doctor associated with JSS. The training of VHWs continues to play a vital role in their quest for providing low-cost and effective health care. The trained VHWs provide rational first contact care using 20 different kinds of medicines, supported by referral advice when required. Other researchers have also reported the successful use of village or community health workers in other parts of the world and how they can play a critical role in care provision and in case identification, prompting appropriate referral to care centers.

On the question of qualifications, selection process and the decision to only use women as health workers, Dr. Kataria was forthright in his determination: “These women were selected after open discussions with the village communities. By training women as VHWs, we took care of two sections of the population: women and children. If we had not done that, we would have the situation of many women with problems opting to not go to male health workers for some of their needs. We also found children to be more comfortable with women. We saw this as a way to empower the village women. Although literate candidates are preferred, we did not make literacy a criterion for training these village health workers. We firmly believe that the poorest women who may be uneducated should not be excluded for that reason. To give you a fair picture, out of the 110 VHWs we have, more than half are not literate to start with. Our waiving that requirement has definitely helped us to attract some of the most highly motivated and committed VHWs from the poorer families.” He gave an instance of extreme commitment by his VHWs: “It would be rare to find a student anywhere in urban India who is as committed to learning as one of our health workers who gets up as early as 1.30 am in the morning, does her household work till 4 am, digs a pit for a daily wage from 4 am to 9 am, wades across a river and comes to our training site by 10 am. You never encounter this level of sincerity and commitment elsewhere.”

Prafull Chandel, in-charge of their educational programs, elaborates on how they provide their training: “Since many of our trainees have little or no formal education, we mostly use oral instruction and pictorial representations with more emphasis on real life situations. The VHWs are trained to elicit symptoms, perform key clinical examinations and perform simple tests. Our programs are tailored to suit the needs of our trainees. Through our training programs, the trainees do acquire some literacy skills by the end of their training periods.” He further adds: “The VHWs are given extensive training in the delivery of rational primary care for all common illnesses at the village level. They can diagnose and treat childhood pneumonia, bacillary dysentery and malaria patients. They are taught a variety of skills such as having an ability to feel for an enlarged spleen (which helps the accuracy of their diagnosis of malaria) and to make blood smears for further investigation at our referral centers. They are plugged into the JSS network so they are able to advise and inform members of the community as to places where they can get further care, and assure them that it is possible at a very low-cost.”

In addition to training VHWs, JSS has also spearheaded efforts to address the special problems faced by women during their pregnancy and childbirth through their training of traditional birth attendants (TBAs). Dr. Kataria said about the initiative: “Since more than 70% of the deliveries are still at home, we recognize the importance of training traditional birth attendants. In the tribal villages, still there are ill-informed practices such as starving the mother for six days after delivery or waiting for the placenta to be delivered first before cutting the cord (which can jeopardize the health of both mother and baby). It has been gratifying to see significant changes in their practices after taking our training.”

The TBAs are also taught to tackle a few emergencies, the most common one being the management of postpartum haemorrhage, by applying uterine compression. Talking of their training program’s effectiveness, he recounted an episode recollected by Milki Bai and Jaymati, two of their TBAs from Atariya village: “Rajeshwari, the Sarpanch of our village delivered a baby boy and after delivery, she started bleeding and it would not stop, and she was feeling faint and cold. We remembered our training: we compressed the uterus with one hand fisted in the vagina and another on her abdomen. We held it like that for 15 minutes, and the bleeding stopped. She recovered after that and is fine now. This was something we would not have been able to manage a year ago.”

JSS Village Health Centers—Second Tier

At the second level, since 2000, JSS has been running weekly mobile outreach clinics in three village health centers located at Shivtarai, Semariya and Bamhni villages, each 50 to 75 kilometers away to the north and northwest of Bilaspur town. Each village health center is typically served by a doctor who visits the mobile clinic with a nurse, a laboratory technician and a pharmacy assistant. A doctor would typically attend to 30 to 75 patients during each visit, depending on the season. The clinics serve around 75 patients during each visit, depending on the season. The clinics serve around 50 forest and forest-fringe villages each in a radius of up to 15–20 kilometers. A distinctive feature of the clinic is that they provide basic laboratory services including malaria and sputum microscopy, helping to provide more rational and effective treatment. The lab is well-equipped to do basic biochemistry, hematology and microscopy of all body fluids, as well as take culture samples.
The village health center at Bamhni is manned by two trained senior health workers (SHWs) round the clock which makes access to quality health care feasible for patients with limited mobility (for instance, the elderly patients and women with young children). As the JSS report says, “The main tasks of the middle level health worker (SHWs fall in this cadre) include diagnosis of common illnesses including emergencies, management of these common emergencies and deciding about referral of those that she/he cannot manage.”

The outreach clinic at Shivtarai, a forest-fringe village about 43 kilometers to the northwest of Bilaspur town, has been running since March 2000. More than 1954 consultations have been offered at this clinic as of 2013. The clinic at Semariya village (42 kilometers to the north of Bilaspur town) has been in operation since July 2000. With the generous support of the locals, the site has been upgraded and more than 3456 consultations have been conducted at this site. At the third clinic at Bamhni village, 70 kilometers to the north of Bilaspur town in the Achanakmaar Game Sanctuary, more than 13048 consultations have been rendered since it began its operation despite the fact that it is difficult to reach the clinic by vehicles. Their unparalleled commitment and dedication to serving remote villages is well-reflected from the fact that they never shied away from their task to reach Bamhni sub-center despite being forced to cross a river in spate.

JSS Community health center at Ganiyari (the JSS hospital)—Third Tier

From its humble beginnings, the JSS community health center at Ganiyari has grown substantially. Today it is a well-equipped, self-sufficient hospital with an outpatient service, an inpatient ward, an operating theatre complex, a low-cost pharmacy, a radiology unit and a laboratory that is equipped to perform even sophisticated tests and cultures. Over the years, it has provided service to more than 100,000 patients.

Responding to a question about their catchment area, Dr. Sushil Patil, physician-administrator at JSS says: “We draw our patients from more than 1200 villages/towns of the district and beyond. Typically, 40% of every OPD (80–100 patients per day) come from the state of Madhya Pradesh. These patients tend to be the most sick. Patients also come from the states of Orissa and the full breadth of Chhattisgarh. Over the years, we have acquired a great reputation for providing low-cost, effective care. Patients place a lot of trust in our ability to cure their illnesses and are equally impressed at the quality and affordability of the care we offer. They not only come from faraway places but are willing to wait any amount of time to avail our services.”

 Asked about alternative healthcare facilities in the region, Dr. Patil mournfully lamented: “The quality of the public health system in this region has been dismal. Patients typically are reluctant to seek care in the government hospitals, as they are known for poor patient care and poor inter-departmental coordination. Particularly, if a patient needs a medication, blood transfusion or a medical clearance for surgery, there is little help that they get from the system. In addition to all these, they are plagued by excessive absenteeism.” Others are equally critical of the poor quality of public health systems: “The rush of patients on any given day at the JSS is not merely an indication of the quality of care, it is also a testament to the lack of anything comparable in the region. There is a government primary health center (PHC) in Ganiyari itself, not far from JSS. But typical of PHCs the country over, it rarely has any doctors, let alone patients, and its appearance of dingy neglect hardly inspires confidence.”

Challenges in setting up a surgical hospital in rural Ganiyari

**Physical Infrastructure**

Buildings & Space

On the choice of their building design, Dr. Kataria said: “Based on our conversations with the community prior to establishing JSS, it was very clear to the core team that the clinic and its facilities had to be something that was welcoming and allowed the average villager to feel comfortable approaching us to receive his or her healthcare. We chose the brick-based structures with thatched roof design given their similarity to other structures in the area as well as their cost-effectiveness in terms of construction and maintenance.”

