IPIHD International Partnership *for* Innovative Healthcare Delivery

Narayana Health

"Japanese companies reinvented the process of making cars. That's what we're doing in health care. What health care needs is process innovation, not product innovation."

–Devi Prasad Shetty, Founder and Chairman

Characteristics

Country	India Malaysia [coming soon] Cayman Islands [coming soon]
Target Population	General population
Geographical Reach	Multinational Urban Rural Suburban/peri-urban
Organization Type	Private for-profit

Form of Care

Primary care	Cancer
Secondary/tertiary care	Heart
Pediatrics	Chronic disease
Emergency care	Diabetes
Prevention	Nutrition
Maternal and child health	Eye care
Organ transplants	

Innovation Type

Right-skill the workforce
Standardize operating procedures
Leverage others' networks and assets
Use proven technologies disruptively
Open new revenue streams across sectors

Website   www.narayanahealth.org

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Description of Innovation

Narayana Health (NH) was founded by Dr. Devi Prasad Shetty in 2001 in Bangalore, India to provide high quality affordable cardiac care to masses. NH has since expanded into several cities in India, as well as Malaysia and the Cayman Islands, and is now one of the largest chains of multi-specialty hospitals in India, providing super specialty tertiary care in almost all specialties, medical, surgical, diagnostic, and support services.

The philanthropic commitment of the organization ensures that no one is turned away for a lack of funds. This is made possible through a cross-subsidy model in which patients can choose different levels of infrastructure according to affordability but the quality and uniformity of the clinical services is strictly maintained.

The success of the NH model is achieved through various mechanisms: leveraging the benefit of scale, assembly line concept for heart surgery, efficient delivery mechanisms, procurement economies, reducing the average length of stay for the benefit of both patients and the company, and re-engineering concepts (both design and material) to reduce the cost of ownership across the equipment life cycle and contribute to lowering capital costs. NH has expanded with a mix of greenfield hospitals and partnerships to lease and rent hospitals, and a mix of owned and leased equipment to reduce capital costs and expand

"When a corporate hospital is developed, they tell the employees, 'This is a hospital for the rich, but we take care of the poor, also. But this is a hospital for the poor, and we also take care of the rich. That is why we exist."

Devi Shetty, Founder and Chairman

The Iron Triangle of Health Care

Treatment is made available to all patients, regardless of ability to pay. Through technology and partnerships with other providers, NH increases **access** to diagnosis and care for populations across India and now also on other continents, even in the most remote regions.
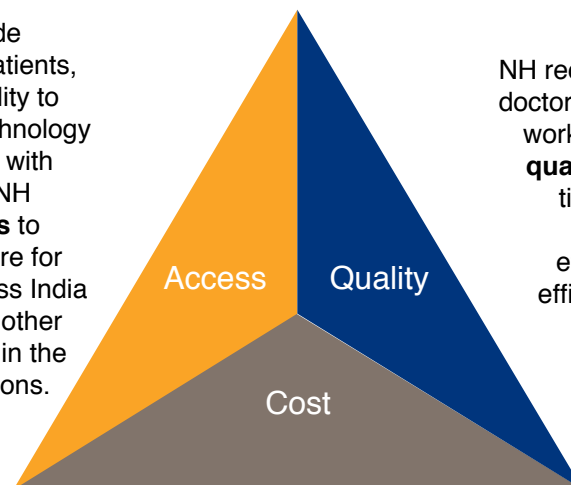
NH recruits world class doctors and healthcare workers and ensures **quality** through real-time monitoring of performance, effectiveness, and efficiency of service provision.

Access | Quality | Cost

Lean operating models, various innovative initiatives, and high patient volume decrease **costs**, allowing for rapid growth while serving all income segments.

quickly. With a pay-per-use model for medical equipment, NH has reduced capital costs significantly and thus is able to expand very quickly across locations. All these initiatives have helped to drastically decrease costs and increase accessibility for low-income populations.

