

COLLIDING HEALTH CARE INFORMATION SYSTEM: AN INTEGRATION APPROACH TOWARDS E_GOVERNANCE

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ABSTRACT

The purpose of this paper is to highlight the importance of converging information communication technology (ICT) and e-Governance in the field of healthcare. This paper will examine how these two powerful platforms need to be utilised effectively to make changes in the field of healthcare, especially in the developing countries. Developing countries like ours do not have easily reachable technologies, nevertheless, technology can still be utilised in governing the e-health system ensuring health information is disseminated effectively and efficiently to the populations that require it. This paper is to discuss how Information Technology inclusion with health systems will give us a better foundation for effective governance by quoting ongoing efforts in Rajasthan state of India.

Keywords: *ICT, e-Governance, e-Health and IT.*

I ICT, E-GOVERNANCE AND E-HEALTH

E-governance involve governing of a country, organisation, company or a household, with the help of Information and Communication Technology (ICT).Conversing of E-Governance in the popular phrasing ,we only refer to the governing of a Country/State using ICT. The application of ICT to transform the productivity, efficacy, pellucidity and accountability of exchange of information and transactions between Governments, between various Government agencies and between Government and Citizens is referred as E-Governance[1].The aim is to endow people with information access.

According to WHO (World Health Organization),E-health is defined as the use of information and communication technologies (ICT) for health which includes treating patients, conducting research, educating the health workforce, tracking diseases and monitoring public health[2].

As defined by Murray & James- “Information and communications technology (ICT) is an extended term for information technology (IT) which stresses the role of unified communications.” ICT conceals any electronic means that will store, retrieve, manipulate, transmit or receive information in a digital form, e.g. personal computers, digital television, email, robots and so no. Zuppo has defined an ICT hierarchy where it is very clear that all levels of the hierarchy "contain some degree of commonality in that they are related to technologies that facilitate the transfer of information and various types of electronically mediated communications.".[3]

II RELEVANCE OF E-GOVERNANCE

Consecutive governments have been trying to address socio-economic problems that includes rural and urban poor, women in rural areas, street children, people belonging to underprivileged castes and people living in less developed areas. However, effective execution of various economic development programmes has proved an obscure goal. With prevailing perspective of developing countries, Government of India recognizes that e-Governance, affords an excellent opportunity for improving governance. When used resourcefully, it can be an initiation for introducing various administrative reforms. These alterations not only will actually provide people unbiased access to economic opportunities but will also go a long way in improving the quality of life than ever before. Therefore, we view e-Governance as a strategic tool for transforming Governance and improving the quality of services provided by the government to its people.

E-Governance can be seen as a vital element of the country’s governance and administrative restructuring schema. By introducing this concept government aspires to provide: [4]

- Governance that is easily understood by and accountable to the citizens, open to democratic involvement and scrutiny - an open and transparent government.
- Citizen-centric governance that will cover all of its services and respect everyone as individuals by providing personalised services.
- An effective government that delivers maximum value for taxpayers’ money with quick and efficient services.



Figure1: E-Governance Source:(<http://cis-india.org>)

The government has recently unified the use of Mobile application (Whatsapp) for better communication and effective governance. It has come up as mode of communication with various units for getting various activities done such as sending circulars, replying to common grievances, calling for meeting or giving notice, sharing feedback on trainings and discussing logistic problems.

III E-GOVERNANCE IN HEALTH SECTOR

The Government of India has embraced e-governance as a trigger and means to redefine and streamline outdated, inefficient health care processes and procedures while simultaneously exploiting the full power of modern ICT. The aim is to provide citizens with easier and faster access to health services. India has recognized the benefits of e-health and steered in a paradigm of citizen-centric service delivery. E-governance is reforming the way government manages and shares information with external and internal patrons. Explicitly, it hitches information and communications technologies (such as Wide Area Networks, the Internet, and mobile computing) to transform relations with citizens, hospitals and amongst various health sectors of government.

3.1 Merging ICT and HealthCare

ICT can give the platform and has the potential to reform the long established organizational design and working capability of orthodox health care system. Factors such as hazards from untreatable diseases ,scarcity in number of healthcare experts and pressure from economic unpredictability enforces the government to plough money on ICT in healthcare. Tele-healthcare is an example how ICT helps healthcare delivery outside hospitals and clinics. Health information includes data such as name,age ,OPD visits ,hospital admittance on smaller scale and embrace details of doctors ,administration ,latest pupations in medicine on wider horizon.

