

**“Clinical Decision Support: A Practical Guide to Developing Your Program to Improve Outcomes”**  
(Abstract: 053)

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This workshop will provide attendees with a practical approach to developing and deploying clinical decision support (CDS) interventions that measurably improve outcomes of interest to a health care delivery organization. The following key steps, including overcoming barriers, will be examined in detail: initiating an overall CDS program, including selecting appropriate CDS goals and enhancing organizational structures needed for CDS success in the context of current health care drivers and enablers; selectively implementing CDS technology to achieve a specific goal, with a focus on stakeholder and process analysis; knowledge management; and following up and monitoring CDS interventions. Special considerations in CDS for small clinical practices, for hospitals and health systems and for vendors will be explored. The course content is drawn from the tutorial leaders' popular and award-winning guidebook series on improving outcomes with clinical decision support, with newly revised material published this year.

**“Best practices in Clinical Decision Support – Latest trends in EMR technology and its impact on clinical decision making process”**  
(Abstract: 108)

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This abstract focus on the Best practices in the Clinical decision support systems, with emphasis on the various Clinical Decision support categories, Clinical decision support in the health care for the targeted HealthCare delivery solution , Exploring the Active and Passive systems , Understanding the successful CDS systems and advantages of CDS system in Health care industry. The main purpose of Clinical decision support system is to assist Clinicians/Physicians and fill the gaps in care. The clinicians interact with CDS system to determine diagnosis, Member profiling and analysis on the patient data to understand the trends in disease/care management.

Highlights:

- What is Clinical Decision Support?
- CDS Categories
- CDS Target Area of Care
- Need for CDS
- Active and Passive Systems

- Successful CDS Systems
- Advantages / Disadvantages of CDS

**“Healthcare Interoperability and Collaboration”**  
(Abstract: 041)

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This workgroup is aimed at all healthcare service providers and covers the latest ICT trends and standards in the healthcare industry. Topics to be covered include: The emergence of EMR, EHR and interoperability Elements of a healthcare information network New collaboration and unified communication trends The role of mobility in healthcare New generation of e-services Challenges of the Indian market

Host

The workshop will be hosted by Johan Griesel, a veteran in IT and healthcare of more than 16 years. The objective of the workshop is to help attendees understand the need, advantages and new opportunities presented by the latest technological developments in information and communication technology.

**“Online Medical Education”**  
(Abstract: 033)

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- 1)How to make a website in 10 easy steps
  - 2)How to conduct an online examination
  - 3)How to create an online course
  - 4)Important softwares and materials for creating online course
  - 5)Simple videoconferencing methods for tele-education
  - 6)How to Publish an electronic Journal
  - 7)How to organise a conference electronically
- The audience for this course is Medical Teachers and ordinary doctors who are primarily involved with the Patients and need some basic knowledge of topics above so as to use the power of Information technology towards using it to improve productivity of Medical Education and their Medical practices.

The Objectives of the Workshop are

- 1)Improving quality of medical / paramedical education and meeting the educational needs of the students despite paucity of teachers and infrastructure by empowering the Medical Teachers to create their own websites
- 2) Improving quality and reducing the cost of health

care delivery by tele-education and tele-assessment .

3)To facilitate cognitive component of learning” by providing interactive teaching material online (Medical Educational Portal) developed by a Consortium of competent teachers at undergraduate, postgraduate and super-specialty levels by involving Medical Teachers .

4)To promote medical research by providing infrastructure for quick exchange of ideas and co-ordination with group of researchers involved in collaborative multicentre studies and facilitating current information access through interactive network.

5)To facilitate Online Continuing Medical Education (e CME) to enhance knowledge and teaching skill and possible Accreditation of Medical Teachers and Health Care Professionals

6)To facilitate Implementing uniform examination pattern and evaluation Coaching students with online and offline in MCQs designing using electronic means

7)Enhancing computer literacy and ICT based skill among medical students and teachers

8)Sharing of Electronic Knowledge resources relating to Medical Education

**“Easily Accessible, Affordable & Advance Healthcare Solution. Vista integrated with CRM”**  
(Abstract: 115)

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India Today needs a healthcare solution that is easily affordable and accessible by all. Such a system is only possible if it has the back bone of an advance IT technology that caters to the need at affordable price-point. Call Centre today is the first line of communication with people in any Service Industry be it telecommunications, finances, automobile, and much more. This paper will focus on the need & services a call Centre can provide to the patients as well as to the Hospital at an affordable price point taking into account easily accessibility & advance integration with HIS at a low cost as done by GTI Infotel through MediCall Hospital Resource System. The same has been implemented & is successfully running at various hospitals including the prestigious Jai Prakash Narain Apex Trauma Centre, AIIMS, New Delhi.

**“E-Health Standardization- Indian Experience”**  
(Abstract: 075)

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Adoption of health information technology has been one of the major issues to see if it can make the process of delivering healthcare for rural & geographically distant population spread across India more efficient. With limited networking among multitude of healthcare providers working in isolation, need for a standard health information system across the country that meets the requirements of diverse groups and to be able to offer value to the most important stakeholder - the patient has been strongly felt in India. Further Electronic medical records and hospital automation are now being adopted in many of the hospitals. With India starting to make strides in the field of telemedicine and e-health the policy makers in India were convinced that the recommended set of standards and guidelines on telemedicine needs to be set in place for its optimal growth. Considering these trends and observing the international scenario, especially growth of propriety systems that made health information exchange difficult in most of the developing nations, Department of Information Technology (DIT), undertook the initiative for defining the framework for an Information Technology Infrastructure for Healthcare (ITIHC) in India. Simultaneously, under a high level Committee and a Technical Working Group, a set of Standards and Guidelines were suggested for the practice of Telemedicine in India. These efforts, among other things, go a long way in proposing standards which are crucial for consideration in development of Indian Health Information Network. As its pioneering effort for defining ITIH, the major stakeholders in the industry were consulted to define the standards for health information in the country with a primary aim to define an acceptable Electronic Health Record (EHR). A number of National initiatives for standardization in IT enabled services for Healthcare, including Telemedicine are drawing substantially from these pioneering efforts. These include initiative of National Knowledge Commission, to set up Working Group for suggesting Indian Health Information Network Development (I-HIND). Ministry of Health & Family Welfare’s Task Force on Telemedicine Standards and the ongoing initiative for Electronic Medical Record (EMR) standardisation. With increasing adoption of Information Technology in different sectors of healthcare in India, it is expected that these standardization initiatives would go a long way in bringing efficiency in integrated healthcare delivery in India. The present paper narrates the experiences of these initiatives and the lessons learnt in the process.

**“Virtual Markets And Hierarchies In Indian Health Care Services”**  
(Abstract: 013)

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The objective of this paper is to analyze the emergent virtual health care infrastructures of the Indian health care system. Particular attention is focused on the role of these infrastructures in services markets serving diverse public and private system stakeholders. This qualitative study also considers social media integrating the increasingly decentralized health care system-including national and individual citizen levels of analysis. Decentralization of services helps to assure system integrity and effectiveness through local data collection, accountability and evidence-based management, while public-private partnerships contribute to system efficiencies and integration. This paper defines some managerial issues in the perspectives of diverse stakeholders including government institutions, non-governmental organizations (NGOs), public and private health care providers and patients.

### **“Sustainable and Large Scale Telemedicine Services in Developing Countries: History and Current Trends”**

(Abstract: 073)

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For many years it has been hoped that Telemedicine could improve healthcare systems in developing countries by improving access to under served areas, and helping to make up for a general lack of health resources. Although a number of different approaches have been tried, utilization of Telemedicine in developing countries has still not met expectations. Some estimates indicate that in fact less than 0.1% of the potential demand for usage of Telemedicine to obtain second opinions and advice from specialists is being met.

A key issue seems to be that, although many pilot projects have been conducted, it has proved to be difficult to use the experience from these projects in order to develop sustainable Telemedicine services. When sustainable services are developed, their utilization also seems to be lower than would be expected. Even in cases where a very low cost service is offered that is valued by its users, it seems difficult to get the utilization rates for these services to grow to large scale. In this respect it is still unclear how best to approach the development of sustainable and large scale Telemedicine services for developing countries.

This presentation will focus on this issue while considering how to approach the development of large scale and sustainable Telemedicine services for India. The presentation will provide an overview of some Telemedicine systems that have been implemented in

developing countries over the past several years, along with some challenges faced by these services with respect to sustainability and utilization. It will also look at some recently identified challenges when trying to set up in country Telemedicine networks in India, and consider how one recent successes in using Telemedicine for eye care may serve as an example for the future.

### **“Cloud Computing as a key to Rural Healthcare Reform”**

(Abstract: 043)

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Almost three-quarters of the Indian population (about 900 million people) lives in remote areas, and health services in general are inadequate for these people. In remote villages, some of the healthcare providers have formal training in alternative medicine, some have no formal training but are recognized by the government (i.e. Registered Medical Practitioners), and some have no formal qualifications or government recognition. On other hand in India there are not only different types of health providers but also disparate systems of healthcare delivery such as the government (public), charity, missionary & corporate hospitals and numerous private clinics. Currently, all health providers work in isolation from one another providing no means for continuous care to the patients.

One solution to this problem is to establish a network among care providers in both public and private sectors to share or transfer medication as well as other patient information. The present IT infrastructure and advancement in cloud computing strengthen India's position to initiate health informatics projects. Government of India needs to promote and encourage its care providers to use electronic health record system.

This presentation demonstrates the Cloud-based Electronic Health Record (EHR) system that was implemented in Xilingol county of Inner Mongolia (China) designed to support work at all levels of the healthcare system. One of the goals of the system is to empower the RMPs so they can register the health information of their community in a way that will improve “last-mile care” to the rural population. This includes enabling preventive medicine, management of chronic diseases, and integrated care between the village level and higher levels of the healthcare system. Cloud EHR systems have great potential to empower rural health workers in developing countries and improve last-mile care. These systems can be utilized by rural health workers that do not have extensive medical education or previous computing experience. The model is also worth exploring in other contexts in both developed and developing countries to enable large

hospitals that can afford IT departments to support primary healthcare providers in rural areas with cloud computing architecture.

## **“A proposal to create new models of medical education to better serve the health care needs in India.”**

(Abstract: 036)

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The practice of medicine requires the synthesis of a vast amount of information, yet in the traditional medical school curriculum the information is provided in disconnected pieces and out of clinical context hence we need an integrated curriculum. There is continuing explosion in new knowledge (genomics, personalized medicine). How should we harness this for improving human health? We have to incorporate modern biology in the training of every physician in India. The traditional method of medical education (with few exceptions) is based on passive learning (“cramming of lectures”) that has not changed much in the past 50 years. We have to transition to active learning in which the student gathers majority of the facts himself/herself and learns to apply the knowledge so obtained in solving clinical problems. Thus the medical education has to change in a manner that promotes active learning.

One method to accomplish the above is to create a standardized competency driven and case based method of medical education that can be delivered to every medical student, rich or poor, urban or rural by electronic methods. This can make the playing field level for students in elite, well resourced medical schools and provincial, often resource poor medical schools.

Important in the design of the case based curriculum will be integration of basic sciences to the practice of medicine so that the goal of personalized medicine is embedded in the training of future physicians of India. In keeping with the philosophy of active learning the system of examination has to change from its current focus on testing “facts” to testing “competencies” in the application knowledge. A system in which the end point is acquisition and measurement of competencies does not impose any single method for acquisition of such competencies, but provides flexibility to utilize a variety of teaching methodologies/models to attain the competencies.

## **“A Framework for Linking Data Quality to Quality of Medical Decisions using Clinical Decision Support Systems”**

(Abstract: 111)

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The topic of Data Quality has been well researched, yet, the study of Data Quality in specialized Applications has been relatively less explored. Most of the existing research works have studied how to measure the quality of data, but not in the context of impact of the quality of data on the quality of outcomes based on decisions derived using the underlying data. This problem is significant in the field of Clinical Decision Support Systems, since poor quality of data in medical records and databases poses a risk in medical-decision making process. Again, limited literature exists in the study of select data quality factors that contribute to specific business outcomes; even more limited in the study of Clinical Decision Support Systems to determine data elements that are most critical for minimizing the risk of negative medical consequences. In this paper, the author examines various published DQ Assessment Methodologies, evaluates their applicability to study of DQ in Clinical Decision Support Systems and proposes a framework for such assessment. The Author recommends approach for future work in implementing this framework.

