

Indian telemedicine moves on to version 2.0

Bangalore-based start-up builds the world's first software application that streams live medical images onto mobile devices of specialists, finds Archana Rai

Bridging THE DIVIDE

i2iTeleSolutions and Narayana Netralaya make an effort to take sophisticated eye care solutions to underprivileged infants in rural areas. 3045 children screened so far, 323 treated.



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FOUR-month-old Tabassum is tearful; squishy liquids are being dropped into her eyes and bright lights shined onto them. Despite her very vocal discomfort, the doctors peering at the images of her retina played out on a computer screen in a Bangalore hospital are upbeat — the blood vessels growing out on her retina are progressing well, there is no danger now of the tiny infant going blind.

A premature baby, weighing less than 2,000 grams at birth, Tabassum is being screened by specialists using a software developed by a Bangalore-based start-up i2i TeleSolutions. The software links ophthalmologists at urban centres with patients in remote areas.

This is telemedicine 2.0, moving ahead from the earlier system of videoconferencing to live streaming of data and images onto the mobile phone of the doctor, says Sham Banerji, CEO of i2iTeleSolutions.

The company is partnering with Narayana Netralaya, a Bangalore-based ophthalmology centre, to pilot a series of initiatives to detect and treat retinopathy of prematurity (RoP) — a condition that affects nearly a tenth of the 27 million children born in India every year.

"Roughly if 100 critical cases are screened, 15-20% may require treatment to prevent blindness," says Dr Anand Vinekar, paediatric retinal surgeon, Narayana Netralaya, who has screened and treated nearly 3,000 babies over the past year using this new software.

In the 18 months since it was set up, i2i has fo-

cused on developing technology that allows data transfer of medical images from ophthalmology to sonography. Using this, specialists at partner hospitals such as MediScan Systems in Chennai can diagnose potential birth defects in foetuses by screening pregnant mothers within the first 13 weeks.

The Worldwide Telemedicine software and services market, which does not include healthcare devices, is expected to grow to \$2 billion in the next two years.

"Our focus is to lead in the fastest growing segments of this market — from tele-ophthalmology, to tele-cardiology, tele-sonography and mobile health," says Banerji, who leads a lean team of ten people in his start-up. With his team of co-founders, Banerji has put in a paid-up capital of \$600,000 to build the business over the past 18 months.

Industry experts say a growing shortage of medical specialists as well as rising incidence of disease in post-industrial societies is leading to this upsurge in demand for telemedicine, which includes both diagnosis and targeted treatment.

For instance, in India, which has the largest concentration of blind people in the world, there is one ophthalmologist for every 10,000 people. "The country is now experiencing the third epidemic of RoP with technology-driven healthcare emerging as the best option to arrest this," says Dr Vinekar.

To begin with, the hospital had a basic system where photo images of children affected with the condition were sent in as email attachments to specialists who in turn diagnosed the condition and re-



TECHNOLOGY NOW INCREASES THE SCALE OF IMPACT. I CAN VIEW IMAGES OF MORE PATIENTS, NUMBER OF DIAGNOSIS RISES RAPIDLY AND ALSO ALLOWS ME TO SOURCE SECOND OPINION IMMEDIATELY ON ANY OF MY CASES

DR ANAND VINEKAR
PAEDIATRIC RETINAL SURGEON, NARAYANA NETRALAYA

verted with no universal screening of all premature children.

"To prevent blindness, a child should be screened within 30 days of birth and treatment initiated within 48 hours of screening as RoP is a progressive condition," says Dr Vinekar.

Addressing this gap in the healthcare delivery system is expected to provide telemedicine companies with their largest market opportunity.

"Several technology drivers are making telemedicine a huge disruptive force in un-served or under-served regions of India. Together, they have the potential to provide access to good medical care without geographical constraints," says Vijay Govindarajan, professor of international business at the Tuck School of Business at Dartmouth, who has blogged about i2i's teleophthalmology solution on the Harvard Business Review blog.

Apart from the rapid growth of mobile phones in emerging markets, he also lists the evolution in technology platform from the older picture archiving and communication system (PACS) to a tele-PACS system that can help multiple specialists to simultaneously view and report on a single image, as the prime influences of this growing trend.

"Technology now increases the scale of impact. I can view images of more patients, number of diagnosis rises rapidly and also allows me to source second opinion immediately on any of my cases," says Dr Vinekar.

The i2i platform now requires a trained technician to take retinal photographs of the babies and upload them on the move to a secure remote server using a data card, from where they can be downloaded onto a phone or a regular computer to a specialist who diagnoses and provides corrective feedback within 15 minutes of the image being first uploaded.

"We built this software initially on the proprietary Apple platform for security and advanced graphical capability. We are looking to extend this to Android platforms now," says Banerji. His company has been approached by makers of Blackberry phones and Samsung to have these applications embedded on their devices as well, he adds.

Currently, this model has been adopted as part of the National Rural Health Mission (NRHM) in Karnataka and Tamil Nadu with primary health centres across 23 districts having this capability. For i2i, which is now looking to make this technology platform agnostic, the spurt in revenues from this model has been significant with average revenues now at \$150,000 every quarter.

"We have seen a huge revenue kick from the tele-ophthalmology and sonography solutions," says Banerji.

Across Indian hospitals alone, there are estimated to be at least 150 million medical images that need to be viewed and screened by specialists. "We estimate that less than 2% of these images are being viewed through the telemedicine route so the headroom for growth is immense," says Banerji, who is now looking to raise risk capital to expand the business.

Rapidly-expanding mobile phone networks is seen as one leg of the expansion for telemedicine, while a spurt in the use of hand-held medical devices with wireless capability could also drive this growth, say experts.

The recently-introduced hand-held ultrasound machine, VSCAN from GE, uses the same chip architecture that powers most smart phones," says professor Govindarajan in his blog. These devices will play a pivotal role in telemedicine, he says. For i2i, this expansion provides a threefold business opportunity.

"We will expand sales and marketing channels in India and select markets overseas and also focus on technology for mobile healthcare access and delivery," says Banerji, who also expects his company to proactively engage in driving rural healthcare through public-private partnerships such as the current engagement with India's rural health mission.

For patients, now the doctor need not be present in person before they receive an expert diagnosis.

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