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REVIEW

Convergence E-Health Services Under a Unified National Health Grid for India

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ABSTRACT

Though the budgeting for health has increased in recent times and we see a robust network of quality public and private health centres across the nation, the budgeting for e-Health technologies have not received the Indian health planner's adequate attention. The heart of e-Health efforts should be an efficient mobile based short messaging network which is very much available at a common man's price. A back up network of call centres like Project M of Africa will not be difficult for a nation that provides call centre back -up and technologies to the world. Convergence E-Health Services under a Unified National Health Grid hold good prospects for a big overpopulated country like India, with a poor and inefficient health infrastructure.

Keywords and Phrases: Broadband internet, SMS, mobile telephony, e Health grid, Internet and Communication technology (ICT) for Health.

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Introduction

Though the budgeting for health has increased in recent times and we see a robust network of quality public and private health centres across the nation, the budgeting for e-Health grid technologies have not received the Indian health planner's adequate attention [1]. Consequently, convergence

technology derived health benefits have not yet reached the poorest and the rural Indians who lack access to hospital care by the modern medicine doctors because of the vastness of the country and the uncontrolled population explosion in spite of the significant Internet and communication technology (ICT) progress made by India [1], [2]

e-Health Initiatives in America

The American Federal Communication Commission's rural project based on e-Health grid initiatives supports the connection of more than 6,000 public and non-profit health care providers nationwide to broadband tele-health networks. [3]. The basic health care facilities networked by the commission are hospitals, clinics, universities and research centres, behavioural health sites, correctional facility

clinics and community health centers [1], [2], [3]. Telehealth and telemedicine services provide patients in rural areas with access to critically needed medical specialists in a variety of practices including cardiology, paediatrics and radiology and in some instances, without leaving their homes or communities [1], [2], [3]. Intensive care doctors and nurses can monitor critically-ill patients around the clock and video conferencing allows specialists and mental health professionals to care for patients in different rural locations, often hundreds of miles away. Similar e-Health care grid initiatives have been reported in Australia, Europe, Canada and Uganda [1], [2], [3]. This article focuses on the various information and communication technology (ICT) led developments that have revolutionized the face of health care provisioning all over the world. We also envisage a futuristic health grid model for taking care of the masses of the Indian population who do not have access to rudimentary health care.

India has to think of making its planners go the ICT way for creating awareness, for providing adequate resources for the introduction of ICT, for providing curative services and for the referral of tele-health services. The convergence of e-Health services with the traditional health services under a unified national health grid will be the only solution to cover the vast tracts of India where doctors do not exist or are unable to provide efficient care [1],[2],[3].

Working Smarter, not Harder for Rural Health Provisioning

Similar exemplary tele-health broad band and telephonic networking efforts are needed to be made to supplement traditional health caring in public health centres and the centres of health caring excellence in India and other developing world nations which have mal-distribution of medical manpower, in order to dispel the health care provider shortages [2]. Indian governmental spending has increased on health care provisioning in

the recent times and we see a robust network of public health centres across the nation catering to the public [2]. Good bandwidth is now available in India and seamless interconnectivity is now possible across the country, though in the area of broadband, India has a lot of catching up to do. The advent of text messaging has made possible new forms of interaction which were not possible before. Thus, Short Messaging Services on the mobiles or SMS is hugely popular in India, where youngsters often exchange lots of text messages and companies provide alerts, infotainment, news, cricket scores update, railway/airline booking, mobile billing and banking services on SMS [1], [2], [3].

Providing More Broad Band for Better Health

Internet connections are increasing the flow of health care services and information, spurring innovation in the health networks and in the applications that travel through the networks. We are seeing the emergence of a new opportunity, a communications and information infrastructure that has the potential to advance the economical and social well-being of all countries and all people in spite of poor GDP. The World Bank estimates that a 10-percentage-point increase in broadband penetration corresponds to a 1.2-percentage-point increase in GDP in developed countries and even higher increases in the developing world [1], [3].

Digital and Mobile Networks

The ICT revolution is being driven by two powerful technological forces which also operate in the field of Healthcare provisioning: first, digital -- including the dramatic growth of the Internet and IP-based networks of health -- and second, the mobile networks largely used for social contact. The socio-economic growth from ICT has now extended to personal finance and millions are now accessing banks through their cell phones; farmers are said to earn more, while consumers pay less as a result of ICT-

related efficiencies [1],[3]. In addition to fostering socio-economic health, we see the potential of broadband in fostering physical health -- bringing medical expertise and information further and faster than previously thought possible in far flung inaccessible regions of the world. We see the potential of broadband in improving education -- connecting students and teachers from different villages, cities, even countries. We see the potential of broadband in improving responses to disasters and emergencies [1], [2], [3].

ICT Is Needed To Manage the Health Care Providers and Educators

Today, many Public funded hospitals are set up under the national Rural Health Mission [3] and many medical dental college hospitals across India provide health services efficiently. But all efforts seem to be in isolation for a country whose engineers provide cost effective electronic networks for the developing world and provide health care workers for the western nations. There seems to be darkness in the health care connectivity scenario as well as in efficient health care provisioning, both in the private as well as public health sectors of India [2], [4].