## **“Rework module of the Health Claims Analytics Workbench”**

(Abstract: 107)

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Health insurers are under increased pressure to improve the way they do business. However, inefficient business processes, lengthy claims processing and outdated information management strategies are proving to be formidable roadblocks to demonstrating value to those who purchase health care benefits. In United States for every dollar spent on health insurance, 6 cents is spent on claims processing and related administrative services. Any opportunity to improve the payment accuracy and thereby reduction in rework on claims will help reduce the overall costs. This abstract details about Rework module of the Health Claims Analytics Workbench (HCAW) and was developed by Accenture to improve payment accuracy and reduce claims rework administrative cost.

- The module uses predictive analytics to identify errant claim payments prior to payment.
- The analytics are effective at identifying all types of claim adjustments— overpayments, underpayments and non-financial issues
- Unlike rules based approaches and fraud aberrance detection analytics, the module learns from adjustment history to detect patterns in rework data, and systematically adjusts to changes in

rework trends over time maximizing benefits.

- Leverages machine learning that incorporates audit findings to improve model performance and audit hit rates over time.
- When used to evaluate claims prior to finalization in combination with audits, the tool can drive significant rework prevention admin and medical cost savings, and improve medication therapy management scores.

Business Value:

The combination of the Rework tool with pre-pay audits can reduce claim rework administrative cost waste by 10-20 percent and increase medical cost savings by 5-15 percent of existing recovery collections.

Results Achieved :

- The tool was re-platformed and integrated to Client needs in a short span of four months as against a typical lifecycle that takes more than 12 months to accomplish a project of this complexity.
- The tool meets all the performance needs of a large claims processing and auditing system. The tool scores and audits approximately 15000 claims in 45 minutes to identify rework opportunities.

### **"Paradigm shift in PACS"**

(Abstract: 032)

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- PACS just a few years back was seen as a monster – too difficult to handle and too expensive to afford

But with the following significant changes having taken place in the recent past, viz

- Hardware getting standardized and costs coming down
- Most of the companies adhering to the global compliance / standards, interoperability becoming easy
- Wide spread usage of internet having reduced the resistance of people against using computers
- Advent of Mobile devices making information available on the move
- Technology having come in to overcome the challenge of lack of bandwidth
- New open standards for storage making migration of data no more an issue
- Collaboration platforms making consultation easy and friendly

- PACS has become user friendly, affordable and so valuable that from Good to have it has become a Must have for all the hospitals.

### **"Leveraging social media collaborative technologies for better care"**

(Abstract: 055)

**Johan Griesel**

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Today's world is witnessing an unprecedented convergence of Information and Communication Technologies. Rapidly increasing internet and mobile phone penetration, easier availability of bandwidth at much lower costs, new generation handhelds and other mobile devices have fuelled the explosive growth of online collaboration and the social media revolution. What impact could this have on the way healthcare services are delivered in the future? How can we leverage this to practically deliver Electronic Health Records, Tele-Medicine and other services that can make healthcare safer, easier to access and more affordable? This keynote showcases a vision of how this is possible today and also why we are ideally positioned to be a leader in achieving this transformation.

### **"A new milestone for hospitals - data mining and business intelligence"**

(Abstract: 014)

**Karanvir Singh**

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Hospitals using a hospital information system (HIS) accumulate a huge amount of transactional data during their daily activities. Extraction of this data in an analyzable form to maximize the benefits of the HIS is given relatively low importance. Most hospitals rely on a set of standard reports made using fixed criteria. Unlike standard reports, data mining and business intelligence (DMBI) software tools allow on-the-fly data analysis of stored data, adding the ability to make informed decisions based on one's own data. It allows cause-effect analysis so that reasons for a current trend can be understood and administrators can perform a "What If" analysis to predict future trends. The essential feature of dynamic data mining is that the analysis criteria are decided by the user on the fly rather than approaching a programmer each time, who could take days adding a new criteria. Currently the number of hospitals using such a tool in India is not even half a dozen, even though the number

of hospitals using a HIS is in hundreds. There is an old adage: What gets measured gets managed. Historically, hospitals have been data rich but information poor. IT investment had done little to enhance the strategic use of data, till BI came along. Implementation of a HIS and an EMR is simply a milestone along the road and for most hospitals the real breadth of investment in their HIS does not begin until they can use this data to define, guide and measure enterprise process improvements. Essentially, business intelligence is what provides a return on investment on HIS investments. Our hospitals experience in using a data mining cum business intelligence tool over the past two years will be the subject of this presentation. Its use by the administrators as well as by clinicians for medical data audit will be highlighted. Examples will be provided of different types of pivots, key performance indicators (KPIs) and dashboard used for hospital workflow analysis as well as for medical data analysis. The return on investment on the cost of purchase of the software will also be discussed.

## **“Electronic Health Records- A Global Perspective”** (Abstract: 034)

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Countries around the world are embarking on implementing Electronic Health Records (EHRs) in anticipation of this technology bringing about a revolution in healthcare delivery. These countries can benefit from the experiences of other countries who have been pioneers in implementing such systems on a national scale, albeit in very different political and social environments. There is tremendous variability in the use of Healthcare Information Technology (HIT) within and between countries, across regions and political jurisdictions and among sectors (e.g., Inpatient versus ambulatory). Despite, or perhaps because of these differences, there are many lessons that we can learn from health informatics strategies and exemplars in other countries.

The HIMSS EHR Global Enterprise Task Force (GETF):- Based on a directive from the HIMSS Board of Directors, the HIMSS Global Enterprise Task Force for EHR was launched in July 2006 and charged with identifying best practices in EHR implementation and integration efforts globally. Dr Pramod Jacob was the lead representative from India in this task force.

The objectives of the EHR Global Enterprise Task Force were:

- To study and describe significant Healthcare Information Technology (HIT) efforts being pursued in nations globally.

- To research those aspects of a solution that differs from one nation to another.
- To identify the common threads in national EHR adoptions that lead to success or failure
- To incorporate best practices into a road map for the development of a successful solution for EHR and other HIT implementations.
- To understand the funding, architecture, and delivery systems of solutions in countries
- To join and communicate with nations of the world to help promote common goals in the global adoption of Electronic Health Records.
- To publish a white paper with the findings of the task force.

This presentation is based on the latest version of this white paper titled- Electronic Health Records: A Global Perspective, published in 2010.

Drawing from experiences around the globe, the presentation will focus on major initiatives, highlight successful innovations, and offer key lessons learnt.

The presentation will go into details of EHR implementation successes and failures in specific countries, such as Canada, England and the US, which are well into the process of implementing large-scale EHR initiatives at the cross regional or provincial level. Initiatives in South and South East Asia such as Malaysia and Singapore will be mentioned.

Hands-on experience and comparative research with these and other global initiatives can help guide efforts in those nations embarking on EHR/HIT initiatives, by underscoring the need to understand the extent of change produced by national EHR programs and information technology, including unintended consequences. The presentation will discuss how they worked to engage physicians, nurses, and other clinicians from the planning process on, and to collaborate actively with the vendor community. The presentation will emphasize the need to adopt standards, create a critical mass of users, protect privacy of patient data, communicate with all stakeholders, and customize strategies.

## **“Establishing Tele-Ophthalmology Centers in the North East”** (Abstract: 051)

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SATHI has been involved in implementation of Telemedicine. It has always had a meticulous approach in providing solutions to grass root problems where only appropriate, easily available and low cost technology is used to fill the gaps in provision of healthcare. Our meticulous approach includes Needs assessment,

Concept Marketing, Orientation and Capacity Building of all the stakeholders, Identifying the technology gaps and how to fill them. Standard procedures are followed. Emphasis is placed to solve the main reasons for poor outcomes which including connectivity, funding and simple but rugged Hardware is used so that help and troubleshooting is always at hand. We do not mind piggy riding on what is easily locally available and build on from there

Looking at the success of our previous project on telemental health support to the 2004 tsunami victims, we have been trying to identify healthcare problems which are suitable for such support. This presentation will attempt to showcase the overall vision, plan and progress of a currently ongoing project.

## **“Implementing Tele Ophthalmology”** (Abstract: 040)

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Spanco (A private company) and SATHI (an NGO) have joined hands with the Government of Mizoram to implement a tele ophthalmology project. The project is as yet in the implementation stage. The presentation will try to explain the problems faced and solution suggested. This can be provide a road map to the audience on how to work as a PPP in the ehealth arena.

## **“TELEMEDICINE SUPPORTED TOTAL EYE CARE PROJECT (TSTCEP) TRAINING PROGRAM”** (Abstract: 042)

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### INTRODUCTION

Advances in Healthcare and Informatics have kept apace, There are immense possibilities through the newly developed technologies to provide relief in far flung areas where even basic needs is an issue. However much groundwork in the form of technical knowledge and capacity building is required.

SATHI (Society for Administration of Telemedicine and Healthcare Informatics – [www.sathi.org](http://www.sathi.org)) has been managing a program run under NPCB (National Program for Control of Blindness) in the northeastern states to provide Telemedicine based support for Eye Care. As per the projections of the Ministry of Health and Family Welfare, a few thousand such centres are planned where Ophthalmic Assistants based at the block level shall co-ordinate and support procedures and advice by

Ophthalmic Surgeons based in Specialist hospitals with less need for the patient to physical travel.

Last month Aster offered to run a Training cum Workshop designed to provide a working frame for the development and implementation of the course. Three ophthalmic assistant were trained and the designated coordinators included ASTER team, SATHI members and SPANCO.

TSTCEP seeks to use this experience to provide a base for the sharing of information and resources in order to educate and promote telemedicine initiatives in the field of ophthalmology.

### OBJECTIVE

TSTCEP Mission is focused on educating, promoting, disseminating, building and applying telemedicine and teleophthalmology. As part of its commitment, Aster has designed a telemedicine course to train paramedical staff – optometrist, optician/ophthalmic assistant in anchoring teleophthalmology center at community levels by enhance knowledge which leverage technology of its associates (SPANCO) and fellow regional colleagues (SATHI) in order to increase access to Eye care for those in the Rural India.

### METHOD

The group was trained for 15 days which included class room lectures followed by workshop at two eye care hospitals and a optical center and a information trip to lenses manufacturing company. Some of the lessons were done online using tools like Skype, Cloud based computing and Teamviewer. The conclusions were presented by conducting a written assessment which included a one hr questionnaire of 60 marks and spotting of 40 marks designed by senior consultant ophthalmologist.

## **“Telemedicine Supported Limb care in the Periphery”** (Abstract: 030)

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### Background

Filariasis with over 250 million population at risk is the 4th highest cause of morbidity in the world with India contributing over 50% of affected persons. While China has managed to control the occurrence of fresh cases, India is lagging far behind. Efforts for reducing incidence by single day mass therapy of DEC in affected districts have a compliance varying between 25 - 60% when over 80% is required for effectiveness.

The reasons for this are many but one which can really make a difference is morbidity control through the complications like Hydrocoel and Lymphoedema which so far have been neglected. We have treated these problems and have proved they are treatable. There is a prevalent reluctance to treat such dreaded complications which should be corrected by providing training as well as tools for the treatment. This will make an important difference to the management and control of an important but neglected healthcare problem.

### **What is innovative about this project**

Based on a 1981 thesis at AIIMS wherein imported pumps and garments were used for therapy, treating lymphoedema has been possible since the 90s with indigenous equipment available at far lower cost. Our results have been largely successful (ref-Ind J Plast Surg. 2009;42:22-30) and even emulated on a mass scale in Tamilnadu. Conommittant mass therapy program of DEC for Filariasis resulted in a fall in incidence in a few selected districts eg Kanyakumari but then, with change of staff and little maintenance, discontinued and the mass therapy program started failing.

A different public/private approach is now required wherein the equipment in the form of pumps and customized garments have to be supplied alongside mass training of para medical workers and local healthcare staff on the hows and whys of using such treatment modalities. This includes leg washing, antibiotics, exercize methods, bandaging techniques etc. Regular follow up is the key which is now possible through telemedicine.

### **Bringing Healthcare for the masses**

There are over 20 million actual sufferers of Lymphoedema in India - largely in the coastal regions as well as East UP, Telengana and Bihar. Although the treatment is simple - can even be provided by para medical workers with occasional monitoring by experts. Monitoring is easily possible through Telemedicine.

