

ABSTRACTS

The 7th International Conference on Transforming Healthcare with Information Technology, and The 21st Conference of the International Society for Telemedicine and eHealth Chennai, India 20 -22 October 2016

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**The 7th International Conference on
Transforming Healthcare with Information Technology**

Joint Plenary

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eHealth Around the World

UNITED FAMILY'S JOURNEY IN HEALTHCARE IT – A CHINA EXPERIENCE

J Shao

Director of Health information System China

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CREATING LARGE SCALE TELEHEALTH NETWORKS IN THE USA

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Telehealth, delivering health care services with patient/clinician separated by geographic distance, by means of health information and telecommunications technologies, has been practiced for over fifty years in the USA. From its inception, this transformative mode of health care delivery was predicated on the rationale that providing patients' convenient access to health care services, reducing their need to travel to receive care and rendering timely expert consultations/care, reduces avoidable mortality/morbidity; especially for people in remote and rural locations. Clinical research studies have repeatedly shown telehealth's benefits. However, results from telehealth pilots/studies that have delivered virtual care as point-to-point services of various size configurations, have not generated the clinical outcome data and robust service delivery models needed to take telehealth services to "scale".

The author of this paper contends that it is necessary to establish large scale telehealth networks in order to undertake the clinical workflow re-engineering and derive the economies of scale necessary for telehealth to bring about transformative change; and address the access, quality and cost challenges that are threatening all health care systems. This paper discusses the rationale for creating large scale telehealth networks, the practical issues associated with building the clinical, technology and business infrastructures to underpin successful expansion of telehealth programs into large scale telehealth networks; ones that can routinely serve millions of patients and bring about transformative change. The paper highlights how this disciplined approach to telehealth service development is particularly relevant in the current US health care environment. An environment where a focus on "value-based care" has opened-up innovative new health care funding models, ones that offer incentives to establish large scale telehealth networks and realize their transformative benefits to sustain robust virtual care services that better serve populations of people with chronic diseases/conditions.

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IMPACT OF HEALTH INSURANCE AND GOVERNMENT REIMBURSEMENT EXPANSION ON VIRTUAL VISIT TELEMEDICINE MARKET, THE USA PERSPECTIVE

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Traditionally telemedicine consultations are offered in a professional to professional (P to P) settings where the patient is with a licensed healthcare provider in a rural location and a healthcare specialist is at a distant remote urban location. Advanced audio/video technology is used for telemedicine consultation along with biometric data measurement devices to obtain a pre-consultation assessment for the remote healthcare specialist. Reimbursement for this "rural" telemedicine consultation for both the originating and the remote site is provided by US Medicare, Medicaid and private health insurance companies. However the adoption for this service has been limited due to strict definition of qualifying 'rural' settings.

In recent years with the Affordable Care Act Law enactment, over 20 million additional Americans now have health insurance coverage. As a result, 31 out of the 50 States and DC (District of Columbia) have enacted healthcare parity laws to provide telemedicine coverage to improve access to healthcare. More than 10 million consumers directly benefited using telemedicine last year, according to American Telemedicine Association. Rapid transition in planned healthcare reimbursement from fee-for-service to a value based service payment is expected to grow telemedicine by incorporation in to clinician work flow.

In addition to the P to P telemedicine described above, a new model of "retail" telemedicine has emerged as an alternative to urgent care or emergency care visits where patients are at their home instead of being at the licensed provider's facility. A service provider virtually connects patient to a licensed provider via mobile health technology. With projected reimbursement from approximately 75% of self-insured employers and private insurance companies, this segment is growing very rapidly. A Deloitte study calculated there would

be 75 million virtual visits in North America in 2014, with potential expansion to as many as 300 million virtual visits a year by 2020.

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DEPLOYMENT OF EHEALTH @ CMC VELLORE, INDIA

A Zachariah

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International Society for Telemedicine and eHealth

TECHNOLOGY FOR HEALTH, OR FOR HEALTHCARE

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TELEMEDICINE IN OTOLARYNGOLOGY PAST, PRESENT AND FUTURE

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WHATSAPP TELEMEDICINE FOR THE DEVELOPING WORLD: WHAT CAN WE LEARN FROM INDIA?

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Telemedicine uptake remains low in the developing world, in part due to the high cost of infrastructure and poor connectivity in rural areas. Smartphone use is growing and has improved connectivity at relatively low cost. WhatsApp is a proprietary, free, messaging application that works across most mobile phone operating systems. It allows one-to-one or one-to-many transmission of text, images, audio and video. In February 2016 over one billion people sent messages via WhatsApp. Doctors have begun using WhatsApp for store and forward telemedicine. This cheap solution has great potential for the developing world. A recent literature review of WhatsApp use for telemedicine, found 32 papers, 12 of which were from India. This study reviews clinical use of WhatsApp for telemedicine in India.

Results: Six papers presented case reports and six described the use of WhatsApp chat groups within hospital units. Chat groups were used for clinical, administrative, and educational purposes. Case reports described clinical management of orthopaedic (2), cardiology, palliative home care, maxillofacial and stroke patients with patients, providing images and information in two instances. WhatsApp was used in eight medical disciplines with six papers reporting use in orthopaedic surgery (4) and maxillofacial surgery (2). Few papers addressed legal and ethical issues such as consent, confidentiality, data security, liability, quality of care and record keeping. No papers reported emailing WhatsApp messages to a secure server for record keeping or deleting messages from phones. All papers reported advantages in using WhatsApp.

Conclusions: Indian physicians have been pro-active in their use of WhatsApp but have not addressed legal and ethical issues related to its use and the developing world can learn from this. Recent changes to WhatsApp in April 2016, providing end-to-end encryption of all messages address many of the data security concerns.

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CURRENT REGULATIONS REGARDING EHEALTH IN EUROPE

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Background: The exponential growth of eHealth is based on the ubiquitous digitalization of all sectors of our society. Yet, the fundament for a successful implementation of eHealth depends on the social environment, in which, rules and regulations are created and observed.

The aim of the presentation is to highlight the European expertise. Europe may serve as an example of how eHealth regulations are build, respecting the interests of different countries, and implemented at international level.

Method: The presentation illustrates the above by focusing on European Union eHealth Policy and Support Measures such as the Digital Agenda for Europe, the eHealth Action Plan 2012-2020, the European eHealth Network, the European Code of Practice for Telehealth Services, the EU Commission Working Document on the applicability of legal framework to telehealth services, etc. With all its regulatory activities Europe intends to achieve widespread deployment of eHealth services, improvement of the quality of health care, reduction of medical costs and fostering the independent living of its citizens.

The importance of improved and continuous international cooperation for successful creation and application of eHealth regulations will also be emphasized. Attention is dedicated to the necessity always to be aware about what is globally going on trough international networking initiatives such as the International Society for Telemedicine and eHealth (www.isft.net) and Med-e-Tel (www.medetel.eu).

Results: Describing the existing eHealth rules and regulations in Europe, and comparing them with those existing in other parts of the world, the presentation will provide a compendium of best practices in the field of telehealth regulations.

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ENVIRONMENTAL e-HEALTH – A CRITICAL COMPONENT OF e-HEALTH READINESS ASSESSMENT

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Background: ‘Environmental protection’ is a current watch phrase. The most common tool is Environmental Impact Assessment (EIA), a requirement in many countries including India. However, in India EIA is restricted to projects such as mining, heavy industry, thermal/hydro-electric/nuclear power, and infrastructure development. No requirement exists for assessment of the environmental impact of e-health, despite a model of the environmental impact of e-Health having been published. How can any e-Health project be considered ‘ready’ if no consideration is given to environmental impact? This study examines published e-Health Readiness Frameworks, Models, or other tools to determine which incorporates consideration of the environmental impact of e-health.

Methods: A literature search identified papers relevant to e-Health Readiness / Preparedness Frameworks, Models, or Tools (to 30 June 2016) using PubMed and Google Scholar and the string: (e-Health OR eHealth OR Telemedicine OR Telehealth) AND (Readiness OR Preparedness). Only the first 100 hits for Google Scholar were assessed. The title, keywords, and abstract were searched for inclusion criteria: abstract

available; English language; linked an e-health term with ‘readiness’ or ‘preparedness’; also referenced the terms ‘model’, ‘framework’, ‘questionnaire’, or ‘survey’.