Successful recruitment and training of world class doctors and healthcare workers, competitive compensation, and appropriately aligned performance incentives and rewards have increased labor productivity and decreased attrition. In addition to services at their own facilities, NH connects with existing hospital networks in other locations through telemedicine and tele-radiology technology, further increasing access to high quality care for low-income populations.

By combining innovative technology and a highly efficient delivery system, productivity is optimized, costs are minimized, and NH is able to increase capacity for tertiary healthcare in India. All NH hospitals are connected through a centralized cloud environment hosting all critical hospital applications and enabling central monitoring of transactions across all locations. A focus on operational efficiency strengthens NH's supply chain competitiveness, optimizing costs. Centralized purchasing allows NH to take advantage of economies of scale in procurement. Barcoding of inventory allows precise stock taking at any time, minimizing holding costs and releasing blocked working capital. All of these innovations result in an average cost of open-heart surgery at NH of $2,000 USD compared to between $20,000 and $100,000 in the United States.

Since the founding in 2001, NH has now has 6,000 beds in 18 hospitals, across 13 locations in India, including a Multispecialty Hospital and the Mazumdar-Shaw Cancer Center in Bangalore. NH plans to further increase capacity to 30,000 beds in the next 7 to 10 years. NH plans to expand their presence into all tier 1, tier 2, and tier 3 cities across India, with large 'health cities' in tier 1 cities and smaller, low-cost hospitals in tier 2 cities. In addition, NH will partner with existing hospitals in tier 2 and tier 3 cities to provide equipment, technology, and managerial expertise.

In keeping with the organization's vision of providing affordable healthcare worldwide, NH has also replicated in other countries. The organization is building a 140-bed tertiary-care hospital on Grand Cayman in the Cayman Islands, scheduled to open in early 2014, that will provide services in cardiac surgery, cardiology and orthopedics to patients from the United States, Caribbean, and other countries in the region. NH plans to expand this hospital to 2,000 beds over the course of the next decade. NH is also expanding into Malaysia with a 35-bed heart hospital (cardiac surgery and cardiology) early next year. NH already has a

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presence in Africa through its telemedicine program, serving 53 locations across Africa. Plans are underway to set up units in Africa in the near future.

Providing Value to the Patient, Community, and Health System

Evolving lifestyle and diet in India has caused an unprecedented increase in heart disease in the country. Incidence of heart disease is three times higher in India than in European countries and India alone accounts for approximately 45% of the world's incidence of coronary heart diseases, with this statistic projected to rise in the coming years. Cancer constitutes another major burden of disease as the second leading cause of death in India, with a rate of incidence projected to increase at 11% annually. The rising demand for cardiac and cancer care is compounding problems of access, especially for poor populations that face a lack of capacity in public hospitals but cannot afford private hospitals.

"In a country where most private hospitals cater to affluent patients – and public hospitals are so starved of funds they cannot attract doctors – Narayana has a clear focus on patients on the lower rungs of the economic ladder."

Amy Kazmin, Financial Times

The vision of NH is to provide "high quality healthcare with care and compassion at an affordable cost on a large scale." It is NH policy that no patient is turned away for inability to pay. Besides leveraging a cross-subsidy model and economies of scale to reduce costs, there are parallel philanthropic organizations, supported and created by NH. These trusts receive donations and help to subsidize the treatment of poor patients. Each year subsidized in-patient care is provided to more than 50% of NH patients, with an average discount of 15%. The organization developed a high volume, affordable model that incorporates economies of scale across a broad and growing hospital system, which enables it to provide these services profitably and sustainably.

NH has taken advantage of telemedicine and teleradiology innovations to dramatically increase access to services for remote populations, far from specialized care providers. NH believes that, a doctor need not be physically present to examine the patient and can treat through tele-consultation and video conferencing across a simple telephone line. Today, NH hosts one of the world's largest telemedicine network connecting 800 centers globally and has treated over 53,000 patients through the telemedicine programs.

