CHAPTER 1.

INTRODUCTION
1. Introduction to Hospital Management.

Hospitals are the key institutions in providing relief against sickness and disease. They have become an integral part of the comprehensive health services in India, both curative and preventive. Significant progress has been made in improving their efficiency and operations. Effectiveness of a health institution, hospitals or nursing homes, depends on its goals and objectives, its strategic location, soundness of its operations, and efficiency of its management systems. The administrator's effectiveness depends upon the efficiency with which he is able to achieve the goals and objectives. Some of the major factors determining the effectiveness of a health institution include patient care management and patient satisfaction. Hospitals are very expensive to build and to operate. Administrators and professionals have to be extremely cost conscious. Effective computerized systems and procedures need to be implemented to ensure proper utilization of limited resources toward quality health care.

though diagnosis, treatment & post discharge guidance and finally rehabilitation are done in hospitals. The fifth objective is that of providing information is an area which needs improvisation. This can be done by the extensive use of computers. Needless to say that the first four objectives also require the assistance of computers in order to serve the patients better, as here we cannot overlook the fact that hospitals are not primarily profit making organizations but one of rendering service. It becomes more difficult a task as they are dealing with cases where it is a matter of life and death and not only that of monitory loss. If a patient who has to undergo a blood test where his glucose intolerance has to be diagnosed goes to the hospital where he enquires about the test, the attendant tells him to proceed with the test but tells him that the test has to be done on an empty stomach which he was not aware, so he had to come back the next day nil by mouth, he was also not aware that the test would take three hours where he has to come back after lunch and then there after consuming glucose, and also he was not aware of the cost of the test. He not only has to waste a day's leave but also underwent a lot of inconvenience. If only there would be a printout given to him stating the cost, duration, and type of test his task would have

\[\text{1 'Essentials of Management'. By Joseph L. Massie 2005.}\]
been easier. This simple information is not available to most of the patients, and the doctors concerned are very busy to sit and counsel patients. Knowledge Management can be applied here. So the use of computer would come in handy at a time like this. We have stated only a regular situation for a small issue but there could be many more cases, where information would come in handy to patients. We do not want to undermine the first four objectives of the hospital either. Where computers would be the best assistant a doctor could have in preparing case papers of the patient where all his past history of diagnosis etc. is stored, his blood group, allergies to penicillin, sulphur, medicines given etc. discharge card etc. Medico legal cases need special form of recording.

1.1 Need for the study & Relevance in Today’s Era

Any hospital has five main objectives:-
1. a. Patient history (signs and symptoms of disease)
   b. Investigations.
   c. Diagnosis.
2. Treatment.
4. Rehabilitation.
5. Information.

1) Though diagnosis, treatment & post discharge guidance and finally rehabilitation are done in hospitals. The fifth objective is that of providing information is an area which needs improvisation. Also considering the rapid expansion of the healthcare industry, the number of patients are increasing due to population expansion and also stressful lifestyles due to urbanization, the patient data has to be stored as it is voluminous where details like patient history like blood group, allergies, diagnosis treatment given are recorded.

2) Medico legal cases need special form of recording as the government directions requires that patient data needs to be stored, till the date of the court hearing is not concluded.

3) Medical error is reduced to a large extent because of computerization.

4) Awareness of technology can be generated among hospital authorities by carrying out this research.
5) The existence of electronic medical record of a patient makes on-line access from anywhere on the globe easier and a lot of paper work is reduced.

6) Medical tourism will be enhanced due to electronic medical records, which will be a great advantage for the economy of India.

7) Hospitals will become more hospitable.

8) Patient Relationship Management (PRM) becomes easier as the future check up dates etc. will be informed to the patients by the hospitals due to the data available with them. This strengthens the bond between the hospital and the patients. This will lead to patronage, branding of hospitals and building a reputation of timeliness of treatment.

9) Epidemic Preparedness will increase due to data interchange and sharing by the way of Health Information Exchanges (HIE) to support nations public health needs and for early detection and rapid response to potentially catastrophic infectious disease outbreaks and other public health emergencies like the recent swine flu and monkey fever epidemic.

10) The HIS can incorporate digital dictation, voice recognition for medical staff to enter data accurately thereby reducing medical error, reducing time for correspondence and medical transcription.

11) Compliance to various government accreditations like PPACA (Patients protection and Affordable Care Act) can be done as this leads to transparency of transactions and adheres to standards laid by different medical bodies.

12) The software industry also gets an important insight into the information needs of the hospitals and various hospital processes and functions carried out by them as a result of this research.

13) Right to Information has been implemented and data needs to be stored to comply with the law. Computerization of hospitals will definitely help in this regard.

14) HIS is ERP (Enterprise Resource Planning) for hospitals, which will help in resource planning, preparing for future planning, having central control, data warehousing and data mining, informing vital statistics of the hospital and improving work efficiency.

15) Financing healthcare becomes easier as insurance companies can also access the data if a central database is created with the help of computerization like the banks have a sibyl list for bank loan customers.
16) The ultimate aim of the hospital is achieved due to computerization – Better patient care with Efficiency.

Hence the research study undertaken is of utmost utility for the hospitals, patients, government, researchers as well as the software industry who are catering to the needs of computerization of hospitals in present times as well as the future needs.

The present study aims at:
1) To study the available Hospital Information System Software in the market as regard to whether it is covering all the aspects needed by the hospitals.
2) To find out the training aspects given to the users in the hospitals as regards to the usage of the software. Suggestions about improving the training program would be stated.
3) The study further investigates how the usage of the software supports in MIS and aids in effective decision making by providing relevant reports.
4) The study also aims to find out that if there is a direct connection between the size of the hospital and the extent of computerization.

1.2 Early History of Hospitals
As early as 4000 BCE, religions identified certain of their deities with healing. The temples of Saturn, and later of Asclepius in Asia Minor, were recognized as healing centres. Brahmanic hospitals were established in Sri Lanka as early as 431 BCE, and
King Ashoka established a chain of hospitals in Hindustan about 230 BCE. Around 100 BCE the Romans established hospitals (valetudinaria) for the treatment of their sick and injured soldiers, gladiators, charioteers, their care was important because it was upon the integrity of the legions that the power of ancient Rome was based.