Currently established treatment modes depend on surgery which not only requires the patient (and relatives) to be not only present themselves to an metropolitan expert centre for periods of a month or more at great cost, the effect of the surgery treatment is not lasting. Complications and or recurrence means the same process is to be repeated again and again.

We shall be providing care at far lower cost at the patients door step. Recurrences and complications are also managed largely without a need to travel.

### **Financial model and plan for sustainability**

SATHI has a collaboration with SPANCO to provide these facilities in the high endemicity villages where they have setup IT based Village Resource Centres (VRCs). SATHI will provide training to local healthcare personnel so they can manage the problems in teleconsultation with lymphologists. Our earnings are through consultancy. and supply of equipment/bandages.

The cost of treatment is roughly Rs 3000 for the first month and Rs 1000 pm thereafter for 2-3 mths. The cost of the equipment and training is roughly 75000 which can be recovered within one year based on an average of 50 patients per location. Doctor fees are adequately factored in this model besides cost of consummables and other recurring expenses. The project envisages using existing ICT infrastructure available from Spanco and other such organisations which will significantly reduce the capital required necessary for a green field project.

### **Summary of implementation plan**

With basic infrastructure in place rolling out the project will take less than 3 months. It is expected that once the state government realises the potential of this PPP approach, it will offer to share it's infrastructure to include larger areas and service more patients thus bringing down the costs due logistics, stocking and training etc. This can include all the filarial endemic districts (Over 120 million population at risk) and other lymphoedema prevalent areas like temple towns eg Deoghar in Bihar. Follow up and maintenance of the patients needs to be done through surgeons (could be government doctors at a later date) in areas close to the centres who will provide direct care like Surgery to create a locally self sufficient disease management protocol. Currently SATHI has a small database of doctors interested in offering their services.

Sustained continuing care (through Telemedicine) will result in better morbidity control than the past experiences.



The model will be scaled up to include more than 10,000 villages – 100 in VRCs in each of the 100 districts in filariasis endemic region. These centres will be supported five regional resource centres and a National Level Apex Resource Centre manned by SATHI. The capacity built at these VRCs will be in form of the trained workers who can manage the cases in consultation with the doctors in the network. Through such a network, services will be made accessible to 120 million population at risk.

#### **Leadership team and organizational structure**

S.A.T.H.I. (Society for Administration of Telemedicine and Health Care Informatics) – a non profit organization - is a group consisting of like minded highly trained and skilled Medical, Information Technology, Social Sciences as well as Tele Communication Professionals who think that Telemedicine can go a long way in providing affordable and quality healthcare to each and every person of our country. All of us are actively working to bring these thoughts to fruition.

All of us are not full time but volunteer for projects. We get paid as per receipts from the project as and when they accrue.

The current project will be managed by Dr S B Gogia - lymphologist and president. With support from Dr M R Surwade, public health specialist, Gurinder Kaur, (Ex OXFAM) and Mr Rajiv Aggarwal who will provide overall project management expertise.

### **“Objectified Assessment of Rheumatoid arthritis in Real Time as an aid for Treat-to-Target Treatment Strategy”** (Abstract: 009)

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Summary: In the field of Rheumatology, ‘Objectified Assessment’ of disease activity using validated instruments for different diseases has become standard-of-care world-wide. This form of targeted treatment has been shown to improve treatment outcome. In India our group has been among the earliest to use this methodology of out-come guided treatment, using it since 2001. This was further simplified following the use of rheumatology-specific EMR software from 2007 onwards. The said software automatically calculates and displays disease status for

guiding treatment. EMR use has proved to be more efficient both by way of increased number of patients being seen in the same time slot with quicker assessment and prescription writing. Additionally, with increased research output which could easily be published, software usage has helped in extracting evidence that is more relevant to the Indian situation.

Objectives: To study the affect of Software supported “Objectified Assessment” on patients with Rheumatoid Arthritis

Methodology: A study was done to view the outcomes of patient in the form of satisfaction and turnover following use Treat to target approach with or without using software specific to rheumatology called “Rheum Aid®”

Results: Patients care outcomes improved following manual use of calculators but it was cumbersome and restricted the total number of patients that could be seen. The number of patients that could be seen increased significantly once the calculations were automated through the EMR software.

Conclusion: Objectified assessment improves care outcomes but needs to be carried out through automated software to be used effectively.

### **“Role of Knowledge Based Expert Medical Systems in improving Quality of Healthcare”** (Abstract: 064)

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This paper outlines the role of knowledge based Expert Medical Systems that internally uses the data mining techniques and concurrent patient chart abstraction for improving the Quality of Care in patient care settings that are in existence in developed countries and need of such systems especially in developing countries like India. The framework relies on the availability of data sets that contains accurate and adequate documentation of clinical findings, results, medications prescribed, follow-up instructions and documentation done at appropriate clinical step during patient care. The developed countries like Unites States have a defined framework for Quality Measurement, it’s calculations, reporting and reimbursements through Medicare and Medicaid programs. Electronic way of submission of these reports is one of the basic components of the Meaningful Use stage 1 program attestation to avail stimulus money for the providers and hospitals. The concurrent chart abstraction and bringing back the inputs from “patient’s experience of episode of care” is newer dimension to Meaningful Use program as well and currently such quality indicators are under evaluation phase.

## **"E-PRESCRIPTION"** (Abstract: 067)

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The objective of this paper is to show that with the help of a well designed software a 100% fool proof, first rate prescription can be generated to safe guard patient's health avoiding unintentional prescription errors which harm 1.5 million people & kill several thousand each year in the USA, costing the nation at least 3.5 billion dollars annually according to a report of 2006 by Institute of Medicine

### INTRODUCTION:

With the explosion of knowledge, especially in the medical field it has become really impossible to keep tab of every development & some kind of assistance has become essential to deliver quality treatment to the masses. Like in every other field use of computers is becoming more & more important in medical field too. There are thousands of drugs in the market which have their own side effects, special precautions & contraindications apart from their serious drug interactions when many drugs are used together in a multi-organ disease setting. It is humanly not possible for any doctor to remember all this. To help clinicians we have designed a software which automatically checks for drug allergies, drug duplications & drug safety in case of pregnancy, lactation, children, elderly as well as liver insufficiency, renal insufficiency & pulmonary insufficiency. The software checks drug safety for individual diseases as well like in case of Hypertension, Porphyria & G6PD. The software can check past, personal & family history and give useful pointers. It may give you useful tips regarding treatment also from time to time while you are writing prescription through it. In nutshell it helps even a minimally qualified doctor write a foolproof, first rate prescription & can be very useful in primary health centers in remote villages.

### OBJECTIVES:

1. Eliminate human error in prescription writing
2. Reduce dispensing errors due to ineligible hand writing in hand written prescriptions
3. Help write 100% fool proof, first rate, evidence based treatment
4. Automatic EMR maintenance & safe record keeping
5. Avoid reinvestigation in case patient has lost his records & save money

### METHODS / ARCHITECTURE :

Developed in Microsoft Visual Basic as Front End & Microsoft Access as Back End Environment, Prescription

Pad Software is a Modular, 3-tier architecture application built to run on any version of Windows, on a very minimum configuration system. The interface of the application is designed in very user friendly & easy to operate interface so that every doctor can easily understand and operate it.

### WHY VB6 & ACCESS:

To speed up prescription writing we need to provide such a solution through which doctor can write a prescription in less than 2 minutes with full patient safety checks like drug duplication, drug allergy & drug interactions.

Also application should be fast enough to run on very minimum configuration system without any problem during

drug interaction checks out of nearly 1,00,000 known interactions.

Using vb6 we can meet out all these requirements, but if use .net or any other latest technology then it becomes system dependent in terms of operating system & hardware configuration.

### Results

Through Prescription Pad we have succeed in providing physicians a good software tool, though which they can write an error free, first rate & safe prescriptions. Also EMR maintenance has never been so easy with other softwares.

### Discussion

Available Alternatives for Application Development Latest technology like Microsoft dot net development environment is bulky in size and is not easy to deploy. Secondly, it can't run on systems with lower version of windows and on slow systems. Why not Web Enable Application Since medical prescription & EMR is something very confidential & private, every user would like to have it on their local computers for safety reasons & for easy and any time access. Also the main objective of the software is to enable a minimally qualified doctor to write first rate, error free & 100% safe prescription in remote areas also where internet connection is not present or has poor connectivity.

### Conclusion

Through this paper I have tried to convey that by the use of latest technologies we can avoid human errors in prescription writing to a great extent and make treatment much safer in multi-organ diseases. The possibility of ROBO DOC is not a distant future.

## **"Evaluation Of Computer Usage In Healthcare Among Private Practitioners Of Nct Delhi"** (Abstract: 026)

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Objectives: 1. To evaluate the usage and the knowledge of computers and Information and Communication Technology in health care delivery by private practitioners. 2. To understand the determinants of computer usage by them. Methods: A cross sectional study was conducted among the private practitioners practising in three districts of NCT of Delhi between November 2007 and December 2008 by stratified random sampling method, where knowledge and usage of computers in health care and determinants of usage of computer was evaluated in them by a pre-coded semi open ended questionnaire. Results: About 77% of the practitioners reported to have a computer and had the accessibility to internet. Computer availability and internet accessibility was highest among super speciality practitioners. Practitioners who attended a computer course were 13.8 times [OR: 13.8 (7.3 - 25.8)] more likely to have installed an EHR in the clinic. Technical related issues were the major perceived barrier in installing a computer in the clinic. Conclusion: Practice speciality, previous attendance of a computer course, age of started using a computer influenced the knowledge about computers. Speciality of the practice, presence of a computer professional and gender were the determinants of usage of computer.

**“Content-Based Image Retrieval  
System for Differential Diagnosis of  
Lung Cancer”  
(Abstract: 006)**

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We have designed a content-based image retrieval (CBIR) system using chest CT images for differential diagnosis of lung cancer. The objective of CBIR system is to retrieve similar nodules from large chest CT image database for a given query nodule. This tool can also be used for training of young radiologists by visualization of nodules having different shape and size. Lung cancer is a disease with significant prevalence in several countries around the world. Pulmonary nodules are potential manifestation of lung cancer. A pulmonary nodule is defined as approximately round opacity, at least moderately well margin and not greater than 3 cm in maximum diameter. The five years survival of a patient diagnosed with lung cancer can be increased from 10%-15% to 65%-80% if the pulmonary nodules are detected at early stage. The main difficulties for identification of pulmonary nodules are nodule may stay at vascular or pleural attachment and they don't have any particular shape or size.

There is large number of images generated by hospitals and clinics every day. These images play very important role in diagnosis of diseases, medical research and education. CBIR system could facilitate the development of interactive computer aided detection technology that would exploit the wealth of data stored in the archive. Finding similar images or reference is one way to assist radiologist during daily clinical practice. Budding radiologists can explore their perception by visualization of all possible sites of lesions for given query nodule and directly provide a diagnosis report without assistance of expert radiologists. The CBIR system is validated on one public database (Lung Image Database Consortium, LIDC) and one private database taken from PGIMER Chandigarh. The average precision achieved for LIDC data set is 72.18% and for PGIMER data set is 78.29%. A feedback system is integrated with CBIR system for inclusion of knowledge of expert radiologists to reduce the semantic gap.

**“Error Resilient Transmission and  
Security Filtering of Medical  
Images”  
(Abstract: 008)**

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The increasing adoption of information systems in healthcare has led to a scenario where patient information security is more and more being regarded as a critical issue. Allowing patient information to be in jeopardy may lead to irreparable damage, physically, morally, and socially to the patient, potentially shaking the credibility of the healthcare institution. This demands adoption of security mechanisms to assure information integrity and authenticity. Structured descriptions attached to medical image series conforming to the DICOM standard make possible to fit the collections of existing digitized images into an educational and research framework.

**“Design And Implementation Of  
Edge Based Image Segmentation To  
Find The Area And Volume Of The  
Urinary Bladder”  
(Abstract: 011)**

**B Padmapriya, T Kesavamurthi, Anju Gupta, T Lazar  
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Ultrasound has become increasingly important in medicine and has now taken its place along with X-ray

and nuclear medicine as a diagnostic tool. Its main attraction as an imaging modality lies in its non-invasive characteristic and ability to distinguish interfaces between soft tissues. Diagnostic ultrasound is now applied for obtaining images of almost entire ranges of internal organs in the abdomen. These include the kidney, liver, spleen, pancreas, bladder, major blood vessels and the foetus during pregnancy. It has also been usefully employed to present pictures of the thyroid gland, the eyes and a variety of other superficial structures. In a number of medically meaningful cases, ultrasound diagnostic has made possible the detection of cysts, tumors or cancers in these organs. This is possible in structures, where other diagnostic method by them were found to be inapplicable, insufficient or unacceptably hazardous.