The Narayana Teleradiology Division (NH Telrad 24/7) offers consultation services and preliminary and final diagnostic interpretations around the clock to Narayana hospitals and diagnostic centers that need extra support. NH Telrad 24/7 allows NH to keep up with patient flow, preventing delayed diagnoses and treatments. In addition, the NH Telrad 24/7 provides supportive diagnostic,

consultation, and treatment services to government, charity, and private health facilities working in partnership with NH. Telemedicine expands Narayana's outreach and awareness efforts and acts as an important triage service to NH health facilities.

NH further increases access using mobile outreach vans that bring diagnostic and consultation services to semi-urban and rural areas in order to increase awareness of health problems and prevention and treatment options.

Health System and Policy Context

India has one of the most privatized healthcare systems in the world. While public healthcare services are available with income-based subsidies and free services for the poorest households, they remain largely unpopular. Long waiting lines, insufficient stocks of free and affordable pharmaceuticals, and substandard facilities and care in public clinics cause the vast majority of the Indian populations to seek private healthcare options. However, the high cost in most of these facilities limits access for lower-income populations. An extremely low hospital bed, nurse, and doctor per population ratio further compounds this lack of access.

Healthcare is one of the major causes of bankruptcy and an estimated 20 million people in India fall below the poverty line every year due to health-related expenses. Although some form of health protection is provided by government and major private employers, health insurance schemes for the Indian public are generally basic, costly, and not widely available. The noticeable gap in access to affordable health care was the catalyst that inspired Dr. Devi Prasad Shetty to create NH as a multispeciality hospital system.

Recently, successful public-private partnerships with insurance schemes are slowly increasing the availability of insurance and making in-patient treatment increasingly affordable for disadvantaged populations. In fact, NH has partnered with the Karnataka government to pioneer a low-cost insurance scheme, the Yeshasvini Cooperative Farmers Health Care Scheme (Yeshasvini Scheme), now the world's largest self-funded micro-health insurance scheme covering more than 3 million people and their families. The Yeshasvini Scheme covers surgical procedures and outpatient care at a monthly premium of 18 INR (about 25 cents USD). The Government of Karnataka matches contributions and keeps implementation costs low by utilizing government infrastructure (e.g. post offices) for premium collection.

NH has worked closely with both federal and state governments in India to make healthcare more accessible and the government has been largely supportive of

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their endeavors. However, regulation imposes large duties on consumables such as heart valves and can delay the creation of new colleges to train doctors and nurses, which present barriers to the growth of NH. The organization has leveraged Dr. Shetty's international reputation to attract skilled clinicians and build a renowned center of excellence. The scale and model of NH operations is also attractive to young doctors: the high patient volume provides them tremendous experience in a short period of time, helping NH clinicians to excel in their domain.

Operating Model

NH submits profit and loss statements to all its administrators and doctors on a daily basis. Updates are sent via email or text message. NH believes that monthly P&Ls are a post mortem, whereas daily P&Ls are a diagnosis, helping to identify and address problems faster.

The operating model is designed with a tight focus on efficiency, costs, and quality and is proactive both in daily operations and longer-term expansion plans. NH consistently looks for ways to cut costs through technology innovation. For example, NH partners with Trimedx to service equipment beyond its usual lifespan, resulting in reduced capital expense and operating costs. NH has negotiated agreements with major medical equipment vendors to use expensive medical equipment on a pay-per-use model. NH was the first hospital in India to integrate all of its units (worldwide) through a cloud-based enterprise resource planning (ERP) system, allowing real time access to data across the group. This dramatically impacts the bottom-line, taking advantage of the pay per use concept and resulting in nil investment and maintenance costs.