Results: In total 269 resources were identified: PubMed (169 results), Google Scholar (first 100 ‘hits’). Elimination of duplicates, references to disaster related ‘preparedness’, and those not presenting models or frameworks left 28 resources. Of the models or frameworks available *none* addressed the issue of environmental impact of e-health. Four papers used the term ‘environment’, but only in reference to the e-health ‘setting’.

Conclusion: For a setting or community to be ‘ready’ to engage in implementation of e-Health, it must recognise the environmental impact of e-health, and have in place training, processes, policy, and enforcement capabilities to ensure reduction in the negative upstream, midstream, and downstream environmental impacts of existing and planned e-health solutions.

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FUTURE VISIONS FOR EHEALTH

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The healthcare systems in industrialised nations are confronted with various changes. Demographic changes with the aging of the population, increasing mobility and changes in the purchasing behavior of our patients, increasing cost pressure and rapid consolidation of service providers and other stakeholders to form powerful market players. These and other factors represent a significant challenge. There are chances in this environment for new medical care instruments such as Telemedicine and eHealth.

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Health IT Essentials – the Reality

HEALTHCARE IT DEPLOYMENT AND RoI IN A MULTI-SPECIALITY HOSPITAL IN INDIA

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Background: Hospital and healthcare industry, like any other industry, have been positively impacted by the IT revolution. Many healthcare institutions across India and the globe are making huge investments in IT, but the return on investment from this is always objective and is highly questionable owing to rise in expense incurred on their adoption against the desirable returns they provide. This study aims to showcase how RoI was evaluated for an Indian hospital after its complete adoption of an integrated hospital IT system.

Methods: For the purpose of study, various RoI indicators were identified and classified into 3 broad categories – financial, patient care quality and business. This study was spread across a period of 1 month, each before and after the complete IT system adoption across the various groups of hospital users – administrative, clinical and management.

Results: On the financial front, RoI in hospital IT system was evaluated against cost saving from decreased staffing and resource re-allocation. For eg. Radiologist in the imaging department began use of speech recognition device which in turn eliminated the need for full time transcriptionist. When measuring RoI on the patient care quality, use of EMR in the OPD consultation chamber allowed doctors to use clinical decision tool, reduction in medical errors, legible and electronic documentation along with an enhanced speed of consultation. Lastly, RoI on business was monitored using length of stay (LoS) as the use of IT

systems across the inpatient workflow resulted in lower LoS, quicker discharges, lower rates of re-admission and higher bed utilization rates.

Conclusion: The introduction of integrated healthcare IT system enabled the hospital to generate a positive RoI as measured against the 3 categories – financial, patient care quality and overall business.

The user friendly and workflow compliant IT system allowed easy and faster adoption across the various user groups – administrative, clinical and management.

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REALIZING AND SUSTAINING DISRUPTIVE TECHNOLOGIES

Gabe Rijpma

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Industry Bytes

CLOUD COMPUTING IN HEALTH CARE: A GAME CHANGER

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Cloud computing has become a very disruptive and innovative technology in delivering computing resources and services. Cloud services encompass several variations of service models for infrastructure, platform and software applications (IaaS, PaaS, and SaaS) and deployment models (Private, public and hybrid cloud). Healthcare industry has been traditionally a slow adopter of technology. However in India, governmental encouragement and support for digital services, changing customer preferences and the rapid expansion of healthcare providers and payers during the last five years have provided necessary impetus to the healthcare IT industry to leapfrog in technology as it happened in Indian telecom industry. Healthcare IT vendors around the world are very actively redesigning their EMR, PACs, CPOE, ERP, patient billing, claims management, business analytics software to host them on cloud platforms provided by large cloud service providers. In India although cloud adoption is in its nascent stage, its enormous benefits like rapid deployment capability, scalability, OPEX model (with no CAPX-Pay as you use), cost reduction and staffing considerations are driving the care givers and payers to migrate from traditional to cloud-based health services. It is estimated that in the next five years 70% clinical and nonclinical data in India will reside in the cloud and completely change the way care is provided to the patients. Healthcare cloud computing market is expected to reach \$9.48 billion by 2020 from \$3.73 Billion in 2015 at a CAGR of 20.5% accounting to 5% of entire cloud computing market. Cloud computing may not be a panacea for all the risks and challenges in the workplace but existing and new entrant cloud service providers are fast emerging as trusted, secure, complaint and reliable service providers. A small case study called “Rainbow Digital 2014” which is a cloud implementation project of a 500 bed super-specialty pediatric hospital network in India will also be presented and discussed.

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DRONES IN HEALTHCARE : A GLOBAL AND NATIONAL PERSPECTIVE

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This paper has its focus on indigenous capability of heavy-duty Drones for emergency organ transport and other medical services, which constitute a small but important percentage of operations in health-care sector. A top-level assessment of global technology readiness, operational experience and bottle-necks including regulatory norms, specific to India, is made in this paper.

Many successful Indian R & D efforts towards the development and deployment of unmanned aerial vehicles (UAVS) or Drones have been launched and are in progress for several decades now, exclusively addressing technology requirements for defence applications. Indigenous Drone technology has reached a maturity level, of being able to support armed forces to handle critical missions, on par with technology levels elsewhere in the world. Multi-disciplinary technologies, manufacturing and maintenance issues, specific mission oriented user-trials have been undertaken, with demonstrated payload capacity many times more than 25-40 kg, a minimum necessity for medical Drones, almost unlimited range and endurance and autonomous operational capability.

Understandably, many of these accomplishments are dual-use technologies and natural expectation and demand from civilian sector today, is that development and deployment of Drones for emergency organ-transport between widely separated hospitals is a simple “Read-Across” and could be accomplished in a short time frame, with minimal development and operating cost. This is inevitable since the other obvious choice for this complex task, that is the use of already available small manned helicopters, is still logistically complex and operationally expensive.

In reality, there are several technology adaptation and integration challenges and administrative bottle-necks that limit their immediate induction into civilian health-care domain, specifically for human-organ transport between hospitals, which have large geographic separations, in urban and semi-urban regions. Technologies relevant to core civilian agricultural applications are closer to organ transport requirements and in the Indian context, can be considered to be the genesis and basis for the development of emergency medical-supplies and human-organ transport Drone system.

Needless to highlight, a lot more needs to be done in selecting the right choice of vehicle and technologies for this specialised task. Obvious choice is either Multi-Rotor Drones such as Hexa- or Octo-Copter or down-sized Helicopter Drones. Great strides have been made in the development of both these types of Drones in European and American institutions and programs have been launched by several technology consortia in India, including the National Design and Research Forum. Multi-Rotor-Copters for medical supplies have already been developed and demonstrated and need to go through certification and reliability demonstration phase. While technology readiness in respect of Structures, Controls and Basic Sensors is quite high, concerted developmental effort is needed to address “endurance-related” power-supply systems, propulsion units and “range-related” navigation, tracking and most importantly “system-related” reliability and cost, which are the prime parameters for organ-transport applications.

Technology-readiness gaps are to easier to bridge since defence-related drone experience and technical skills are already available and have been injected into developmental programs. Three other operational issues are equally important and need to be addressed on priority: Legal, Ethical, Safety and Certification issues imposed by the DGCA and other administrative machinery, training and certification of Drone Pilots for operation and maintenance and training of Medical Personnel to handle organ-transport containers and ground operations at hospitals.

With the available Drone technologies and prototypes for other applications, operational experience and human resources, organ-transport system is a certain technological reality, supporting health-care system in India, in a short period of a few years, with the support of medical organizations and adequate funding.

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DEPLOYING TECHNOLOGY IN PREVENTING NCDs: LESSONS FROM THE AROGYA WORLD mDIABETES PROGRAM

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Background: Noncommunicable diseases (NCDs) kill 38 million people each year, 75% in low- and middle-income countries, prompting the declaration that NCDs are “key barriers to poverty alleviation and sustainable development”.

In India, over 66 million people live with diabetes and 1 million die each year because of diabetes. Arogya’s study of 10,000 women showed that 25% families spend 25% of household income on NCDs, and 7%, as much as 50%. Therefore, a sustained focus on addressing this serious issue is essential.

While the figures are staggering, many of these diseases are preventable through three basic and inexpensive behaviour changes. Eating a healthy diet, increasing physical activity and avoiding tobacco can prevent over 80% of heart disease, 80% of Type 2 diabetes and 40% of cancers.

Arogya’s mDiabetes program helped people make these changes.