When we mingle the term ICT with health information ,there emerges the concept of Health Information Management(HIM). The term Health Information Management (HIM) is used to describe the process of collecting ,analyzing and digital and traditional health information essential to provide efficient patient care

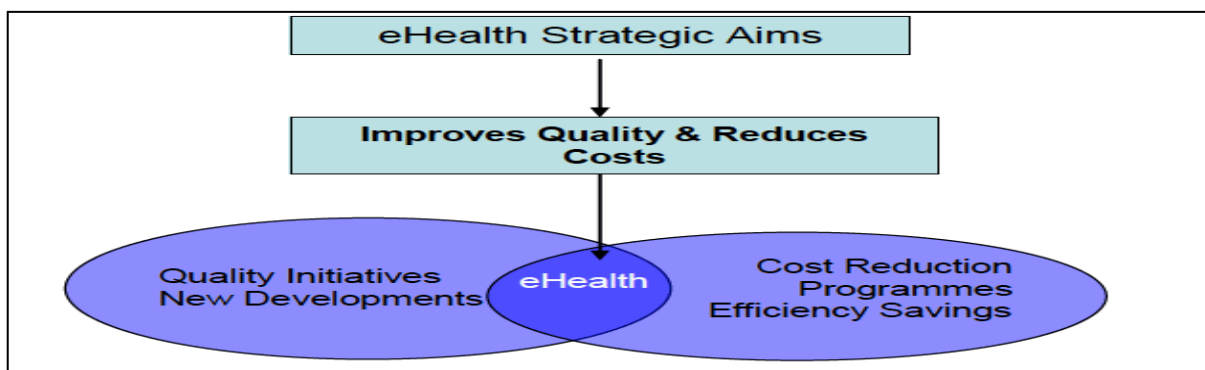


Figure 2 : Framework of eHealth source:(<http://www.gov.scot/>)

This is done by qualified professionals whose work area spans from operational ,administrative tasks to connecting clinics and hospitals. Managed care defines the primary care provider as principal provider of care and as gatekeeper for access to certain diagnostics tests and speciality care. HIM ensures to provide an organization, the right information, when and where required. Major goal of managed care is to provide more care outside the hospital. There are differences in the temporal nature of information, the responsibilities of each member of health care team, the need for a communication infrastructure to facilitate coordination and other logistic concerns which impact the detail design of information system.Health Information Management(HIM) provides us the means for better patient care ,time saving, upto date operations will



strengthen administration and cost control leading to boosted profits. Then arises the need of Health Information System (HIS). HIS must be integrated and implemented in such a manner as to provide exact information reachable to concerned person within the acceptable time limit and in user-friendly form. Health care industry must follow globally accepted standards and protocols like Health Level 7 (HL7) and HIPAA (Healthcare Insurance Portability and Accountability Act) standards for exchanging messages which deals with factors such as patient information privacy, medical record management etc. [5] New strategies in e-health need to target at improved quality and reduced costs which impacts the central role of primary care and demands emergence of integrated delivery systems.

Technological advances that lead to favourably affect the foundation of Integrated health system are as follows:

- **Internet** - From the times the widespread connectivity of Internet came into being, several changes have coalesced to bring together a paradigm shift that now touches all segments of society. Internet Service Provider have made access convenient and judiciously inexpensive with increased bandwidth. It is this pervasive connectivity that enables various organizations to share data throughout their geographically dispersed clinical delivery sites and reach the consumer i.e. the patient at home.
- **Universal view:** Software that make easy to connect to search, browse and download information from anywhere on the network. Compatibility of the softwares and platform independence make these softwares run on almost any computer.
- **Intranet:** Intranets use industry standard document formats, data exchange protocols and softwares. It uses better bandwidth, security and administration as they are controlled and operated by private enterprises so prove useful for health care applications.
- **Network centric computing :** Networking technologies is putting an end to the boundaries between and within various the government sectors. Capability to manage hardware and software more centrally reduces the acquisition and operating cost for the enterprise software.
- **Increased number of digital citizens:** Digitization has lead to emergence of active consumer of government services. There is drastic increase in the population which is comfortable in using digital technologies with gradual increase in developing countries [6].
- **Change in Service-delivery mechanism:** The way a service is delivered to consumer these days is going through a fundamental change and we are moving towards an era of “on-click” availability of almost everything. More citizen-centric government services are expected with more efficiency and transparency with reduced operating costs.

IV CURRENT STATUS OF E-HEALTH IN INDIA

Much has changed since the times health care is practiced, as the Information technology available has significant effect leading to fundamental shift in the delivery of health care, favoring outpatient care, guideline driven care over autonomous decision-making. The need to examine and manage the health needs of a population has drastically increased the demand for information system that capture clinical data. The

Government of India, has come out with guidelines for E.H.R standards in India while inaugurating National Health Portal. These recommend set of standards to be followed by different healthcare service providers in India, so that medical data becomes manageable and easily transferable.