As a nation, renewed honest effort should be made by Indian government to implement Information and communication technology for health care provisioning of the India's poor without access to health services. It is believed that broadband is the future of mobile, and also that mobile is a key part of the strategy for broadband [3], [4], [5].

Messaging Network for Participatory Health

India's robust telecom infrastructure is the result of a controlled and phased growth which is coupled with strong policies. Today, most people have a mobile connection in most of the urban areas of India and many parts of rural India are covered by an efficient communications

network. The Indian mobile market continues to expand with regular new entrants [4],[5],[6]. Most of the middle class of India have email ids and use the internet regularly for education, scientific research and collaboration. The SMS or short messaging service is a very popular method of networking across the classes and has been put to efficient uses for social networking, product marketing, etc. We strongly believe that the SMS technology, being simple, has facilitated the development and the growth of efficient text messaging and may be useful in spreading health awareness, health education and health promotion in any nation. But efforts have not been made towards the spreading of health care awareness or health education. In short, there is ample scope for the use of this cheap technology to reach out to the masses and to request their support in health care provisioning for a healthy nation. Ideally people should participate in their health empowerment. It is also a corporate social responsibility of various corporates involved in the ICT business to empower Indians in e-Health. [4],[5],[6]

Unified National Health Hotline and Messaging grids like the Global Public Health Intelligence Network

(GPHIN), [7], developed by Health Canada in collaboration with WHO, have served as a secure Internet-based multilingual early-warning tool that continuously searches global media sources such as news wires and web sites to identify information about disease outbreaks and other events of potential international public health concern. Similar Health care hotlines as a concept are yet to arrive in the Indian society, in spite of the advances in ICT here. ⁷We envisage a network which is very similar to the above dedicated service providers under the Health ministry and the Home ministry, which can incorporate state level and district level health hotlines and messaging networks and also sub-district and city level health

telephonic hotlines and messaging networks. Similar networks do exist already, with regards to the home department gathering intelligence about the society, including health at both the national and state levels [7], [8], [9].

The Role of the Cable Based Internet

Today, Indian citizens have access to the television (TV) and Indian TV channels have been very innovative with regards to the health needs of the society and have often initiated several national health debates and often carry free health related advertisements. The overall concept of health messaging through the electronic media including the radio has been successfully employed in India. However, the Indian Cable network has to be modulated to suit social or health messaging, but still these media have a lot of potential apart from providing internet access to villages.¹⁰

Unified National Health Grid

A **networked** Indian health care system under the leadership of the Indian Medical Association, All India MD/MS/DNB Doctors Association, the Qualified Medical Practitioners Association, the Homeopathic and Ayurvedic doctors associations, the Indian Medical Council, the Indian Dental Council and the Nursing council, as well as dental nursing, physiotherapy professional associations and all health sciences universities across India, can do wonders for the patient e-Health caring. Such an e-Health grid should be accessible to all patients and should reduce the inefficiencies within the health care delivery services of India [10], [11].

Even another second health grid can also be envisaged and an online network using the SMS technology to reach all the health care providers including the unqualified practitioners should be attempted for redundancy in health networking. Fjeldsoe et al have recently published a review of

research which examines the application of SMS for various health behaviour change interventions [11]. A large number of studies were published last year (2008) which reported on the developmental work of SMS programs or on SMS trials that were in progress, which indicates that research into the health behaviour change via SMS is increasing. They found that most of the studies which were conducted to date (10/14 studies) had focused on the management of chronic diseases, predominantly using SMS as a reminder service to increase the adherence to treatment programs among sick individuals (i.e. blood glucose monitoring among diabetic patients). Less than half of the studies (4/14 studies) had focused on promoting preventive behaviours to healthy individuals (i.e. smoking cessation or healthy nutrition). Some researchers [12] found statistically significant, positive changes in behaviour in more than half of the studies (8/14 studies). These are said to be promising results for the future of SMS in health behaviour change research [11], [13], [14].

Project Masiluleke (“to give wise counsel” and “lend a helping hand” in Zulu),¹⁵ or Project M, is designed as a 3 stage test to assess the ability of mobile technology to help reverse the HIV/AIDS and tuberculosis crises in South Africa and across the continent. The goal is to connect citizens nationwide to critical health-related information, as well as lifesaving HIV and TB resources. The first stage of the project uses “Please Call Me,” or PCM, text messages - a special, free form of SMS which is widely used in South Africa and across the continent - to deliver approximately 1 million HIV/AIDS and tuberculosis (TB) messages each day for one year to the general public. The messages connect mobile users to existing HIV and TB call centers where trained operators provide the callers with accurate healthcare information, counseling and referrals to local HIV and TB testing clinics. After three weeks of beta testing, Project M had reportedly helped triple the average daily

call volume to the National AIDS Helpline in Johannesburg.