**Electricity**

Mr. Paramanand, chief administrative officer, shared how they tackled the issue relating to electricity: “In the late 1990s, most of rural India, just like much of the low-resource locations elsewhere, was not electrified. Ganiyari was a typical Indian village that had little existing infrastructure with very poor overall electrification. Luckily power lines already ran through the general vicinity of our site and the local state electricity board was helpful in providing electrical connection for JSS. But it (the electricity) was highly unpredictable. We had frequent outages to the point that the actual availability in a day could be less than a combined total of 8 hours. Over the years, we tackled this issue of power outages through a transformer that was donated to us. Over time, we have also purchased two generators which also act as backups to provide uninterrupted power supply to our OTs and for other emergency uses.”

**Water**

The team did not face significant challenges with respect to water sources, given that Ganiyari used to be a rural irrigation colony. Mr. Paramanand continued: “Today, our internal needs are met with the water from two borewells on campus; the waster is stored in an overhead
water tank that can hold up to 100,000 litres. We purify water before use in three different ways: (i) Big reverse osmosis (RO) filter donated by one of the leading RO filter manufacturers is used to purify water for autoclave purposes, (ii) at various water dispensers, ultra-violet (UV) filters are deployed for purification and finally (iii) UV drum is used for cleaning at other places including the community center. We also check regularly (3–4 times a year) for its potability and if found unsafe, we deploy chlorine-based purification.

**Medications, Supplies and Supply Chains**

When asked about the availability of medications and other supplies, Dr. Kataria said: “Luckily, since Bilaspur has several pharmaceutical warehouses, it is a distribution hub to the hospitals and clinics in the area, including ours. So we have not had many problems with getting generic versions of drugs and supplies. We have also been able to purchase medications and supplies at relatively lower prices, thanks to the bargaining power that our alma mater All India Institute of Medical Sciences (AIIMS) enjoys”(See Table 8 for comparison of JSS’s low-cost generic drugs with market rates). Mr Paramanand added: “Within the larger purchase agreement negotiated by AIIMS, JSS is able to procure supplies on an as-needed basis. Although, as chief administrative officer, I am authorized to decide on minor purchases, larger purchasing decisions are typically made by a purchasing committee comprised of clinical (includes all four remaining founding physicians) and administrative staff at JSS. Such a systematic procurement system has enabled us to streamline costs without compromising clinical needs.”

**Equipment, Maintenance and Donations**

Maintenance of medical equipment always poses severe challenges in low-resource settings. Talking about this issue, Dr. Kataria said: “Very few equipment manufacturers are located in rural areas, and the few biomedical equipment technicians who reside near Ganiyari are always on high demand. Many times we make purchasing decisions not based on the quality of the equipment, but rather on our ability to service and maintain the equipment.”

Recollecting an interesting episode, Dr. Kataria shared: “When we had to purchase our first generator, we had a choice between a relatively inferior local unit and a superior unit from overseas. In the end, we went with the local make largely because we knew it could be maintained by the local technician. It is important to recognize that all equipment will fail, and it’s a matter of having the resources to fix it and move on.”

Also Dr. Kataria points out that in private hospitals in the neighborhood such as the SRC hospital, a common workaround in tackling reliability issues is to have redundancy in supplies and equipment. Although it adds cost, in most cases the redundancy is justified. He notes that for laparoscopic and gastroscopy equipment, for example, it might take months for a defective component to be sent to Delhi for diagnostics, repair and eventual return to Bilaspur.

Given its NGO status and the positive coverage it has received for its commitment to the rural poor, JSS has been fortunate, Dr. Kataria notes, in attracting the attention of philanthropists. Some philanthropists have been interested in donating equipment, but Dr. Kataria notes that it’s problematic if the donation is based on what the donors are able to give, as oppose to what the hospital actually needs. He notes that the donation of expensive, fancy equipment that cannot be repaired and maintained locally is like receiving an expensive Italian sports car to drive in the middle of the desert. “Without a mechanic or a fuel station, it’ll quickly end up as an expensive piece of machinery rusting and gathering dust.”

**Sterilization**

On the topic of sterilization, Dr. Kataria says: “The ability to sterilize reusables is critical for surgical care. Although in rural environments, this can be achieved at relatively low cost using some basic instrumentation, we have opted to invest in industrial healthcare-grade sterilization machines at our hospital. We didn’t want to take any chances with respect to safety of our patients. Also, these machines have ensured safety in our extensive reuse of test tubes and sterilizable glass syringes.”

**Ancillary Services**

**Laboratories**

JSS has invested in basic laboratory equipment on-site, and has established relationships with a laboratory in Bilaspur that provides diagnostics at reduced rates. Basic chemistries, coagulation profiles, blood counts, blood typing and cross-matching can be performed on-site. The lead time involved for send-out tests can vary between a couple days to weeks.

**Blood Bank**

JSS has been at the forefront of advocating for improved blood banking facilities in low-resource areas. It is estimated that over 99% of blood banks in India exist in urban centers, leaving less than 1% of blood banks for the rural citizens. The closest blood banks to JSS are in Bilaspur, and the time necessary to obtain blood in the case of an emergency can span up to several hours. Recent changes to the law have allowed centers like JSS to serve as blood storage facilities, so blood collected elsewhere can be stored in coolers at JSS. This has reduced the delay in provision of necessary life-saving transfusions. However, as Dr. Kataria points out, they are in perpetual shortage both on-site and at the source blood bank. For this reason, they sometimes use tranexamic acid, which has been proven to reduce the need for blood during surgical procedures.
Pathology
Currently they have no pathology services available on site and all diagnostic pathology specimens are sent to a laboratory in Bilaspur for formal reading.

Radiology
X-ray machines and ultrasound equipment are available on site. More complex imaging consisting of CT scans and MRI are only available in Bilaspur. There is no staff radiologist, so films are read by the clinicians on-site. More specialized reads (for example echocardiography) are obtained through clinician networks generated by the founders. For example, a cardiologist at Mayo Clinic Jacksonville (an AIIMS colleague of Drs Kataria and Jain), trained a nurse to operate ultrasound equipment for the purposes of echocardiography. The images are sent electronically to the cardiologist who is able to provide reads remotely.

Waste management
Paramanand was proud to point out that JSS manages its medical and clinical wastes as per the state government regulation through its tie up with Envirocare, a private waste management firm. Waste from medical, laboratory and pharmaceutical practices are collected at the source and properly classified and stored in different colored bins and kept in a designated waste storage building before they are fortnightly collected by Envirocare for disposal.

Ambulances
JSS owns 5 ambulances: they were gifts from various donors over the years. On average, the ambulance service receives 2-3 emergency calls a week and the ambulances are also used to transfer patients to local doctors/hospitals if they need to be referred.

Overall facility capabilities
There are three inpatient wards at JSS. The original ward had 15 beds that mostly served the post-operative patients recovering from general, gynecological, pediatric or ENT surgery. Since August 2009, they have opened a new ward consisting of an additional 15 beds and since 2010, there is also another ward fully dedicated to tuberculosis patients with the total bed capacity going up to 70. The operation theatre complex includes 2 major operation theatres and a labor room.

Staff on duty as of September 2014
The surgical team at JSS consists of Dr. Raman Kataria, Dr. Rachna Jain and another obstetrician. Dr. Kataria is a pediatric surgeon turned generalist; he takes care of obstetric and gynecological procedures along with basic orthopedic procedures. Dr. Jain is an obstetrician and gynecologist, who handles basic general surgery and is capable of providing a laparotomy if necessary. The other obstetrician on staff is available largely for emergency caesarean deliveries. An external orthopedic surgeon provides his services on a pro-bono basis once weekly, as does an urologist who provides endo-urologic services. Both are located in and work at the district hospital in Bilaspur. “There is no such thing as a specialist in rural surgery,” explains Dr. Kataria. “We don’t want to be paralyzed by our specialized training. You must be a multi-specialist, trained in and capable of providing pretty much everything. If you are not trained in something, we recommend training yourself through experience. When faced with a situation where a patient is either going to die or suffer a chronic condition because timely service is unavailable or unaffordable, it is better to try our best to salvage the situation even if we are not the best-trained to deliver that service. Over the years, each and every one of us have become very good at what we practice and this de-specialization of doctors has made us more versatile in handling diverse situations with limited resources.”

