Health is a state of complete physical, mental well-being. Health is metabolic efficiency and sickness is metabolic inefficiency. Nobody is totally healthy or totally sick, is a combination of health and sickness. Good Health means the person is free from illness. The Health care of a person is the preventing disease, treatment, and management of illness and the preservation of inefficiency of health through the services offered by the medical, nursing, and allied health professionals.

In the present health care system of hospitals, the Personal health information has historically been recorded and stored in a paper-based format. This format has a low initial cost and provides certain reliability but has some important limitations. Paper-based records can be difficult to access, time-consuming to update, and impossible to share. Paper-based records are generally not very secure and quite vulnerable to destruction. As a way to overcome these deficiencies there has been a great emphasis on the adoption of Electronic Health Records (EHR's).

Computerization and the use of information technology are relatively moving the health care system from paper report into computer report with the help of an Electronic Health Record. Information and communication technology altered the way of stored, shared and generated data of medical information. EHR system also increases the efficiency and cost effectiveness of health care system. The biggest benefit of an electronic health record system is it improves the quality of health care of person. With the many advances in information technology over the past 20 years, particularly in healthcare, a number of different forms of Electronic Health Records (EHR) have been developed, and implemented. The type of electronic health records varies with one country to another country. Over the years a number of terms have been used to describe the move from a
manual/paper record to electronic form. Some of the better-known terms include, Automated Health Records, Electronic Medical Record, Computer-based Patient Record, and Electronic Health Record.

A number of factors have emerged over the past several years and have led to increased attention toward adopting EHR’s. While many factors are technological in nature, changes in health care delivery and consumer expectations will also be influential in adoption of EHR’s. But some of the obstacles in the implementation of electronic health record system is lack of funds and technology, lack of technical expertise and computer skills of staff, and lack of data processing facilities.

The region of present study of interest is an Integrated Electronic Health Record System, which integrates the health parameters like BP, Blood Glucose, Pulse oxygen, Pulse rate and other clinical measured parameters. The Integrated Electronic Health Record system includes the measurement devices of Blood Pressure, Blood glucose, Pulse oxygen, Pulse Rate and Clinical Analyzer... Etc... Electronic health record is a complete patient personal health data stored in a health smart card is an integrated chip card of credit card sized plastic card, which is embedded with a computer chip. The patient can access the Health Smart record and the health care providers like physician and hospital system can also access the health smart card. With the enhanced information of an EHR system, improves the patient care and the health system management. The EHR system provides the person’s identity, physician’s identity, health information and administrative information. The Health Smart Card data can be read/access by the Smart Card Reader in hospitals, physician’s offices, clinics, labs, and pharmacies in emergency time.

In case of lost of paper report information, there is tremendous impact on the patient. This can be avoided with the design of an EHR system which increases the patient care quality and improvements in data legibility, accessibility, prescription ordering, prevention, disease management
care and decision support. But there is no chance of loss of report in health smart card of electronic system. If the patient suddenly gets sick, the patient can't read the information and can't deal the situation. Doctor's also can't remember the state of illness and medicines. By storing all the data within an electronic health record, the doctor can read and give the necessary treatment. Simultaneously the patients are on multiple medications and go to multiple specialists and pharmacies, when they visit to other physician's they just read the previous report and find the current condition, then they give the required treatment for the present health condition of the patient.

In EHR Record, the person identity provides the patient information like date of birth, height, weight, residence address, and contact phone/mobile number with insurance details, guardian information with address and contact number. Physician's identity provides the physician name, address and contact number of the consult doctor. Health information provides the health parameters of patient like blood group, blood pressure; blood Glucose, Heart Rate, Oxygenation of Blood, X-Ray, Blood and urine test results, etc., with the results of transactions between patients and their health care providers. Administrative information provides the administrative function such as billing. New record is generated from individual interacts with a health care professional's. i.e., a new record is generated for every interaction; every record is added to the health record. A series of records will become as a complete modified electronic health record system.

By the designing of Electronic Health Record System, it is possible to share all available information of a patient between various departments in a hospital as well as between various medical specialists. EHR system also avoiding unnecessary repetitions of similar investigations and efficient decisions are possible with it. There are many benefits with electronic health record, some of the benefits are
(i) It supports patient care and improves its quality of health treatment and reduces fraud treatment.

(ii) Health Smart card reduces the administrative costs associated with health care delivery and financing.

(iii) Health cards in Electronic Health Record System support the clinics in clinical and health service research.

It is also possible to develop a new health care technology by the introduction of Electronic Health Record System. EHR system are also accommodates more future developments in health care policy, technology, management and finance. Also it ensures patient data confidentiality at all time. The various aspects of study are consolidated into a thesis a total of seven chapters.