In ancient cultures, religion and medicine were linked. The earliest known institutions aiming to provide cure were Egyptian temples. Greek temples dedicated to the healing god Asclepiads might admit the sick, who would wait for guidance from the god in a dream. The Romans adopted his worship. Under his Roman name Esculapius, was provided with a temple (291 BC) on an island near the Tiber River in Rome, where similar rites were performed. Roderick E. McGrew (1985).

The loss of monastic hospitals in England caused the secular authorities to provide for the sick, the injured, and the handicapped, thus laying the foundation for the voluntary hospital movement. The first voluntary hospital in England was probably established in 1718 by Huguenots from France and was closely followed by the foundation of such London hospitals as the Westminster Hospital in 1719, Guy’s Hospital in 1724, and the London Hospital in 1740. Between 1736 and 1787, hospitals were established outside London in at least 18 cities. The initiative spread to Scotland, where the first voluntary hospital, the Little Hospital, was opened in Edinburgh in 1729.

The early hospitals were primarily almshouses, one of the first of which was established by English Quaker leader and colonist William Penn in Philadelphia in 1713. The first incorporated hospital in America was the Pennsylvania Hospital, in Philadelphia, which obtained a charter from the crown in 1751.

1.3 History of Hospitals (1800-2012)

Upto 18th century Vaidyas and Hakims were the order of the day. University of Takshila and Nalanda taught medicine. In the times of King Ashoka, Chola and Pandya Kings and Mughal Emperors hospitals were set up for the welfare of people. The use of Allopathic medicine started after the British missionaries came to India, in the sixteenth century. Eighteenth-century London was for many an unhealthy place to live, but there was growing institutional provision for curing the sick and the lame. In

---

addition to the extensive care available through the parish (available from parish nurses and workhouses), and a variety of more or less qualified doctors. By 1800, when London hospitals catered for between twenty and thirty thousand patients a year.


Nineteenth century hospitals were not places where you expected to be cured, they were places to go when all other options had been exhausted. In the early part of the century medical science was very crude, and often consisted of cures like bloodletting, where the doctor cut the veins of the patient to let bad blood escape. In some cases the best outcome you could expect was that the cure wouldn't kill you. It wasn't until the latter part of the 1800's that researchers began to understand how to deal effectively with illness and disease.

20th Century Hospitals as we know them today began to emerge in most of the country in the early- to mid-1800's, a bit earlier than the voluntary and non-profit old-age homes. Some early hospitals included care for the elderly as a part of their mission, even building homes attached to the hospital where the poor elderly could live. (Medical History of Michigan, 1930).

Unlike the younger, healthier patients, poorhouse patients tended to have chronic conditions that required long term care. People who weren't poor cared for the chronically ill at home. Those who were poor and ill, many of whom were also elderly, often ended up in hospitals for very long periods of time. (Charity Hospital, 1890).

In the early 21st century, it was thought that a facility of 800 beds was the largest unit that could be governed satisfactorily from a single administrative unit while maintaining a corporate unity.

In many countries nearly all hospitals are owned and operated by the government. In Great Britain, except for a small number run by religious orders or serving special groups, most hospitals are within the National Health Service. The local hospital management committee answers directly to the regional hospital board and ultimately
to the Department of Health and Social Security. In the United States most hospitals are neither owned nor operated by governmental agencies. In some instances hospitals that are part of a regional health authority are governed by the board of the regional authority, and hence these hospitals no longer have their own boards.

Hospitals that specialize in one type of illness or one type of patient can generally be found in the developed world. In large university centers where postgraduate teaching is carried out on a large scale, such specialized health services often are a department of the general hospital or a satellite operation of the hospital. Changing conditions or modes of treatment have lessened the need or reduced the number of some types of specialized institutions; this may be seen in the cases of tuberculosis, leprosy, and mental hospitals. On the other hand, specialized surgical centers and cancer centers have increased in number.

Dr. A.K. Malhotra in his book ‘Hospital Management’ by Global India Publications New Delhi. 2009, has mentioned that The British were instrumental in building hospitals in India. The first hospital was built in Goa and then Madras, Calcutta Delhi and Mumbai in 1874, where even the Portugese were instrumental. In the 19th century Modern Medicine took a firm root, Nursing came into being. Medical care spread all over India first by foreign funding then later by local funding as the importance of Hospitals grew. Organized medical training was started by the East India Company and they established a medical college at Calcutta and later at Madras. At the end of the 19th century there were 4 medical colleges in India and Hospitals took an organized structure as people realized that it is not a place to place the sick.

In the early years of 20th century more efforts were made to govern Hospitals in an organized way by transferring their administration from Public assistance powers of Local Administration committees to Health Administration Committees called as Public Health Hospitals. The Military hospitals which were started for treating only soldiers were now transferred to Civil Administration where even the civilians were availing of treatment. Local government were encouraged to start hospitals at the district and Taluka levels. The Indian Medical Service (IMS) ran many of these hospitals. Some hospitals at the provincial headquarters were converted into teaching hospitals and attached to medical colleges.
Between World War I and II reorganization of hospitals took place by starting Commissions of Enquiry. Rehabilitation centers and Fitness centers were established, these centers did commendable work in surgery and medical treatment as well.

19th century

English physician Thomas Percival (1740-1804) wrote a comprehensive system of medical conduct, Medical Ethics, or a Code of Institutes and Precepts, Adapted to the Professional Conduct of Physicians and Surgeons (1803) that set standards.

During the nineteenth century, the Second Viennese Medical School emerged with the contributions of physicians such as Carl Freiherr von Rokitansky, Josef Skoda, Ferdinand Ritter von Hebra, and Ignaz Philipp Semmelweis. Basic medical science expanded and specialization advanced. Furthermore, the first dermatology, eye, as well as ear, nose, and throat clinics in the world were founded in Vienna, being considered as the birth of specialized medicine.

By the mid-nineteenth century most of Europe and the United States had established a variety of public and private hospital systems. In continental Europe the new hospitals generally were built and run from public funds. The National Health Service, the principle provider of health care in the United Kingdom, was founded in 1948.