Considering the importance of measurement of volume of the urinary bladder, a novel approach using edge based image segmentation has been employed. The technique discussed in this paper deals with a method for automatic edge based image segmentation of the urinary bladder from a 2D ultrasound image for finding the area and volume of the urinary bladder accurately. The study of area and volume would provide valuable information about the abnormalities of the bladder and also the extent of abnormality. This method makes use of traditional Hough transform over the preprocessed image to link the discontinuities present in the segmented image which is obtained in the subsequent stages of processing. Experimental results show good performance of the proposed model in segmenting urinary bladder to measure its exact area and volume.

### **“Real Time Carotid arteries detection in Vascular Ultrasound Medical Imaging”** (Abstract: 035)

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This paper presents a new approach and case study for real time detection by applying method of Distance Transformation for carotid arteries detection and analyzing in Vascular Ultrasound medical imaging. The method uses a novel framework of predefined template matching and substance tracking for feature ultrasound segmented image frames, by matching with hierarchy schema of generated template for given substance shapes and size distribution. The substance matching and tracking system processing framework model for feature image frames that are passed through preprocessing stage, which transmits detected block information to the transformation parameters. Further frames containing modest motion data in the search area of the artery of walls are detected in preprocessing

earlier stage itself and are substance blocked from further processing. Hence, the projected results will demonstrate throughput of the various size and shapes of artery of neck carotid artery substance detection and brings to reusable and making this approach a more robust detections system.

### **“Content-Based Image Retrieval System for Interstitial Lung Diseases”** (Abstract: 047)

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Finding similar images or reference is one way to assist radiologist for differential diagnosis of Interstitial Lung Diseases (ILDs). Content Based Image Retrieval (CBIR) has been identified as an important research topic in this direction. CBIR system could exploit the wealth of HRCT data stored in the Picture Archival and Communication System (PACS) by finding similar images or references that will help to narrow down the differential diagnosis of ILDs. These benefits motivated us to design a special purpose CBIR system (Med-IR) for Interstitial Lung Diseases (ILDs), where the user can provide one interstitial disease pattern as input and the system will retrieve few most similar patterns available in the database. Med-IR uses visual content such as texture to retrieve image from large image database, given a query image. A novel approach for rotation invariant texture retrieval is proposed. A software platform is designed to store the images and retrieve similar images against a query image on demand. A graphical user interface (GUI) has been developed to facilitate query formation, retrieval and display the retrieved images. The performance of the system is evaluated using a database that contains 60 HRCT images (in DICOM format) containing five lung tissue pattern such as consolidation, nodular, emphysema, ground glass and normal. Quantitative performance evaluation shows that the system achieves a precision of 67.62% and recall of 78.89%. Feedback from radiologists at different level of expertise on system performance will help for further improvement. Therefore, a module has been developed to collect the feedback on system performance from radiologists and integrated with the GUI. Our objective is to demonstrate the software tool and get the feedback from radiologists so as to improve the performance further.

### **“Current Prospective In Gene Therapy And The Role Played By Medical Informatics”** (Abstract: 019)

**Mayadhar Barik, Dr. Vaibhav Choudhary, Sushil K Meher**  
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Introduction: Gene therapy aims to fix a disease linked with genetic abnormality. Gene therapy is currently receiving attention from the scientists, clinicians and the general public in an attempt to correct genetic defects including congenital abnormalities and neurodevelopmental disorders.<sup>1</sup> However its application is beset with complications partly because of lack of advanced knowledge and research and partly because of vested interest by the society.

Objective: This study is an attempt to highlight some of the major benefits of gene therapy and to define the role played by the medical informatics in facilitating rational use of gene therapy.

Materials and Methods: An attempt was made to review major studies in the international literature to synthesize the potential risks, benefits of gene therapy. We also reviewed the tools and techniques in the field of medical informatics which can be employed for spreading awareness about gene therapy. We developed a conceptual model of matching the key concepts with the current protocols used in the field of medical informatics.<sup>2</sup>

Results: Gene therapy offers a new hope for the treatment of neurodegenerative disorders like Huntington disease. Its application in Parkinson disease has moved a step closer to acceptance in the wake of its successful double blind clinical trial. The educational media, viz., fall under four categories, audio media, the visual media, the audio-visual and the virtual-media in vitro and vivo. The simulation and animation capabilities of the media are quite helpful in the conceptualization of gene therapy. The audio-visual media are useful for counseling in matter of genetic disorders the public.

Conclusion: Our study suggests that an integrated and holistic use of medical informatics can be highly beneficial for the advanced application of gene therapy in the years to come. The current application of gene therapy has become debatable and often controversial because of tendency to use for manipulating the desirable attributes.<sup>3</sup> However its rational use is likely to benefit the mankind.

### **“Evaluation and monitoring of meta-analysis in medical research through information technology”** (Abstract: 023)

**Mayadhar Barik, Sushil K Meher**  
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Introduction: Monitoring and evaluation in the field of health care are much more important and closely related. They are undertaken to find out the result of a research project in relation to the clinical benefits, risk

factors and its importance for society. Objective: Its efficiency, effectiveness, sustainability and reproducibility and hence play a crucial role in medical research and education.

Material and Methods: How a programme project research results, treatment performances or has performed including reasons for expects of performance, whether positive or negative which is usually with emphasis on impact for people, research scholars, doctors, scientists, genetists, paramedical staff and others.

Results: This article includes tries to describe new innovative methods in research methodology. Effective monitoring is important for purposeful conclusion of a research.

Conclusion: Here the statistical analysis should be included in the main protocol, although it may also be useful to produce detailed statistical analysis plan separately. For each outcome variable analysis of population missing data at the subject level, analysis of individual trails, meta-analysis model, estimation and hypothesis testing are to be performed. To avoid too many false positive results, it is desirable to limit the number of covariables investigated in this way.

### **“Approximation of Neural Network using Differential Evolution for Protein Superfamily Classification”** (Abstract: 054)

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In this paper we have made an attempt to build an efficient classifier using feedforward neural network which can be used to classify the protein into their superfamilies. The classification task organizes proteins into their superfamilies and helps in correct prediction of structure and function of newly discovered proteins. This can help the Biologists for diagnosis of diseases and drug discovery. The feedforward neural network was initially trained using the traditional Backpropagation learning algorithm but the major drawback is it takes long and uncertain training time. As BP algorithm are limited to search for a suitable set of weights in an apriori fixed network topology this mandates the selection of an appropriate optimized synaptic weight for the learning problem in hand. Differential Evolution (DE) is a population based stochastic optimization technique which is very effective in solving real valued global optimization problems. Thus, a hybrid method combining DE-BP is implemented in this paper. The numerical simulations were performed on the data set obtained from UCI machine repository. The DE-BP approach outperforms BP algorithm in terms of sensitivity, specificity and accuracy.

**“Review on design of exoskeleton  
for Rehabilitation Engineering”**  
(Abstract: 063)

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Considerable numbers of people suffer from stroke and paralysis in almost all industrialized countries. To alleviate this problem and improve quality of life of these patients, researchers have been developing robotic exoskeleton which can assist impaired limbs. The purpose of this review is to show the effectiveness of these exoskeletons and its future use in Indian market. The manuscript discusses the developments of exoskeletons outside India; presents need of such robots, their development, their expected effect and efficient usefulness in rehabilitation process. It is an attempt to explore one of the efficient ways to treat impaired limb, which is used minimally in India.

**“EMG Based Multichannel Human  
Computer Interface for  
Rehabilitation Training”**  
(Abstract: 072)

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Aim of this paper is to design a low power single supply wearable EMG extractor unit for high speed real time EMG monitoring and developing a Myoelectric based multichannel gaming platform for rehabilitation purpose, especially in diseases where there is temporal loss of mobility. Preamplifier section is designed with instrumentation operational amplifier AD623 located at the site of extraction through Biopotential electrode. Acquisition and processing of multichannel EMG signal is done by ATMEGA8 processor. For real time high speed processing, USART serial communication with IC FT232 is implemented which provides a maximum of 3mbps speed. Isolation is provided in the circuit by a digital isolator which galvanically isolates amplifier and computer linked via USART. A game is developed in C# dotnet platform which is controlled through multi channel EMG signal derived from opposing muscles in forearm responsible for wrist movements. RMS value from different channels are combined to form a vectored output which may function similar to a standard x-y joystick. Such myoelectric interface helps in regeneration of lost emg signal in amputee and aids in rehabilitation programe, prosthetic and orthotic designs, treatment of cerebral palsy, stroke etc.

**“Application of Bio-CAD Modeling  
and Rapid Prototyping in Customized  
Prosthesis Fabrication”**

(Abstract : 105)

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Rapid prototyping is one of the advanced manufacturing processes, which was initially used only for visualization purpose. In later stages due to the advancement of materials used in rapid prototyping technology it is also used to manufacture tools and functional part. In medical field rapid prototyping technology is very much useful in the development of Customized implants, Prosthesis and Scaffolds. And also as the result of development in modern imaging, computerized three dimensional data processing and advanced engineering techniques, prosthesis that match the anatomy of patient can be accurately modelled by using computer aided design. This modelling techniques base upon the Chromatography or Magnetic Resonance Imaging scanning of human body developed a new field called Bio-CAD. This paper aims to describe Bio-CAD Modelling and Rapid Prototyping technologies for design and fabrication of custom-made prostheses.

**“Emerging role of Informatics to  
improve population health”**  
(Abstract: 061)

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I will discuss the use of data, information and knowlegde framework and human centered approaches to design and develop technology-mediated, multifaceted interventions to support chronic care. Case studies describing interactive, tailored, health information platforms using various multimedia techniques to disseminate right information to the right person in the right format through use of touch screen computers will be outlined.

Will also provide examples of use of human centered approaches to deliver interactive health information platforms such as touch-screen computers placed in kiosks for the purpose of recording demographic information, knowledge, attitudes, and practice information; self-reported clinical assessments; and risk assessment information and health education for lifestyle modification.

**“Can a New Sociotechnical Model for  
Health IT be Useful to Guide  
Healthcare Reform in India?”**  
(Abstract: 037 & 038)

*Dean F Sittig, Hardeep Singh, Shubnum Singh, Kanav  
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Overview: Through a panel-based interactive discussion, this session will discuss if and how a newly proposed sociotechnical model could be useful for design, development, implementation, use and evaluation of health information technologies within the Indian context. This panel discussion will build upon Session 1, which aims to discuss this model in detail and present studies that illustrate its practical application in health systems in the United States.

Session length: 60 minutes

Background and Rationale for the Session: In the past few years, several efforts are being made to initiate reform of the health care system in India. Transformation of the health care delivery system must leverage the use of technology as a foundation. While technology is essential, it must be accompanied by a comprehensive strategic approach that accounts for the social aspects of this effort including the context of the socio-political environment in which it is being implemented, as well as the knowledge, skills, and experience of the people involved, for example. Failure to recognize and take into consideration all of these socio-technical issues has led to several large-scale failures in other national HIT projects. The goal of this session is to extend the discussion surrounding the incorporation of these socio-technical issues into several real-world health IT projects that are currently underway in India.

### **“Measuring and Tracking the Progress of Implementing a Comprehensive Electronic Health Record: A Mixed-Methods Approach”** (Abstract: 059)

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India is entering an era of technology revolution in health care. The current literature and experiences in global settings reveals that implementation of electronic health records (EHR) is often challenging. Although, data on EHR implementation is available from several countries including UK, USA and Canada, there is little data about EHR implementation experiences in India. This body of knowledge will be useful to guide future implementations of EHRs in the Indian context. In this paper, we discuss our early experiences of implementing a comprehensive EHR at four facilities of a single private health care system in India. We use a mixed-methods approach (both quantitative and qualitative) in our assessment.

### **“Reducing EMR implementation cost and improving adoption using**

### **eLearning for training and change management.”** (Abstract: 007)

**Saurabh Bhatia**  
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Introduction

Going live after a successful implementation of an HIS or EMR in a big hospital is the beginning of the problem for the clinical adoption, training and change management team.

