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Informatics in clinical practice in developing countries: still early days

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Tamil Nadu will soon become the first state in India to provide telemedicine in the public sector when the local hospital in Thiruvallur is connected to the Chennai Medical College (about 40 km away) through an integrated services digital network (ISDN) line and linked terminals. Tamil Nadu cannot yet connect every district and taluk hospital to the nearest medical college because the ISDN facility is not available in many places outside Chennai. This reflects misplaced priorities in a country which has developed technologies for launching missiles and satellites and for producing nuclear bombs; provides cellular telephones, colour televisions, and luxury cars for the rich; and sends thousands of computer professionals to the United States every year. The story is the same everywhere in the developing world.

Summary points

Developing countries can benefit the most from informatics and telemedicine, but they have the least access to these technologies

Despite growing interest in informatics and telemedicine, developing countries have not made much progress

Inadequate access to technology, inadequate investment in health care, and misplaced priorities have hindered developments

In the absence of deliberate government policy, new technologies will benefit only the rich

Priority must be given to establishing the infrastructure for health care as technology alone can be counterproductive

Inadequate access to technology

Inadequate access to technology, especially computers and telecommunications, is a key factor in the inability of developing countries to take advantage of progress in delivering health care. Most developing countries do not have the necessary infrastructure—the computer terminals, networks, communication channels, and bandwidth. This is not surprising when we consider that the income of the richest 20% of the world's population, which enjoys 83% of the world's income, is 80 times greater than that of the poorest 20%.¹ In developing countries as a whole, 3.9% of the population have a telephone line, 0.7% have a computer, and 0.05% have access to the internet.² According to Bruce Girard, former director of Latin America's community radio, Pulsar, 95% of all computers in the world are in the developed nations. In many African countries fewer than 0.5% of people have a telephone line (table).³ In India, the proportion is 1.9%, compared with over 60% in the United States, Sweden, Switzerland, Norway, Denmark, and Canada. The *Human Development Report 1997* tells us that in Australia one person in five owns a personal computer; in India the proportion is only one in 1000. There is an average of one fax machine for every 30 people in industrialised countries, but in developing countries, one fax machine serves more than 1000 people. A Swiss person spends an average of four hours a year on

international phone calls compared with 60 seconds for a Chinese and 12 seconds for an Ethiopian. For every person who logs on to the internet in developing countries there are 149 people logging on in the industrialised world. In mid-1998, the United States, with less than 5% of the world's population, had more than 50% of the world's internet users.⁴ In contrast, South Asia, home to 20% of humanity, accounted for less than 1% of internet users.

The simple truth is that the information and communication revolutions have not yet touched millions of people in the developing world. These people continue to be the "have nots" and the "know nots" and risk being left behind always. In one of the greatest achievements of the century, we got rid of apartheid based on skin colour, but we are now facing the emergence of apartheid founded on access (or lack of it) to information.⁵

Investment on health

Most developing countries invest very little in health care. In 1990-7, rich countries spent more than \$2500 (£1500) per capita on health—about 10% of their gross domestic product. However, low income countries spent barely \$15 (£9) per capita. This was 4.5% of their very low gross domestic product, and just above the estimated \$12 (£7) a year needed to secure the

Availability of telephone lines in selected countries³

Country	Population in 1998 (millions)	Gross domestic product per capita in 1997 (US\$)	Main telephone lines, 1998 (thousands)	
			No	Per 100 inhabitants
Angola	12.09	1 684	72.2	0.60
Burkina Faso	11.31	199	41.6	0.37
Ghana	19.16	372	105.5*	0.57
Madagascar	16.36	224	43.2*	0.27
Uganda	20.55	317	54.1	0.26
Mali	10.69	231	26.8	0.25
Myanmar	44.50	3 856	213.5*	0.48
India	982.22	384	17 808	1.86
China	1255.70	734	70 310*	5.62
Canada	30.30	20 608	18 637*	62.11
United States	270.37	30 173	172 452*	64.37

*1971 data.