The medical team at JSS is headed by Dr. Yogesh Jain, a pediatrician by training, and consists of a team of three retired staff physicians who volunteer their services and are available part-time, providing a range of services from general medicine to pulmonology. The organization consistently has 4-5 junior physicians, who are generally in the midst of training (basic or advanced) or have completed training. Turnover is high, as these individuals usually use the JSS high-volume experience as additional training to further their careers. To date, JSS has had a few surgical trainees spend 3–9 months on site, with very few showing the commitment to stay for the long haul.

The nursing situation is equally challenging. It is difficult to attract skilled nurses to a rural area where the pay is low. There is little incentive to sacrifice a job in an urban area, which may be less disruptive to their personal lives and family situations. Because of the nursing shortage, we train local volunteers who are on-the-job to assist with nursing duties. To address this issue, in 2010, JSS initiated a state-approved nurse-training program to which they reserve a large proportion of the seats to candidates belonging to the local community areas in the region. “We find that individuals with ties to the community, who have grown up in these areas, are much more likely to stay at JSS even with the prospects of higher-paying jobs elsewhere in the cities,” says Sumesh who runs the basic training course for the nurses.

Service Provision to the Poor
JSS has been so successful with its outreach efforts and positive word-of-mouth, that over 500 patients line up to be seen every week; they come from over 3000 remote villages within a radius of 200 kilometers from Ganiyari. About 20% of these patients are triaged to a surgical consultation for a potential surgical issue and JSS hospital has performed over 25000 surgical procedures since inception; over 1500 of them were performed in
Teaching Case

2012–2013 alone. Exhibit 2 shows the different conditions for which surgeries are performed at Ganiyari.

**Abdominal**
Urinary stones, gastro-intestinal perforation, gallstones, appendicitis, hernia, hydrocele, hemorrhoids, fistula-in-ano, intestinal obstruction, cancer of the colon and rectum, hydatid cyst.

**Gynecological and Obstetric issues**
Cancer of the uterus, uterine cervix and breast, ovarian cyst, dysfunctional uterine bleeding, cystocele, rectocele, vesico-vaginal fistula, caesarean section.

**Chest and ENT**
Empyema thoracis, thyroid adenoma, mixed parotid tumor

**Skin and connective tissues**
Necrotising fasciitis, pyomyositis, post-burn contractures, squamous cell carcinoma, abscesses, fractures.

**Congenital and pediatric**
Cleft lip and palate, tracheo-esophageal fistula, clubfoot, hydrocephalus, Hirschsprung disease, congenital pyloric stenosis, posterior urethral valves, stricture of the urethra, Wilms’s tumor, necrotizing enterocolitis, hypospadias, undescended testes.

Since it opened its doors, JSS has cared for more than 270,000 patients; about 44% were from backward castes, 35% Dalits, and 14% Tribals. By 2014, the sub-centers had cared for about 75,000 patients and the VHWs had cared for about 26,000 patients; over 72% were Tribals, 19% backward castes, and 7% Dalits.

It costs only 10 INR (less than $0.20 USD) to register at JSS, and half of that if you are pregnant or a child under the age of 6. There is no separate fee for an initial consultation or repeat consultations during the first week; after that, each consultation costs just 5 INR.

The median expenditure for an illness for its complete evaluation, laboratory investigation and drug needs for an entire month costs the patient a meager 110 INR. Many surgical procedures are provided through the RSBY scheme, so a surgical hospitalization, which can be a catastrophic financial expense, costs nothing to patients if they are unable to afford it.

Delivery of Health Care at Ganiyari hospital: Patient Experience

**Registration**
Sushil Patil, physician-administrator at JSS, elaborated the process (see Figure 4) by which patients flow through the system: “Any incoming patient will join one of two queues: new patient or existing patient. Except for emergencies, it is typically first-come first-served (FCFS).

Emergency patients may skip the registration process and go directly to the OPD.”

He adds: “New registration typically happens the evening before the OPD (Saturday, Tuesday, and Thursday evenings). You may have noticed the luggage patients have kept along the corridor to indicate their position in their line. Based on their position in the waiting line, they are given a token for OPD appointment that may not necessarily be on the following day. Typically if a patient comes to register on a Tuesday, he or she will probably get a token for a Friday’s OPD. While patients are in line, our staff members will go through and make sure that any patients with acute issues are moved out of the line for quick assessment.”

Since patients travel from far away, they frequently stay on campus grounds or in the dharamshala for a few days before their turn comes. JSS provides shared kitchen areas where patient families are permitted to

---

**Exhibit 2:** List showing various conditions for which surgeries are performed at Ganiyari

**Exhibit 3:** Key milestones at JSS

- January 1998: Appropriate technology development work
- March 1998: Decision to work in rural Bilaspur
- May 1999: Setting up base
- January 2000: Community program initiation
- February 3, 2000: Clinic starting at Ganiyari
- May 2001: Operationalization of the operation theatre and 10 bed ward inauguration
- June 2003: Opening of the sub-center and the community health programme for the 75 villages in the Achanakmaar tiger reserve and surrounding areas
- August 2004: Mitanin—hamlet based health worker programme, based on ideas from many organizations including JSS
- September 2005: Training workshop for rural physicians and surgeons of Bilaspur district
- January 2006: Commission of new operating theatre services
- March 2006: Workshop on hunger and health at Ganiyari
- 2007: People from over 2500 villages coming for their health problems to Ganiyari including 3 districts of Madhya Pradesh
- February 2009: Multi-stakeholder workshop at Ganiyari on management and control of falciparum malaria Ganiyari
- February 2009: Blood storage center commissioned at Ganiyari
- February 2010: Inpatient bed strength raised to 70
- February 2011: ANM training school for adivasis and Dalit girls
- March 2012: Skype classes and telemedicine start
- January 2013: GNM training school started
- March 2013: Workshop at Ganiyari on rational use of investigations in a low resource setup
- January 2014: DNB programme in family medicine started
cook their own meals. They also have the option to buy subsidized meals from the JSS canteen.

At the time of registration, every patient is given an identification card with a registration number. JSS maintains the medical records of all its patients; patients need only bring their identification card to each visit. JSS is currently in the process of converting their paper records into electronic versions, but in the meantime, the paper records are color-coded to indicate gender, diagnosis, age (green for children, yellow for women, white for men), and participation in community services (pink for those in the intensive village programme).

**Triaging**

After registration and when it is their turn, the patients go to a screener, a position typically served by a JSS Senior Health Worker. The screener, being well-trained in categorizing the patients by their ailments, triages the patients efficiently and sends them to the appropriate physician. For instance, patients with a medical problem will be sent to Rooms 1, 2 or 6; diabetes cases are sent to Room 6; surgical cases are sent to Room 3.

Dr. Kataria also noted that they strive to achieve same-day treatment for their patients. Asked to elaborate more on this, he said: “Even if it stretches the system, we wanted to have a single-day service provision. From consultation to investigation to treatment, we strive to finish as much within a day as possible.”