NH's telemedicine services provide access to remote diagnosis, consultation, and treatment services for patients at 800 remote locations, allowing NH to reach new populations without capital expenditure. NH has served 53,000 cardiac patients for free through this facility. Coronary care units (CCUs) are set up in remote locations in India and are equipped with electrocardiogram (ECG) machines, video-conferencing, and technical staff. ECG images are scanned and transmitted to the hospital where a specialist diagnoses the condition and discuss it on video with the patient and physician. A decision can be made on whether or not the patient requires surgery, saving the cost of unnecessary hospital visits. This makes it possible for specialists to see many more patients.

Clear clinical procedures increase efficiency while ensuring high quality of care. A shift system for surgery creates an exponentially more efficient operating theater, resulting in more patient procedures completed per day, decreased costs through economies of scale, and increased access for low-income populations. High throughput in the operation theater is supported by ever-increasing facility capacity.

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High productivity and low attrition of NH staff result from strong investments in human capital recruitment, retention, and management. NH's social mission and leadership, as well as competitive compensation and incentives in line with other private hospitals, attract and retain a team of highly qualified cardiac surgeons and other tertiary care specialists from around the world. Surgeons receive fixed monthly salaries, rather than payment for each procedure, which is more typical in Indian private hospitals. NH is affiliated with training institutes for nurses and paramedics, ensuring a constant supply of well-trained healthcare professionals.

Profit and loss statements are updated daily and sent via email or text message to executives, allowing NH to identify and address capital flow issues as they arise, rather than discovering them weeks later. Data on the performance of individuals and departments is also monitored daily. NH designed a customer-centered complaints process in 2011 called PEARLS (Patient & Employee Ailment Resolution & Learning System) that provides a simple and powerful tool for monitoring and ongoing improvement. Employees or patients can call one number to log a complaint, maintenance request, or other issue, which is then sent directly via SMS to the caller and the heads of the relevant service departments. The service department addresses the problem and updates the status in PEARLS; an update is sent to the caller who determines if it has been satisfactorily addressed. If not, it is sent back to the service department. Response time is typically within 24 hours of a complaint, allowing PEARLS to solve a large number of complaints quickly. Since the system was established in 2011, more than 28,000 issues have been recorded and 99% have been solved.

NH is able to grow extensively because their innovative model of expansion does not tie down capital. Secondly, they can add new hospitals to the portfolio much more quickly because the civil infrastructure is already present.

With regard to expansion, NH adopts a two-pronged growth strategy: greenfield projects, in which NH constructs and manages an entire hospital unit, and brownfield projects, in which NH acquires existing hospitals. This model of leveraging existing infrastructure allows capital to remain available and decreases the time in which newer hospitals are established. NH plans to expand their presence into all tier 1, tier 2, and tier 3 cities across India by establishing large 'health city' campuses in tier 1 cities and smaller, low-cost hospitals in tier 2 cities. In addition, NH will partner with existing hospitals in tier 2 and tier 3 cities to provide equipment, technology, and managerial expertise.

Business Model

NH is a profitable organization and generates revenue using a fee-for-service model in which direct payment is made by the patient or health insurance scheme. Of the total revenue, 80% is generated from inpatient procedures, 10% from outpatient procedures, and 10% from remote consultants and diagnosis.

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"I believe charity is not scalable, irrespective of how wealthy you are. If you constantly do something for free, you will run out of money. You have to look at building business models that are sustainable."

Devi Shetty, Founder and Chairman

To allow for treatment regardless of ability to pay, NH uses a cross-subsidization system in which patients with more means partially subsidize the cost of services for those with less. This subsidization scheme remains sustainable because the full charge is still far below the cost of comparable services at other private hospitals, making Narayana an attractive option and increasing volume of paying patients. In addition, the strong philanthropic ideals and commitment of Narayana generate donations that support free or heavily subsidized treatments to patients from disadvantaged populations.

Impact Metrics

Quality metrics

- Quality audits & certification
- Joint Commission International (JCI), 2 accreditations
- National Accreditation Board for Hospitals and Healthcare Providers (NABH), 4 accreditations

Cost and sustainability metrics

- Daily profit and loss tracking and monitoring

Access and utilization metrics

- Monitoring of average length of stay (ALOS), occupancy, etc.