Low earth orbit (LEO) satellite produced by SATELLIFE. This version is called HealthSat-2

minimum preventive and essential clinical services. Even Latin America spends far more (\$274 (£164)) than the meagre \$16 (£9.50) in South Asia, \$34 (£20) in sub-Saharan Africa, \$18 (£10.50) in India, and \$19 (£11) in China. People living in remote areas in developing countries have little or no access to medical and healthcare services. The nearest hospital or clinic is hours or even days away. There is a severe shortage of medicines and of healthcare professionals—especially specialists.

Need for better communication

The combination of inadequate investment in health care and a poor communications infrastructure can be deadly. Poor health care can result from a lack of good information. Decisions may be based on outdated information. Research may be repetitive or plain irrelevant. According to Dr Gottlieb Monekosso, director of the World Health Organisation's regional office in Africa, "Establishing reliable communications may be one of the most important priorities for improving health care in Africa."⁶ This statement applies to other developing regions as well.

Use of informatics

To be fair, conscientious doctors and organisations in many developing countries have tried to use informatics as much as they can. For example, the neurosurgery department at the King Edward Memorial Hospital in Mumbai has maintained an electronic patient records system since 1957, thanks to the foresight of its founders, neurosurgeon Homi Dastur and neurologist Anil Desai. Amrita Institute of Medical Sciences in Kochi in the southern Indian state of Kerala has established India's first filmless hospital, where all radiology images are stored in computer image archives and are available on any of the computers located within the institute. Last year, Sri Ramachandra Medical College in Chennai, India, was linked to Toronto's Hospital for Sick Children in Ontario, Canada. This enabled doctors in the two hospitals to share their expertise in performing open heart surgery on infants and young children on a real time basis through an internet/video link via satellite.⁷

Success stories

In what became a major public health success story in recent times, information technology played a key role in

combating malaria in West Africa. The multinational effort mobilised sensors, telephone lines, satellites, and computers for the surveillance and tracking of the hazardous black fly larvae along the Volta river, which meanders through 11 countries. When the highly contagious and fatal Ebola disease hit the Democratic Republic of Congo, information technology helped fast access to medical expertise to deal with the disaster. In Latin America, satellite links between hospitals in Mexico City and 10 rural hospitals in the province of Chiapas have reduced needless referrals to specialists by 60%. The use of the internet to save lives of patients in countries ranging from China to Turkey has formed the stuff of many stories in newspapers and magazines.⁸

Telemedicine projects

Increased use of informatics and telemedicine can benefit the developing countries a great deal, but for now they have to be satisfied with a few sporadic examples, such as the many telemedicine projects launched around the world.⁸ The first of the telemedicine projects sponsored by the International Telecommunication Union was launched in Mozambique in January 1998. This was followed by projects in Malta (March 1998) and Myanmar (April 1998), and a few others. The International Telecommunication Union has also sponsored two symposia on telemedicine for developing countries—one in Portugal (1997) and another in Argentina (1999).^{8,9} The WHO has incorporated telematics as a major tool in its Health for All strategy. But, as always, the proof of the pudding is in the eating—that is, the actual spread and proper use of telemedicine in these countries. Often, there is the real threat that new technologies will benefit only the rich and will have no impact on the poor. For example, cardiologists in Amman now receive and diagnose electrocardiographic data via satellite, land lines, and the internet from medical centres, corporations, hotels, holiday resorts, and even the Royal Jordanian Airlines.⁶ In contrast, the HealthNet email service in Nepal concentrates on simple telemedicine solutions involving low cost personal computers and basic, text based email. In a country with scarce medical expertise and an unevenly distributed population, that is the right thing to do.