United States

In the United States the traditional hospital is a non-profit hospital, usually sponsored by a religious denomination. One of the earliest of these almshouses in what would become the United States was started by William Penn in Philadelphia in 1713. These hospitals are tax-exempt due to their charitable purpose, but provide only a minimum of charitable medical care. They are supplemented by large public hospitals in major cities and research hospitals often affiliated with a medical school. The largest public hospital system in America is the New York City Health and Hospitals Corporation, which includes Bellevue Hospital, the oldest U.S. hospital, affiliated with New York University School of Medicine. In the late twentieth century, chains of for-profit hospitals arose in the United States. The decline in the membership of religious orders has changed the status of Catholic hospitals.
In the 2000s, modern private hospitals began to appear in developing countries such as India.

While hospitals, by concentrating equipment, skilled staff and other resources in one place, clearly provide important help to patients with serious or rare health problems, hospitals also are criticized for a number of faults, some of which are endemic to the system, others which develop from what some consider wrong approaches to health care.

One criticism often voiced is the industrialized nature of care, with constantly shifting treatment staff, which dehumanizes the patient and prevents more effective care as doctors and nurses rarely are intimately familiar with the patient. The high working pressures often put on the staff can sometimes exacerbate such rushed and impersonal treatment. The architecture and setup of modern hospitals often is voiced as a contributing factor to the feelings of faceless treatment many people complain about.

1.4 Development of Hospitals after Independence in India.

After Independence there was growth of industrialization and population expansion which caused a lot of medical and health problems. At that time there were 7400 hospitals and dispensaries in India there were 1,13,000 beds, 19 medical colleges and 19 medical schools in India. Considering the rise in poverty and limited resources Committees like the Bhore Committee, Mudaliar Committee, Jain Committee, Shrivastava Committee, Siddhu Committee, Rao Committee, Bajaj Committee.

According to Health Information India (1995-96) as on 1st January 1996 there were 146 medical colleges, 15,097 hospitals, 623819 beds admitting 30 million in patients every year. The out patients were countless. Out of these there were 421 rural hospitals, 10416 urban hospitals, 4473 government hospitals and 10289 private and voluntary, 335 local hospitals. The patient to bed ratio as suggested by Mudliar committee is 1 be per 1000 population but it is 0.67 which is below the required ratio. This will lead to overcrowding and mismanagement in hospitals. 6000-7000 beds need to be added every year to maintain the ratio.
1.5 History of Government and Private Hospitals (Year 1800-2012)

Health care is a social sector and it is provided at State level with the help of Central Government. In the Constitution of India, health is a state subject. Central governments' intervention to assist the state government is needed in the areas of control and eradication of major communicable & non-communicable diseases, policy formulation, international health, medical & para-medical education along with regulatory measures, drug control and prevention of food adulteration, besides activities concerning the containment of population growth including safe motherhood, child survival and immunization Program. Another major component of the central sector health programme is purely Central schemes through which financial assistance is given to institutions engaged in various health-related activities. These institutions are responsible for contribution in the field of control of communicable & non-communicable diseases, medical education, training, research and parent-care.

Government hospitals are owned and governed by governments, State or Central. These hospitals rely on subsidies and grants for part of their operations and perform more charity than other hospitals. Because these hospitals are tax supported, government agencies are likely to monitor operations and have the authority to increase or decrease funding through budgeting processes. Other nonprofit hospitals are privately owned and usually community hospitals or physician group hospitals. Physician influence tends to be stronger in these hospitals. These hospitals rely also on patient fees and public donation.

Hospital Management provides a direct link between healthcare facilities and those supplying the services they need. This procurement and reference resource provides a one-stop-shop for professionals and decision makers within the hospital management, healthcare and patient care industries.

A hospital is a health care institution providing patient treatment by specialized staff and equipment.
Government of India website data from the Health ministry site up to 2009 mentions that Eleven thousand six hundred and thirteen (11,613) allopathic hospitals are existing in India. Today the total value of the healthcare sector is 6% of GDP. 15,393 Hospitals were there in year 2002 in India.

Indian Scenario
A recent study in India indicates that healthcare is delivered by a multitude of public and private providers. The government infrastructure is large in both rural and urban India. In rural areas, the government has a vast base of primary healthcare centers, community health centers and sub centers. The public infrastructure in urban India consists of tertiary medical colleges, district and taluka hospitals and urban health posts. The private healthcare delivery sector consists of a large number of private practitioners, for profit hospitals and nursing homes and charitable institution. The average size of such hospitals is less than 22 beds—much lower than developed countries.

The purpose of for profit, investor owned hospitals was primarily to increase the value of invested capital. Prior research finds that for profit hospitals tend to locate in more profitable areas and are smaller than nonprofit hospitals. For profit hospitals obtain fewer donations and are not tax subsidized and so rely primarily on patient fees. Church hospitals are owned and governed by religious organizations; they were originally organized to provide services for church members, to restrict procedures that are contrary to religious beliefs and to permit patients to follow the tenets of the religion for last rites and other ceremonies. These hospitals rely on both patient fees and donations. Government hospitals are owned and governed by governments, State or Central. These hospitals rely on subsidies and grants for part of their operations and perform more charity than other hospitals. Because these hospitals are tax supported, government agencies are likely to monitor operations and have the authority to increase or decrease funding through budgeting processes. Other nonprofit hospitals are privately owned and usually community hospitals or physician group hospitals. Physician influence tends to be stronger in these hospitals. These hospitals rely also on patient fees and public donation.
Non profit firms may earn profits. In fact, many, including hospitals, do. Rather nonprofit firms are precluded from distributing profits to persons who exercise control over the firm. Although such firms can pay reasonable compensation to suppliers of inputs, resulting earnings cannot be distributed. Such earnings must be retained and used by the firm. Because of the non distribution constraint, nonprofit firms have no owners, that is, persons who control and share residual earnings.

Ownership form and hospital behavior: The social welfare implications of for-profit versus nonprofit ownership, and private versus public ownership, have been of interest to economists for decades. In stylized microeconomic models of organizations, theory predicts that the for profit organizational form is efficient because of the high powered incentives that arise from the presence of a well defined residual claimant with legally enforceable property rights. Researchers exploring the effects of for profit, private, non-profit and public hospital ownership on productivity have reported a wide range of empirical results. On one hand, some researchers report that the for-profit form achieves greater productive efficiency, on the other hand, many studies find that for-profit hospitals have higher costs or markups than do nonprofits. And a substantial literature argues that nonprofit hospitals have costs and/or quality similar to that of for profits, concluding that hospitals are socially indistinguishable on the basis of ownership status.