Methods: Since mobile phones are widely used in India, 56 messages were sent to over 1,000,000 consumers across India who opted for the mDiabetes service, over a 6-month period, in their language of choice. Of them, nearly 1000 consumers were chosen for a study to gauge the effectiveness of using text messages to change behaviour. Their behaviour, pre- and post-intervention, was compared against an almost equal number of people who did not receive these messages.

Results: 11% to 15% more respondents adopted various healthier habits as a result of the program, as compared to those who did not participate in it.

Conclusions: Prevention is the only way to minimise NCD-related burden on low and middle income economies. This study, which was carried out as part of one of the largest deployments of m-health in the world, shows that text messages are an effective way to help consumers make behaviour changes. Other technologies such as audio, video, smartphones and analytics can further increase effectiveness of NCD-prevention interventions.

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EVIDENCE BASED CLINICAL DECISION SUPPORT – AN ENABLER FOR CLINICIANS IN THE 21ST CENTURY

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We are living in the era of information and technology, but the field of healthcare still suffers from massive “Information asymmetry”. With the healthcare ecosystem changing rapidly – thanks to deteriorating lifestyles, changing disease paradigms, technological advancements and freely available information in public domains – clinicians are under tremendous pressure to make critical clinical decisions faster and more accurately, while dealing with all these uncertainties. In addition to “information asymmetry”, another major factor affecting both quality and cost of care is “variability” in clinical practices resulting from flexible workflows and clinical decision making.

Clinical Decision Support (CDS) tools help clinicians make crucial clinical decisions at the point of care by bringing unique patient data/ variables, standard clinical guidelines and smart analytical tools together. Currently available CDS tools range from simple knowledge based rules engines to complex analytical tools using big data and artificial intelligence. In our routine clinical practice, pull kind of drug decision support is the most commonly used CDS tool, but with advancing technology we are now able to extend decision support to practically all aspects of clinical care including both diagnostics and therapeutics.

Now is the time to talk about bringing the best of the CDS technology to India in order to help our clinicians make better and faster decisions and to improve quality of care while minimizing variability and cost of care.

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Clinical Applications of HCIT

HOW TO IMPROVE LARGE SCALE EMERGENCY MANAGEMENT BY INTRODUCING MODERN ICT

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Background The EU project “BRIDGE” intended to build a system to support interoperability – both technical and social – in large - scale emergency management. The system should serve as a bridge between multiple First Responder organisations in Europe, contributing to an effective and efficient response to natural catastrophes, technological disasters, and large -scale terrorist attacks. The project has demonstrated this by creating a platform providing technical support for multi -agency collaboration in large-scale emergency relief efforts. The key to this was to ensure interoperability, harmonization and cooperation among stakeholders on the technical and organisational level. The vision of the BRIDGE project was to allow the creation of a common, comprehensive, and reliable operational picture of the incident site; enable integration of resources and technologies into workflow management. Benefits for First Responder:

Methods: The BRIDGE-project (total cost € 18,075,144.20) was a collaborative project co-funded by the EU Seventh Framework Programme. The BRIDGE consortium consisted of a well balanced mix of cross-disciplinary academics, technology developers, domain experts and end-user representatives. Regional Centre for Medical Emergency Research and Development, Stavanger University Hospital, Norway had the chairman for End-User Advisory Board.

Results: The BRIDGE EU project developed support in rapid decision making during a large-scale, multinational crisis response. The intension was to enable more efficient performance, reduce workload, improve quality and efficiency of situation assessment, decision making, and timeliness and effectiveness of communications and coordination, optimize the use of resources. Several concept cases were developed, i.e.: Adaptive Logistics, Advanced Situation Awareness (incl. octocopter), Dynamic Tagging of the Environment, Federated Control Room Support First Responders, Integrated Training System, Information Intelligence, Robust and Resilient Communication, and Situation Aware Resource Management, Master table and E-triage.

Conclusion: The project demonstrated that it’s possible, by introducing modern ICT, to increase safety of citizens by developing technical and organisational solutions that significantly improve crisis and emergency management.

A TELEMEDICINE'S NEW STEP ONGOING : TRANSATLANTIC TELECONSULTATION

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Geraldine Menand,¹ Eglantine Cloche,¹ Simone Widmer,³ Claude Bronner³
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French expatriates' population in Houston stands above 10,000 individuals, including families. Besides, Houston is the largest hospital and medical concentration in the world. In this context, why setting up a program of teleconsultation, with physicians in France?

- Because there is a demand for such a service: medicine is a highly sensitive, culturally-influenced sector and actual access to care providers can be difficult in different ways: distances, eligibility of physicians under proprietary health insurance systems, costs of deductibles and co-payments, etc. But the major challenges remain the language barrier and the fracture represented by the loss of contact with his/her 'own' French General Practitioner, Paediatrician or OBGyn;
- Because teleconsultation has come of age and now works efficiently.

Our presentation will focus on technical, ethical, deontological, legal aspects and on the issue of pharmaceutical prescriptions and procurement. An economical model will be presented and the importance of a government-sponsored personal health record is emphasized.

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THE GLOBAL TREND OF eHEALTH: FOCUSING ON REGIONAL HEALTH INFORMATION NETWORKS

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Background: The rise of medical expenditures of the elderly due to chronic diseases becomes an important issue for all countries. One measure to cope with this is telemonitoring or eHealth, which monitors biodata of the elderly staying at home or sharing health information among related institutions. The introduction of these systems is not sufficient to achieve the goals, but supporting systems are required for efficient and meaningful use of eHealth. This paper investigates the condition for successful use of eHealth.

Method: This paper is based on the field research on regional health information networks in the US, UK, and Japan: (1) Healthix, New York, US: this network connects about 500 institutions which share the health records of 16 million residents which include diagnosis, medication, examinations, allergy, etc.; (2) CMC (Coordinate My Care), London, UK: this network supports care at home, in particular cancer patients and emergency care; and (3) *Ajisai* network, Nagasaki, Japan: This connects about 300 institutions and the number of registered patients is about 50,000. These three networks are compared with respect to (i) objectives, (ii) system, and (iii) outcomes.

Results: The followings are some findings from surveys. (1) Healthix has the largest registered patients and the accumulated data is used for "Population Risk Management" to predict diseases. (2) The elderly registered to CMC have less emergency calls or hospitalizations than non-registered residents. (3) Medical institutions in the *Ajisai* network avoid double examination, or double medication, and promote efficiency.

Conclusions: The global trend of these networks has progressed one step. It is recognized that the larger network can accumulate big data, which enables to use the population approach. Big data can be used for prevention from diseases, or worsening, and raising the therapeutic ratio. This paper proposes some policy to promote these benefits from eHealth.

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ePHARMACY AND ePRESCRIPTION: PRESENT AND THE FUTURE

Eswara Reddy
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Special Addresses

DELIVERING HCIT

Russel Branzell
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QUALITY HEALTH CARE: TECHNOLOGY AND DATA DRIVE IMPROVEMENT

Stephen Lieber
HIMMS Global, Germany

Technology and related information systems are strategic assets in 21st century health care. Recognising how technology, data and the systems related to them drive quality is critical to improving patient outcomes, reduced medical errors and more efficient and effective care. This session will cover how models developed by HIMSS help to establish how well a health care facility is utilising technology to transform care in that setting. Using the Electronic Medical Record Adoption Model (EMRAM), the Continuity of Care Maturity Model (CCMM) and the Adoption Model for Analytics Maturity (AMAM), this presentation will demonstrate the positive correlation that exists between IT and quality.

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HEALTHCARE APPS – WHAT WE SHOULD LOOK OUT FOR

Angela Joshi
Google, India

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IMPLEMENTING A STRATEGY BUILDING A SECURE AND RESILIENT CRITICAL INFORMATION INFRASTRUCTURE

Manish Tiwari
Microsoft Corporation, India

Organizations must get better at cybersecurity basics. In the same way that basic training prepares military recruits for the more complex roles by drilling basic skills, cyber defense starts with basic protection, detection, response, and recovery tactics. A cybersecurity foundation covers the basics and ensures that prerequisites for advanced solutions are met.

Like an alert border guard can stop a suspected terrorist from entering the country, scrupulous attention to continuous monitoring is the foundation of a sound cyber defense strategy. When it comes to cybersecurity,

getting the basics right matters. By basics, I mean the fundamental principles of good infrastructure management—know your network, guard your perimeter, and keep systems up to date.