India is considering to set up a National eHealth Authority (NeHA) for standardisation, storage and exchange of electronic health records of patients as part of the government's Digital India programme. An authority to be set up by an Act of Parliament will work on the integration of multiple health IT systems in a way that ensures security, confidentiality and privacy of patient data. A centralised electronic health record repository of all citizens which is the ultimate goal of the authority will ensure that the health history and status of all patients would always be available to all health institutions. Union Health Ministry has circulated a concept note for the setting up of NeHA, inviting comments from stakeholders[7]. Connectivity is not the only issue to be considered, confidentiality and security safeguard also needs to be developed.

V E-HEALTH CARE SYSTEM IN RAJASTHAN

The Government of Rajasthan is actively promoting Medical and Healthcare sector giving an opportunity for the private sector to invest in medical and healthcare institutions which includes medical, dental and paramedical. To facilitate the establishment of quality health institutions within the framework of set standards and norms . Government seeks participation from the private sector for quality healthcare delivery. The state has as well immense potential of extending its tourism into medical tourism with its Rajasthan Investment Promotion Scheme(2014)which offer concessions and tax benefits for such investments.

The “Aarogya Rajasthan Abhiyan“ a drive for healthy Rajasthan is approved by Chief Minister Vasundhara Raje on August 25, 2015, to collect and compile health data of rural population in the state. Rajasthan is the second state in the country after Kerala to launch such a campaign [8].

E-health cards will be generated for people living in rural areas. 48,000 health workers would collect health-related information of about five crore people by visiting about one crore family unit. This programme will have health camps where rajasthan residents would be issued health cards based on spot diagnosis which can be used for future treatment and follow-up of a patient.

VI E-HEALTH INITIATIVES BY RAJASTHAN GOVERNMENT

As stated by Rajendra Singh Rathore ,Medical, Health & Family Welfare Minister of Rajasthan, “It is the priority of the state government to enable the reach of the local and global healthcare discoveries and initiatives to the people of Rajasthan“[9]. Keeping this as the main theme Information Technology in health sector has been a major focus of healthcare industry and seems inevitable to continue as the industry endeavours to automate health information, improve electronic reporting of medical data, streamline daily work flows in hospitals and increase cost savings by rationalization work efforts. Thus, IT is a promising tool in healthcare that can provide new ways to healthcare providers to collect, store, retrieve and transfer information electronically. In this regard, National Health Mission has taken up few e-initiatives and implemented them successfully.

ASHA Soft is an online system which facilitates the health department under National Health Mission(Rajasthan). ASHA Soft has been prepared by National Informatics Centre unit of Rajasthan State with the cooperation of ASHA Soft Core Group under the directions of Mission Director[10]. It captures beneficiary wise details of services given by ASHA to the community, provides online payment of ASHA to their respective bank accounts and even calculates total incentive in accordance with the actual health services provided, which will help in strengthening of monitoring and management of physical & financial progress. ASHA (Accredited Social Health Activist) Programme also known as ASHA Sahyogini in Rajasthan was started in 2005, it has played an important role in implementation of health activities under NRHM. This has been brought into view as a key component of the community process intervention and now, has emerged as the largest community health worker programme in the world. At rural status it is a great contribution for enabling people's participation in health. Asha soft has improved the monitoring and evaluation of post natal care as ASHA's get payment only after their visit is verified by the supervisor. Payment reports can help in analyzing sections where ASHAs are not working very actively and push can be laid over those services. This would be a clear effort towards better governance through e-health effort.[11].

e-Aushadhi is web-based application which manages the stock of various drugs and surgical items required by different district drug warehouses of Rajasthan. The main objective of a District Drug Warehouse is to supply drugs to the various medical institutes that are associated with the given district drug warehouse. e-Aushadhi helps in establishing the needs of various district drug warehouses in such a manner so that all the required materials and drugs are made available to the consumer district drug warehouses without delay. This application includes classification of items, codification of items, etc.

Pregnancy, Child Tracking & Health Services Management System (PCTS) is an online software used as an effective planning and management tool by Medical, Health & Family Welfare department, Government of Rajasthan. The system maintains online data of more than 13,000 government health institutions in the state. The System facilitates integrated system for HMIS and Pregnant woman & child tracking for better health surveillance, it is a useful tool for improving institutional delivery. PCTS has been bestowed with National Award for E- Governance (2011-12) and best project under e-Health category (2010)[12]. It also helps in tracking BPL and JSY cases, online tracking of pregnant women, infants and children, improved monitoring of immunisation programme, identification of cases for sterilization, management of health institutions, online directory of health institutions and provides **Swasthya Sandesh Seva (SMS Alerts)** to Citizen and Health Workers[10]. Table below show data about this alert facility.