In India too, the above conclusion stands true. There are hospitals both in the private and public who extend service quality par excellence. Due to the unregulated system, there are also the extreme cases of poor quality healthcare provided by hospitals, many operating with unskilled medical staff and in substandard facilities.

Rather than the ownership model, it would be prudent to mention that the leadership and the resultant vision, mission and goals of the organization, is what determines the outcome and its quality in an organization.

**Bed capacity of Government Hospitals**

Bed capacity of government hospital in India is five lakh forty thousand (5,40,000). With population of One twenty one crores, 540000 beds is quite a low figure.
<table>
<thead>
<tr>
<th>State</th>
<th>Government Hospitals</th>
<th>Beds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Andhra Pradesh</td>
<td>359</td>
<td>34000</td>
</tr>
<tr>
<td>2. Arunachal Pradesh</td>
<td>161</td>
<td>2000</td>
</tr>
<tr>
<td>3. Assam</td>
<td>153</td>
<td>8000</td>
</tr>
<tr>
<td>4. Bihar</td>
<td>1717</td>
<td>22000</td>
</tr>
<tr>
<td>5. Chhattisgarh</td>
<td>218</td>
<td>9000</td>
</tr>
<tr>
<td>6. Goa</td>
<td>20</td>
<td>3000</td>
</tr>
<tr>
<td>7. Gujarat</td>
<td>373</td>
<td>29000</td>
</tr>
<tr>
<td>8. Haryana</td>
<td>154</td>
<td>8000</td>
</tr>
<tr>
<td>9. Himachal Pradesh</td>
<td>142</td>
<td>8000</td>
</tr>
<tr>
<td>10. Jammu &amp; Kashmir</td>
<td>92</td>
<td>4000</td>
</tr>
<tr>
<td>11. Jharkhand</td>
<td>500</td>
<td>5000</td>
</tr>
<tr>
<td>12. Karnataka</td>
<td>919</td>
<td>64000</td>
</tr>
<tr>
<td>13. Kerala</td>
<td>386</td>
<td>31000</td>
</tr>
<tr>
<td>14. Madhya Pradesh</td>
<td>377</td>
<td>20000</td>
</tr>
<tr>
<td>15. Maharashtra</td>
<td>765</td>
<td>50000</td>
</tr>
<tr>
<td>17. Meghalaya</td>
<td>38</td>
<td>3000</td>
</tr>
<tr>
<td>18. Mizoram</td>
<td>20</td>
<td>1000</td>
</tr>
<tr>
<td>20. Orissa</td>
<td>1709</td>
<td>15000</td>
</tr>
<tr>
<td>21. Punjab</td>
<td>231</td>
<td>11000</td>
</tr>
<tr>
<td>22. Rajasthan</td>
<td>475</td>
<td>32000</td>
</tr>
<tr>
<td>23. Sikkim</td>
<td>30</td>
<td>1000</td>
</tr>
<tr>
<td>24. Tamil Nadu</td>
<td>581</td>
<td>47000</td>
</tr>
<tr>
<td>25. Tripura</td>
<td>31</td>
<td>2000</td>
</tr>
<tr>
<td>26. Uttar Pradesh</td>
<td>925</td>
<td>32000</td>
</tr>
<tr>
<td>27. Uttarakhand</td>
<td>695</td>
<td>8000</td>
</tr>
<tr>
<td>28. West Bengal</td>
<td>294</td>
<td>55000</td>
</tr>
</tbody>
</table>

Source: Ministry of Health Website 2009.
Introduction

Some interesting facts concluding from above data are as follows:

1) Bihar leads the list of states with most government hospitals with one thousand, seven hundred and seventeen government hospitals. Orissa has second highest number of government hospitals in India with seven hundred and nine government hospitals.

2) The most populous state in India, Uttar Pradesh comes third in the list with nine hundred and twenty-five hospitals.

3) Karnataka with nine hundred and nineteen government hospitals comes fourth in the list.

4) Maharashtra with Seven hundred and sixty-five government hospitals is fifth in the list of highest number of government hospitals while Uttarakhand with six hundred and ninety-five government hospitals comes sixth in the list.

5) Tamil Nadu with five hundred and eight one government hospitals comes seventh in the list while Jharkhand with Five hundred government hospitals comes eighth in the list.

6) Rajasthan has four hundred and seventy five government hospitals which makes it ninth in the list of states with most number of government hospitals.

7) Kerala with three hundred and eighty six government hospitals comes 10th in the list of states with most number of government hospitals.

8) Gujarat has three hundred and seventy three government hospitals.

1.6 Scenario in 2000-2012 & Future Estimates in India

India’s healthcare industry is currently worth Rs 73,000 crore which is roughly 4 percent of the GDP. The industry is expected to grow at the rate of 13 percent for the next six years which amounts to an addition of Rs 9,000 crores each year. The national average of proportion of households in the middle and higher middle income group has increased from 14% in 1990 to 20% in 1999. The population to bed ratio in India is 1 bed per 1000, in relation to the WHO norm of 1 bed per 300. In India, there exists space for 75000 to 100000 hospital beds. Private insurance will drive the healthcare revenues. Considering the rising middle and higher middle income group we get a conservative estimate of 200 million insurable lives. Over the last five years, there has been an attitudinal change amongst a section of Indians who are spending more on healthcare. Corporate hospitals mushroomed in the late eighties. The boom remained short-lived and out of the 22 listed hospitals most are being trading below
par. An increasingly fragmented market, lack of statistics, capital intensive operations and a long gestation period are all wise reasons to shy away from investing in the healthcare industry. Government and trust hospitals dominate the scene. Many of the trust hospitals suffer from poor management. Good corporate hospitals are still too few to amount to a critical mass. Corporate hospitals failed a decade ago because they emerged in isolation and weren't part of a larger phenomenon. However, now, there are the insurance companies, the hospital hardware and the software companies that have come together to create the boom. In the mid 80's, the healthcare sector was recognized as an industry. Hence it became possible to get long term funding from the Financial Institutions. The government also reduced the import duty on medical equipment's and technology, thus opening up the sector. Chain of Hospitals has become a reality.