Problem statement

We faced the issue of training a massive employee user base for a quaternary care hospital. The total number of users to be trained were 4000, while the adoption period was about 2 months; 1/5<sup>th</sup> the required time.

Cost of conventional training

The cost of conventional training worked out to be about 5.28 Million Indian Rupees (52.8 Lakhs).

Cost of eLearning based training

In the interest of time and money, we switched to eLearning training modules, allowing everyone a period of 45 days, and learning it simultaneously. The cost of training came down to 14.5 Lakh Rupees, and the training was covered in a period of 2 months.

Total saving in terms of implementation

With switching almost the entire training to automated online training modules, we saved not only over 38 Lakh rupees in the implementation effort, but also saved the hospital from what otherwise could have been a certain failure of adoption due to the 10 month long training and adoption cycle

### **“Leveraging Data Analytics in Healthcare- Some interesting Case Reports”** (Abstract: 015)

**Sanjeev Sood**  
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Introduction

Data Analytics can be defined as the science of extensive use of data, statistical and quantitative analysis, explanatory and predictive models to drive evidence based decisions and actions. In recent years, breakthroughs in data-capturing technologies, data standards, data storage, and modeling and optimization sciences have created opportunities for large-scale

analytics programs. Some health care organizations have not only leveraged fact based decision making, but also created sustained competitive advantage and made their business strategies around their analytical capabilities.

Indian scenario-basics first.

Most Indian HCOs are yet to embark on analytics journey or are still in early stages of it. They need to generate and compile good quality data by structured and reliable reports and returns from multiple sources. This data needs to be transformed into intelligence to guide decision and policy makers, administrators and health care personnel. Currently, most HCOs are data poor; some are data rich, but information poor; very few could be data and information rich.

Data Analytics - Application in Healthcare  
This presentation briefly discusses application and role of data analytics in practice of evidence based medicine;

performance and outcome measurement based on integrated HIS of VHA;  
design innovative health insurance products for population ;

capacity management by HCOs by accurate forecasting and timely scheduling, early detection of emerging disease vectors, spotting outbreak of epidemic (BioSense and HealthMap Projects);  
prevention of fraudulent health insurance claims;  
effective inventory management;  
activity-based costing;

Monte Carlo Simulation and multiple regression analysis, queuing, transportation, replacement and assignment models to refine processes.

Some Case Reports  
Some case reports of successful data analytics by NRHM Programme for planning , John Hopkin's Comprehensive Unit-Based Safety Program (CUSP), Tracking Infection control data as part of Apollo's Clinical Excellence programme, SGRH's data mining application for BI and monitoring of KPIs are also briefly discussed.

### **"Hospital Information System, An Integrated Approach For Better Patient Care and Generation of Electronic Health Record."**

(Abstract : 018)

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Information technology comes with promise of helping and managing scarce resources, increase efficiency and reduce workload and increase work productivity. Hospital Information System has also penetrated the Hospital with the same objectives and it has come a long way from being merely an information system to

an ERP which comply with world health standard and generates Electronic Health Record for researchers, provides Decision Support System to Health Care Managers and help in delivering fast and quality healthcare service to the Patients. Hospital information System is a network of computers which help in medical information management and its online operations. It covers Patient Management, Laboratory Information System, Ward Management, Clinical Data Management and Support Services and Back Office Operations. HIS construction relates to various affairs of Hospital like Creating IT Infrastructure in Hospital, Customization of HIS as per the business rules of Hospital, Training to Clinicians, Nurses, and Technicians. Institutionalization of HIS requires lot of efforts and it requires management commitment and takes years to institutionalize the HIS in a Hospital. Sometime lack of funds and interest in HIS will result in failure of the system. Traditionally HIS in Hospitals is locally spread with in the premises of the Hospital. Hospital generally hosts the HIS Application on its servers and serves to its end users and it generally does not share the information with other Healthcare Institutes and Patients resulting in various standards of Health Data Capture. With the advent of technology HIS has come out of the premises of Hospital and has moved on Cloud. The main deterrents to healthcare IT adoption have been cost and a dearth of relevant applications and services. High upfront costs have been a major factor influencing technology adoption for hardware and software investments. Cloud not only helped hospital to reduce the infrastructure cost but also helped in sharing the information with the other healthcare facility. It had also helped in standardization of health record across the globe. This paper presents the detail functionality of HIS and implementation strategy of HIS in operationalization and institutionalization of the modules.

### **"Perceived benefits of Hospital Information System & EMR by End Users A Survey done in a Government Hospital"**

(Abstract: 28)

*Anindam Basu, Anandhi Ramachandran*  
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An IT system for any hospital is one of the most important support services for the fulfillment of their most important core services which is the Patient Care. After the implementation of the IT systems which consists of Hospital Information Systems for the Administrative purposes and Electronic Medical Records for Clinical purposes, we often forget to know what actual benefits the End User thinks about the system. The perceived benefits which can be described as direct and indirect benefits respectively can only be achieved only if the people actually using the system know the



actual benefits of the systems. To know the above, a study was done in a Government Hospital in Delhi which is using ICT services for patient care from more than 18 months.

Objective behind the study:

a) To study the perception of the Hospital Staff towards the computerized system.

b) To study the kind of problems faced by the staff of the hospital in the system.

Methodology: A questionnaire based quantitative study was done with the total sample size of 52 people from different departments in the Hospital. Random sampling was done and SPSS 16.0 was used for the quantitative analysis.

Results: More than 80 percent of the staff says that there is a significant improvement in the hospital work after the implementation of the ICT systems. Also the average rating of the ICT systems in the hospital was given 7 out of 10 by the hospital staff. The study also showed that more the usage of the system by the users, more they see the overall benefits of the system.

Technical problems were the only issue that the people were facing which was also a minimal.

Conclusion: For any Information System to be successful, it is very important that the hospital staff takes full interest in the system. It's the people, process and technology which have to be worked out together for any success ICT system. The system in the initial stages would look a somewhat difficult but a regular usage would led to the proper functioning of the hospital and hence providing a better patient care. Hospital Staff and technology used for the ICT systems play major role along with the hospital processes.

### **"Significance Of A Meticulous Change Management Strategy In Successful Implementation Of A Healthcare Information System"**

(Abstract: 29)

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In the field of healthcare Informatics which is a relatively new arena for the professionals, many organizations are buying various software products in order to track the health status of their work force. The idea behind this is to keep a record of the health of their employees so that they can eventually track their productivity. However, not many of them have been actually able to implement such technology and derive the actual benefits of it. The reason behind this is the failure of the managers to understand that buying a Health Care Information System (HCIS) is not as simple as buying furniture or stationary for your organization. The main obstacle is not the cost of such a product but the "change" which is required to be brought in the psyche of the workforce and the workflow so that the frozen mindsets embrace such an advancement with

open arms and also retain it for the years to come.

Objective behind the study:

1. To understand the orientation and psyche of the employees towards usage of HCIS

2. Suggest an ideal model of Change Management in the field of healthcare Informatics with special focus on Indian scenario.

Methodology:

The awareness level of the workforce of an organization of around 400 people was studied using various tools like personal discussions, focus group discussions and written questionnaires. The tools of interaction varied from cadre to cadre. An Awareness programme was held for the workforce about the benefits of HCIS. After this programme the acceptance level of the system was evaluated by counting the number of people who registered themselves with the HCIS. Convenience sampling was done and analysis was done using SPSS software. A health improvement framework in the form of matrices was proposed.

Results:

Out of around 400 hundred employees not even 10 were aware about the system or its potential applications and hence no one ever used it. However after the awareness programme 226 people delightfully registered on the system and showed faith in HCIS.

Conclusion:

Change management in an organization is a very complex and challenging task which if done carelessly or in absence of a clear vision and strategy can lead to failure of the initiative and once failed it is really difficult to overcome the ensued negativity. Bringing about a change in the field of healthcare informatics is even a more difficult task because of lack of familiarity of people to this field. Hence, a proper leadership, guidance and a strategy are utmost essential to make it a successful and retentive change

### **"Business Analytics on the fly for Healthcare Enterprises using the Cloud Model"**

(Abstract: 046)

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Meaningful analysis of voluminous health information has always been a challenge in most healthcare organizations. Accurate and timely information required by the management to lead an healthcare organization through the challenges found in the industry can be obtained using business intelligence (BI) or business analytics tools. However, these require large capital investments to implement and support the large volumes of data that needs to be analyzed to identify trends. They also require enormous processing power which places pressure on the business resources in addition to the dynamic changes in the digital technology. This paper evaluates the various nuances of

business analytics of healthcare hosted on the cloud computing environment. The paper explores BI being offered as a Software as a Service (SaaS) solution towards offering meaningful use of information for improving functions in healthcare enterprise. It also attempts to identify the challenges that healthcare enterprises face when making use of a BI SaaS solution.

### **“Personal Eternal Health Passbook” (Abstract: 022)**

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The advent of information technology has revolutionized the implementation of EHR that gained global importance. Despite its implementation, medical people preferred complete individual health information including past and currently used medications, therapies, lifestyle and habits as “Health in human, it is the general condition of a person in mind, body and spirit, usually meaning to be from illness, injury or pain”. “Biomedical, is the tolerance, environmental stress and variations and the application of the principles of biology and physiology, to clinical medicine”. It is vital and apt recording system for efficient and comprehensive patient care.

The paper “Personal Eternal Health Passbook” (PEHP) will encompass; self recommended care/treatment; visit to different Ops, GPs and hospitals, Homeopathic, Unani, Herbal, Ayurveda. The PEHP is an extension of EHR and link document, its formats are: Patient ID, Health Summary, Child Development, Immunizations, Self care/treatments, Medications, Investigations, Hospitalization, Obstetrics & Gynecology, Therapy, Chronic Disease, Dental. In conclusion, effective EHR at health institution level and PEHP at personal level linking together and complementing each other e-Health system will add value for accomplishing complete 360 degree information for providing comprehensive continuity of care to patient, at right time, at right place and at right cost.

### **“Setting Up Of The Telehealth Services In India: Concept And Proposal” (Abstract: 050)**

**Kunal Kanti De, Tushar Kanti De, Arin Basu**  
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Worldwide, several barriers need to be addressed in the process of delivery of health information and provision of health care services from health care providers to the beneficiaries. This is particularly true for practitioners and Patients in developing countries where inadequacy of manpower and logistic support are problems. Besides there are geographical and other factors between the

service providers and consumers which prevent the later from accessing the health care services in time and just on demand. These barriers pose significant problems in emergency medical conditions when the patients’ demands for the services are highest. It is believed that establishing telehealth services might be a step to overcome this difficult situation. This would be based on establishing a virtual communication system between the client and the health providers. The purpose of this presentation is to provide a conceptual framework of organizing telehealth services (emergency, elective and educational services) aimed at patients in remote villages in India connecting health providers and patients.

In organizing this telehealth services advanced information and telecommunication technologies will be used for the exchange of just in time health information and delivering health services to the people in need. This will supplement routine preventive and curative services delivered to the consumer by the provider. The telehealth services utilize audio and video conferencing for interaction, computer graphics and interactive multimedia for delivery of information and internet as the media. The direct benefit of establishing such telehealth services would be earlier intervention, better access and rapid delivery of information. In turn this will likely to result in reduced hospitalization and better quality of life of the patients and their well being.

It is argued that in India there is a gap in manpower and logistic supplies in health care delivery systems. This eventually results in high disease burden and morbidity. However India is also well advanced in information technology applications; here cell phone connectivity is excellent and entrepreneurs have consistently developed low cost easily accessible devices, and people at different social strata are receptive to technology. India already has good telecommunication network infrastructure for its easy functioning. Thus India is a suitable ground for establishing telehealth facilities for reducing disease burden and efficient delivery of health services. In the state West Bengal no formal telehealth services are delivered at present. We propose to assess the scope and effectiveness of establishing telehealth services with a view to increase the efficiency of health care delivery services in the district of Bankura in West Bengal and aim to build a flagship project in telehealth services.

### **“A Wireless Sensor Network based Fall Detection and Activity Monitoring System for the Elderly” (Abstract: 079)**

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We propose the design of a wireless sensor network based smart monitoring system Gaitsense for fall-detection and activity monitoring of elderly people. Gaitsense consists of sensor nodes called gait nodes that can be conveniently worn at the waist or ankle and a live software application that continuously monitors all the nodes. Each gait node detects exceptional events associated with its subject such as a fall and uses the software application to immediately alert concerned authorities about the incident through multiple Internet and GSM based communication systems.

