

Sanjay Prakash Sood of the Centre for Electronics Design & Technology of India describes how new communications technology is currently driving the healthcare industry forward in Asia.

## TELEMEDICINE ON THE RIGHT TRACK IN INDIA

IMAGINE THESE TWO SCENES. IN ONE, HEART SURGERY IS BEING performed using da Vinci, a revolutionary breakthrough in endoscopic cardiac surgery in favour of the patient. It simplifies heart surgery, ensures minor incisions, reduces pain and enables a far speedier recovery. Also called minimally invasive surgery or intuitive surgery, da Vinci is a state-of-the-art system and is the first operative surgical system in the world cleared by the FDA.

In the second scenario, a traditional (non-qualified) birth attendant is managing a childbirth in less hygienic conditions, eventually leading to a maternal mortality rate of 400 per 100,000 deliveries.

The level and standard of the healthcare to the patient in the two scenes depicted above is radically different. It is amazing to believe that they are both taken from real life and present day healthcare services available in the same country, 300km apart in the north of India.

Scene one is a recent trend at the Escorts Heart Institute and Research Centre in New Delhi. The second scene describes a scene quite common during child births in the states of Himachal Pradesh (with a literacy rate of around 78 per cent), Uttar Pradesh and Bihar, to name just a few. Within India itself, a wide gap exists, as far as healthcare infrastructure is concerned.

### Telemedicine is a promising option

For an average practising Indian doctor, the meaning of terms such as telehealth and e-health are not very clear – strangely enough though, ‘telemedicine’ is a relatively friendly term. No doubt telemedicine has not yet come to maturity in India. The Indian Government has responded to the need of this technological marvel primarily through the department of information technology in the Ministry of Communications and Information Technology and the Indian Space Research Organisation (ISRO), India’s space agency. The two are flag-bearer organisations as far as the efforts to wire the healthcare delivery systems across the country are concerned. Pilot projects are currently underway.



Telemedicine can help highly skilled healthcare workers to share information with colleagues based outside their cities

Pilots are aiming to initiate teleconsultation among tertiary level hospitals as well as connecting remote hospitals with those that have specialised medical care facilities. Connectivity through video conferencing for tele-education is one of the prime applications of telemedicine being given due consideration in various telemedicine programmes.

The Indian software and services industry has already created a place for itself in the international market by providing high-quality solutions to the world. Digital signatures, e-learning, smart cards and e-governance are among the areas of interest for the Indian Ministry of Communications and Information Technology. Nanotechnology, molecular computing, soft-computing and biometrics are also being explored.

In March 2002, India had the largest telecom networks in Asia, comprising of 35,023 exchanges with around 45 million fixed line telephones. Over seven million cellular phone subscribers are using the mobile communications networks in the country.

This has promoted the concept of distance learning and digital libraries, while along similar lines, a project titled Gyan Vahini is being planned where 95 medical colleges and 27 dental colleges will have intranet and internet access, as well as a campus-wide network of 100Mbps on optical fibre.

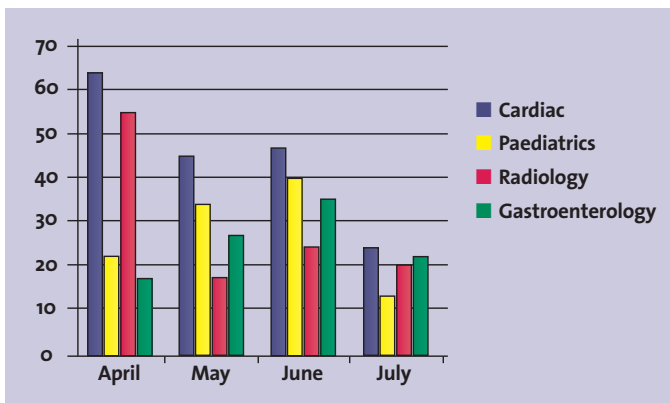


Figure 1: Specialty breakdown of the number of cases consulted from Aragonda – through the Apollo Telemedicine Network

### Government initiatives

A maiden telemedicine pilot is linking three tertiary level hospitals, forming a dedicated network through ISDN lines for the specialties of radiology, cardiology and pathology. The technology will flow down to the peripheral level as well. Efforts of the Department of Information Technology, the Ministry of Communications and Information Technology and the Indian Government have created two indigenously developed integrated telemedicine software packages.

Titled Sanjeevani (developed by the Centre for Electronic Design & Technology of India at Mohali) and Mercury (developed by the Centre for Development of Advanced Computing at Pune), both these packages perfectly complement each other. ISRO's joint effort in 2000 with the Apollo Group of hospitals has provided a 50-bed Apollo hospital at Aragonda village with a satellite link to the Apollo hospital at Chennai (formerly Madras) through VSAT. ISRO has been instrumental in providing the telemedicine services to the isolated communities in the country.