1.7 Opening Of The Insurance Sector:
In India, approx. 60% of the total health expenditure comes from self paid category as against governments contribution of 25-30 %. A majority of private hospitals are expensive for a normal middle class family. The opening up of the insurance sector to private players is expected to give a shot in the arms of the healthcare industry. Health Insurance will make healthcare affordable to a large number of people. Currently, in India only 2 million people (0.2 % of total population of 1 billion), are covered under Mediclaim, whereas in developed nations like USA about 75 % of the total population are covered under some insurance scheme. General Insurance Company, has never aggressively marketed health insurance. Moreover, GIC takes upto 6 months to process a claim and reimburses customers after they have paid for treatment out of their own pockets. This will give a great advantage to private insurance Companies which are planning to launch Smart Cards that can be used in hospitals, patient guidance facilities, travel insurance, etc. The Consultants, Financiers and Insurance Agencies are to benefit from this boom. The insurers will use PPOs, that will grow into HMOs, to assume insurance risks on the clients behalf. Medical Equipments, Medical Software and Hospitals will see the biggest boom.

1.8 Regulatory Bodies
The Indian Association for Medical Informatics, or IAMI, is a professional society that plays a role in promoting and furthering the application of informatics in the
fields of healthcare, bioscience and medicine in India. It was established in 1993. The objectives of the IAMl are to sensitize the Indian medical community to the benefits of Information Technology (IT), bring about awareness and ensure greater utilization of IT in healthcare facilities across the length and breadth of India. The IAMl also aims to provide necessary assistance and guidance to other organizations to implement and reap the benefits of IT for health care. It supports introduction of computer literacy along with medical education, development of computerized as well as medical digital libraries, access to information and creation of databases. IAMl emphasizes on research and development of medical informatics as an independent discipline. It provides various communication and interaction channels among its members by means of e-groups and through publication of a scholarly journal³.

1.9 Uniqueness of the industry

The healthcare industry is generally a large unique industry and one that is in transition. Health care is provided in a number of settings physician's offices, local health departments, urgi-care centers, health maintenance organizations, and home health agencies. The hospital however is the most intricate setting and is the institutional center of the health care delivery system. The management of hospitals is a complex and challenging task for the field of management. The health service industry has grown significantly over the past several decades. In 1983, health care expenditures totaled 1,459 for every man, woman and child. Forty-one percent of these expenditures were for hospital care. 4.3 million people were employed by hospitals. Hospitals are short-stayed, general hospitals, the type of community facility that is typically thought of as a 'hospital'. But hospitals vary a great deal in size and teaching affiliation. Although all hospitals have much in common, specific management problems vary according to the type of hospital. Joseph L. Massie¹(2005).

1.10 Classification of Hospitals

As per the Directory of hospitals in India 1988 hospitals are classified according to their objectives, types of patients being treated, ownership and control.

Types:

1) Central Hospital: All hospitals staffed by 2 or more medical officers, can offer in patient accommodation and should provide medical and nursing care for general medicine, general surgery, Obstetrics & gynaecology, paediatrics.

2) Rural hospital: As per Register General of India hospitals in rural areas staffed by 2 or more medical officers, can offer in patient accommodation and should provide medical and nursing care for general medicine, general surgery.

3) Specialized Hospital: Hospital should provide medical and nursing care for one discipline or for specific disease affected for one system eg TB, eye, leprosy, orthopaedic, paediatric, mental, cancer, infectious disease, veneral disease, maternity, ENT (Ear, Nose, Throat) etc.

4) Teaching hospital: A hospital which is attached to a college for dental/medical education.

5) Isolation hospital: A hospital which requires isolation of patient due to infectious diseases.

1.10.1 Classification as per Ownership and control

1) Public hospitals: These are run by Central Government, State Government, Local Bodies and Public Sector on non commercial basis. They may be
specialized or general. General hospitals should not treat infectious diseases as they are not equipped to do so.

2) Voluntary hospitals: Which are established and incorporated under the Societies registration Act 1882, Public Trust Act or any other Act of Central and state government. Board of trustees are prominent members of community, and retired senior officials of the government. No part of the profit or assets goes to any member, trustee or individual. They run on a no profit no loss basis. The well to do patients are charged and poor patients are not charged.

3) Private Nursing Homes: They are owned by a single doctor or a group of doctors. They do not admit mental patients or ones with communicable disease, only patients with illness, injury, chronic disease are admitted. They may run a chain of hospitals.

4) Corporate Hospital: They are latest concept which are public limited companies formed under Companies Act. They run on commercial basis. They can either be generalized or both.

1.10.2 Classification as per System of Medicine

1) Homeopathic.
2) Ayurvedic.
3) Siddha.
4) Naturopathy.
5) Allopathy.

1.10.3 Classification as per Bed Strength.

1) Large Hospital: having bed size more than 500.
2) Medium Hospital: having bed size 200 to 500.
3) Small Hospital: having bed size less than 200 beds.

1.10.4 Classification as per Clinical basis

1) General Hospital: here patients are treated for all kinds of disease.
2) Specialized hospital: in this type of hospital patients are treated for particular type of disease, such as heart, cancer etc.
1.10.5 Classification as per length of stay

1) Short term stay or Acute Hospital: Patients suffering from gastro enteritis, fever etc where treatment is of short duration.

2) Long Term or Chronic Hospital: Patients suffering from cancer, TB, schizophrenia etc. where treatment is of long duration.

1.11 Departmentation
Hospitals would generally have departments namely:
1. Orthopedic. (Bones).
3. Cardiac. (Heart).
5. Oncology. (Cancer).
8. Eye.
9. ENT (Ear, Nose, Throat).
10. Surgery. (General).

Apart from this counseling centre where patients need to be guided and counseled each department will have a head. If there is a teaching affiliation like in the case of medical colleges, there will be a teaching head for each department.

1.12 Staffing in Hospitals
The organizational structure of hospitals have the medical staff organized into departments such as surgery, medicine, obstetrics and pediatrics. The degree of departmentalization of the medical staff depends on the specialization of its members and not primarily on the size of the hospital, although there is usually some correlation between the two. The chiefs of the medical staff departments, along with the chiefs of radiology and pathology, make up the medical advisory board, which usually holds regular meetings on medical-administrative matters. The professional work of the individual staff committees. In a large hospital the committees may report
to the medical advisory board; in a smaller hospital, to the medical staff directly, at regular staff meetings.

