E-Medicine

"e-medicine is the ability to provide interactive healthcare utilizing modern technology and telecommunications." Basically, e-medicine allows patients to visit with physicians live over video for immediate care or capture video/still images and patient data are stored and sent to physicians for diagnosis and follow-up treatment at a later time. Whether you live in the center of Los Angeles or deep in the Brazilian Amazon, e-medicine is an invaluable tool in Healthcare.

Here's an example of how e-medicine works everyday. Say you have a horrible sore throat and visit your healthcare provider (could be a general practice physician, nurse practitioner, or unlicensed health worker in a village depending where you live), who does an examination and is concerned with what he sees. Your provider recommends a referral to an ENT specialist for a follow up diagnosis and treatment plan. Well, instead of traveling to the nearest specialist, which depending where you live could be anywhere from a 45-minute drive or an 18-hour boat ride up the Amazon River, your provider connects you directly to the ENT specialist via e-medicine.

Here are some of the major benefits of a e-medicine Consultation:

- • The specialist actually hears your medical history and current condition directly from you and your provider instead of the specialist receiving a dictated note in the mail.
- With the use of ENT medical peripherals such as a nasopharyngoscope, your provider can pass this medical peripheral into your nasal passage which will allow your provider and the ENT specialist simultaneous crystal clear video of your throat and vocal cords.
  - The specialist may ask you to cough, pronounce letters, etc. in order to get the best outcome for the diagnosis.

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- • The specialist can diagnose and recommend treatment immediately.
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  Your provider has the opportunity throughout the examination to ask questions and learn
- from each and every consultation. The continual education of your provider via medical consultations is an immeasurable benefit to all his patients.

e-medicine Usage Models

Real-Time:

This is the most common use in e-medicine. Like the example above, live video allows the provider, patient and specialist to all communicate together to achieve the best outcome for the patient.

- In or outpatient specialty consultation
- Physician supervision of non-MD clinician
- Generally require higher bandwidths (minimum 256kb)

Store and Forward (asynchronous):

Used when both health providers are not available or not required at the same time. The provider's voice or text dictation on the patient's history, current affliction including pictures and/or video, radiology images, etc., are attached for diagnosis. This record is either emailed or placed on a server for the specialist's access. The specialist then follows up with his diagnosis and treatment plan.

Home Health e-medicine

When a patient is in the hospital and he is placed under general observation after a surgery or other medical procedure, the hospital is usually losing a valuable bed and the patient would rather not be there as well. Home health allows the remote observation and care of a patient. Home health equipment consists of vital signs capture, video conferencing capabilities, and patient stats can be reviewed and alarms can be set from the hospital nurse's station, depending on the specific home health device.

•Usually low bandwidth analog Plain Old telephone System (POTS). Some newer systems do support higher bandwidth capabilities.

•Disease management, post-hospital care, assisted living, etc.

Summary of Benefits of e-medicine

To Rural Physicians and clinics (spoke sites)

- Receive education from the specialist/provider
- Better health outcome for their patients
- Enhanced community confidence in local healthcare
- Attend continuing medical education courses from their clinic

•To Patients

- Loved ones remain in their community with family support
- Cost savings from not having to travel extensively
- Immediate urgent care
- Confidentiality of specialty examination or visit (Because the patient visits the general practice doctor, he can be seen for any specialty care without anyone else knowing)
- Patient education courses (nutrition, oncology, etc.)
- Properly stabilize patient prior to transport
- Early Diagnosis prior to escalated medical episode

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- **Rural Patient's Community - Rupees follow the patient :** Patients that routinely travel to visit doctors in large urban areas tend to purchase their goods and services from those cities, e-medicine keeps those Rupees local.

To e-medicine Providers (hub sites) :

- Expand patient outreach
- Major surgical procedures resulting from the initial e-medicine consultation
- Reduction in ER visits
- Promotion of Hospital
- Charge tuition for clinician education courses (CME, CNE, etc.)

E-Medicine is not an evolutionary concept but a revolutionary concept in itself. It represents a very innovative approach in providing quality health care whenever and wherever needed, but is seen lacking reliability, user friendliness & most importantly governmental support.

In fact the main challenge facing website administrators, software engineers, system developers & medical practitioners is to develop strategies that will give e- care a reliable environment to exploit opportunities and make it more feasible & cost effective.

The current synergy between health reform initiatives (which are defining how health care services are accessed and delivered) and advantages in technologies (that support e-medicine projects) has resulted in proliferation of e-medicine projects. The existing scenario demands that the development of e-medicine strategy be based on a sound knowledge of the present and future potential of e-medicine to improve health care access and quality, while reducing health care costs.

What is E-Medicine ?

It has been defined "as the use of telecommunication" to provide medical information and services. It may be as simple as two health professionals discussing a case over the telephone, or as sophisticated as using satellite technology to broadcast a consultation between providers at two distant locations, using videoconferencing equipment.