A brief review on designing of the Electronic Health Record, the nature of Health Smart card and their uses and advantages in the health care system are presented in the chapter1. The earlier literature on the Electronic Health Record System (EHRS) is also present in this Chapter. Health data in Electronic Health Record System is legible, accurate, safe, secure in the health card and readily available when the health data is required. It also integrates the latest information about the patient care i.e., from different data from different departments in hospitals. The people always carry the health card with them at all times. The health smart card gives the medical, personal data of a patient for immediate accessing provides medical history, current medications, allergies, the names with telephone numbers of guardian and other information, necessary for medical treatment decisions.

The chapter 2 covers a detailed description of the smart cards with their micro module, components, architecture and fabrication. The presentation covers the types of smart cards with the help of internal structure. These cards are accessed by the smart card reader, with the relevance
standards of ISO7816. The smart card reader is an electronic device, which is interface medium between the smart card and a personal computer. In addition, a detailed discussion of the applications and advantages of smart cards are also present in this chapter. A smart card based systems have high security with personal identification, which protect the information. In present design the application of a smart card is in health care are used as health card or medical card or medical file access card. These cards in Electronic Health Record System are used to store patient's medical history and personal data are accessed readily when it required. Health smart card reduces the routine paper works as well as it eliminates the medical errors and fraud and speed up the pharmacist access for prescription.

Chapter 3 deals with the designing of a non-invasive method of oscillometric measurement of blood pressure of a patient. It is designed with an implementation of micro controller MCF51QE128 a cuff having sensor and detector. The detector signals are measured by the inbuilt comparators and ADC to measure systolic and Diastolic pressures and are displayed on the liquid crystal display. Simultaneously the measured values are transferred to the personal computer using serial communication port for the further analysis with Integrated Electronic Health Record System (IEHRS).

The Chapter 4 deals with the designing of a non-invasive measurement of Blood Glucose for the measurement of Blood Glucose of a patient. It is designed with an implementation micro controller PIC18F4520. The Blood Glucose meter will sense the signals from measurement strip by the inbuilt comparators and ADC. The measured results are displayed on the liquid crystal display. The measured Blood Glucose values are uploaded to the personal computer using serial communication port for further analysis.

The chapter 5 deals with the designing of a Non-Invasive Optical Plethysmography or Pulseoxymeter. The Pulseoxymeter is used for the measurement of the Blood Oxygenation of a
patient. It demonstrates the implementation of a Single-Chip portable Pulseoxymeter using the ultra low power capability of the Mixed Signal Micro Controller MSP430FG439. In Pulseoxymeter, the calculation of the level of the oxygenation of blood (SaO2) is based on measuring the intensity of light that has been attenuated by body tissue. The pulseoxymeter having a sensor probe, the PulseOxi Probe having two LED lights sources of Visible/RED LED and Infrared Led, and a photo diode detector. The detector signal are measured and amplified by the inbuilt operational amplifiers, analog to digital converters, and digital to analog converters to measure the Pulse Oxygen SaO2. The measured pulse oxygen, heart rate are displayed on the liquid crystal display and simultaneously the measured values are transferred to the Personal Computer using Serial Communication port for EHR system for the further analysis.

The chapter 6 deal with the chemistry analyzer is used to analyze the clinical parameters of a patient. In the present study the semi auto chemistry analyzer of RT1904C from the Rayto Life & Analytical Science Co., Ltd, used to analyze approximately 160 clinical parameters. Some of the parameters are Blood test, HB test, serum test, cholesterol test, urine test ... etc. later on these test results are uploaded to the Personal Computer for further analysis with IEHRS system. This chapter also deals with the development of Electronic Health Record for storing the health parameters of a patient in health smart card. The measured health parameters from the different devices like Blood Pressure, Blood glucose, Pulseoxymeter and other clinical parameters blood test, urine test, x-ray, Ultra Scan...Etc are uploaded to a personal computer using serial communication RS232 (as explained in previous chapters). It also deals with the creation and modification of an EHR using patient details which generates a database file in a personal computer as well as on to health smart card by using smart card reader ACR38 to replace the paper record. Health Card can be accessed for further analysis, updates and modifications of a patient particular without using paper report. The software developed in visual Basic for the Integrated Electronic Health Record system and menus
are selected by doctor, lab, pharmacy, administration. A hard copy of Paper report also obtained from this program. The EHRS health details of a patient are also transmitted to any system or to a place through internet. The description of IEHRS is explained in detail with the help of windows.

The chapter 7 deals with results, discussion and suggestions for the future development of the system which increases the concerns regarding the protection of patient's confidential medical information and privacy has increased.