General hospitals often also have a formal or an informal role as teaching hospitals are affiliated with undergraduate and post graduate education of health professionals at a University, and they provide up-to-date and often specialized therapeutic measures and facilities unavailable elsewhere in the region. As teaching hospitals have become more specialized, general hospitals have become more involved in providing general clinical training to students in a variety of health professions.

Hospitals that specialize in one type of illness or one type of patient can be generally be found in the developed world. In large university centers where post graduate teaching is carried out on a large scale, such specialized health services often are a department of the general hospital or a satellite operation of the hospital. Changing conditions or modes of treatment have lessened the need or reduced the number of some type of specialized institutions; this may be seen in the cases of tuberculosis, leprosy, and mental hospitals. On the other hand, specialized surgical centers and cancer centers have increased in number.

The board of trustees bears ultimate responsibility for the actions of the hospitals management and medical staff. The board makes the overall governing policies and sets the hospital bylaws. The difference between the boards of trustees of corporate business enterprises with social enterprise with deepening economic overtones. A hospitals board is frequently composed of community and business leaders. They do not own or have financial interest in the hospital and leaders.

Hospital is made up of clinical departments, nursing services, diagnostic services, support services, and auxiliary services. Hospital is made up of a series of departments which work together in a system to render medical, nursing and Para medical and support services. There is no universal model for hospitals but a matrix organization or a pyramid structure is ideally suited. Lateral as well as vertical organizations are generally followed. There are functional organizations, division of work, and authority and responsibility which is defined. The Organizational Structure will depend on size of hospital. The medical staff is generally not trained in
managerial expertise. The top management is to direct and control all activities of subordinate groups. Departments have goals and responsibilities which they fulfill. There is clarity in organizational relationship. Classical theory of management is followed where Unity of Command, delegation of authority, responsibility and authority is well defined.

1.13 Hospital Management

History of Hospital Management (Year 1800-2012)

Medicine and surgery date back to the beginning of civilization because diseases preceded humans on earth. Early medical treatment was always identified with religious services and ceremonies. Priests were also physicians or medicine men, ministering to spirits, mind and body. Priests/doctors were part of the ruling class with great political influences and the temple/hospital was also a meeting place.

Medicine as an organized entity first appeared 4000 years ago in the ancient region of Southwest Asia known as Mesopotamia. Between the Tigris and Euphrates rivers, which have their origin in Asia Minor and merge to flow into the Persian Gulf.

The first recorded doctor's prescription came from Sumer in ancient Babylon under the rule of the dynasty of Hammurabi (1728-1686BC). Hummurabi's code of law provides the first record of the regulation of doctors' practice, as well as the regulation of their fees. The Mesopotamian civilization made political, educational, and medical contributions to the later development of the Egyptian, Hebrew, Persian and even Indian cultures.

For Hundreds of years, the Greeks enjoyed the benefits of contact and cross fertilization of ideas with numerous other ancient peoples, especially the Egyptians. Although patients were treated by magic rituals and cures were related to miracles and divine intervention, the Greek recognized the natural causes of diseases and rational methods of healing were important. Hippocrates is usually considered the personification of the rational non-religious approach to medicine, and in 480 BC, he started to use auscultation, perform surgical operations and provide historians with detailed records of his patients and descriptions of diseases ranging from tuberculosis
to ulcers. The temples of Saturn, Hygeia and Aesculapius, the Greek god of medicine all served as both medical schools for practitioners and resting places for patients under observation or treatment.

The Roman talent for organizations did not extend as readily to institutional care of the sick and injured. Although infirmaries for the sick were established, it was only among the military legions that a system for hospitalization was developed. After the injured were cared for in field tents, the soldiers were moved to valetudinarians, a form of hospital erected in all garrisons along the frontiers. Apparently those stone and wooden structures were carefully planned and were stocked with instruments, supplies and medications. The decree of Emperor Constantine in 335 AD closed the Aesculapia and stimulated the building of Christian hospitals. Around 370AD St Basil of Caesarea established a religious foundation in Cappadocia that includes a hospital, an isolation unit for those suffering from leprosy and buildings to house the poor, the elderly and the sick. Following this example similar hospitals were later built in the eastern part of the Roman Empire. Another notable foundation was that of St Benedict at Monte Cassino, founded early in the 6th century, where the care of the sick was placed above and before every other Christian duty. It was from this beginning that one of the first medical schools in Europe ultimately grew at Salerno and was of high repute by the 11th Century. This example led to the establishment of similar monastic infirmaries in the western part of the empire.

The development of efficient hospitals was an outstanding contribution of the Islamic civilization. The Roman military hospitals and the few Christian hospitals were no match for the number, organization and excellence of the Arabic hospitals. The Arab’s medical inspiration came largely from the Persian Hospital in Djoundisa bour (sixth century Turkey), at which may of them studied. Returning to their homes, they founded institutions that were remarkable for the times. During the time of Mohammed, a real system of hospitals was developed. He was the first to order the establishment of small mobile military Bimaristan (hospital). Asylums for the insane were founded ten centuries before they first appeared in Europe. In addition, Islamic physicians were responsible for the establishment of Pharmacy and chemistry as sciences. Some of the best known of the great hospitals in the middle Ages were in Baghdad, Damascus and Cairo. In particular, the hospitals and medical schools of
Damascus had elegant rooms, an extensive library and a great reputation for its cuisine. Separate wards were set aside for different diseases, such as fever, eye conditions, diarrhea, wounds and gynecological disorders. Convalescing patients were separated from sicker patients and provisions were made for ambulatory patients. Clinical reports of cases were collected and used for teaching.

1.13.1 Indian Hospitals.

Historical records show, especially the Chinese traveler Fa Hein who reported in his books, that efficient hospitals were constructed in India by 600 BC. During the splendid reign of King Asoka (273-232 BC), Mughal emperor Feroz Shah Tughlaq. Indian hospitals started to look like modern hospitals. They followed principles of sanitation and cesarean sections were performed with close attention to technique in order to save both mother and child. Physicians were appointed—one for every ten villages—to serve the health care needs of the populations and regional hospitals for the infirm and destitute were built by Buddha.