**“Tele-health center for rural India”  
(A bottom to top approach for  
improving health care facility at  
rural remote areas ) (A conceptual  
analysis)”**

(Abstract: 096)

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In India there are 68.84% of the total population who belongs to rural area (according to census2011) But unfortunately because of huge population and difference in socio economical condition with wide geographical variation it is very difficult to provide better health care. The most important thing is lack of specialty health care professional especially the doctors and investigation procedures are still not accessible to public health care institutions. Keeping on these issues rural tele health care concept conceive to full feel the unmet need of these population and provide better health care to these huge population to move the nation towards achieving the MDGs. The rural tele health care center are small unit of tele-medicine setups which are cost effective and easily operate by PHC doctors which facilitate the professional to provide better healthcare by consulting with special doctors about treatment and out sourcing the investigation procedures through a dual channel link through a dedicated broadband or using cloud technology.

**“Conceptual ICT systems framework  
empowering rural health workforce  
in India for MDG 4 & 5”**

(Abstract: 027)

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India, the 2nd largest country as far as population is concerned, is facing a very serious concern over the health related MDGs that includes MDG 4 & 5 for Maternal & Child Health respectively. To tackle this serious issue India launched up many programmes including the RCH under NRHM, IMNCI etc to overcome

the overall condition that India is facing for the above Health Indicators. The rural health workforce including ANMs and ASHAs are been trained vigorously to tackle this situation efficiently and effectively. This has helped somewhat to achieve the goals, but the shortage of this Health workforce (approx. 21066 ANMs & 8745 SCs working without ANM) is another area of concern for the Indian Government. Also as Health is a state subject for a country like India, some states are utilizing ICT systems for delivering the primary health care to the beneficiaries. The ICT frameworks used by the different states are majorly focusing on the beneficiaries but very few on empowering the rural health workforce. The following paper tries to provide a conceptual framework of information systems according to the Indian context to empower the Rural Workforce for improving their efficiency and effectiveness for providing services to the rural population.

**“Micro Health Centre: Cloud Enabled  
Infrastructure Solution for Health”**

(Abstract: 060)

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India's achievements in the field of health have been less than satisfactory and the burden of disease among the Indian population remains high. Commission on Macroeconomics and Health of the World Health Organization (2001), have argued that better health care is the key to improving health as well as economic growth in poor countries. Healthcare delivery at the village level is constrained by lack of healthcare infrastructure, lack of doctors, lack of supply-chain and lack of appropriate monitoring of the existing healthcare infrastructure. This paper proposes an innovative, low cost health care infrastructure that can be rapidly rolled out to provide basic healthcare using tele health services. This solution is an instant-on cloud enabled, rapidly deployable infrastructure that would require minimal training to operate. It consists of a standard shipping container converted to a Micro Health Centre, to bring much needed preliminary healthcare to those in need. Furthermore all supply-chains such as trucks, trains, roadways etc are aligned to handling shipping containers so it can be easily transported to remote rural areas. The Micro Health Centre provides healthcare services, health education as well as medicines thereby meeting the severe lack of health facilities and improving the quality of healthcare.

**“Medical Informatics activities in  
J&K”**

(Abstract: 068)

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## Introduction

- The project entitled "Computerization and Campus Wide LAN at SKIMS" conceived to setup LAN at SKIMS premises for providing internet facility to its community of medical doctors and officials including PG students viz a viz computerizing its patient records and using the laboratories effectively has culminated as a fully functional integrated System comprising of:
  - Network Established consisting of 450 Nodes
  - 150 workstations already operational
  - Central Switch and allied circuitry in place
  - 4 Servers operational
  - Telemedicine facility started at SKIMS by ISRO in the year 2003 on the recommendation of Standing Committee of Parliament and was followed by installation of 11 more nodes in the state which include Govt. Medical College Srinagar, Govt. Medical College Jammu, District Hospitals at Doda, Kathua, Kupwara, Poonch, Kargil, Leh, and Sub District Hospital at Zanskar, Uri, Tangdar. SKIMS being the only super specialty Hospital in the State and having a well established IT platform including LAN for 500 Nodes, Hospital Information System etc servers as the HUB for the Project.
  - So far around 4000 patients have been benefited by this facility across the State.

## The System

Since the inception thrust has been given to the implementation of the existing HIS to full extent and capacity building for the same.

- The HIS provides total automation of patient treatment providing an integrated health record for the patient and ensures efficient and optimal performance of the hospital.
- Being a modular system, HIS at SKIMS ensures sustained benefits through changes in technology thereby, protecting and providing optimal returns from the investment.
- HIS also provides for an accurate, electronically stored medical record of the patient.
- A data warehouse of such records can be utilized for statistical purposes and for Research.

Apart from that progress has been made in identifying areas of improvement and designing solutions for other operations at the Institute.

## The Network

The network consists of structured cabling with multi-core optical back bone for 13 segments and structured high quality UTP cabling for individual stations which is capable of providing access to more than 450 nodes. Each segment is capable of getting configured as sub-LAN itself for individual sections and departments.

The department of IT has a dedicated team of professionals to operate support and optimize the internet service provided to different areas of the institute through appropriate channels. Presently we

have;

- Functional HIS on 70 workstations. The systems are in respective places for the modules of HIS.
- NKN (100 Mbps Leased Line)  
170 Active Users.....
- Broadband (2 Mbps Phone Line)  
44 Broadband Lines....  
(Where NKN availability is not feasible), Quarters, etc.....
- WIFI (54Mbps)  
6 Active Sites  
3 more Sites will be operational soon

## Sub Networks

Sections/ segments are listed as follows

1. Nursing Stations and administration : All wards and Floors
2. Drugs and Pharmacy
3. Medical records Department
  - a) Out Patient Department
  - b) In patient Department
  - c) Main Department
4. Radiology
5. Central Stores
6. Labs
  - a) Pathology
  - b) Immunology
  - c) Microbiology
  - d) Biochemistry
  - e) Haematology
  - f) Blood bank
  - g) Pharmacology
7. Material management
8. Engineering
9. Administration
10. Services
11. Regional cancer center
12. Library
13. Faculty
14. Paying Ward Block

State of the art technology and training of Staff

The institute has procured all equipment of latest technology and specifications available at the time of purchase. Wherever possible equipment and software have been procured under DGS&D system of Rate contract.

Training has already been given to 75% of the staff including nursing staff which in itself is a milestone in the process of capacity building.

## Future Plans

During the 4th meeting of the task force for Health Sector Reforms in J&K held under the Chairmanship of Hon'ble Chief Minister and attended by the top bureaucracy as well as the experts from across the country, it was agreed that SKIMS telemedicine centre shall be upgraded as State Resource Centre for capacity building in Telemedicine and e-governance in health in J&K and as such the detailed project report submitted has been phased out for implementation.

The projects in pipeline at SKIMS are:

1. Hospital Security & Surveillance System.

2. RFID system for Library management.

In fact SKIMS intends to expand the IT activities which would lead to implementing an Integrated Command and Control System in the long run having the following subsystems:

- 1 Security and Surveillance system based on IP (network) Cameras
- 2 Server based Analytics at various locations
- 3 IP based PA system
- 4 RFID based Access Control
- 5 Digital Display Network for Hospital Information system
- 6 Fire Alarm and Suppression system
- 7 Walky Talky system for security personnel
- 8 Visitor and Parking Management system
- 9 Under vehicle scanner
- 10 High value equipment security system
- 11 Building management system
- 12 Barrier and Panic Buttons
- 13 Video Wall etc. etc.

### **“Integrated Network Solutions for Private Healthcare Sector in India”** (Abstract: 081)

**Rahul K Garg**  
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Currently 4.2% of India's GDP is contributed by Healthcare sector and 67% of that comes from private sector. In future, most of the growth in healthcare is expected to come from private sector only. But this sector itself suffers from problems which might hinder its growth. As of now, most of the private clinics are single specialty, scattered all over and lack IT system support. Because of such deficiencies, the service capacity is limited in terms of quality and quantity. The patients spend excess money on travel, diagnostic tests and lose a lot of data in the process of getting treated due to prolonged treatment. Also, at times, their satisfaction level is not up to the mark. Above all, this sector is not ready for the forthcoming opportunities like e-health, health insurance and electronic data management. To solve the current problems and to make the whole system ready for future challenges, it is proposed in this paper to set an integrated network among the private clinics and hospitals, through which their data is centralized and which can ensure a quick, easy and secure flow of information within the healthcare community. The proposed idea may face some important challenges and issues which can be settled through sound policies and state of art implementation. Once implemented, the project promises better service levels, cost and time savings and ability to serve future demands of the industry.

### **“Design & Implementation of Wi-Fi based Access Network for Health Care professional in All India Institute of Medical Sciences, New Delhi, India.”** (Abstract: 113)

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The All India Institute of Medical Sciences is a premier Medical Education Institute working in the area of patient care medical education and research. There are around 4000 students mostly staying in 18 Hostels. The students staying in hostels are provided with Wi-Fi connectivity as per the following design & Implementation plan. The bandwidth for Internet is available from

1. ERNET (45Mbps)
2. NKN (100 Mbps)

This bandwidth is distributed through Cyberoam UTM through a DHCP server and Wi Fi network is being centrally managed by Computer Facility. The connections to hostels is given by number of point to point wireless connectivity.

This point to point connections to Hostels are further distributed through Access Point (AP) network in each hostel. This Network is primarily used by the students staying in the hostels for primarily accessing online Journals subscribed by B B Dixit Library. Users are authenticated through MAC binding. Certain unwanted categories of sites like trading, pornography etc are blocked.

The Wi Fi facility is being used by 1370 students. It is now proposed to improve the Network efficiency by increasing the number of access points and also increasing the technology from BG to BGN also there is a plan to extend bandwidth through OFC cable to individual hostels instead of Wi Fi point to point connectivity where there is a limitation of bandwidth. It is also proposed to introduce a Wi Fi controller and Network Management System ( NMS) to manage the network properly and to deliver the signals uniformly.

### **“Piramal e-swasthya "A case study of IT initiative in health sector”** (Abstract: 098)

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MOTIVATION:

Though India has made remarkable progress and growth in the Healthcare sector, there still exists

disparities between rural and urban geographies. 75% of health infrastructure and medical manpower are concentrated in urban areas where 27% of the population lives, and with around 77% Indians earning just Rs 20/day, accessing quality healthcare services is still a challenge. To address this issue, a remote healthcare delivery Telemedicine model has been started by 'Primal Enterprise Ltd.' as a pilot project in Jhunjhunu district of Rajasthan, bringing healthcare at the doorsteps of villagers through 'Information Communication Technology'. Aptly known as 'Piramal-e-swasthya'

**RESULT:**

'Piramal-e-swasthya' has displayed its feasibility and effectiveness by the warm response and acceptance it has received in the Jhunjhunu village. Now it has started its pilot project in Churu, Nagaur areas of Rajasthan covering more than 75 villages.

**CONCLUSION**

Piramal-e-swasthya' model operates in such a manner that each member involved in the service delivery chain becomes a stake holder in providing these services in their villages, truly democratizing healthcare.

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**"Need For Knowledge Management among Clinical Practitioners for Collaborative Learning"**

(Abstract: 078)

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Knowledge sharing is the behavior of disseminating one's acquired knowledge with other members within one's organization or group. The focus of knowledge management is how to share knowledge to create value-added benefits to the health organization. Traditional methods of professional development for health care practitioners focus on didactic educational strategies, such as conferences, rounds, meetings and symposia. However, there are limitations to this passive dissemination process within the dynamic environment of contemporary clinical practice. It is now essential that information is readily accessible and specific. Sharing knowledge of physicians within hospitals can realize potential gains and is critical to survive and prosper in competitive environments. The ultimate objective of physicians knowledge sharing is to elevate the quality and efficiency of care in hospitals. Looking through the process and stages and the theories, this research tries to understand knowledge dissemination, sharing behavior, perception, practices and measurement aspects from the point of knowledge management.