**Mechanics of Surgical Care Delivery**

Surgical conditions presented at Ganiyari are diverse (see Exhibit 2 for a range of conditions for which surgeries are performed at the JSS hospital at Ganiyari and Figure 5 for the surgical delivery scheduling process). Patients requiring surgery, upon their arrival in Room 3, will be seen by a junior doctor who will provide them with a checkup including a physical exam. After the examination, the doctor will decide whether to send the patients for lab tests and further investigations if necessary. All laboratory, imaging and ancillary services are conducted on site, after which, Dr. Kataria, the senior surgeon, makes a decision about the patient’s surgery.

Surgery for a given patient is scheduled based on a multitude of factors, including wait time (depending on the surgery backlog), illness severity, and the distance the
patient travelled. Typical wait time is about 2 weeks but it can be as long as 1-5 to 2 months, depending on the above-mentioned factors.

Patients who underwent minor procedures under local anesthesia are typically sent home after the procedure. Regional anesthesia patients remain at the hospital for 24 hours, and general anesthesia patients stay about 7–10 days. Women who have caesarean deliveries usually stay for 4 days.

Surgical Innovations
The approach at JSS for surgical procedures aligns with its overall mission to provide affordable health care. Their focus in surgical procedures has been on minimizing costs by providing frill-free, basic care without compromising quality at any stage of care. To meet this goal, JSS adapts strategies that have been proven to be successful at other institutions, and works to find innovative alternatives when necessary. To contain costs, general anesthesia is only used when it is essential, and the OR, while fully-equipped, is basic. The three basic procedures described below illustrate the approach at JSS and illustrate the impact of these initiatives on cost reductions.

Inguinal herniorrhaphy using mosquito net mesh
Inguinal hernia repair is one of the most frequently performed surgical procedures in the world. Although hernias are common conditions that affect men and women of all ages, they are much more common among older men and infants. Men have a 27% lifetime risk for developing inguinal hernia, while women only have a 3% lifetime risk. It is estimated that more than 20 million inguinal hernia repairs are performed annually worldwide.

Inguinal hernia refers to the weakening of the abdominal wall in the groin area and a “herniation” of abdominal cavity contents into or through the inguinal canal. As a result, the patient experiences a bulge in the groin often accompanied by pain. The severity can range from minor inconvenience to debilitating pain. Rarely, the abdominal contents that slide into the hernia defect can obstruct or twist on themselves (strangulation), which can be life-threatening.

Sharing his insights about the acuteness of the problem in tribal areas near Bilaspur, Dr. Kataria said: “In tribal areas of Bilaspur, there are many untreated inguinal hernia cases, and patients often develop large inguinoscrotal herniation as a result of delayed presentation. We have encountered emergency situations where fatalities are not that uncommon.”

Inguinal hernias are generally repaired with an incision to the groin, separation of the abdominal wall layers and placement of a prosthetic mesh to bridge the hernia gap. This is known as the tension-free hernia repair since it replaced the earlier approach of simply buttressing a repair performed under tension. In India, polypropylene mesh cost about INR 1500. Although the use of such expensive synthetic mesh is universal in high-income settings, it is cost-prohibitive in poorly-resourced rural communities.

Dr. Kataria elaborated on some of their innovations to tackle the affordability issue: “Although our repair procedure is surgically identical to that performed in high-income settings, there are some notable exceptions. Firstly, we prefer spinal anesthesia to general anesthesia. We have replaced pre-packaged, disposable nylon sutures with simple nylon fishing wire, which costs 10 INR and it
The Lancet Commission on Global Surgery
Teaching Case

### Summary of Costs for performing hernia repair at JSS

Table 11: Summary of costs for performing hernia repair at JSS

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost (INR)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical supplies requirement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spinal 2 ml lox</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Spinal needle for injection (23 gauge)</td>
<td>70</td>
<td>Reused with autoclave</td>
</tr>
<tr>
<td>2-0 catgut suture</td>
<td>48</td>
<td>Vs. INR 150 for vicryl—to tie the sac</td>
</tr>
<tr>
<td>Simple nylon</td>
<td>1</td>
<td>Simple nylon INR 10 for 10 patients</td>
</tr>
<tr>
<td>Mosquito mesh†</td>
<td>5</td>
<td>Vs. INR 1500 for monofilament mesh</td>
</tr>
<tr>
<td>Dressing material</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Silk reel</td>
<td>12</td>
<td>INR 250 for 20 cases; 12.5 rupees/case</td>
</tr>
<tr>
<td>Gloves 2 pairs</td>
<td>12</td>
<td>INR 6 per pair</td>
</tr>
<tr>
<td>Antibiotics given (pre-op)</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Staff requirement

- Surgeon: 1
- OT Assistant: 1
- Anesthetist: 1

Time per surgery (minutes): 30–40
Number of surgeries in 2012–13: 259
JSS Price (Patient fee) (INR): 3500
Reference Price: 18000

Mosquito nets (5 INR) are cut into the appropriate sizes and then autoclaved for use as the prosthetic mesh instead of the more expensive, pre-packaged synthetic meshes (1500 INR); the mosquito nets is a good value for money. Although we have not conducted randomized clinical trials comparing the two approaches, there are other studies done elsewhere that have confirmed their effectiveness and safety.” (See Table 11 for the net impact of these initiatives on cost of providing surgery.

### Summary of Costs for performing laparotomy at JSS

Table 12: Summary of Costs for performing laparotomy at JSS

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost (INR)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical supplies requirement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spinal 4 ml</td>
<td>16</td>
<td>75% are done with spinal anesthesia</td>
</tr>
<tr>
<td>Spinal needle for injection (23 Gauge)</td>
<td>70</td>
<td>Reused with autoclave, it is made of steel</td>
</tr>
<tr>
<td>2-0 catgut sutures</td>
<td>94</td>
<td>INR 47 per strip</td>
</tr>
<tr>
<td>2-0 silk sutures</td>
<td>140</td>
<td>INR 70 per strip</td>
</tr>
<tr>
<td>Dressing material</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Gloves 2 pairs</td>
<td>12</td>
<td>INR 6 per pair</td>
</tr>
</tbody>
</table>

Staff requirement

- Surgeon: 1
- OT Assistant: 1
- Circulator Assistant: 1
- Anesthetist: 1

Time per surgery (minutes): 60–90
Number of surgeries in 2012–13: 40
JSS Price (Patient fee) (INR): 3500
Reference Price: 15000

Laparotomy, also known as abdominal exploration, is an important basic procedure that is required in treating a variety of urgent or emergent conditions, including vascular emergency (ruptured aneurysm), occluded blood supply to abdominal organs (mesenteric ischemia), and any perforation of gastrointestinal tract (from an infectious ulcer like *H. Pylori*), the small intestine (typhoid infection, for example) or large intestine (diverticulitis or cancer). Usually it is an emergent procedure done to explore the abdomen for intra-abdominal catastrophe.

Though repair of the potentially catastrophic findings upon entering the abdomen requires high-level surgical expertise, the laparotomy procedure itself—defined as the surgeon gaining entry into the abdomen—is not particularly resource-intensive. It requires only bards for the incision and sutures or electrocautery to stop bleeding and to close. Generally, there is no implant of foreign material (other than sutures). However, the procedure does have an ill-defined cost component that is a function of the problems discovered during the procedure. For example, the time and materials (sutures, grafts) required for intestinal or vascular repair can be extensive.

Here again, Dr. Kataria explained how JSS was able to contain costs: “In contrast to general anaesthesia that is typically used in high-income settings, we prefer to administer spinal anaesthesia (with general anaesthesia only when necessary). In addition, the surgeons at JSS made concerted effort to minimize the number of sutures and disposables consumed during the surgery through a variety of ways. For instance, if a tear in the intestine requires repair, it may require anywhere between 1 and 20 suture ties (insertion needle, extraction needle, and tying of the suture ends) to repair the defect. In high-income settings, many surgeons use a fully prepackaged suture for each tie in order to save time through the rapid tie of the suture. At JSS, we use the same suture for at least 7 ties, and use the suture until it is very short on the cut end. It is slower, but more efficient.” (See Table 12 for a summary of the cost of surgery at JSS compared to the cost of surgery elsewhere)

### The Caesarean Delivery

At JSS, Caesarean deliveries are performed by surgeons and obstetricians using the standard procedures in line with the latest surgical techniques. A single double needle absorbable suture is used for the uterine closure,
a simple nylon suture constructed of the locally-sourced nylon (described in the hernia repair section) is used for fascial closure and a silk suture is used for intra-operative hemostasis.