The middle Ages: Religion continued to be the dominant influence in the establishment of hospitals during the middle age. From the early fourth century to the fifteenth century trade was almost totally suppressed and many city dwellers returned to the land. Religious communities assumed responsibility for care of the sick. The rational, nonreligious approach that characterized Greek medicine during the era of Hippocrates was lost, as hospitals became ecclesiastical, not medical institutions. Only the hopeless and homeless found their way to these hospitals, in which the system of separation of patients by diseases was eliminated, three to five patients were accommodated in each bed and principles of sanitation were ignored. Surgery was avoided, with the exception of amputation, in order not to disturb the body and to avoid the shedding of blood per the church edict of 1163 that, in effect, forbade the clergy from performing operations. Religious order emphasized nursing care, the first religious order devoted solely to nursing is considered to be the St Augustine nuns, organized in approximately 1155.

Yet hospital construction increased in Europe during the middle Ages for two reasons. First, Pope Innocent III in 1198 urged wealthy Christians to build hospitals in every town and second, increased revenues were available from the commerce with the
Introduction

crusaders. The oldest hospital still in existence are the Hotel –Dieu in Lyons and Paris, France. The term Hotel-Dieu indicates that it is a public hospital. The earliest mention of the Hotel –Dieu in Lyons is found in a manuscript of 580 AD, in which its establishment by Childebert is recorded. The Hotel-Dieu of Paris was founded by Bishop Landry in 660, on the LLe de la Cite. In 1300, the hospital had an attending staff of physicians and surgeons caring for 800-900 patients, and its capacity was doubled in the fifteenth century. In these hospitals more attention was given to the wellbeing of the patient's soul than to curing bodily ailments. The growth of hospitals accelerated during the crusades, which began at the end of the 11th century. Pestilence and disease were more potent enemies than the Saracens in defeating the crusaders. Military hospitals came into being along the traveled routes: the knights Hospitalers of the Order of St John in 1099 established in the Holy Land, a hospital that could care for some 2000 patients. It is said to have been especially concerned with eye disease and may have been the first of the specialized hospitals. This order has survived through the centuries as the St John's Ambulance Corps.

In contrast, in Asia and Africa, during the same period, construction of effective and efficient hospitals was spurred by Islamic rule and the Crusades. The two hospital systems enforced sanitary measures, performed surgery and separated patients according to disease: the Islamic hospitals because they were still following the Greek and early Roman traditions, and the hospitals created by the Crusaders because injuries sustained in combat necessitated surgery and the presence of pests and contagious disease necessitated sanitary conditions and the strict separation of patients. For the first time, medical systems of the East and the West vied for the supremacy of medical care. Arab hospitals were notable for the fact that they admitted patients regardless of religious belief, race or social order.

1.13.2 Renaissance Age:
The renaissance period lasted from the fourteenth to the sixteenth centuries. It received its name from the Italian “rinascita” meaning rebirth, because of the common belief that it embodies a return to the cultural priorities of ancient Rome and Greece. The healing arts were again characterized by a scientific, rational approach. The period also saw the beginnings of support for hospital like institutions by secular authorities. Toward the end of the 15th century many cities and towns supported some
kind of institutional healthcare: it has been said that in England there were no less than 200 such establishments that met a growing social need. The gradual transfer of responsibility for institutional healthcare from the church to civil authorities continued in Europe after the dissolution of the monasteries in 1540 by Henry VIII, which put an end to hospital building in England for some 200 years. Only the powerful hospitals in London survived when the citizens petitioned the King to endow St Bartholomew, St Thomas and St Mary of Bethlehem hospitals. This was the first instance of secular support of hospitals.

The loss of monastic hospitals in England caused the secular authorities to provide for the sick, the injured and the handicapped, thus laying the foundation for the voluntary hospital movement. The first voluntary hospital in England was probably established in 1718 by Huguenots from France and was closely followed by the foundation of such London hospitals as the Westminster hospital in 1719, Guy’s hospital in 1724 and the London Hospital in 1740. Between 1736 and 1787 hospitals were established outside London in at least 18 cities. The initiative spread to Scotland where the first voluntary hospital, the little Hospital, was opened in Edinburgh in 1729.

If the middle ages can be seen as the period of the great hospitals, the renaissance was really the period of the great school of medicine. Schools of medicine flourished in Germany and in central and eastern Europe. The scientific study of human anatomy as a science were facilitated by dissections of animals. In 1506, the Royal College of Surgeons was organized in England, followed by organization of the Royal College of Physicians in 1528. The major contribution of the Renaissance to the development of hospitals was in improved management of the hospital, the return to the segregation of patients by disease, and the higher quality of medicine provided within the hospital. Clinical surgery took great strides during this period, not only in Italy but also in France, especially under Ambrose Pare, who introduced the ancient methods of stopping hemorrhage by using ligatures and abandoned the barbaric system of cauterizing irons. The academic world of northern Italy was tolerant of new cosmopolitan ideas. By the mid fifteenth century, all major courts and cities of Europe sent their finest physicians to Italy for advanced training.
The New Era

The first hospitals of the New World were built in colonies of Spain, France and England. Those built under the flags of Catholic Spain and France retained the ideals of the Jesuits, the Sisters of Charity and the Augustine Sisters and their hundreds of years of hospital knowledge. Hospitals built in the English colonies, however, reacted against English traditions.

The first hospital in the New World was constructed as part of a system for the occupation of overseas territories. Bartholomew de las Casas, one of the priests who accompanied Columbus on his first voyage and a well known historian referred to the founding of the village of La Isabella in Hispaniola (today, Santo Domingo), in January of 1494. Columbus made haste in constructing a house to keep supplies and the ammunition for the soldiers, a church and a hospital. No further information survives to indicate whether the hospital was actually built.

