1. INTRODUCTION

1.1] Definitions:

a) EMR:

An electronic medical record (EMR) is a computerized medical record created in an organization that delivers care, such as a hospital or physician's office. Electronic medical records tend to be a part of a local stand-alone health information system that allows storage, retrieval and modification of records.

b) EHR:

An electronic health record (EHR) is an evolving concept defined as a systematic collection of electronic health information about individual patients or populations. It is a record in digital format that is theoretically capable of being shared across different health care settings. In some cases, this sharing can occur by way of network-connected enterprise-wide information systems and other information networks or exchanges. EHRs may include a range of data, including demographics, medical history, medication and allergies, immunization status, laboratory test results, radiology images, vital signs, personal stats like age and weight, and billing information.

How EHR Works?
Linda Kloss, executive vice president and CEO of the American Health Information Management Association (AHIMA), defines the three essential capabilities of an electronic health record as follows:

- To capture data at the point of care
- To integrate data from multiple internal and external sources
- To support caregiver decision making.

The US IOM report, Key Capabilities of an Electronic Health Record System identified a set of 8 core care delivery functions that electronic health records systems should be capable of performing in order to promote greater safety, quality and efficiency in health care delivery:

"The eight core capabilities that EHRs should possess are:

- **Health information and data.** Having immediate access to key information - such as patients' diagnoses, allergies, lab test results, and medications - would improve caregivers' ability to make sound clinical decisions in a timely manner.

- **Result management.** The ability for all providers participating in the care of a patient in multiple settings to quickly access new and past test results would increase patient safety and the effectiveness of care.

- **Order management.** The ability to enter and store orders for prescriptions, tests, and other services in a computer-based system should enhance legibility, reduce duplication, and improve the speed with which orders are executed.

- **Decision support.** Using reminders prompts, and alerts, computerized decision-support systems would help improve compliance with best clinical practices, ensure regular screenings and other preventive practices, identify possible drug interactions, and facilitate diagnoses and treatments.

- **Electronic communication and connectivity.** Efficient, secure, and readily accessible communication among providers and patients would improve the continuity of care, increase the timeliness of diagnoses and treatments, and reduce the frequency of adverse events.

- **Patient support.** Tools that give patients access to their health records, provide interactive patient education, and help them carry out home-monitoring and self-testing can improve control of chronic conditions, such as diabetes.
- **Administrative processes.** Computerized administrative tools, such as scheduling systems, would greatly improve hospitals' and clinics' efficiency and provide more timely service to patients.

- **Reporting.** Electronic data storage that employs uniform data standards will enable health care organizations to respond more quickly to federal, state, and private reporting requirements, including those that support patient safety and disease surveillance.

The EHR includes information such as observations, laboratory tests, diagnostic imaging reports, treatments, therapies, drugs administered, patient identifying information, legal permissions, and allergies.

Medical Informatics or Health Informatics is the study of resources and methods involved in managing health information. E-health or Electronic health is an emerging field of medical informatics that refers to electronic storage and delivery of health services to the patient. The health domain is adopting IT with a great pace and Hospital Information Systems (HIS) have shown an exponential growth in the last decade. The functionalities of HIS depend on higher heterogeneity of sub-systems built with different specification and protocols. Devices and systems come from different vendors with different network interfaces.

Electronic Health Record (EHR), a by-product of HIS, is segmented through the treatments provided by various care-providers over a period of time. This manifests itself in a variety of forms ranging from general record keeping to specific clinical data for particular areas of care. Ready availability of data improves the quality and delivery of healthcare. Often, it is required to fragment the EHR as per need of the user. The healthcare domain has been slow to adopt IT technologies to manage patient information. Most physicians continue to rely on paper records-leaving room for inefficiencies to share data with other fellow professionals, thus restricting timely and quality care to the patient.

A comprehensive problem list facilitating continuity of care incorporating national standards gives a head start in clinical decision making and quality improvement in interoperable health data exchange. Nations are currently collaborating and taking
Interoperability initiatives enabling global access of EHR. Enormous research work is undergoing in this domain considering various medical and legal aspects to smooth and secured sharing of health records.

Design effective applications and models to integrate electronically gathered data and knowledge for providing quality care to the patients, is a key to seamlessly share these resources. Moreover, the sensitive health data floats over the network that may increase the probabilities of data being exposed or misused by unauthorized users. Security of confidential health information is another important issue in such environment.

Interoperability enables better workflows, reduced ambiguity, and allows data transfer between disparate EHR systems. Sharing of EHR occurs not only between inter and intra-hospitals but also with external agencies. It is possible only if all the relevant records of the patient are available in desired format and at required time. To realize their full potential, EHR products must share information seamlessly. Interoperability becomes a constraint due to differences in operating systems, programming language and hardware for those subsystems.

Apart from functional constraints, many other challenges like legal, security and privacy issues, require utmost consideration while designing smooth data transfer from one HIS to another HIS or other relevant parties who may need this information to maintain continuity of care to the patients. Protecting the medical data and patient’s privacy from all unconcerned is another prime concern. Various methods and techniques prevail for the purpose. Establishing access control, robust encryption techniques and preventing access of data if the device is lost or stolen are a few of them. Timely retrieval of information ensures acceptance and usability of such applications by its prime users. The overall aim is to move health care towards a series of easily available, interconnected, reliable, secured and efficient services. Enormous research work is undergoing in this domain covering all aspects to enable secured sharing of health records. This study focuses on smooth, secured and uninterruptible sharing of health data and proposes a framework for the same.

The Health Survey and Development Committee, headed by Sir Joseph Bhore recommended establishment of a well-structured and comprehensive health service
with a sound primary health care infrastructure. This report not only provided a historical landmark in the development of the public health system but also laid down the blueprint of subsequent health planning and development in independent India. During the tenth five year plan the major objectives are Reduction in fertility, mortality and population growth rate.

The Eleventh Five Year Plan will provide an opportunity to restructure policies to achieve a New Vision based on faster, broad-based, and inclusive growth. One objective of the Eleventh Five Year Plan is to achieve good health for people, especially the poor and the underprivileged. In order to do this, a comprehensive approach is needed that encompasses individual health care, public health, sanitation, clean drinking water, access to food, and knowledge of hygiene, and feeding practices.

In India after agriculture healthcare is the largest sector offering more employment and generating more revenue. The Indian healthcare is divided into two categories one is public/government and second one is private. Government sector healthcare is limited care institutions in few cities and primary healthcare centers in rural areas whereas private sector healthcare institutions are mostly in urban areas. In India there are well trained medical/healthcare professions and the cost wise it is very low when compared to Asia, US and Western countries. The present Indian healthcare market size is US$100 billion and anticipated to grow up to US$ 280 billion by 2020 with 22.9 compound annual growth rate. According to department of industrial policy and promotion Indian hospitals and diagnostic centers are drawing the FDI too. To promote health industry in India, Social Endeavour for Health and Telemedicine was introduced to rural population through information technology accessibility, improving the skills and by introducing the technologies for the success of „Digital India”. Another initiative by Government of India is the agreement between Sweden and India for improving the quality of health through the technology innovation and research and development. Mr. Narendra Modi, initiated E-health services with an objective to offer effective and economical healthcare services to all people through electronic health records, to get online appointments etc. Hence India found to be the with large market potential for the medical devices industry to tap both urban and rural India.