User satisfaction metrics

- Patient satisfaction surveys

Achievement of positive health outcomes

- Clinical outcome indices

Goals for Scaling and Replication

1. Increase bed capacity to 30,000 in 7 to 10 years
2. Expand to other countries and to smaller towns in India
3. Maintain or improve clinical outcomes

External Support Required for Scaling and Replication

1. Sharing challenges and best practices with similar innovators with the ultimate goal of reducing costs and making healthcare affordable for all
2. Introduction to business leaders
3. Mentoring and support

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Selected Media Attention and Awards

Press

Financial Times (March 21, 2013). Corporate Responsibility: From the Heart.
http://www.ft.com/intl/cms/s/0/6a049988-85ba-11e2-bed4-00144feabdc0.html#axzz2fvTfUFXa

Radio Cayman (April 3, 2013). Health City Cayman Islands: Building Opportunities for Caymanians.
http://www.radiocayman.gov.ky/health-city-cayman-islands-building-opportunities-for-caymanians

The Economist (2011). Innovation Award Winner, Business Processes: Devi Shetty.
http://www.economistconferences.co.uk/innovation/businessprocessawardwinner2011

HBS Case Study (June 22, 2005; updated August 5, 2011). Cardiac Care for the Poor

BBC (August 2, 2010). Production Line Heart Surgery.
http://www.bbc.co.uk/news/health-10837726

Knowledge@Wharton (July 1, 2010). Narayana Hrudayalaya: A Model for Accessible, Affordable Health Care?
http://knowledge.wharton.upenn.edu/india/article.cfm?articleid=4493

Wall Street Journal (November 25, 2009). The Henry Ford of Heart Surgery.
http://online.wsj.com/article/SB125875892887958111.html

Forbes (July 7, 2009). The World's Largest Heart Factory.
http://business.in.com/article/beyond-business/the-worlds-largest-heart-factory/1442/1

Awards

Financial Times ArcelorMittal Boldness in Business Award, Corporate Responsibility/ Environment (2013).
http://www.ft.com/intl/cms/s/0/34e70264-8668-11e2-ad73-00144feabdc0.html#axzz2fvTfUFXa

Best Hospital Awards 2010, by CNBC and ICICI Lombard Healthcare, for the category "Commendation for driving affordable and quality healthcare for all"
http://hca.moneycontrol.com/winners.php

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India Shining Star CSR Award, awarded by Shri Salman Khurshid, Honourable Union, Cabinet Minister for Water Resources and for Minority Affairs on 19th Feb, 2011

Included in Fast Companies' list of *World's 50 Most Innovative Companies* (2012)
http://www.fastcompany.com/3017477/most-innovative-companies-2012/36narayana-hrudayalaya-hospitals

Federation of Indian Chambers of Commerce and Industry (FICCI) Health Care Excellence Award for Addressing Industry Issues (2012)
http://pharmabiz.com/NewsDetails.aspx?aid=70906&sid=2

Frost & Sullivan India Healthcare Excellence Award for Healthcare Service Provider Company of the Year (Revenue between INR 500-1000 Cr) (2012)
http://www.frost.com/prod/servlet/summits-gsd.pag?as=attend&eventid=259937685

Dr. Devi Prasah Shetty, the founder of NH, has received numerous awards for his ongoing contributions towards healthcare, including:

- Rajyotsava Award (2002)
- Ernst & Young: Entrepreneur of the Year award (2003)
- Padmashree (2003)
- Dr. BC Rody Award (2004)
- The World Economic Forum Social Entrepreneurship Award (2005)
- NDTV Indian of the Year Award (2010)
- The Economist Award for Innovation in Business Process (2011)
- Padma Bhusan (2012)
- FICCI Health Excellence Lifetime Acheivement Award (2012)

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Narayana Health provided the source data for this document and is responsible for the accuracy of the content