Continuing on the earlier discussion about their cost-cutting initiatives Dr. Kataria explained: “The caesarean delivery is a well-established procedure all over the world and our procedure is very similar to how it is done in high-income settings except for major differences in cost arising primarily due to labor and materials savings.” (See Table 13 for a comparison of our costs to standard costs incurred elsewhere.)

### Improvements in Healthcare Indicators

The tireless efforts of the doctors, paramedics and other staff at JSS have led to significant gains in various health care indicators for the project area. From 2000 to 2013 (Table 9), we saw a truly remarkable drop in infant mortality rate (IMR); it plunged down from a high of 119 deaths per 1000 live births in 2000 to 22.45 in 2013–14. The result is even more remarkable when we consider the fact that the rest of Chhattisgarh is still suffering a much higher IMR: 59 deaths per 1000 live births in 2013. Equally impressive results have been achieved in under-5 mortality rates (USMR); it was reduced from 145 deaths per 1000 live births in 2000 to 40.95 deaths per 1000 live births in 2013–14. The malaria incidence rates have also significantly fallen from a high of 33 deaths per 1000 people in 2000 to 4.1 deaths per 1000 in 2013–14.

The birthweight of newborns has significantly improved in this period. More than 84% of newborn babies had a birthweight exceeding 2.5 kg. Efforts to prevent malaria in pregnant women have significantly contributed to this result.

### Financial Viability of JSS: Costs & Revenues

The commitment of JSS to providing high-quality healthcare cost effectively is reflected in almost all of its activities, including wage and salary structure, minimization of waste and costs, and pricing policies, and the actual care delivery. As described earlier in the context of surgical procedures, significant effort and attention has been devoted to minimizing the cost of services by using alternative, less-expensive materials.

JSS’s salary structure also captures the organization’s philosophy to foster an equitable society (see Table 10). The salaries for all staff, including that of medical professionals, are well below their counterparts in other hospitals. The informal understanding is that doctors at JSS draw no more than 25% of market rates for similarly qualified doctors. JSS also encourages and supports the policy of giving employment to both spouses as it helps to enhance the household income of married couples. In addition to the salaries, an extra 300 INR are also paid per child to all employees up to a maximum of two children. Further, as can be seen from the table, the senior management at JSS has strived hard to keep the ratio of the highest to the lowest salary at between 8 and 10 and to not exceed 10.

The impact of cost reduction efforts in delivery of surgical procedures is reflected partially in the posted prices of JSS. Representative data on costs and prices are provided in Tables 11–13 for the three procedures described earlier. The tables also present reference prices for similar procedures (See Annexure 2 for prices at SRC for equivalent procedures) that can be used as a benchmark for comparison. The reference prices denote the prices charged by SRC, a private hospital in the region and rates approved under the Rashtriya Swasthya Bima Yojana (RSBY) scheme,” a government-sponsored insurance scheme that targets those who are poor or below the poverty line.

It should also be noted that while JSS announces standard prices for each procedure, patients are treated based on need, irrespective of their ability to pay. As a result, only a fraction of the patients pay the full price and several are treated at no charge. In addition to revenue collected from the patients, JSS also receives payments from the RSBY administrator for patients enrolled in the insurance scheme. In any case, revenue from the patients (including payments from the RSBY scheme) is not adequate to cover the full costs of running the facility and JSS depends on contributions from philanthropists and charitable organizations for its survival. The details of expenses and revenues received by JSS from various sources are summarized in Table 14.

### Looking to the future—Key challenges and possible options

At the board meeting on the previous evening, the team discussed several challenges that JSS faces in the future.
Reflecting on the accomplishments of JSS since its inception, Dr. Kataria was pleased that more than 200,000 poor and needy patients have been treated during this period, irrespective of their ability to pay. However, he also realized that with a population of 25–3 million in Chhattisgarh alone, most of whom were poor and below the poverty line, this was a drop in the ocean and there was room for a lot more, and any initiative to expand and scale up JSS’s operations would benefit the larger community and society. Dr. Kataria was well aware that while expansion was desirable it was not easy due to severe resource constraints and limitations in infrastructural facilities. First, with patient revenues covering only a small percentage of total annual expenditure, JSS was heavily dependent on external sources in the form of donations and grants to remain solvent. While some of the grants were tied to specific activities and had long-term commitments, reliance on annual grants made JSS financially vulnerable. In the past, several initiatives had been suggested and discussed to assure more stability, but there was no concrete follow-up action. In the meeting that Dr. Kataria attended the previous day, the executive committee members revisited the details of some of these initiatives and the details of their discussions on pros and cons of each as follows:

### Establishment of a corpus

With its demonstrated commitment and dedication to the cause of providing affordable healthcare for the poor, JSS has developed an enviable reputation and credibility, not only locally but also nationally and beyond. Thus today it has the potential to leverage this reputation and seek funds from the corporate houses for establishing a corpus. Such a corpus has the advantage of freeing the organization from day-to-day funding worries and would help focus on its core mission. Second, access to a corpus would enable better long-term planning, particularly for creation of suitable facilities. The recently enacted legislation requiring corporates to spend 2% of their profits on CSR activities is also likely to be helpful in implementing this initiative. Critics of this option worry that seeking funds from corporations who don’t share the same values as that of JSS may limit the scope of the activities they wish to pursue.

### Increasing posted prices of JSS’s services

It was argued in the past that a small to moderate increase in posted prices would enable JSS to increase patient revenues without compromising its mission. The suggestion was motivated by the recognition that a good number of patients could afford to pay a higher fee, but did not do so because of the posted price. Further, it was argued that the posted prices were well below those at comparable facilities—lower than the government-approved rates for RSBY and less than a fraction of the rates charged by SRC in the same district. It was also pointed out that in any case needy patients were always treated and never turned away because of their inability to pay, and any proposed change in posted prices would not affect them.

### Encouraging RSBY patients to avail of JSS’s services

Clearly, RSBY approved rates were higher than the posted prices of JSS, so increasing the number of RSBY patients where payment was assured under the insurance program, JSS’s finances would improve accordingly, thereby effectively deriving benefits of cross subsidy from one patient group to the other. The practices followed in nearby SRC and other private hospitals indicate that, if marketed well, such a strategy could be effective in boosting overall revenues. However, Dr. Kataria has consistently opposed this as it would dilute the focus of JSS. There was also a concern that creating such “class” distinctions among patients has the danger of driving away the poor patients.