Many IT organizations overlook fundamental security measures in their haste to adopt the latest cybersecurity solution being pushed by the press or marketed by vendors. In most cases they fail to utilize the existing features built into the products that they have already bought. In many cases, organizations fail to even implement their IT infrastructure as recommended by the OEMs and also best practices. However, a persistent adversary requires an informed and persistent defense. Security professionals must take a life-cycle approach to cybersecurity as the foundation of their strategy and organizations formulate and implement a Digital Transformation Strategy with a three or five year vision.

A life-cycle model of cybersecurity identifies the people, processes, and technology needed to protect systems, detect intrusions, respond to security events, and recover systems. Through proactive assessment, planning, and preparation each step of the way, your organization can mitigate the risks associate with cyber threats and improve its strategy going forward in a cycle of continuous improvement.

The session is intended to cover some of the forgotten fundamentals of Information Security, sharing from experience the common mistakes made in the conduct of IT Risk Assessments and application of security controls.

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ROLE OF ICT IN MEDICAL RESEARCH

Soumya Swaminathan

Secretary of Health Research, Govt of India and Indian Council for Medical Research

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MODERATOR'S OVERVIEW

Sangita Reddy

Apollo Hospital Group, India

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HCIT Spectrum

ENHANCEMENTS TO A COMPUTER-ASSISTED SCREENING TECHNOLOGY FOR DIABETIC RETINOPATHY: SYSTEM REDESIGN BASED ON OUR PILOT STUDY IN INDIAN SETTING

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Rajiv Raman, SS Badrinath

Background: Diabetes related vision loss is a major risk among 50 million diabetics in India, and diabetic retinopathy (DR) is identified as a leading cause of preventable vision loss in working age population. The current clinical protocols especially tele-screening for early detection, are well-amenable to augmentation by computer-assisted screening technology, for providing cost-effective large-scale deployment and preventive eye care for diabetics. We had developed a DR screening system based state of art image analytics technology, and conducted a pilot study of our system in a retrospective setting, to assess the applicability and value add in large prospective studies and routine telescreening. Though the performance of our system

was at par with international systems, our experiment indicated the need for 3 specific capabilities to be incorporated in the system in order to succeed in Indian settings.

Methods: Our DR image screening system was developed based on images from publicly available retinal image datasets (about 2000 images) from around the world. The pilot study included 200 cases sampled uniformly from an epidemiological study to represent various levels of pathology. The data and the system outputs showed the need for a strong module examining image quality, specific analysis for clinically significant macular edema, and analytics for fail-safe recognition and flagging of proliferative (late-stage) DR. A dataset of 587 images was constructed from our study to develop these modules.

Results: The developed system for image quality examination uses machine learning to rank the quality of an image, and bypass further analysis if details in the image are scarce (could be due to advanced pathology or auxiliary complications). The second module localizes the macula, identifying macular edema (exudative clusters, proximity to macula, and intensity) and grades clinically significant macular edema. The third important module for proliferative DR examines neovascularity and provides a heat-map of the different regions of retina which could be having proliferative vascular abnormality and retinal detachment. All the 3 new modules involve novel indigenously developed image analytics, since prior art which is applicable the Indian scenario was found to be scarce.

Conclusion: Learnings from our pilot study of computer-assisted DR screening were used to develop new computational modules specific to needs in Indian scenario. The developed systems are data driven, and can iteratively be refined to provide quality-assured DR screening capability, and empower more technicians to participate in the care delivery process, enabling outreach at national scale.

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EVALUATING THE FEASIBILITY OF VIRTUAL MENTORING CONNECTING AN ACADEMIC CENTRE TO DISTRICT HEALTH PROFESSIONALS FROM BIHAR IN PROVIDING QUALITY CARE FOR ALCOHOL USE DISORDERS

M Jayant,¹ S Lekhansh,¹ A Ashfaq, KSunil,² Narendra Sinha,² AK Shahi,² C Prabhat,¹ K Arun,¹ S Lakshmanan,¹ Pratima Murthy,¹ Vivek Benegal,¹ Miriam Komaromy,³ Sanjeev Arora³
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Introduction: The State Health Society, Government of Bihar approached NIMHANS to develop a model to equip non-specialist primary health physicians and counsellors in the management of alcohol use disorders (AUDs), a serious public health problem in India.

Methods: A two week on-site training followed by an online fortnightly virtual tele-mentoring based on NIMHANS ECHO model was employed. Multi-point videoconferencing was used by the ‘HUB’ (NIMHANS) to conduct tele-health sessions and share best practices with the ‘SPOKES’ (i.e. physicians and counsellors from nine districts of Bihar). A baseline questionnaire repeated before and after three months of tele-mentoring was used to assess the participants’ knowledge, skills and level of expertise. Primary measures to assess the impact of training included a monthly report of the total number of AUD cases seen, admitted for inpatient care and retained in follow-up.

Results: Of the 28 doctors and counsellors who attended the onsite training program, 18 regularly attended the online component and provided feedback at three months. Significant improvements were reported in knowledge, and competence to assess and treat alcohol use disorders. The relative contribution of the online tele-mentoring and handholding component in these improvements was perceived by the participants as 72%. Over three months, 2143 cases were screened across all the centres, of whom 709 (33%) had an AUDIT score greater than 16, indicating harmful use or dependence. The follow up rate was noted to be 49.1%. Only 76 (3%) cases required referral to specialists.

Conclusion: The tele-mentoring model was found to be effective in training non-specialist physicians and counsellors to provide health care for AUDs as reflected by the number of patients seeking treatment, retained in the treatment and a significant decrease in the need for specialist referral. The main barrier for regular participation was internet connectivity.

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VIRTUAL KNOWLEDGE NETWORK NIMHANS ECHO: INNOVATIVE TELE-MENTORING MODEL FOR SKILLED CAPACITY BUILDING IN ADDICTION AND MENTAL HEALTH

Prabhat Chand, K Arun, M Jayant, S Lakshmanan, S Manjula, R Lakshmi, N Kubenthiran,
Vivek Benegal, Pratima Murthy, Miriam Komaromy, Sanjeev Arora

Background: Expertise necessary to provide quality care for Addiction & Mental health (AMH) disorders is insufficient, inequitably distributed, and inefficiently used. Most Patients do not receive timely care, leading to large treatment gaps and poor outcomes. To bridge this gap, NIMHANS, Bangalore in collaboration with UNM ECHO Institute has started weekly NIMHANS ECHO tele-health sessions since 2014.

Methods: The ECHO model is a hub-and-spoke knowledge-sharing network, led by expert teams from the HUB (NIMHANS). Multi-point videoconferencing is used to conduct tele-Health sessions and share best practices with the community health care provider- SPOKES (doctors and others). Each weekly session has complex case presentations by the participants and discussion on comprehensive case management and includes a brief didactic on a specific topic. Once a month, an anonymous semi-structured online evaluation form measuring the utility and effectiveness of the tele-health sessions is e-mailed to the participants.

Result: During the last one year, 40 tele-health sessions were held with 800 instances of participation, representing 130 unique individuals from 60 different sites. One hundred ninety three feedback responses were received from the spokes. Positive feedback was received on following domains i.e. “*ability to deliver evidence- based objective content*”, “*Opportunity to ask questions*” and “*Relevance to the session objective*”. Ninety percent reported these domains as very good (4) and excellent(5). The participant also reported, on average, a 60-80% increase in self-efficacy.

Conclusion: Weekly tele-ECHO sessions are perceived as a successful approach for knowledge and skill transfer from an academic centre (HUB) to community health care professionals (Spokes) to extend care for complex addiction and mental health issues.

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IS HIE ENOUGH FOR CARE COORDINATION?

Amar Jain

Clinical Intelligence. MphRx

The Health Information Exchange (HIE) model intends to resolve the problems of data exchange in the healthcare industry. It heavily relies on federated data stores. However, it doesn't assist with the resolution of real time scenarios, such as:

- usage of patient data by clinicians and patients or;
- how to drive clinical workflows to ensure digital transformations of care delivery.

Some other noted shortcomings of the HIE model include:

- Heavy reliance on source systems to fetch patient data.
- Lack of features like - Workflow Engines or Smart Alerts to power real digital transformations and its heavy reliance on the HIE vendors to deliver any or all of these solutions.
- Inability to build custom apps and workflows based on Open APIs.
- Restrictions on warehousing of data as a Clinical Data Repository.
- No additional benefits like longitudinal analytics, research usage of the data.
- Does not incorporate any patient-reported data - which now is a very critical source of information.