**"SELF MANAGEMENT OF PERSONAL HEALTH – AN ABSOLUTE NECESSITY"**

(Abstract: 070)

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Self Management of Personal Health (SMPH) is a new concept proposed by the designer of the world's first portable electronic health record developed in UK in 1997, where an individual acquires minimum essential knowledge on personal health which he/she will be able to enhance gradually and manage it by himself / herself to a great extent without leaving every thing to the healthcare providers. This has become more necessary now, as thousands of cases are reported all over the world on professional negligence and deficiency in service by the healthcare providers, in which, there was lot of scope for improvement in the existing situation, if taken care by the individual himself/herself. Had the victims of professional negligence got little more general knowledge on their own health and its management, the doctors would not have committed the said omissions and commissions in their profession. An Individual Electronic Health Record (IEHR) which is portable, purely personal, completely individual patient-oriented, universally usable, with an embedded software working on a stand alone PC provides the necessary supportive services for its multipurpose utilities serves as the tool for achieving the SMPH. The main objectives of the IEHR and its supportive services are meant to educate the owner in essential aspects of health matters, to keep all the information on personal health and its management ready all the time for the benefit of the individual in practicing SMPH and all the details on the past health episodes (both in-patient and out-patient records) and all other essential health information that are required by doctors of any specialty, readily available to them at the time of consultation, investigation and treatment, to enable them in giving the best possible patient care to their patients. The other purpose is to facilitate an individual to live, stay, tour and work in any part of the world free of worries on any aspect of healthcare in both the situations of emergency and non-emergency nature and to keep the medical records in a dynamic state for multiple purposes such as telemedicine consultations and more effective insured healthcare for any number of selected countries through a concerted support of many health insurance organizations and healthcare providers. This paves the way for many-a-benefit to the individuals, doctors and health insurance organizations.

**"Soarian Quality Measures – Measurement of Clinical Quality Indicators"**

(Abstract: 066)

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This paper outlines the role of “Soarian Quality Measures” based on REMIND – a Siemens patented technology for improving the Quality of Care by automating patient chart abstraction. CMS and JCAHO in United States of America has a defined framework for Quality Measurement, its calculations, reporting and reimbursements through Medicare and Medicaid program on quarterly basis. Recently introduced Meaningful Use program mandates electronic way of data submission to avail stimulus money for the providers and hospitals and has introduced penalty clause for non-compliance starting 2015.

### **“Online Medical Application: Innovation in Healthcare Delivery System”**

(Abstract: 049)

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The healthcare industry has been experiencing a proliferation of various online applications which aimed to enhance better and cost effective healthcare delivery. ICT have played a vital role in bringing medical applications Online.

Various studies had revealed that two main factors driving the current effort to integrate healthcare delivery worldwide: rising expenses and changing patterns in the demand for healthcare. OMA can prove to be very handy tool in solving both the problems.

OMA have benefited both healthcare providers and payers in terms of reduced time and efforts apart from better quality of care and standard processes. The medical data will also be available and accessible anywhere anytime.

OMA requires initial investment but have many long term benefits most of which depends on how thoroughly the system is integrated into practice and the extent to which users participate.

Apart from many benefits issues in terms of OMA usability and accessibility have to be considered. It should be designed keeping in mind both the provider and payer prospective.

After going through various literatures we found that there is lot of scope available in OMA. Though OMA has added another dimension in terms of healthcare delivery and reporting methods, however there are some issues which have to be taken care of. Here we have attempted to highlight all such aspects related to OMA and tried to come up with best possible solutions.

### **“Study of Protein Motifs in Growth Factors and their Receptors in Human: A Computational Biology Approach”**

(Abstract: 016)

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The structure of many eukaryotic cell regulatory proteins is highly modular. They are assembled from globular domains, segments of natively disordered polypeptides and short linear motifs. The latter are involved in protein interactions and formation of regulatory complexes. The function of such proteins, which may be difficult to define, is the aggregate of the sub-functions. It is therefore desirable to efficiently predict linear motifs with some degree of Accuracy. We have tried to predict linear motifs in various Growth Factor and their Receptors in Human followed by their Phylogenetic Analysis. This study is an attempt to predict prospective growth factors and their structural and functional homolog. This may be used to develop a stand- alone computational system or tool to screen candidate molecules important for Growth Factor Function and Growth Factors- Receptors.

### **“Impact of PACS in a Hospital”**

(Abstract: 100)

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Picture Archiving and Communication System (PACS) is a medical imaging technology which provides safe storage and convenient access to images from multiple modalities. The greatest impact of PACS has been on the Radiology Department of the hospital. It helps to access and deliver images and related data timely and in a very efficient way. It has proven very effective tool in eliminating barriers of film based radiology. It has removed various gaps in providing services to patients and thus has smoothened the functioning of various activities related to patient care delivery in the hospital. On the basis of comprehensive review of literature we would try to bring various factors related to its implementation and benefits it could bring to the health facility regarding various functioning activities and impact on work practices and the user acceptance of PACS within and outside the hospital and what further we can do to utilize PACS in providing better healthcare delivery in the hospitals.

## **"CLOUD COMPUTING IN PUBLIC HEALTH"**

(Abstract: 084)

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The time when computer and internet usage is increasing day by day, what if it imparts to maintain public health. What if every common person from India has access to his desirable health service, and even in the remote places where various health facilities are not available. What, if a disease is detected before turning of it into an outbreak. At the time, when even in US it hasn't been yet adopted fully India can make a big change. This all can be made possible by 'being in cloud', i.e. A number of health facilities, information available on a click. Under a cloud many kind of information data base like EHR, EMHR, PHR, E-PRESCRIBING, HIE, MEDICATION HISTORY, PATIENT SUMMARY INFORMATION can be made available at any time for consultancy, decision making, disease analysis, collecting and sharing information between various stakeholders. It is also quite important to avail required information to common people on the basis of their demand.

## **"Application of e-commerce Business Models in Health Care Industry"**

(Abstract: 094)

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E-commerce has changed the way of conducting the business. During the last decade, a noticeable growth has been recorded both in internet users as well as in the market size of the e-commerce. In the first part, the paper discusses the growth of internet users and e-commerce in India. Paper highlights that there is skewed growth of e-commerce in India. E-commerce industry is limited to a certain category of buying such as travel purchases, electronic items, online classifieds, buying movie tickets, food delivery, gaming subscriptions, etc. On the other hand, health care industry, third largest growing sector in India has not witnessed the presence of many successful e-commerce companies. There may be so many reasons for this but the prominent reason behind this is, not having the suitable e-commerce Business Model for healthcare industry. The present paper describes the various e-commerce business models adopted by business to consumer (b2C) e-commerce companies worldwide in health care industry. The major e-commerce business models discussed in this paper include Portals, E-tailer, Content provider, Market Creators, Service Providers and Community providers. In the end, paper concludes that in depth understanding of these business models

will definitely help Indian corporates in health care industry to make the presence in cyber world.

## **"Telemedicine: A transformation in Rural System"**

(Abstract: 017)

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### Introduction

Telemedicine refers to the use of electronic communication technologies to provide clinical care. Telemedicine enables a physician or specialist at one site to deliver e-health, diagnose patients, give intra-operative assistance, provide therapy or consult with another physicians or paramedical personnel at a remote site. Telemedicine and E-Health has contributed a lot in upbringing the health care sector worldwide but in developing countries like India lot has to be done in implementing and making telemedicine cost effective especially at rural areas. By this paper we will be showing the problems which are there in the current health care delivery system especially at the rural level for e.g. people in small towns and villages are today deprived of accessibility to cardiac healthcare, because to become cardiologists it takes somewhere between 5-12 years and due to serious demand of doctors in this country they are majorly found only in urban hospitals and leaving the district and village hospitals deficient of cardiac support.

### Methodology

Study has been conducted at PGI-Lucknow; PGI-Chandigarh; Narayana Hrudayalaya; Asian Heart Foundation; Apollo group of hospitals which all have contributed a lot in health care delivery through cost effective mass deployment of Telemedicine. Study has been designed to analyze the approach of the telemedicine to the rural area, number of population covered and success stories and key challenges faced while implementing the telemedicine in these areas.

### Result

Different project faced different problems while implementation of the project but common problem faced is the acceptance by the people and their resistant nature, so key issue is rapport building, as set up looks almost virtual and rural people are mainly uneducated. Still by telemedicine health care delivery system has improved a lot and accessibility of services are made available to rural India.

### Conclusion

Telemedicine has changed the penetration power and accessibility of health care services to the rural India, includes benefits like home care services i.e.: telemedicine centre are located near to house hold so those who are resistant to go to hospitals can access



services. It has resulted in making people friendly with technology .telemedicine has generated jobs for healthcare as well as IT professional. Support from the government is required, as investment in this sector from government is quite low, public private partnership model which has been piloted in most of the cases are seems to be quite successful should be implemented on a large scale .

## **“How to reach Un-reachable - Can we afford to ignore m-health?”**

(Abstract: 077)

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The mobile phone has transformed itself from portable communication device to the world in one's hands. It is increasingly being relied upon by healthcare professionals to stay abreast of medical trends , which has lead to emergence of top healthcare technological concepts – Mobile Health or simply m-Health. m-Health represents broad spectrum of connected devices , products and application services . We have many similar jargons which are used in parallel like e-health , telemedicine ...etc , but all can converge to solve - How to reach un-reachable ? No doubt we have reached over 900 million mobile users and over one tenth users having smart-phones , but there is big Indian “ Digital Divide “ , between Urban and rural , literate and illiterate or Non-tech savvy , which lead us ponder ! Baseline remains – Affordability , Accessibility and Availability – but scarcity of recourses and reach , we need to evolve rather than only depending upon physical proximity . We have now varied platforms – Blackberry , Androids and iPhone ...etc – in handheld or Tablets ( resonating is oversubscribed “ Aakash “ – made in India story ) , but we have to get preparedness for our own applications – a main enabler , which is going to make difference ? It requires delivering an application , integrated in existing application framework. Not only this , models which has to work in India has to be mix , match and meet – with affordable access to Internet and Technology options ( whether it is 2G/3G/LTE and optimal availability of bandwidth and transfer rate ) , Population reach , language spoken support , budgets , literacy and most important simplicity or usability. Who will be paying and sharing revenue stream or business or delivery model ? We need to evolve business model or take PPP ( Public Private Partnership ) approach – involving Government or State agencies , NGO or Global Agencies , Healthcare providers – Hospitals , Insurance Agencies for their Inclusion in health plans , Service Providers – Telecom , Logistics , Pharmacies and retailers , Pharma and life-sciences organizations , Medical device organizations ,

Independent Service vendors – Search Engine , Health portals , Hosting and web-site providers and most important Patients and Citizen All these entities have to come together , then only m-Health will go through maturation process from Independent and stand-alone initiatives , to Integrated , to the point where m-health is pervasive through industry and all citizen's. There are various factors influencing growth of m-Health , but among top are :  
1. Change in Patient ( or Citizen's ) and Physician's behaviors , There is increased active engagement and control of personal health and awareness / access to online community and social networks.  
2. Maturing Infrastructure and technology – With mainstream Internet adoption and maturing tools and increased use of mobile devices.  
3. Favorable market forces – with Government / PPP acceleration of electronic health records .

There are also unresolved technical issues with respect to standards , security , privacy and other regulatory matters . The industry's slow progress in agreeing to standards is problematic as comprehensive solutions typically call for diverse devices and systems to work together to address unique and the complex needs of an individual patient. On privacy and Security , inclusion and categorization , of healthcare related information, it is yet missing in “ IT Act 2008 “.

No doubt our evolving paradigm in healthcare – Access ,Sense , Reach and Care , “ m-Health “ will help in changing it from Reactive to Proactive . We need to be realistic and answer – How ?

## **“A Study to Assess the Effectiveness and Reliability of the Telemedicine Bringing Specialist Healthcare to the R ural India with Optimized Cost-effective Services. ”**

(Abstract: 093)

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Since long one of the major priorities of Indian Health Administration has been to provide basic minimum healthcare for India's population which is predominantly rural and distributed across distant geographical locations.

700 million people live in rural India, whereas medical specialists are mostly confined to urban areas. There is only one hospital bed available for more than 1500 persons, and one doctor for more than 16,000 people. There have been numerous governmental and NGO's working to bridge this gap, but technical backwardness and geographical disadvantages have proved to be major barriers to create any profound

impact. Telemedicine (health-care delivery

where physicians examine distant patients using telecommunications technologies) has been heralded as one of several possible solutions to some of the medical issues of many developing countries. Its major advantages include excellent geographical viability, Point- To-Point optimization and cost effectiveness. Telemedicine business in India is estimated to expand at a good pace. The aim of the present study is to assess the effectiveness and reliability of the telemedicine equipment in bringing specialist healthcare to the rural areas, and complimenting it with a case study conducted in the Pilani.