### Changing the patient mix

While funding issues and the ability to remain solvent were important, Dr. Kataria was more concerned about the persistent shortage of qualified and trained medical professionals that was severely limiting the number of patients able to be treated. In part, the problem was due to the low level of wages offered and the unattractive lifestyle in rural India. As a result, only the most dedicated and committed individuals chose to come and serve in JSS. While modest increases in salaries may ease the problem a little, it was clear that JSS would never be able to attract professionals on the basis of salary. Rather the complex environment and diversity of case mix at JSS offered a rich

### Table 14: Income and Expenditure at JSS

<table>
<thead>
<tr>
<th>Year</th>
<th>Income in INR</th>
<th>Expenditure in INR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2011–12</td>
<td>2012–13</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receipts from Activities (Mainly patient services)</td>
<td>147,747,719</td>
<td>16,180,397</td>
</tr>
<tr>
<td>Donations</td>
<td>2,086,012</td>
<td>1,406,214</td>
</tr>
<tr>
<td>Grants received</td>
<td>33,433,377</td>
<td>52,367,666</td>
</tr>
<tr>
<td>Other incomes (Through interests)</td>
<td>6,805,016</td>
<td>6,679,722</td>
</tr>
<tr>
<td>Total Income</td>
<td>INR 57,009,084</td>
<td>INR 77,633,999</td>
</tr>
<tr>
<td>Expenses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drugs &amp; Consumables</td>
<td>14,312,067</td>
<td>14,970,249</td>
</tr>
<tr>
<td>Admin Expenses</td>
<td>5,498,293</td>
<td>8,369,748</td>
</tr>
<tr>
<td>R &amp; D Expenses</td>
<td>198,610</td>
<td>579,848</td>
</tr>
<tr>
<td>Manpower cost</td>
<td>20,422,770</td>
<td>29,652,566</td>
</tr>
<tr>
<td>Community welfare expenses</td>
<td>4,304,347</td>
<td>5,391,225</td>
</tr>
<tr>
<td>Financial charges</td>
<td>110,281</td>
<td>9031</td>
</tr>
<tr>
<td>Depreciation</td>
<td>1,531,484</td>
<td>1,962,650</td>
</tr>
<tr>
<td>Total expenditure</td>
<td>INR 46,278,599</td>
<td>INR 60,935,317</td>
</tr>
</tbody>
</table>

While funding issues and the ability to remain solvent were important, Dr. Kataria was more concerned about the persistent shortage of qualified and trained medical professionals that was severely limiting the number of patients able to be treated. In part, the problem was due to the low level of wages offered and the unattractive lifestyle in rural India. As a result, only the most dedicated and committed individuals chose to come and serve in JSS. While modest increases in salaries may ease the problem a little, it was clear that JSS would never be able to attract professionals on the basis of salary. Rather the complex environment and diversity of case mix at JSS offered a rich
opportunity for training professionals that could be leveraged to provide a steady stream of qualified people that could help JSS deliver service to more patients. The key step in this initiative would involve JSS being recognized as a qualified place for imparting advanced training and certification for professionals such as doctors and nurses. Such recognition would help bring qualified people for additional training and require them to spend a specified period, usually a few months to as long as two years. In return for the training and certification, such professionals would be available to serve JSS and enhance the capacity of the facility to deliver more services. The downside of the scheme was that JSS would have to devote some of its precious resources towards training. And, Dr. Kataria was not sure that the people coming in for certifications were committed to caring for JSS’s core patient group.

He was also worried about the complete absence of second level of leadership at JSS. The organization still depended on Dr. Kataria and the founders for all major decisions and while there had been several junior doctors who had spent extended period of time at JSS, to date no one had emerged at the next level to take the organization further.

Contributors
KS, DT, NR and PA led the writing of the paper and did the analysis. NR and PA made the site visits, conducted interviews and collected data. JM and NR read earlier versions of the report and provided valuable feedback. All members of the India case group contributed ideas for the report, reviewed the report, and agreed on the final version.

Members of the India case group
Prakash Awasthi (Doctoral candidate, Indian Institute of Management, Bangalore); Rowan Gillies (Global Surgery Fellow, Harvard Medical School); John Meara (Plastic Surgeon-in-chief, Harvard Medical School); Nakul Raykar (Paul Farmer Global Surgery doctoral candidate, Harvard Medical School); Nobhojit Roy (Visiting professor for public health, Tata Institute of Social Science), Kannan Sethuraman (Associate Professor, University of Melbourne, Australia); Prakash Awasthy (Doctoral candidate, Indian Institute of Management, Bangalore, India)

Acknowledgements
Funding for this case was provided by The Rockefeller Foundation. Professor Devanath Tirupati wishes to acknowledge the support of the Airbus Chair at IIM, Banagalore.

Footnotes
1 The exchange rate on 27th December, 2014: 1 US $ = 63.68 Indian Rupees (INR).
3 Chhattisgarh, the 26th state of India, was founded on 1 November 2000 with Raipur as its capital city by essentially carving out 16 southeastern districts of the central Indian State of Madhya Pradesh (see Figure 2 for a detailed map of Chhattisgarh). This state named hosting a population of about 25.5 million ranks as the 9th largest state in India. Chhattisgarh has an area of 1,35,191 square kilometers and there are 27 districts, 146 blocks, and 20,108 villages. Although the region is bestowed with abundant natural resources, more than half of its districts have been classified as remote with relatively poorer levels of infrastructural development. One third of its population is made up of tribal people (also known as adivasis or original dwellers) who are marginalized and the state continues to face a higher rate of poverty, illiteracy, infant and maternal mortality and malnutrition out of the 16 districts of the state.
4 A phrase used in India to denote submitting resignation papers.
6 http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG.
8 “India has just one doctor for every 1,700 people,” Indian Express, 22nd September 2013.
13 Source: http://www.bioline.org.br/request?is03109
14 Photos from JSS hospital are provided in Appendix 1.
15 It was classified as a backward district in terms of its socioeconomic development, ranking 9th in the Human development indicators out of the 16 districts of the state.
16 Despite constitutional safeguards, the interests of the locals remain marginalized and the state continues to face a higher rate of poverty, illiteracy, infant and maternal mortality and malnutrition when compared to the average Indian population (see Tables 2 and 3 for comparative statistics based on 2011 census).
17 Dalits represent a class of people in India who are considered as untouchables under the Indian caste systems.
18 A brief description about RSBY is provided for interested readers in Appendix 2 for contrasting a private hospital setup with JSS’s Ganiyari hospital.
19 Dr. Kataria says that they have found the use of sterilizable glass syringes to be cheaper, more reliable and easy to use than disposable plastic syringes. The added benefit of being more environmentally friendly was also mentioned.
20 Hindi word for free dormitory.
21 Caesarean deliveries are generally performed with a transverse skin incision in the lower abdomen. The subcutaneous tissues can be bluntly dissected with the surgeon’s fingers or with the aid of a scalpel, and includes the subcutaneous fascia, the thick fibrous tissue that forms the core of the abdominal wall strength known as the fascia, the rectus muscle layer, and the peritoneum, a layer of tissue that lines the abdominal cavity. Once the uterus is exposed, it is opened with a low transverse or low-vertical incision. The classical approach, now rarely used in the high-income world and avoided at JSS because of a high rate of uterine rupture, involved a high vertical incision that extended into the upper portions of the uterus. Unfortunately, in some parts of the low-resource world — it is impossible to know exactly how often — the classical approach is still used. Once the fetus is delivered, the most important aspects of closure involve suturing the uterus in two layers and the fascial layer described above. The evidence is less strong for closure of the subcutaneous tissue prior to skin re-approximation of the skin.
22 A brief description about RSBY is provided for interested readers in Appendix 3.
23 A brief description about RSBY is provided for interested readers in Appendix 3.
Given that patients frequently travel days to be seen and cannot afford lodging, patients stay on the JSS campus, reserving their spot in line for the outpatient clinic by placing their belongings on a numbered spot on the ledge. The line can extend to 300 patients prior to each outpatient clinic day.

Waiting position number 12 is marked on the ledge for the outpatient clinic visit. Patients will place belongings, physically sit and/or sleep there, or tie a piece of clothing to the area to reserve their spot in line. JSS staff combs the line multiple times per day to identify patients who have acute issues that require more immediate attention.
The head nurse at the JSS Hospital in Ganiyari, Nurse Kutti (foreground), helps screen patients by collecting basic information from the patient about their medical complaint or condition, helping to triage patients for medical or surgical consultation. Patients who are identified as having a potential surgical condition will see Dr. Raman Kataria in OPD Consultation Room #3. Upwards of 60 patients in each session will be referred to Dr. Kataria.