Due to circumscribed availability of HIEs, you cannot run real-time critical clinical workflows on them. There is no concept of an ecosystem with an HIE. All in all it is partially solving the problem of exchange of data.

Now, the critical question is - *How can we solve these problems?*

Here are some approaches that can bring about true interoperability in today's healthcare scenario where; different systems are already in place, with different stake holders:

- Adoption of vendor neutral platform.
- Adoption of the evergreen plug and play model.
- Commitment to open standards; it avoids future lock-in.
- Support multiple standards - HL7, FHIR, DICOM, CCDA, XDS, and IHE profiles for easy integration.
- Data and care orchestration tools that allow building micro applications.

This presentation will help attendees realise the limitations of today's healthcare system and how we can turn on a disruptive mode to ensure our healthcare delivery is going in the right direction.

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PERSONALIZED MOBILE APPLICATIONS IN HEALTHCARE

Bhargavi Upadhy
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HealthTech as an industry today focuses on population as a whole. Based on the ailment history, patients are treated similarly, on a large scale. Services are tailored based on statistical analysis conducted on large population.

Recent studies have shown that this 'One size fits all' strategy does not work well. Patients look for personalized services, doctors look for medicines that fit a person best and hospitals are looking at how to serve a patient better taking into account his/her preferences and history. Mobile phones, being the most personalized devices that a patient uses, can be of immense help in this domain. Mobile applications can be built as natural extensions to various services a hospital, pharma, health-tech or any other healthcare centric industry provides.

Personalization involves tracking user actions continuously, using wearable technology sensibly, managing identity and authorization issues, analyzing user behavior and accordingly tailor service and content to meet the needs of a consumer (patient). Moreover, healthcare applications have some unique problems to solve. From ensuring user engagement, privacy, security, legal impacts of the services, to dealing with multiple 'cloud environments' in the backend, the mobile app developers need to pass through un-trodden paths.

This paper focuses on sharing the learnings we had addressing various business segments and markets (from personal health management to hospital to home monitoring) as Mobility Platform Center within Philips.

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THE PITFALLS TO ACHIEVING THE STANDARDISATION AND INTEROPERABILITY OF CLINICAL DATA

Rahil Qamar Siddiqui, Fardeen Siddiqui, Shyam Pachauri, Sarfaraz Ali
Sidqam Technologies

Over three decades into the work of controlling how clinicians record data, the field of health informatics still has a long way to go. Work in the field of recording standard, coded data is important to reduce medical errors caused by misinterpretation and misrepresentation of data. On the one hand, clinical systems available in the market have not kept pace with the research being done in the field of data standardisation and interoperability. On the other hand, system providers still struggle with getting the non-tech-savvy clinicians to embrace technology into their daily work routine. This paper investigates a real-time clinical system that pioneers the work of aligning structure and standards to control data at the point-of-care to achieve the long-standing goal of standardisation and interoperability of clinical data, and discusses why it is so hard.

There is a need for more uptake by the clinical system providers to implement advancements in the field of health informatics research within the software's that they deliver for use in healthcare practices. However, at the same time it is critical that the complexities of the system implementing high-end research are hidden from the end-user clinician by keeping the user interfaces simple and intuitive and providing a better user experience. The real-time clinical system, Eventus, is such a system that implements atleast two internationally renowned healthcare IT standards, ISO EN13606 and SNOMED CT, to improve the

structured and standardised recording of data at the point-of-care while keeping the user interface simple and easy to use.

A study conducted by the team revealed that clinicians are more likely to use a clinical system if the complexities underlying the system architecture are not visible to them and the total time spent by them during a consultation reduces as a result of using technology. There was an increase in interest from the clinicians to use a new clinical system to enhance the standardisation and interoperability of data, when the effort required by them to achieve that was negligible. Also, there was a significant increase in uptake of Eventus, based on its simple and attractive user interface despite the knowledge that it is based on healthcare standards and encourages coded data entry in certain consultation areas such as problem, diagnosis, medications, and others.

The research concluded that there is a growing awareness and acknowledgement by the clinical community about the need for more standards-based, interoperable, and analytical systems to drive healthcare into the next era of more joined-up and improved patient care. However, it is imperative that these systems drive these objectives with minimum demand from the clinicians to become technology geeks.

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THE USE OF WEB OFFLINE SEMINARS BY BRAZILIAN PHYSICAL THERAPISTS

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The use of technology for health professionals especially physiotherapy has in recent years reached a magnification level and distribution, driven by the use of the Internet and digital media. The TICS with educational focus enable the expansion of knowledge without territorial restrictions, space and time. With professional training proposal, training, professional meetings, web seminars have been circulated. In Brazil through the Telehealth Brazil network program, linked to public universities, several areas of expertise has run activities in continuing education. The telefisioterapia Telehealth is one of the prominent areas of the State of Rio-Uerj River which accounts for an accessibility and arouses interest in the educational community in health as a proposal for continuing education for Brazilian physical therapists. Objective: To identify the use of Web seminars way off line by Brazilian physical therapists.

Methodology: The research data collection instrument was the Telefisioterapia database Center Rio de Janeiro State University of Rio de Janeiro in the period 2010 to 2014. The data analysis work lasted six months where the hits were tallied the platform to offline seminars. A descriptive statistical analysis of the number of hits being performed, recorded seminars, access location by federation unit and time of day to use the tool.

Results: The offline mode seminars presented a total of 4,101 hits on all 40 recorded seminars, representing 51.1% in the Southeast, 30.2% northeast, south 9.0%, 7.2% center -west, and 2.3% north. The period of use of the tool was 41% at night, afternoon 32%, 23% dawn, morning 4%.

Conclusion: The continuing education of physical therapists web seminars showed expanding and acceptance by Brazilians, but still seems to be more present in major centers, requiring strengthening to remote regions. The southeastern region, former capital of the country is a leader in its use while the northern region has to limit the use of this tool. An important fact is the connection day of the period being prevalent at night, showing a tendency to use at home and not in the workplace. Evidence of poor access to the Internet, use of technology and the program ignorance can influence this result.

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CLOUD APPLICATIONS ON AIRBORNE AND ALLERGY DISEASES VULNERABILITY

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Cloud computing is becoming an increasingly popular cost-effective enterprise model in which computing resources are made available on-demand to the user. Cloud computing offers many benefits to all enterprises and its service-users. The Cloud model moves IT infrastructure from an upfront capital expense to an operational one and organizations are using the cloud for large batch-oriented tasks which results in large processing powers in low cost. The major motivational factors of adopting Cloud computing, review the several cloud deployment and service models. It also offers several benefits over traditional IT service environment-including scalability, flexibility, reduced capital and higher resource utilization are considered as adoption reasons for cloud computing environment.

In current scenario ICT plays vital role in improving and streamlining the traditional systems of healthcare in India. Timely availability and delivery of healthcare service to the patients in India is still the challenge due to the dearth of Medical Health Facilities, Medical professionals and economical laboratory facilities. As despite of the recent developments the maintenance of Central Repository for Patient –illness or other clinical trial or less availability of electronic Medical Records for policy decisions still requires more efforts and computing integrations. Since the diagnosis of any illness is linked with the past history of diseases and care of the patient and even with other social determinants as well environmental factors. Hence the integration, virtualization of these factors using technology along with its linking with electronic medical records is essentially needed for controlling the quality of Healthcare services or diseases vulnerability in India. Big data technologies describe a new generation of technologies and architectures, designed to economically extract value from very large volumes of a wide variety of data, by enabling high-velocity capture, discovery and analysis.

Linking of Climate change/Weather factors , air quality, socioeconomic and health datasets using the Cloud computing and Big Data, will provides new insights to the human health and wellbeing, and underpins the development of decision support/alert tools that will promote resilience to healthy living environment for all living beings.

There are significant spatiotemporal lags between change in air-quality and health outcomes or occurrence of allergy and asthma diseases. Complexity presents an increasing challenge to the researcher and policymaker in understanding and addressing the possible risks of weather, air-quality causing airborne diseases, allergies and their timely benefits to human health and wellbeing.

The aim of this research is to define the algorithm for utilizing multiple evidence sources using Cloud Computing and Big Data as quality of service (QoS) for controlling the airborne and allergy diseases vulnerability. Introduce the Predictive Health Analytics as Cloud Service (PHAaS).