Swasthya Sandesh Sewa (SMS Health Alerts)						
S.No.	SMS	Upto July, 13	From Aug 13 to July 15	42597	Total	in Lacs
1	Delivery schedule sent to ANM	550000	2838519	0	3388519	33.89
2	Immunization schedule sent to ANM	0	333975	0	333975	3.34
3	Vaccination reminder sent to Beneficiary	337000	4064755	0	4401755	44.02

Table1 Source(<http://nrhmrajasthan.nic.in/HMIS%20Projects%201.htm>)



Arogya Online Project is an e-Health initiative to automate the hospitals in the state to improve the patient care. The 'Arogya Online' is health information management system that rationalizes work-flows operations, resource utilisation and management to improve hospital administration, enhances the quality of patient care, creates platform for information exchange, end to end supply chain management within the system. The modular design structure of this software application augments operational flexibility, the system performs complex tasks like investigation billing, bed management, and various other related activities. This initiative assists the changeover of paper-based clinical record keeping to electronic means for better information exchange.

Saghan Nirikshan Abhiyaan is an effort to identify the gaps in the health services at the health institution. This initiative gives access to information anywhere and anytime, provides direct and effective monitoring of progress. It is foundation for better planning and decision making by identifying gaps in health facilities infrastructure and also identifying best health institutions.

Computerized Human Resource Information System (CHRIS): It is an integrated streamlined system to keep the employee data. This secure web- based system contains complete information of all contractual or permanent staff which can be managed when required. It also provides real time status of HR for instance vacant or filled positions etc.

Integrated System for Monitoring of PCPNDT Act (IMPACT) Software- This web based Software IMPACT was launched on October 1, 2012 by the Medical Health & Family Welfare department with the collaboration of NIC [13]. It provides the online form F of every woman whose sonography test is conducted, it is being reported online by every centre. All sonography centres in the state have been enrolled with the Medical, Health & Family Welfare department and details are available in the software. It provides online surveillance system of government for prevention of sex determination to save girl child. It is an demanding scrutiny drive using Information technology for all Government districts, Community Health Center(CHC), Primary Health Center (PHC) hospitals.

Rajasthan Janani Shishu Suraksha Yojna (RJSSY) Software : It is a health programme launched on 12 Sep ,2011 in all 33 districts of Rajasthan by then chief minister Ashok Gehlot at Dudu near Jaipur[14]. This is an effort to bring down the maternal and infant mortality rate in the state and is estimated to benefit more than one crore pregnant women & newborns. Its official website :<http://rajswashya.nic.in/JSSK.htm> provide all the means to entitle and eliminate of out of pocket expenses for pregnant women and sick infants, access to public health institutions, free Delivery & C –Section, free medicines, free transport from home to health institution, between health institution in case of referrals & drop back home. Earth Institute, Columbia University , Mumbai has done evaluation and validation of JSY/JSSK/MSLY scheme in their two districts namely Dausa and Rajsamand which can be helpful to identify the hold-ups and awareness of community related to government

schemes, thus leading to look for remedial action for effective implementation of beneficial schemes launched by the government[11].

Mukhyamantri Nishulk Janch Yojna (MNJY): This is effort with aim to provide free of cost basic diagnostics services at all government Institutes of health care .This scheme will provide everyday patient visiting government hospitals with basic investigation service. It is started with the mission to strengthen the existing laboratories and other diagnostic facilities (and to create additional facilities if required) in all the public health institutions, reduce the treatment cost to patients & decrease the out of pocket expenditure.[15]

VII CONCLUSION

With all the above mentioned initiatives in action, healthcare system in Rajasthan seems to set an example for other states. Deliberate analysis of the information needs and work flow requirements in ambulatory care will help system developers design information system that increase the efficiency and effectiveness of clinical practice throughout .Thus, we can view e-Governance as a vehicle to initiate and sustain transformations in health sector. Another fundamental concept that heightens the need for computerised health records is that of Integrated Delivery System(IDS). IDS is composed of health care provider, service provider and facilities to provide a range of health care services to a defined population. To manage the delivery of care in an IDS , a health system must have efficient and accurate ways of capturing ,managing and analyzing clinical data collected at the different sites where care is provided.

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