Dr. Raman Kataria discusses the plan of care with a patient in OPD Room #3, the room reserved for surgical consultation. In the foreground, JSS staff continue efforts to organize the flow of as many as 300 patients to see the appropriate clinician, get the necessary diagnostic tests, obtain a diagnosis, treatment plan and appropriate medications from the pharmacy prior to the end of their visit. One way that JSS minimizes cost the patient is by striving to provide all needs on a single visit without need for repeated follow-up.
A diagram details the process by which JSS staff process and keep track of up to 300 patients in each outpatient clinic day, from registration to pharmacy.

One of two operating rooms at the JSS Hospital
While many of the components are older than those found in the high-resource setting, these are functional and easy to maintain and replace. Large windows provide much natural light, allowing less electricity usage during times of energy conservation.
Blood samples are processed in the JSS laboratory. JSS uses reusable, sterilizable glass test tubes instead of the disposable variety that are ubiquitous in most healthcare settings in the high-resource world.

JSS had to purchase a blood cooler and storage unit in order to keep blood on reserve for emergency usage. Ideally, JSS would be able to have its own blood bank on-site, but the costs of maintaining a certified, government-approved blood bank standard are prohibitive.
Nurses tend to patients in the inpatient ward in the JSS Hospital in Ganiyari. An area behind a brick wall divider, not pictured, serves as the intensive care unit, where nursing staffing ratios are 1:2 with up to six patients and continuous heart rate and blood pressure monitoring is possible.

A nurse tends to a surgical patient at the JSS Hospital in Ganiyari. An area behind a brick. JSS has established a nursing training program, which is now certified by the state and provides a source of nursing workforce to itself and to other institutions in the region. Training nurses locally has helped with retention.
Dr Raman Kataria, left, rounds on the surgical post-operative patients in-between his daily load of operative cases. A visiting physician, right, from Massachusetts, USA presents the overnight issues and status update. The supporting physician workforce at JSS consists largely of rotating physicians at various stages of training in India or abroad.

The JSS team has established a process by which disposable gloves that have been only minimally soiled are collected, washed, disinfected and then packaged for non-sterile re-use.
Appendix 2: Health system evolution in Rural India

India’s rural healthcare system owes its origin to the philosophy expressed in the Government of India’s 1946 Report on the Health Survey and Development Committee, often referred to as the Bhore Committee Report, later strengthened through the Alma Ata declaration in 1978. Driven by its mission to provide all its citizens access to primary care, irrespective of their individual socio-economic status, the Indian Government developed a three-tiered referral system based on predetermined population norms (see Table 6). It consists of sub-centers (SCs), primary health centers (PHCs), and community health centers (CHCs).

At the lowest level, SCs are the first point of contact for patients, and serve to provide basic medical care, health education and strategies for disease prevention. Each SC is manned by at least one auxiliary nurse midwife (female health worker) and one male multipurpose worker. One health assistant (female) typically supervises six sub-centers. As per the figures provided by the India’s Union Ministry of Health and Family Welfare (UMHFW), there were 148,124 sub-centers functioning in March, 2011—about 12% lower than the prescribed number as per government norms.

PHCs often serve as the first contact point between the rural populace and a health professional. They are designed to provide integrated curative and preventive healthcare to the rural population. A PHC, which acts as a referral unit for six sub-centers, is typically manned by a medical officer who is supported by 14 paramedical and other staff. It is typically equipped with 4–6 beds for inpatient care. As of March, 2011, there were 23,887 PHCs functioning, yet representing a 16% shortfall when compared with the norms for PHCs.

The highest tier in this structure is the CHC, which is usually manned by a surgeon, a physician, a gynecologist, and a pediatrician along with 21 paramedical and support staff. They are equipped with 30 in-door beds, OR, X-ray unit, labor room and lab facilities and they act as the referral unit for 4 PHC’s. As of March, 2011, there are 3,346 CHCs, which are only half as many as recommended.

Rural healthcare in India is characterized by a huge mismatch between supply and demand for health professionals. Although the posts of health workers at various levels are sanctioned, many of them are unoccupied due to shortage of applicants for these posts. Qualified and registered doctors are rarely ready to work in remote rural and tribal areas that lack social infrastructure and where the residents have no ability to pay for the services. A recent report highlights the acute shortfall: there is only one doctor per 1,700 citizens in India; this falls short of the WHO stipulated minimum ratio of 1:1000. To meet the shortfall, India would need about 300,000 more doctors by 2020—110,000 for sub-centers, 50,000 for PHCs, 80,000 for CHCs and another 50,000 for medical college hospitals. Hence, rural residents are unable to receive treatment for basic ailments due to a shortage of facilities as well as qualified personnel. The private sector is expanding to fill in the unmet need but their services are unaffordable to the rural poor. As a result, universal access to good quality healthcare, envisaged almost 70 years ago by Sir Joseph William Bhore, still remains elusive. The Government of India launched a 7-year (2005–12) National Rural Health Mission (NRHM) in April 2005 to focus on providing an improved quality of life for rural populace with a special focus on 18 states which have weak public health indicators and weak infrastructure. In spite of such policies to bridge the gap in access to healthcare between rural and urban population, there still remains a huge deficit in health outcomes for the rural citizens in India. Further commercialization of health care services that has taken place in the last 20 years has limited access to affordable, high-quality essential health care.

Footnotes


2 Figures from Chapter 11, Health Infrastructure in rural India and India’s health workforce by Garg

3 “India has just one doctor for every 1,700 people,” The Indian Express, 22nd September, 2013.
According to a 2010 estimate from the World Bank, 32·7% of India’s population falls below the international poverty line of $1·25 a day on purchasing power parity basis. By 2007, with a mere 15% of India’s population being covered by a pre-paid insurance scheme, research had confirmed that illness shocks were proving to be catastrophic for those who were either below poverty line or were just above it. Also, insured citizens comprised mostly of urban government employees and rich households (WHO 2008). The Government of India, recognizing the need to protect the poor from such financial catastrophe, launched the landmark micro-insurance initiative called the Rashtriya Swasthya Bima Yojana (RSBY) in April 2008 as a way of providing affordable health insurance. The scheme aimed to provide hospitalization coverage for most diseases for more than 60 million households designated as “below poverty line” (BPL) over the five years (2008 to 2013). By January 2011, the RSBY had been rolled out in over 400 districts in 26 states, and in the first two years, the initiative had covered more than 18 million households with almost 55 million individuals.

Eligible households were able to enroll by paying only 30 INR (less than $0·50 USD) as a registration fee, and 75% of the premium was paid by the Central Government with the rest being taken care of by the respective state governments. The enrolled beneficiaries were able to visit any ICF for in-patient care for any of the approximately 700 surgical or medical procedures. The government had fixed the rates at the participating hospitals for these procedures. Preexisting conditions are covered from day one and there is no age limit specified for receiving the benefits. Coverage is extended to five members of the family including the head of household, spouse and up to three dependents. A registered household was covered for a maximum annual sum of 30000 INR (about $667 USD) of inpatient care. The OPD facilities, however, were not covered under this scheme, but OPD consultations were free. However, beyond consultation, if the patient incurred any expenditure that did not lead to hospitalization, the costs were not covered by this scheme.

Not everyone has been praising this initiative with critics highlighting problems with RSBY, such as: (i) No support for outpatient care is provided under this scheme which the critics say may lead to excessive indebtedness among the poor, (ii) On the one hand, people covered by this scheme are undergoing all kinds of procedures that they may not actually need and on the other hand, many people who are in need are left out of the RSBY.