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IMPLEMENTATION OF ONLINE SAFETY INCIDENT REPORTING SYSTEM IN A TERTIARY CARE TEACHING HOSPITAL

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Background: Reporting and analysis of safety incidents in the hospital is an essential aspect of continuous quality improvement. Hospitals should have a robust incident reporting system in place to ensure timely reporting and for eliciting immediate response for critical events. This study serves to showcase the benefits of harnessing information technology in improving patient safety through online incident reporting.

Methods: The pre-existing paper based system for incident reporting was evaluated and a process mapping was done. The fallacies of the system were identified. Input was taken from the hospital staff regarding the features to be included in the online system. A web based platform was designed by the in-house IT department based on the requirements.

Results: The online reporting system was made available through the hospital intranet and was accessible from all the computers in the hospital. 84% of the incidents were reported on the day of occurrence. Once the report was submitted, it was automatically directed to the concerned staff based on the category of incident. It also featured SMS based alerts to ensure rapid dissemination of information. This was followed by implementation of corrective and preventive actions and submission of final report. 20% of reports were reviewed and addressed on the day of reporting and 45% within 3 days.

Conclusion: The introduction of the online reporting system enabled the hospital to ensure faster implementation of corrective and preventive actions. The user friendly nature of the software helped in ensuring acceptance by the hospital staff. The digital data capture facilitated easy analysis and creation of custom reports. The data thus collected can also be used as a baseline for assessing the impact of patient safety initiatives in the hospital

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HEARING SCREENING IN SCHOOL AGE CHILDREN IN EUROPE, CENTRAL ASIA AND AFRICA

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Hearing problems often may cause troubles with speech understanding, delay the speech development and can have negative impact on social development of the child. The prevalence of hearing loss in children increases with age and may involve different types of hearing problems that cannot be identified by neonatal hearing screening. Hearing screening programs enables early detection of different types of hearing disorders in chosen age group, early detection of hearing problems in the school-age children allows us to implement the effective medical and therapeutic procedures.

Aim: Comparison of the results of hearing screening in school age children in Europe, Central Asia and Africa.

Methods: Hearing screening was performed in the group of 1796 school children (two age groups – first- 7-8 yr, second 12-15 yr.) in Moldova, Romania, Russia, Tajikistan, Kyrgyzstan, Azerbaijan, Armenia, Senegal and Ivory Coast. Pure tone audiometry was performed on Sensory Examination Platform[®] with audiometric headphones. Positive result of the screening test was defined as any hearing impairment greater than 20 dB HL in any ear, at any frequency from 500 to 8000 Hz.

Results: Europe, 3 countries – positive results of hearing screening tests were in 62 children from 462 tested (13.4%). Central Asia, 4 countries – positive results were in 216 children from 1011 tested (21.4%). Africa, 2 countries – positive results were in 105 children from 321 tested (32.7%).

Conclusions: There are important / significant differences between regions in positive rates results. There are no significant differences between the age groups in hearing screening results.

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SOFTWARE PLATFORM THAT CARES FOR MOTHER AND HER BABY

Bhargavi Upadhya
Philips Innovation Campus

Background: One of the most precious moment in a woman's life is when she becomes mother. Caring for her baby is her top most priority. Can IoT revolution combined with cloud technologies and mobile apps provide her a sense of 'always connected' with her baby? Can we help her ensure her baby is growing well by automatically checking the baby's nutrition and vital body parameters? Can we improve health care in remote villages where there are hardly any doctors but people use mobile phones?

Methods: We looked at the options of improving the child care in a holistic approach by using tailored IoT devices, cloud technologies and mobile apps. Surveys across countries revealed that custom made mobile apps efficiently bridge the gaps between health care providers (hospitals, doctors, midwives, village health clinics). But it is the use of intelligent IoT devices that can monitor the babies and powerful cloud services that provide much more value to the consumer.

Results: Creating a 'software platform' that can handle diverse market needs, various country specific needs is not easy. But once built, it becomes a powerful base to drive innovative solutions to market much faster. This end-to-end solution brings down the cost dramatically as the consumer base increases in size.

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VIABILITY OF TELEHEALTH INVESTMENTS FOR DISADVANTAGED COMMUNITIES

Susheela Venkataraman
Asian Development Bank

Background: For many underserved communities, telehealth holds out great promise; at times, it is the only way to reach medical care to communities in underprivileged, distant or inaccessible areas. While many pilots have been implemented and have shown the feasibility of telehealth as a viable and appropriate mechanism, very few implementations have scaled up.

Method: This e-poster analyses the outcomes of three telehealth projects.

In Bhutan, a pilot used TV whitespace for bandwidth and a containerised eHealth centre. a project in Mongolia focussed on maternal and new born health. In Karnataka, a rural empowerment pilot included telehealth as well.

Results: All of these projects were successful in different ways. The Bhutan pilot showed that alternate technologies such as TV whitespaces are a good way to provide bandwidth to underserved rural populations. "Plug and play" equipment reduces setup time and makes support easier. The implementation in Mongolia was able to save many women's lives and improve local case management. In rural Karnataka, the pilot showed that it is possible to achieve financial viability when telehealth is part of a bouquet of ICT-based services. In all cases, government involvement and support were important.

Despite these successes, not many implementations have scaled up. The reasons include financial viability, poor infrastructure and the lack of primary healthcare systems and supply chain.

Conclusion: Technology is only one aspect of an effective telehealth implementation. There has to be a focus on integration of the entire eco-system including systems and processes, involvement of patients, data security, policies and financial viability. The technology and processes have to be simple, and there should be adequate technology support and skills. Lastly, telehealth has to complement other parts of the healthcare system. The government must commit itself to universal health coverage as well.

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SUCCESSFUL e-HEALTH FACILITATED EDUCATION, TREATMENT, AND REFERRAL FOR MENTAL HEALTH IN RURAL AFGHANISTAN

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Background: Afghanistan has a long history of invasion and war. Evidence suggests 50-60% of the population over 15 years is affected by at least one of four common mental disorders: depression, anxiety, post traumatic stress disorder, or substance abuse. While the Afghan Ministry of Public Health recognises the need for, and has prioritised, enhanced mental health capability, progress is slow. The country, a resource constrained setting, has an impossibly small pool of psychiatrists and mental health trained Community Health Workers and hospital-based nurses; alternative approaches are needed. A multinational team used conventional and e-health facilitated solutions to address the four most common mental health issues within Badakshan Province, Afghanistan. This ePoster summarises the process and results of the 3-year study from conception to conclusion, including some challenges and opportunities for scaling.

Methods: The methods included face-to-face and virtual networking (using community meetings (populace) and SMS (adolescents)); smartphone-based collaboration tools (for patient registration, assessment, and referral), smartphone-based blended learning tools (for CHW and nurse capacity building); and Internet-based videoconferencing (for psychiatric consultation).

Results: Comparison of baseline, mid-term, and final evaluation data has shown positive change in: awareness of mental health issues, superstition, stigma, and mistreatment of afflicted individuals (amongst the population and healthcare providers); knowledge and capability (amongst healthcare providers); referral and teleconsultation for patients; and implementation of a District Health Information System capability. Ongoing conflict caused some difficulties, and improved consistency in evaluations would have been beneficial.

Conclusion: eHealth offers significant potential to address the mental health needs of resource constrained locations, and to do so in a manner that improves popular and health worker based awareness, time to treatment, and access to psychiatric services, and is low cost (using simple technological solutions). Streamlining and scaling of the solution should be pursued.

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DISASTER e-HEALTH. GROWING NEED! GROWING INTEREST? MOVING FORWARD

Richard E Scott

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Background: Some literature shows natural and anthropogenic disasters are increasing in frequency and severity. Some shows an increase in attention to disaster preparedness. Other literature shows e-health to be a flexible and viable tool in handling healthcare needs – including in disasters. How can we bring these two worlds - e-Health and Disaster Management - together in a meaningful and mutually beneficial way? This study scans the literature for evidence relating to e-Health in Disaster Management and to collaboration between the two fields, and then extracts lessons relevant to developing collaboration between the two disciplines.

Methods: Searches of PubMed and Google Scholar (first 100 hits). Search strings were: ((e-Health or Telemedicine OR Telehealth) AND (Disaster Management OR Disaster)), and Collaboration AND ((e-Health or Telemedicine OR Telehealth) AND (Disaster Management OR Disaster)).