The simplest definition of E-Medicine is that it uses multimedia technology (voice, video and data) to deliver medical services. The lower cost of band- width and improvement in video and data compression standards have increased the number and types of medical services that can be delivered from a distance to include virtually every specialty.

E-Medicine is an application and not a technology. It uses a hybrid technology incorporating elements of television, telecommunication, computers, engineering and medicine. Services can be delivered on a combination of technologies with a variety of equipment.

Objectives of E-medicine :

"E-Medicine is not an evolutionary concept but a revolutionary concept and at the heart of every revolution, there is the need for a sudden massive change, at the core of which is the human mind." By taking into consideration "Health For All," we'll discuss some objectives for which E-Medicine has originated.

1. To make high quality healthcare available to traditionally under privileged population - In India, there is a large rural based population separated by large distances which need access to regular quality medical care. E-medicine can enhance citizen's equality in the availability of various medical services and clinical health care, despite these economic and geographic barriers.

2. Save the time wasted by both providers and patients in traveling from one geographic location to another to avail services on time- Think of a patient who requires immediate specialist consultancy, and there is no specialist available to cater to him. This is where e-medicine could be utilized for effective healthcare delivery.

3. Reduce costs of medical care – The ever- rising cost of healthcare is becoming a prime concern. The incidental expenses related to patient care, i.e. the cost associated with factors other than the actual medial care such as travel, accommodation for relatives, food etc also contribute substantially to the overall cost of treatment. In a country where health insurance is yet to catch up, all these are borne by patients, in many cases by selling property and livestock. If hospitals can reduce these costs associated with treatment, it would go a long way in reducing the burden of care on the patient. E-medicine seems to be the answer.

Initiatives taken by healthcare organizations;

There are many activities that are going to contribute to the spread of E-Medicine in India. Of which APOLLO (Hyderabad) and ASIA HEART FOUNDATION (Bangalore) are emerging as key players. Madras Medical College is the first government medical college to have E-Medicine installed in INDIA.

Organizations such as ISRO, have taken innovative approach to facilitate healthcare delivery by launching an exclusive health satellite. It provides almost 100% uptime, making it the best medium

for a country such as India with diversity in terrain. General Electric and Wipro are also undertaking e-medicine stations in Chennai and Hyderabad.
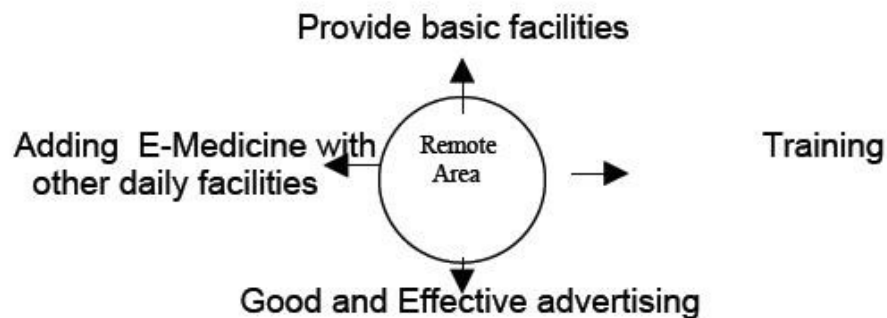
Grudges and Hindrances:

- **Perspective of medical practitioners** : Doctors are not fully convinced and familiar with e-medicine. They cannot understand how their jobs can be performed more effectively and efficiently through the use of e-medicine. The very thought of diagnosing a patient when he/she is physically absent just on basis of the data provided through the net turns them blue. Similarly practitioners in remote areas feel threatened that they will be surpassed due the reach of brand names like APOLLO, Asia Heart Foundation etc.

- **Patients' fear and unfamiliarity** : There is a lack of confidence in patients, about the outcome of E-Medicine. The main problem is that any treatment consist of two factors; first is chemotherapy i.e. treatment by medicines and the other is psychotherapy that means treatment by emotions which is absent in e-medicine.

- **Financial unavailability**: There has been several isolated initiatives from various organizations and hospitals for the implementation of e-medicine projects. But the technology and communication costs being too high, make it financially unfeasible.

- **Lack of basic amenities:** In India, nearly 40% of population lives below the poverty level. Basic amenities like transportation, electricity, telecommunication, safe drinking water, primary health services, etc. are missing. Any technological advancement can't change a bit when a person has nothing to change.

- **Literacy rate and diversity in languages** : Only 65.38 % of India's population is literate with only 2% well-versed in English. So the rest of the people are facing a problem in adopting E-Medicine. Also, the presence of a large number of regional languages makes the applicability of a single software difficult for the entire country.