Satellite

Agencies are trying to make a difference. SatelLife, is a non-commercial organisation, based in Massachusetts, USA, that provides free store and forward messaging services for developing countries via a low earth orbiting satellite called HealthSat-2. The HealthNet project of SatelLife, funded by the International Development Research Centre of Canada and others, for example, connects health professionals in 21 countries in Africa (Botswana, Burkina Faso, Cameroon, Congo, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Kenya, Malawi, Mali, Mozambique, Nigeria, South Africa, Senegal, Sierra Leone, Sudan, Tanzania, Uganda, and Zimbabwe); five countries in Asia (China, Indonesia, Myanmar, Nepal, and the Philippines); Bolivia; and Haiti.¹⁰ The HealthNet email service distributes *AIDS Newsletter* and provides summaries of published reports, expert commentary, event information, and community discussion facilities in numerous forums like the cardiovascular health forum ProCOR, in which health professionals in 51 countries participate. Burns surgeons in Mozambique, Tanzania, and Uganda have used the network to consult with one another on surgical techniques.

Midjan Group

The Midjan Group comprises experts from the telecommunications sector, telemedicine institutes, ministries of health, manufacturers and equipment suppliers, universities, and hospitals, who share the common objective of promoting telemedicine applications in developing countries.¹¹ It provides European telemedicine services to countries like Senegal and South Africa.

There have also been a few examples of information technology in use, such as the one in South Korea connecting hospitals in fishing and farming villages to university hospitals in Seoul.

One other use of informatics in no way advances medical practice in the developing countries. This is the rapid growth of medical transcription centres in countries like India.

Limiting factors

The bottom line is that developing countries, which can benefit the most from the use of informatics and telemedicine, are the ones that have the least access to them. Despite growing interest in telemedicine and medical informatics in these countries, issues of affordability, cost effectiveness, and sustainability remain to be addressed. In clinical practice, informatics is useful in four fields—electronic patient records, telemedicine, clinical decision systems, and improving access to information. But it has its limitations. Enrico Coiera has pointed out that medicine, more than other professions, is culture specific and depends to a very large extent on the social context within which the practitioner and the patient interact.¹² The dialogue between the patient and the doctor takes place in a combination of natural language and gestures, and in an atmosphere of interpersonal understanding. Hence, it cannot be reduced easily to transmission by mere computers. In any case, telemedicine and other applications of information technology in medicine cannot replace the basic health infrastructure. Email is no sub-

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Developing countries still need to have enough doctors, clinics, and hospitals. Only in combination with such an infrastructure can informatics make a difference. It is all too easy to put the technology cart before the basic priorities horse.

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- 1 Editor's choice: the champagne glass of world poverty. *BMJ* 1999;318: frontispiece.
- 2 United Nations Development Program. *Human development report 1998*. New York: Oxford University Press, 1999:167, 193. (Human development indicators, tables 17 and 34.)
- 3 International Telecommunication Union. Table of basic indicators. www.itu.int/tbi/industryoverview/at_glance/basic.pdf (accessed March 1999).
- 4 United Nations Development Program. *Human development report 1999*. New York: Oxford University Press, 1999:62.
- 5 Arunachalam S. Information and knowledge in the age of electronic communication: a developing country perspective. *J Inform Sci* 1999;25:427-38.
- 6 Rao M. Internet is emerging as key component of telemedicine infrastructure. [*Indialine net.columns* July 16, 1999]. www.indialine.com/net.columns/index.html (accessed 23 July 1999).
- 7 Tele-link for tele-surgery. <http://voiceindia.com/jun98/snap.html> (accessed 2 July 1999).
- 8 International Telecommunication Union news page on the first and second telemedicine symposia for the developing countries and the Midjan Group. www.itu.int/ITU-D-Tech/Telemedicine/Telem-en.htm (accessed on 23 July 1999).
- 9 International Telecommunication Union. World telemedicine symposium for developing countries, Portugal, 30 June-4 July 1997. www.itu.int/ITU-D-HRD/hrdevents/telemed/secondsymp.htm (accessed 20 August 1999).
- 10 SatelLife. www.healthnet.org/index.html (accessed 20 August 1999).
- 11 Inmarsat and telemedicine. www.inmarsat.org/newsroom/telemed/midjan.html; www.ehto.be/midjan (accessed 20 August 1999).
- 12 Coiera E. *Guide to medical informatics, the internet and telemedicine*. London: Chapman and Hall Medical, 1998.