Results: A total of 85 (from 428) unique resources linked e-Health with Disaster Management, while only 3 (from 133) related collaboration with e-Health and Disaster Management. Since 1986 there is good evidence demonstrating application of various e-Health solutions to disaster management. In contrast, there is no evidence of any systematic process for developing informed and productive relationships between the fields of e-Health and Disaster Management.

Conclusion: e-Health has been used minimally in disaster response, and globally is seldom considered in Disaster Management planning, yet it could contribute at each stage of the disaster management cycle. Disaster Management is complex, involving international, national, sub-national, and local governments, organisations, and businesses, and every member of the ‘local’ (affected or responding) community. Collaboration is essential. The e-health community must actively engage with the disaster community to raise awareness and understanding, and to develop and embed e-Health within Disaster Management. Specific recommendations will be made as to a way forward, for which those in the e-Health field must take responsibility for action.

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TELE CERVICAL CANCER SCREENING FOR PEOPLE IN MOUNTAINOUS AREAS

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Background: Cervical cancer is one of the most common and deadliest cancers affecting women. Early identification and treatment provision helps in, halting its progression and curing the disease. One such effort to screen women for precancerous lesions of cervical cancer, is being done under the Himachal Pradesh Tele Health Services Programme. WHO’s ‘Guidelines for screening and treatment of precancerous lesions for cervical cancer prevention’ are being adhered to, under this service.

Methods: Gynecology services are being rendered to the people located at Kaza and Keylong, through Tele Medicine. An increasing trend of women with suspected lesions were identified and with an idea to screen them, tele-cervical cancer screening was initiated in January 2016. The coordinators were provided virtual training on PAP smear, and cervical examination by Gynecologist from Apollo Hospitals, Chennai. Cases marked as ‘at risk’ by the Gynecologist are provided a specific day to do PAP smear, under the specialists supervision. The slides are then sent to Apollo Hospitals, Chennai, where the pathologist provides a report on the smear.

Results: From 7th January 2016 to 15th June 2016, a total of 23 women have been screened under this service. Out of this 23 no abnormalities were found in 13 cases, benign cellular inflammatory changes in 5 cases, inflammatory changes in 1 case, atrophy and inflammation in 1 case, and atrophic changes in 1 case were observed. For rest of the two cases the slides were asked to be repeated, as the smear was unclear. Medication is provided to patients and they are being followed up for any changes.

Conclusion: Cervical cancer is one of the few cancers that is thought to be almost entirely preventable and this service is one step in that direction.

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TELE-EMERGENCY SERVICES IN THE HIMALAYAS: OPERATIONAL CHALLENGES

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Background: Himachal Pradesh Tele Health Services Programme, is an initiative to provide access to quality health care services to local communities in Kaza and Keylong. The terrain and topography of both the locations coupled with health seeking behavior of the local population, lead to several emergency situations, for which services are not available at the local hospital. Tele-Emergency services has been an important component of this programme, providing emergency services, for which people would have to travel around 250 km.

Methods: A complete emergency set up including 12 lead ECG, Spirometer, Defibrillator, medications and a console for tele-consultation, have been installed at both the locations. Patients in emergency situations are stabilized by connecting to Emergency physicians located at Apollo Hospitals, Chennai, through a tele-conferencing software, by trained coordinators. A local doctor available at the center manages the patient based on the advice of Emergency Physician and provide medications as per his suggestions.

Results: A total of 284 tele-emergency consultations have been done till July 2016, out of which 96 cases were females and 188 cases were males. Notable consultations include, stabilization of seven cases of Myocardial Infarction (MI), which include a case of Streptokinase administration. 2 cases were stabilized by administering Cardioversion, through tele-mentoring by the Emergency Physician. Patients are being followed up, to know the improvement in their condition. Voice Of Customer analysis showed the overall satisfaction with the services ranging between 9-10.

Conclusions: A major challenge other than connectivity and power issues, is utilization of Tele-Emergency services by even non-emergency cases which was considerably low (43/284). The health seeking behavior of the local population was also a big challenge, because some of the patients referred to higher center denied the service.

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TELE HEALTH SERVICES IN THE HIMALAYAS: OPERATIONAL CHALLENGES

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Background: Under Himachal Pradesh Tele Health Services Programme, quality health care services are being provided at two isolated locations, Kaza and Keylong. This inventive public-private association (PPP) provides access to general, specialty, emergency, and tele-laboratory services. A MoU was signed between Apollo Hospitals and National Health Mission, Himachal Pradesh, to deliver health care services at these two locations.

Methods: A turnkey solution was employed, on a Program Management Mode (PMM), with quantifiable points like milestones and monthly reports. Very Small Aperture Terminals were installed amidst landslides and Sub-zero temperatures. Local Staff were recruited from the community and along with local government staffs were trained in Chennai. Doctors at Apollo Hospitals, Chennai were sensitized about the interaction, through the Tele Medicine medium. Personal interaction by telemedicine coordinators on both sides ensured the traditional human touch. Point of Care Diagnostics were stationed at both the centers and a complete emergency set up was installed. Internal audit was performed and Voice of Customer utilized for obtaining patient feedback on the services.

Results: From the day of initiating the operations (21st April 2015) till July 2016 a total of 3,154 tele-consults were done. Of which 2,870 were general and speciality consults and 284 were emergencies. 1109 patients were benefited by tele-laboratory services and 23 women were screened under tele cervical screening. Under tele-emergency, 9 cases of Myocardial Infarction (MI) were stabilized, including two cases of Cardioversion.

Conclusions: Among major challenges were internet connectivity, power supply, and health seeking behavior of the patients, timely availability of doctors, and availability of medicines. In spite of all these challenges, this programme provides a proof of concept that quality health can be provided in isolated mountainous areas.

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TELEDERMATOLOGY: A REPORT ON HIMACHAL PRADESH TELEDERMATOLOGY SERVICES

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Background: Information and Communication Technology (ICT) has provided new channels and means for providing quality health care services. Tele Dermatology is one such example, for application of ICT in health care. Himachal Pradesh Tele Health Services Programme, run as a Public Private Partnership, has been providing dermatology services, as one of its component.

Methods: Kaza and Keylong located at 3,600 meters from sea level, were identified for the provision of Tele Health Services under this programme. Wood's lamp was provided at both the centers for examination

of the skin lesion. The trained coordinators take the history of the patient before the specialist arrives for consultation, to increase the efficiency of the whole process. The process of tele-consultation is live interaction, where the dermatologist from Chennai examines the patients located at the centers through live video conferencing. Medications are dispensed by the coordinators based on the prescription provided by the specialist. Coordinators performed a field visit to areas, based on the prevalence of certain dermatological conditions in respective areas.

Results: Till July 2016 a total of 419 patients have been benefited under these services. Out of the total, 229 were female patients and 190 were male patients, and all age groups ranging from 3months to 84 years utilized the services. Outbreaks of Tinea Capitis and hand foot mouth disease were identified and with the help of Government authorities, the community was sensitized to prevent further spread. Seborrheic dermatitis (49), acne (different types) (71), tinea capitis (15) and eczema (26), were among the most commonly diagnosed conditions.

Conclusion: The patients rated the satisfaction at 8, for the services provided. With limited literature available on Tele Dermatology in mountainous areas, this program, shows its impact in remote areas.

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SEEKING HELP IN AN ONLINE SUPPORT GROUP: AN ANALYSIS

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FACT FILE:

- * 70 mn: Approximate number of people suffering from mental illnesses in India
- * 3000: Number of psychiatrists in India
- * 11,500: Estimated requirement of psychiatrists
- * 500: Number of clinical psychologists in India
- * 17,250: Estimated requirement of clinical psychologists

Laughing Martian is an organization that was started with an aim to create a dent in the world. We're a team of young psychologists who believe that a great mind can create wonderful things in this world and promoting neurodiversity should be one of the primary goals of the human race. The rationale is simple, every human being in this universe is here because they add value to our lives.

In our experience as individuals in this field we realised that people struggle to get through their life with each passing day and we felt that this is something which should not be a struggle for anyone. We also realised that people due to nature or nurture who developed certain psychopathology were ostracized which resulted in their exacerbated symptoms. Therefore, we came together to form this organization whose sole responsibility is to increase resilience in human beings and enable them to lead more adaptive and satisfying lives.

Our objectives include:

1. Connecting people via anonymous platform (online app)- create a safe and secure environment.
2. Developing an economical infrastructure to scale development of mental health in India.
3. Increasing ease of identifying people needing help.
4. Sustainable model of mental health treatment in India.