To handle this surge in calls, Project M uses virtual call centers where existing help-lines will be augmented by teams of highly-trained, highly-adherent HIV+ patients who will field questions via their mobile devices from the general public. These peer counselors will be closely vetted, trained and will represent “gold-star” patients - extremely knowledgeable about their illness, diligent about their treatment regimen and intimately familiar with the weight of an HIV+ diagnosis. These virtual call centers truly hold the potential to create hundreds of new jobs and to considerably increase the capacity of South Africa’s health system. We don’t see any reasons for not incorporating similar initiatives in India or world wide. With the possible philanthropic help of various corporates and ICT leaders like Nandan Nilekani, Sudha Narayanmurthy, Azim Premji and others we can do better than Project M even here[16], [17],[18].

“Please Call Me” x 1 Million x 365 for India

The first stage of the project for Project M built around the use of specialized text messages, delivers approximately 1,000,000 HIV/AIDS and TB messages each day, for one year, to the general public. These messages were broadcast in the unused space of “Please Call Me” (PCM) text messages – a special, free form of SMS text widely used in South Africa and across the continent. Utilizing technology from the Praekelt Foundation, message content from iTeach, design insights from frog design, and network capacity donated by MTN, the messages are known to help connect mobile users to existing HIV and TB call centers. Trained operators provide callers with accurate healthcare information, counseling and referrals to local testing clinics. Within its first months, this service sent out over 300 million messages, helping triple the average daily call volume to the National

AIDS Helpline in Johannesburg. Similar efforts can help India. A more robust HIV project and National AIDS Control Organisation can help India in developing such a 24x7 SMS based ‘please call me’ network [15].

New ICT Weapons to Defeat Paediatric Diseases

Health-e-Child was started in January 2006 as an integrated project of the 6th Framework Programme of the European Commission and is now delivering revolutionary medical services to its participating institutions across Europe. As a consequence to ICT investment, European healthcare professionals can now freely and seamlessly use the Grid environment to conduct large studies and exchange expertise within the Health-e-Child European excellence network. The platform handles medical data ranging from genetics to imaging and clinical examination data by synthesizing those in a cohesive unified whole. This harmonized view of the data is said to form the basis of personalized treatment, comparison and the identification of the classes of different individuals, based on their biomedical profiles. Regardless of their location and thanks to a simple USB key, physicians are able to connect to the system and navigate through the European population of children who are enrolled in their studies, to quickly identify similar cases having been treated and to check how they recovered, ultimately impacting on their decision making or simply helping at better understanding rare patient conditions [16], [17].

In a world that is increasingly dependent on ICT, the Indian government and technocrats can also think of investing to develop an ICT-based health care system. Except a few health care centers and hospitals that have deployed a semblance of ICT for things like data collection and management, the Indian public health care system is not automated

and needs attention. Once implemented properly, such an e-health system can help all citizens, especially the rural to gain access to better health care delivery through ICT [17]

We feel that ICT has to be clubbed with higher bandwidth to establish health care information systems which can cut across primary, secondary and tertiary health care systems. It can also enable the deployment of convergence technologies for the development of drug information and records, for the study and control of epidemics, for provisioning health insurance, for research and the dissemination of information, for distance learning in the health profession and to reduce average health costs and to improve the health system's productivity [15], [16], [17].

The Indian government would achieve these objectives by capitalizing on the existing global ICT infrastructure such as e-mail facilities that could connect medical, nursing, dental and other paramedical rural health personnel in India with their peers in India's academic institutions and health universities [15],[16],[17].

ICT skills training should be included in the curricula of all medical and paramedical educational institutions in India. Training would not only connect medical personnel, but would aid in the development of software packages for health care delivery, primarily to support clinical work and hospital management. As a tool to survey national health threats, the national health grid can be exploited to teach ways of preventing the transmission of HIV and to educate patients and their families on palliative measures, providing them with information through online conferences where they can share their experiences. The short messaging service will be a valuable help at hand in all such endeavours [15],[16],[17].

Adequate national, social and individual state level and district level budgeting for a similar unified network of ICT providers, working in unison with the health service providers of the nation, will offset the existing health infrastructural defects and serve as an efficient health forecasting tool. HIV control, malaria and epidemic control will become a reality and will remove pandemic associated health nightmares of the health providers and the public at large. The heart of such efforts should be an efficient mobile based short messaging network which is very much available at a common man's price. A back up network of call centres a la Project M of Africa [16], [17],[18].

will not be difficult for a nation that provides call centre back –up and ICT technologies to the world. Such networking can be easily attempted in the private sector under the leadership of Medico-Friends Circle or the CEHAT which have a significant say in the Indian Health care thought process and regulation [15],[16],[17].

Abbreviations

GDP=Gross domestic product, SMS=short messaging service, ICT=Information and communication technology

CEHAT= Centre for Enquiry into and Allied Themes HIV=Human immunodeficiency Virus

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