Footnotes
Appendix 4: Shri Ram Care Hospital in Bilaspur, Chhattisgarh (SRC)

Growing up in Bilaspur and observing the plight of the poor who were stranded between a very low-quality, overburdened public health system and a highly variable quality and often unaffordable private health system, Dr Amit Soni was determined to establish a hospital that provided best health care at affordable cost to the middle and low-income citizens—he intended using profits generated from full fee paying patients to subsidize care for those who could not afford it.

After medical school, Dr Soni pursued training in surgery at the Bhabha Atomic Research Centre Hospital in Mumbai, followed by a fellowship in minimally invasive surgery at Sir Gangaram Hospital, New Delhi. Upon his return to Bilaspur in 2008, after a short stint with Indian Railways for three years, he founded the Shri Ram Care Hospital (SRC) in 2011 with funding provided from their family business.

SRC is a 75-bed multi-specialty hospital providing a range of medical and surgical services that include emergency services, ICU management, advanced laparoscopic and onco-surgeries, chemotherapy, upper gastro intestinal (UGI) endoscopy and colonoscopy. The hospital specializes in dialysis services that include both hemodialysis and peritoneal dialysis. SRC is well-equipped with modern facilities including two advanced operating theatres, digital X-ray machine, and fully advanced automatic pathology services. A more detailed list of services provided and the facilities available is presented in tables at the end of this Appendix.

Today, SRC treats about 100 to 150 OPD patients daily and performs about 10 to 12 surgeries. In addition, the hospital handles 40 to 50 pregnancies and caesarean deliveries per month. The physician team at SRC is headed by Dr. Amit Soni and his wife, Dr. Natasha Soni, a pediatrician by training. There are three other surgeons on their payroll that include an orthopedic surgeon, an urologist and a general surgeon. The medical staff consists of 10 permanent doctors, 31 visiting doctors and more than 40 nurses. In contrast to JSS, SRC has been more successful in attracting medical professionals due to a combination of factors. First, SRC offers relatively competitive salaries (see data presented towards the end of this annexure). Second, Bilaspur is a growing town that offers a lifestyle that is closer to that found in other urban centers. And third, the local medical college in Bilaspur provides SRC access to fresh graduates looking for their first jobs. Most of these graduates consider working at a highly professional and demanding environment such as the one SRC provided as a valuable experience to further their career prospects.

In keeping with its mission of providing affordable healthcare to low- and middle-income citizens, cost reduction is one of the major focus areas at SRC and practices to curb costs are similar to those followed at JSS. However, there are some important differences. First, the facilities at the hospital are more upscale, consistent with the target population. Similarly, the pricing policy of SRC reflects the higher levels of affordability of the middle class population. While the hospital is committed to providing care to the needy patients, the majority of the poor patients (low-income and below the poverty line) are enrolled in government-sponsored insurance schemes (MSBY) for those above the poverty line and RSBY for those below the poverty line. Taken together with its pricing and the standard rates approved by the government under its insurance scheme, the need for subsidy for the needy patients is somewhat modest and the hospital has been making modest profits since its inception. A representative pricing chart and some details of SRC’s financial performance can be found in the tables below.

Footnotes
1 There was a mega-budget hospital (Apollo) in Bilaspur that was known to offer high-quality but prohibitively expensive surgical care.
2 Dr Soni was son of a successful local, wealthy industrialist.
3 Govt. of Chhattisgarh, in their drive to improve the affordability, availability and accessibility of quality health care to every citizen of the state, has initiated Rashtriya Swasthaya Bima Yojana (RSBY) for the unorganized workers and Mukhyamantri Swasthaya Bima Yojana (MSBY) to provide protection to every uncovered household against the risk of health spending leading to poverty. The scheme is designed to provide health insurance coverage up to INR 30,000 to all the left out families not covered under Rashtriya Swasthaya Bima Yojana.
I. Facilities at SRC

- 75-bed hospital
- 45 general ward beds
- 12 air-conditioned private ward beds
- 12 ICU beds
- 6 dialysis beds
- 5 haemodialysis machines, peritoneal dialysis
- 24/7 trauma Unit (ICU-backup)
- Ventilators, infusion pump, defibrillator
- 2 advanced operating theatres
- Digital X-ray machine
- Ultra sonography/ 2D Echo/ ECG/TMT
- Labour room
- 24/7 medical shop
- 2 ambulances

Nurses  INR 10,000-12,000
Lab assistants  INR 15,000
Junior doctors  INR 10,000
MD  INR 80,000-90,000
Doctors  INR 300,000

II. Salary structure at SRC (per month in INR)

III. Income and Expenditure at SRC 2012–13

<table>
<thead>
<tr>
<th>Income in INR</th>
<th>Expenditure in INR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales of services 48,863,710.00</td>
<td>Purchase Accounts 14,482,521.00</td>
</tr>
<tr>
<td>Other Income 1,415,953.00</td>
<td>Administrative Expenses 25,194,656.85</td>
</tr>
<tr>
<td>Total Income INR 50,279,663.00</td>
<td>Financial Expenses 1,030,541.00</td>
</tr>
<tr>
<td></td>
<td>Depreciation 5,676,575.00</td>
</tr>
<tr>
<td></td>
<td>Total Expenditure INR 46,384,293.85</td>
</tr>
<tr>
<td></td>
<td>Profit INR 3,895,369.15</td>
</tr>
</tbody>
</table>

IV. Cost of 3 Index Surgeries at SRC

<table>
<thead>
<tr>
<th>Inguinal Hernia</th>
<th>Component</th>
<th>Number</th>
<th>Cost per unit (INR)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensocaine</td>
<td>1</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spinal Needle</td>
<td>1</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolene Mesh</td>
<td>1</td>
<td>1,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-0 Vicryl</td>
<td>3</td>
<td>383</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-0 Vicryl</td>
<td>1</td>
<td>383</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin Stapler</td>
<td>1</td>
<td>695</td>
<td>Alt: Ethilone 2-0 INR 113</td>
<td></td>
</tr>
<tr>
<td>Sterilized Gloves</td>
<td>4</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antibiotic</td>
<td>3</td>
<td>1,74</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Staff Needs</th>
<th>Number</th>
<th>Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgeon</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>OT assistant</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Anesthesiologist</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Charge to Patient</td>
<td>INR 18,000</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Laparotomy</th>
<th>Component</th>
<th>Number Needed</th>
<th>Cost per unit (INR)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensocaine</td>
<td>1</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spinal Needle</td>
<td>1</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-0 silk</td>
<td>2</td>
<td>94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-0 vicryl</td>
<td>2</td>
<td>383</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 catgut</td>
<td>1</td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-0 vicryl</td>
<td>1</td>
<td>383</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin Stapler</td>
<td>1</td>
<td>695</td>
<td>Alt: Ethilone 2-0 INR 113</td>
<td></td>
</tr>
<tr>
<td>Gloves</td>
<td>2</td>
<td>40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Staff Needs</th>
<th>Number</th>
<th>Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgeon</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>OT assistant</td>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td>Anesthesiologist</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>Anesthesia Assistant</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>Circulator</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>Charge to Patient</td>
<td>INR 30,000</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C-Section</th>
<th>Component</th>
<th>Number Needed</th>
<th>Cost per unit (INR)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensocaine</td>
<td>1</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spinal Needle</td>
<td>1</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-0 vicryl</td>
<td>1</td>
<td>113</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-0 ethilon</td>
<td>1</td>
<td>113</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 catgut</td>
<td>2</td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gloves</td>
<td>4</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#16 Foley</td>
<td>1</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dressing</td>
<td>1</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Staff Needs</th>
<th>Number</th>
<th>Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgeon</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Neonotologist</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Circulator</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Charge to Patient</td>
<td>INR 22,000</td>
<td></td>
</tr>
</tbody>
</table>

V. Profit & Loss Account for the Year Ending March 31, 2013

Profit INR 3,895,369.15