We began our journey in October 2015 and decided to take up one psychopathology at a time. We researched on substance intake patterns in individuals around the world and explored suitable interventions which could help them. This research was also published and won an award under 'Best Innovation in Public Mental Health' at the International Conference on Public Mental Health and Neurosciences in Bangalore. With the approval of the psychology community at NIMHANS Bangalore we went ahead with our q.u.i.n.t.o model and were able to assist 200 people (from Delhi, Bangalore and Chennai) in reducing their respective addictions.

Our team is led by two psychologists Ms. Anusha Arora and Ms. Archana Rebbapragada. We hope to continue on this mission and achieve our goal of making a million struggling individuals mentally healthy by

2018. We are to conduct workshops in Delhi Public School R.K Puram and Amity group of institutions from July-August 2016. We hope to generalise this intervention for all schools and colleges across Delhi NCR.

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TELEHEALTH ASSISTANT COURSE

Srinivas Rao,¹ K Ganapathy²

¹Apollo Medskills, ²Apollo Telemedicine Networking Foundation

Telehealth is an example of the deployment of Information and Communication Technology in providing remote healthcare. It is particularly useful in low resource settings, to bridge the urban rural health divide. Telehealth makes distance meaningless and Geography History. Worldwide there is an acute shortage of healthcare providers. In the last two decades, in India, individuals with a passion and commitment have tried to introduce Telehealth in the Healthcare Delivery System. They were all self taught. Telehealth is now increasingly being deployed by more hospitals in the public and private sectors. Telemedicine infrastructure is becoming available in district and medical college level hospitals across the country. Most institutions having TeleHealth infrastructure are unable to recruit personnel with the necessary blend of technical, healthcare and basic managerial skills. The time is now opportune for creating a formal cadre of TeleHealth Care Facilitators.

Apollo MedSkills and Apollo Telemedicine Networking Foundation will impart the TeleHealth Assistant (THA) course endorsed by the National Skills Development Council of the Govt of India. This will provide entry level formally trained personnel with skills to deliver and manage these new eHealthcare delivery systems. The certified THA will understand the design, selection, procurement, installation, management, maintenance and evaluation of TeleHealth systems appropriate to present and future needs. The THA will be exposed to basic clinical skills and will be able to administer a telemedicine unit understanding the needs of the Tele consultant, Vendor and the Patient. The curriculum will include - *Introducing Healthcare , Telehealth overview and application, technology used for store and forward and live interactive teleconsultation, home TeleHealth protocols and procedures, assisting Teleconsultants , understanding the attributes of successful TeleHealth programs and building awareness and support for such programs, communication skills and client services.* Minimum Eligibility criteria is completion of 12 std. 11 weeks of online classes and 1 week of contact program and hands on exposure will be followed by assessment after completion of all modules.

The poster will visually demonstrate the importance, necessity and unique nature of this first of its kind initiative.

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BETTER PHARMACEUTICAL INDUSTRIAL OUTPUTS THROUGH ANALYTICS

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Objective: The pharmaceutical industry develops, produces, and markets drugs licensed for use as medications. Pharmaceutical companies are allowed to deal in generic and/or brand medications and medical devices. They are subject to a variety of laws and regulations regarding the patenting, testing and ensuring safety and efficacy and marketing of drugs. The objective of this presentation is outline the challenges pharma industry is facing with respect to sales and marketing and lead discovery and optimization. The paper lists the various bottleneck with respect to sales force and performance. It gives a procedural phased framework on how analytics can tackle the issue. The paper also presents several examples and current practices adopted by Pharma industries with respect to analytics.

Methodology: This study analysed extant literature, identified gaps. It analysed the current practices in the developed markets and in emerging markets. Based on the gaps the paper explained analytics and its immediate methods that are relevant to industry requirements. The study is exploratory in nature.

Findings: Companies fail to realize the competitor's analytical asset despite having robust technology tools. In order to address the challenges that industry faces, there is a need to improve its commercialization capabilities and here is where Analytics plays a huge role. To measure the performance of sales force where companies can turn the data into information. That capability may be as basic as providing monthly or quarterly standard reports of their sales by each of their representatives or it can be as complex as providing data cubes that enable power users to conduct ad hoc queries to understand market share trends by customer segment and by product line. Reliable history of all key data. A major step in evolving the sales and marketing analytics capability is to move from straightforward performance tracking, to the analysis of that performance. Depending on the specific medical device sector and how one goes to market, there can be dozens if not hundreds of relevant and insightful analyses.

Research limitations: An exploratory study of pharma data with respect to analytics context, though extremely important would need to be empirically tested by different market verticals. Data being unstructured, and the competitor data is very turbulent to business environments, the analytics framework can make a crucial strategic contribution to organizational success.

Conclusion: The Indian pharma industry is undergoing a massive overhaul through business transformation driven by technology initiatives, regulations and patent hassles. The attractiveness of Indian pharma market will increase competition. With data management and analytics high in the priority list of Indian pharma firms, the adoption of big data will increase manifold. The focus of this paper has been to evaluate the competitive scenarios in the Indian pharma industry and to identify how analytics capabilities can fit the requirement to analyse industry needs. The information on competitors is widely scattered and not easily retrievable, this makes it a prized asset. Technologies like big data and advanced analytics can help firms build critical insights about competition in the industry.

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DMPR: AN ADVERSE DRUG REACTION DATABASE AND TOOL KIT FOR RETRIEVAL OF RELEVANT LITERATURE

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Adverse drug reactions (ADRs), one of the major causes of failure in drug development, have become an important subject of research in the pharmaceutical industry. As a part of our research work, we developed DMPR database in MySQL, containing complete description of Drug-Protein-ADRs information, Drug-Drug and Drug-Food interaction information with evidence from literature. DMPR database contains unique combination of more than 1500 Drug-Protein-ADRs and few thousand Drug-ADRs information. Evidences are mainly collected from literatures, public databases and from different online websites using web scrapping technology. The web interface (front-end) developed using Bootstrapping technology, provides variety of browsing and search options, help page which guides user step-by-step, database statistics in graphical format and links to the original sources from which the data have been collected.

We also engineered "e-Scider" (Scientific data fetcher) an application to obtain most relevant literatures containing Drug-Protein-ADRs information with statistical output in pictorial format. e-Scider was developed in Python using text mining approaches for retrieval of literatures containing ADR or any other terms from various databases like NCBI's PubMed and European Pubmed Central also assign the retrieved articles in most, moderate and least read categories. It allows retrieval of article information like title, author(s) name, abstract and also enables user to download multiple full-text articles in a single platform in short duration of time. DMPR database and e-Scider server will be freely available for commercial and non-commercial organizations.

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DEVELOPMENT OF AN ANDROID APPLICATION FOR DRUG AND POISON INFORMATION CENTER (DIC)

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The term drug information was developed in the early 1960s, the first DIC was established at the University of Kentucky in 1962, and the Center was established to act as a source of selected, comprehensive drug information for staff physicians and dentists. Now a day the easy accessibility of unregulated health information over the internet may prevent healthcare professionals from using DIC and may result in potentially misinformed consumes. The possible reason may be many are not considering sending a formal letter to DIC when they are in need of information. More over the time bound functioning status of DIC also adds to the limitation. The possible solution to these problems would be taking the DIC to their close proximity, where comes the concept of developing Smart Phone APP.

Aim and Objectives: The proposed work is to develop and evaluate an android mobile application for Drug and Poison Information Center (DIC) functioning at Government Headquarters Hospital Ooty, The Nilgiris District, Tamilnadu.

Methodology: Study Period: August 2016 to March 2017. Study Site: Drug and Poison Information Center, Govt. District Head Quarters Hospital, a 420 bedded secondary care hospital. The work is focused to Develop, Implement, Evaluate and Launch the developed Android App for Drug and Poison Information Services.

Inference: Developments in information technology have improved our ability to store and access the vast amount of drug information. Many of the databases available online are expensive and may not be affordable for individual physician, pharmacists or any healthcare professionals (HCP). Drug information resources available online are not peer-reviewed and the information contained in them needs to be carefully evaluated. Further DIC focus on evidence based medicine in any time needed by the HCP, which integrates current clinical research evidence with pathophysiologic rationale, professional expertise and patient preferences.

Conclusion: A drug and poison information service through App can make a positive impact on public health by providing easy access and immediate response to HCP.

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