- **Technical constraints** : E-medicines supported by various types of software and hardware, still needs to mature. For correct diagnosis and pacing of data, we require advance biological sensors and more band-width support.

- **Quality aspect** : "Quality is the essence" and every one wants it, but can sometimes create problems. In case of health care, there is no proper governing body to form guidelines in this respect and motivate the organizations to follow, it is solely on organizations how they take it.

- **Government Support :** The government has limitations and so does private enterprises. Any technology in its primary stage, needs care and support. Only the government has the resources and the power to help it survive and grow. But in India we are not the favored ones. There is no such initiatives taken by the government to develop it.

- **Biological consistency** : Diagnosis itself is a complex process and symptoms of disease are not consistent in all the patients. The consultant makes a disease diagnosis on the basis of information gleamed from the patient. In e-medicine the consultant tests the hypothesis, it may be right or wrong.
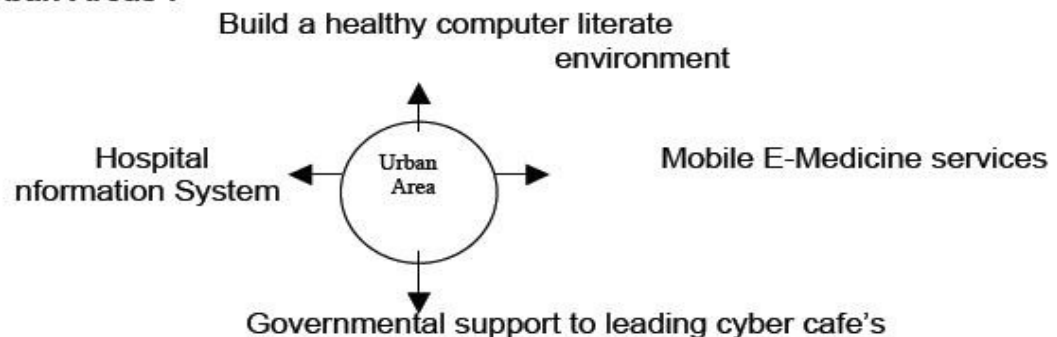
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The importance of right strategy planning- A specific approach for each case

For Remote Areas:-

Provide basic facilities

Adding E-Medicine with other daily facilities   Remote Area   Training

Good and Effective advertising

- **Provide basic facilities- l**ike Transportation, Electricity, Primary health care centers (PHC) etc.
- **Integrate E-Medicine with other daily facilities-** like Education, Health, Banking services etc.
- **Training-** it is essential to train the literate people from rural areas.
- **ood and Effective advertising campaigns- by video or by audio, which can be understood by rural people.**

For Urban Areas :-

Build a healthy computer literate environment

Hospital nformation System   Urban Area   Mobile E-Medicine services

Governmental support to leading cyber cafe's

- *Build a Healthy computer literate environment*--by providing good knowledge to learners
- *Hospital Information System*-- In big hospitals, we can adopt the HIS strategy to promote E-Medicine
- *Mobile E-Medicine services*-- mobile vans fully equipped with all the equipments of E-medicine, can take frequent rounds in urban areas to spread awareness
- *Governmental support to leading cyber-café's, for the spread of knowledge on health issues amongst laymen.*

Environment:-

Technical

Financial   Environ -ment   Social and Political

Educational
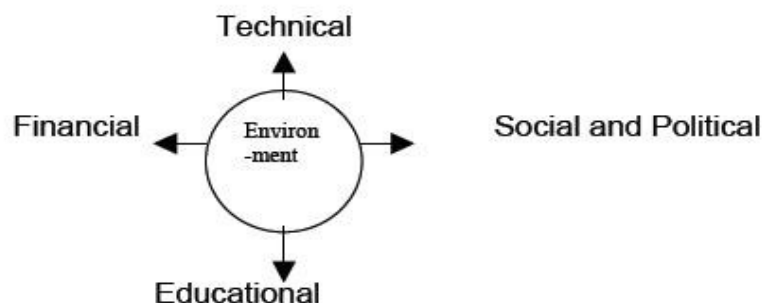
Technical -
- User-friendly technology like Graphical User Interface.
- Flexibility and adaptability in terms of technology.
- Involving the user from the beginning of project.
- Quality control and proper standardizations.
- Making expert systems to help users as well as patients.

Social and Political -
- Active participation of society.
- Strong political will.
- Involve NGO volunteers with these activities.

Educational -
- Providing continuous Medical Education (CME) for users like doctors.
- Training programs for health care professionals, patients and other persons.

Financial—
- The government has limitations and so does the private sector. A combined effort from both is needed. In private sector- software, hardware companies, computer education institutes and corporate hospitals can play a major role in it.

Conclusion :
To witness a successful revolution in E-medicine, we need to bring these array of activities together. If these experiments work in India over the next decade, the vast population living in developing countries will be winners and bear the fruit of our success.