### Telemedicine at a corporate level

Among the pioneers in telemedicine service providers at a corporate level are Escorts Heart Institute and Research

Centre and Escorts Heart Alert Service (EHAS) in and around New Delhi. Escorts, a premier super-specialty clinic, started a trans-telephonic ECG service to the people of the capital, against a nominal payment. The Telemedicine Technologies Centre at Mumbai has been providing the telemedicine services to those in India seeking a second opinion from experts in the USA to save time and money, as well as offering expert medical services to those in Bangladesh.

### Telemedicine in action

Telemedicine was seen in action within 24 hours of the devastating earthquake in January 2001 in Bhuj in the state of Gujarat (Western India). The Ahmedabad-based Online Telemedicine Research Institute (OTRI) provided telemedicine links for teleconsultation in pathology, radiology and cardiology between Bhuj and the surrounding hospitals. Over 750 sessions were established in a period of 30 days.

OTRI again contributed through telemedicine during the Hindu festival of Kumbh Mela, which drew over 25 million pilgrims to the banks of the river Ganges for the holy dip. OTRI transferred data (cardiology and radiology) for more than 200 ailing pilgrims and sent microscope images of micro-organisms to monitor the levels of cholera-causing bacteria in the river water. Both these projects, with proven benefits at large scale, have acted as a catalyst for the growth of telemedicine in the country.

Two non-profit organisations of South India – Sankara Netharalaya (Chennai) and Narayana Hrudayalaya (Bangalore) – are actively into teleophthalmology and telecardiology, respectively, as well as tele-education and video-conferencing.

Meanwhile, the Apollo group of hospitals is actively expanding its Apollo Telemedicine Network across the length and breadth of the country by using ISDN and ISRO's VSAT connectivity. Apollo has networked over a dozen far-flung hospitals, and the company is also tying up with groups in neighbouring countries in the Indian sub-continent for delivery of medical expertise to the less privileged.

On top of this, web-based telemedicine solutions are gaining popularity owing to internet's low cost and widespread availability. Doctoranywhere.com is India's first ISO 9002-certified telemedicine company. The subscription to such web-based services is now touching 3000.

### Changing the healthcare delivery system

Indian telemedicine programmes are isolated, but synergy among the medical institutes, hospitals, telemedicine programmes and NGOs can change the complexion of the healthcare delivery system. In 2004, ISRO plans to launch a dedicated satellite for Indian healthcare applications. Over a dozen secondary level hospitals in the government and corporate sector at a national level are working towards computerised hospital information systems, which is a stepping stone towards a networked healthcare delivery system regionally or nationally.

Correctional telemedicine is yet to be born, although a study was carried out to evaluate the benefits of correctional telemedicine in Chandigarh. The findings of the study hint at significant cost savings. Technologists and engineers are leading this digital revolution, but it will eventually be taken over by the Health and Family Welfare Ministry of India to make it reach the masses at the earliest possible opportunity. Some obstacles need to be overcome before this happens though. These include:

- Lack of health infrastructure and services
- Shortage of computer-savvy healthcare personnel
- Outflow of doctors – there are about 60,000 and 35,000 Indian doctors in the USA and UK, respectively
- Lack of training facilities with regard to the application of information and communication technology in medicine – terms like HIS, RIS and PACS are still unheard of by many in the healthcare community
- Virtually no exposure to the applications of computers and communications technologies in the curricula of medical colleges
- Poor quality of communication services in most of the cities, which are otherwise all set to improve

**Table 1: Teleconsultations from January 2000 to June 2002 on Apollo's telemedicine Network**

Specialty	Total no. of consultations	Patients treated in consultancy centres	Patients referred to speciality centres
Cardiology	675	568	107
Paediatrics	503	427	76
Nephrology/urology	324	285	39
Endocrinology	275	248	27
Radiology	416	358	58
Pulmonology	158	136	22
Dermatology	306	268	38
Gastroenterology	297	248	49
Gynaecology	278	227	51
General surgery	187	151	36
Ent.	299	246	53
Orthopaedics	268	233	35
<b>Total</b>	<b>3986</b>	<b>3395</b>	<b>591</b>

In India, the IT applications in healthcare are on a progressive track. A chance for a possible revolution has dropped off slightly, but the average man or woman can still hope for an evolution of the healthcare delivery system. This evolution may eventually lead to a strong networked healthcare delivery system in the country. Nevertheless, the field is wide open and clear for India to pursue low-cost solutions on rural telemedicine even more assertively, especially when all the ingredients for the set-up are available inland. This technology has great potential for serving the ocean of humanity in rural India, but the efforts must be synergised. ○

#### ABOUT THE AUTHOR:

Sanjay Prakash Sood coordinates the telemedicine project at the Centre for Electronics Design & Technology of India at SAS Nagar. He is one among the pioneers of telemedicine in India.