**“Supplementing Education and Training in Neurosurgery: Web-based education and tele-education”**  
(Abstract: 114)

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Over the years, surgical training has been changing and years of tradition is being challenged by legal and ethical concerns for patient safety, work hour restriction and the cost of operating room time. There are only fourteen hundred neurosurgeons in India for a population of over one billion (as compared to 1 per 75,000 population in Europe, US & Japan); of these only one hundred are in academic practice. Nearly 40-50 young neurosurgeons are passing out of several institutions in the country every year. Most of these institutions lack facilities for continuing neurosurgical training in terms of surgical techniques and technology. Also the work and time constraints of the neurosurgeons in practice limits them from updating themselves to latest advances and techniques in their fields. In such a scenario it becomes important to provide a global platform to these neurosurgeons where they can learn about the latest technologies, techniques and increase their knowledge at their own pace and convenience. Web-based education and tele-education caters to all these requirements and is thus a remarkably fast-adopted/growing technology across the globe. This presentation shall focus on the formulation and impact of a free-access virtual platform by Neurosurgery Education and Training School (NETS), AIIMS to enhance the learning experience for trainee neurosurgeons.

**“M-Health(An universal Accessible HealthCare Information Source)”**  
(Abstract: 071)

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In the era of information technology e-health is take a vital role to provide better health care facility in so many area of health care system. But unfortunately it is not accessible always and to all category of people especially to rural peoples as desktop or laptop is not in thwarted hand. In last few year the Mobile technology change rapidly and also cost effective for which the mobile density in India is quite high and increase rapidly. Keeping on mind this to avail the various health care need to common people M-health( Mobile health technology develop in recent year and use successfully though it is still in blooming phase .No doubt the M-Health becomes a potential health information source in future.

**“Diabetes Education via Telemedicine”**  
(Abstract: 082)

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Developments in information and communication technology ( ICT) have developed services for masses. One of the most important area is health care. Telemedicine is advanced health care providing solution to situations. This article includes the potential benefits made available by this technology. The basic functions of telemedicine system include tele-monitoring of patient’s blood glucose data, self management actions and remote care from doctors to diabetic patients. This study giving example of telemedicine,use of telecommunication to support health care. According to WHO fact sheet 346 million people worldwide have diabetes. In 2004, an estimated 3.4 million people died from consequences of high blood sugar. WHO projects that diabetes deaths will double between 2005 and 2030. Methodology opted is review of literature from various studies. Present study describes use of IT in medicine, diabetes education via telecommunication and network connectivity. Diabetes education via telemedicine is effective in improving diabetes and well accepted by patients, reduced diabetic stress is also observed. These things suggests that telemedicine can be successfully used to provide diabetes education to patients.

**“Use of Integrated Health Screening & Information Systems (IHSIS) to monitor cardiometabolic risk factors in a large urban population in Delhi.”**  
(Abstract: 101)

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Urban India has witnessed a steep rise in lifestyle disorders like diabetes, metabolic syndrome and cardiovascular diseases in the past few decades. An important underlying etiological factor for most of these diseases is increasing abdominal adiposity. About one-third of the adult urban population is at an increased risk of developing diseases that can be prevented by lifestyle modification and weight reduction. Estimation of prevalence of cardiometabolic risk factors for a large population has always been a costly and cumbersome affair.

**“ICT Greening : Call for trained HIT professionals”**  
(Abstract: 092)

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ICT Greening is all about using ICT more efficiently to achieve reduction in energy consumption which has null or zero effect on the most important resource – The planet Earth itself, and therefore considers the acquisition of energy efficient ICT solutions. In this paper, I have chosen to use the term 'Green ICT' rather than 'Green computing' as it encompasses all the activities of the ICT industry which supports the green business as well as energy efficiency. Green ICT is the most ideal way in making significant steps in reducing the overall impact of ICT onto the environment by adapting sustainable practices to reduce carbon emissions, e-wastage disposal, new technology implementation, reduction of power consumption, participating in responsible purchasing practices and providing sustainable infrastructure for green business. The content analysis used in this paper is from appropriate literature review papers representing both national and international scenarios. Hence, through Green ICT, organizations gains monetary benefits due to reduction in overall operating costs, which also contributes towards lowering levels of carbon emissions, reduces the transportation and transmission costs, enables the organization to be sustainable, enables an easier transition into mandated practices and establishes a lasting change for the planet. In turn, ICT have a lot to do with the environment which indirectly affects the health of whole community hence, this calls upon the need of trained health ICT professionals to “do more good” for the betterment of the society and environment.

**“E-Swasthya Kutira” (A Rural ICT Health Information Center) An Innovation May Bring Revolution in rural healthcare By.”**  
(Abstract: 031)

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According to GOe (An initiative of WHO to find out and understand the importance of use of ICT for healthcare system and services) government should develop and roll-out ICT enabled infrastructure to address and streamline healthcare services in their country. An efficient e - health infrastructure can be established with an integrated approach by incorporating services like •EHR •PIS •HIS •GPIS •NER • NDR• Directories of Healthcare Professionals and Institutions, • Tele-health, • GIS etc. The importance and value of this information system was clearly recognized by OECD countries that participated the survey carried out by GOe in 2005, which included India also. Not surprisingly India is way behind from many other countries in implementing these solutions. Current health informatics in India is though disappointing but quite promising as there is some sporadic successful initiative by private and government bodies.

Keeping one eye on all above facts E-SWASTHYA KUTIRA (a rural health information center) concept conceive to meet the unmet need of health information and to provide appropriate reliable health information, education ,guidance under one roof at village level. In spite of all so call obstacles like large size, population density, , inaccessibility, illiteracy, poverty, diversity in life style, rural-urban distribution and geo-environmental variation, this innovation may bring revolution in rural healthcare by promoting preventive health at right time to right individual and reach the unreached population using ICT which is well developed in India. No doubt successful implementation of this concept improves health status (indicators) of rural and tribal remote areas and facility the system towards achieving MDGs.

**“Computerized Nursing Ward Administration”**  
(Abstract: 044)

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The author during his service in nine countries had observed that nursing services are exceptional due to their dedication to the profession. From the time a patient is admitted, till he is discharged major responsibility rests with the in-charge nurse. During this process, the nursing staff is overburdened by too many jobs including nursing and non-nursing functions; e.g., interaction with many people, too much documentation work, and responsibility towards sick and injured with minimal staff to carry out within the time schedule to the utmost satisfaction of everyone. It is found, in developing countries, the head nurse spend 70% of her

time on administrative work and staff nurse 50-60% on patient care. The hospital reputation depend mainly on, wards which run 24/7 to deal with cases from simple to complex and high risk emergencies treated in the ward. Each nursing station will have a master screen that will provide hourly information of jobs to be performed by the duty nurse, accordingly the work to be carried out. Similarly, each service department will have a master screen that will exhibit the pending works to be carried out in different wards which will have to be attended promptly.

**“A Global Travelers’ Electronic Health Record Template (TrEHRT) Standard for Personal Health Records”**  
(Abstract: 045)

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Tourism as well as international business travel creates health risks for individuals and populations both in the host societies and home countries. One of the strategies to reduce health related risks to travelers is to provide travelers and relevant caregivers timely, ongoing access to their own health information. There are many websites offering health advice for travelers. For example, the World Health Organization and United States’ Department of State offer up-to date health information about countries relevant to travel. At the same time, little has been done to assure travelers that their relevant medical information to available at the right place and at the right time when the need might arise.

WHO’s the mHealth global observatory reports that there are about 5 billion mobile phone subscriptions with over 85% of the world’s population now covered by a commercial wireless signal.6 Consumer Technology Survey showed about 85% of the frequent business travelers’ use the smartphones. With the emerging economical subscribing plans of 3G/4G by the telecom companies the numbers of smartphone users are rising constantly. One of the blogger from Intel Corporation posts “according to a new report, patient self-care and updating personal health records may be the next big opportunity”.

Applications of ICT utilizing mobile phones for health management are promising tools both for the delivery of healthcare services and the promotion of personal health. This presentation describes the project developed by International informaticians under umbrella of the International Medical Informatics Association (IMIA). A template capable of becoming an international standard is proposed. This application is available for free to anyone who is interested. Furthermore, its source code is made open.

**“Causes for Delay in Effecting EHR Globally”**  
(Abstract: 052)

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Despite hectic efforts globally by many nations, in swift implementation of Electronic Health Records (EHR) could not succeeded due to several hindrances. The author served as WHO Consultant and Senior Consultant in the Ministries of Health in eight nations, during the course of four decades, he has overseen the development of most neglected medical records, moving from virtually no systematic medical record services to the foundations of national EHR system in less than 20 years leading to paperless records. In order to understand thoroughly the causes for delay in effecting EHR globally in GCC and other countries including the potential problems encountered before, during and after developing EHR, a study was undertaken. The study revealed the number of causes which delayed in effecting EHR globally, were classified mainly into three categories such as Three Ts; Team (Men), Tactics (Process) and Technology. Important barriers were mainly the cost, finance, hardware, software; standards, interoperability, technical support and training. And transformation process from manual to electronic, legal validity, security, privacy, incorporating standards and getting certification by CCHIT are major causes for delaying the EHR implementation. Nevertheless, the identified issues need to be addressed prudently, if we want swiftly the implementation of EHR globally

**“Health Informatics – Certification & Dissemination of Information on Emerging Infectious Diseases and Lifestyle Health Problems”**  
(Abstract: 106)

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DBT’s Bioinformatics Centre (BIC) has thrust on Healthcare Informatics and extends services related to integrated usage of information communication and related technologies for better health services. SEVAMED, a quarterly update on Infectious Disease Research & Traditional Medicine containing guest articles, health bytes, news & views besides bibliography is being published and made available online also. MGIMS-JBTDR Health Update web portal for current awareness on Emerging Infectious Diseases and Lifestyle Health Problems is also maintained. Online Health Informatics Certification (OHIC), a six month

Course being conducted for Healthcare professionals has received 21 registrations from India & abroad. Mycoprotease and MTB proteome comparison databases have been developed at BIC incorporating information on Mycobacterium tuberculosis strains sequenced so far and single point mutations are being studied to understand virulence properties. HPV-PDB database being developed includes structural & sequential inputs on 50 completely sequenced HPV strains associated with cancer. Further, an online interactive network of reputed institutions involved in holistic healthcare for lifestyle diseases is being developed to promote holistic healthcare and research on lifestyle diseases.

**“Performance Metrics Indicative of Supervision: A Study of Community Health Workers.”**  
(Abstract: 086)

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Community health programmes are often hindered by difficulties of supervising community health workers (CHWs) in remote areas, analysing data they collect, and translating that data into actions or feedback that will improve their performance. The use of mobile phones for remote data collection and CHW supervision provides such benefits as real-time workforce monitoring, but this benefit is diminished if no system exists to efficiently monitor incoming data.

Through analysis of data collected by CHWs across a number of maternal and child health programmes in rural India, we have identified performance metrics that can be easily extracted from collected data, namely client follow-up rate, quantity of data submissions, and average duration of CHW/client interactions. By comparing these metrics across programmes we have noted lower performance that is statistically significant at one implementation site where high turnover of supervisory staff and addressable technical problems with mobile phones were significant barriers to effective supervision, which were not faced at other implementation sites.

We conclude that performance metrics identified are indicative to the level and quality of supervision for community health programmes and propose that further investigation is merited to determine the effects of monitoring such metrics on the efficiency of CHW supervision.

**“Acute Organophosphorous Pesticide poisoning and its Impact on Health: A Case of Patients suffered in Munger District in Bihar”**  
(Abstract: 0110)

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This short note describes six patients which were suffered from acute Organophosphorous Pesticides (OP) poisoning in Munger district of Bihar in India. In this study, we have highlighted the necessity of drug informatics in the promotion of treatment of poisoning of patients in India. Health consequences resulting from OP and from poverty, substandard living conditions, migrancy, language and cultural barriers, and impaired access to health care are described. The pharmacist should try to use better informatics methods like telemedicine, bioinformatics (better than atropine by screening analogues of atropine) and nanomedicine to reduce clinical toxicity and higher efficacy at lesser dose to reduce the death rate due to organophosphorous poisoning.