The first hospital in North America was built in Mexico City in 1524 by Cortes: the structure still stands. The French established a hospital in Canada in 1639 at Quebec City, the Hotel Dieu du Precieux Sang, which is still in operation although not at its original location. In 1644 Jeanne Mance, a French noblewoman, built a hospital of ax-hewn logs on the island of Montreal; this was the beginning of the Hotel Dieu de St Joseph, out of which grew the order of the Sisters of St Joseph, now considered to be the oldest nursing group organized in North America. The first hospital in the territory of the present day United States is said to have been a hospital for soldiers on Manhattan Islands, established in 1663. The early hospitals were primarily almshouses, one of the first of which was established by William Penn in Philadelphia in 1713. The first incorporated hospital in America was the Pennsylvania Hospital, in Philadelphia, which obtained the charter from the crown in 1751. According to an inscription on its wall, the institution intended to foster patient’s self respect and remove any stigma from a hospital visit by charging fees. Benjamin Franklin helped to design the hospital, which was built to provide a place for Philadelphia physicians to hospitalize their private patients. Franklin served as president from 1755 to 1757.

In another break from tradition the New York hospital was founded in 1771 by private citizens who formed the Society of the New York hospital and obtained a grant to
build it. The hospital was characterized by a spirit of learning and research. As with other hospitals founded before the era of large fortunes, the New York hospital was built on the contribution of small merchants and farmers.

Another innovation was the first hospital conducted only by women. The New York Infirmary for Women and Children was opened in 1853 by the first woman to earn a medical degree in the United States, Elizabeth Blackwell and her sister. Again, this is another example of a private owned hospital that was founded to accommodate physician’s needs.

The European and Latin American tradition of charity hospitals, based on love of God and neighbors and the conviction that the government owed a responsibility to helpless citizens was never a part of the US hospital traditions. As a result, a more competitive system of hospitals developed, with fewer subsidies and less involvement of religious organizations in total healthcare. Massive government involvement in healthcare began in 1926 with the return of veterans from World War I.

The magnitude of the industry has grown significantly in the past few decades as the history of hospitals already states.

The profession of hospital administration is unique because hospitals are unique organizations where professionals are working in a life and death activity and to manage this the professionals require high level of skill. Hence hospital administration evolved as a discipline over a period of time where very few formally trained hospital administrators are available in the developing countries, while most of the hospitals are being managed by managers who had on the job training and managing by the principle of traditional approach. Though hospitals have administrative and service functions that are common to other commercial enterprises, but it requires integrating with highly technical and clinical services with administrative and service departments like laundry and hospital engineering services functioning alongside highly technical, nursing and medical care activities. This variety and complimentary are what make hospital administration a difficult job.
Introduction

In the 18th century hospital administrators were selected from the rank of nursing service and registered nurses had been serving as hospitals head administrator. In Church hospital administrator was frequently selected from the rank of religious order.

In mid 1930 first formal university course for hospital administration was developed. The American College Hospital Administration (ACHA) is an organization that has influenced advancement of the profession of hospital administration. After World War II the field of hospital administration gained status as the need for formally trained hospital administrators increased, however the situation in developing countries including India is grim as hospital administration as a profession is still in infancy due to non availability of trained hospital administrator and pressure from clinicians to hold seat of authority. In 1939 American College of hospital administration designed a code of Ethics for hospitals and healthcare executives, which defines as how healthcare executives should function within the highest standard of ethical performance. The code has since undergone several revisions in order to keep pace with change in the profession. The clinician and practicing physicians are taking grater role in hospital management and decision making process because it effects their professional lives and these clinicians are ever taking management roles hospitals full time medical director.

The main task of hospital administer is to coordinate hospitals resources in order to fulfill institutes medical care objective in the most effective and efficient way possible. He should manage personnel, materials, equipment and finances and is responsible for all functions including medical staff functions, nursing, technical and general service activities.

The hospital administrators of the 1940s and 1950s were primarily concerned with institutions internal operation and those activities directly supporting care of hospitals patients. The hospital industry changed dramatically subsequently in the 20th century as many Governmental regulations came into existence. The hospital administrator has now two roles to perform, firstly managing those activities that went on in a hospital and secondly to participate in community activities and assess the needs of the community as these influence hospitals functioning. The hospital administrator of
today 21st century is also the public relations officer and is also educating community about hospitals to make hospital more acceptable by community. He also monitors quality of medical care in the hospital provided by medical professionals. This is the era of sub and super specialties, and Information Technology. The hospital works as per rules, regulations, policies and guidelines laid down by hospital board and administration. The hospitals are managed by the principles of Total Quality Management (TQM). The concept of Medical Record is in reality now.

1.14.1 The management and administration includes:-

- Diagnosis, Prevention: Here various tests are conducted like x-ray, MRI, blood and urine tests, bone marrow tests, sonography, blood sugar, blood pressure, heart tests like stress test, 2-D Echo, 3-D Echo, Color Doppler, physical examinations like heart beat per minute, color of eyes etc.

- Treatment: It could be only medical management, may sometimes include some procedures surgical or laser treatment, physiotherapy, radiology etc.

- Post discharge care and rehabilitation: Where the patient is given guidance and advice about lifestyle management, diet, further medication etc.

- Information: In the right to information the patient must know about the tests, procedures conducted on him the risks, cost, side effects, recovery period etc. But sometimes in the interest of the patient some facts may be hidden from him and told to his relatives and nearest in kin.

- Medico legal cases. Where cases like burns, suicide, homicide, genocide, accidents, fights, a separate management is done where records have to kept of the FIR lodged, statements of the patient etc. Ideally this information is to be stored for five years minimum and maximum 10 years as an aid to the investigation procedures of the police, till the case has been declared as solved.

- Staffing: Hospitals are labor intensive. In 1982 labor costs averaged 56.7% of operating expenses. Hospitals employ people with a wide variety of skills. The range goes from an unskilled janitor or food service worker to the most highly educated and specialized paraprofessional and professionals who are highly specialized in different areas or fields.
Introduction

- Management Control: The regular planning, controlling, budgeting, motivating will also be regular procedures.
- Accounting: Staff payroll salaries (visiting or in-house), professionals and para-professionals, nurses, ward boys, cleaners, sweepers, cooks, laundry men, technicians, ambulance drivers. Bed occupancy is studied as empty beds signify bad business. Billing of patients, checking insurance type, reimbursements etc.
- Inventory: Stock control of all inventories in the hospital like medicines, surgical and non surgical instruments like stethoscope, injections, saline bottles etc. Also the beds, tables, bed covers, curtains etc.
- Purchase Order: The regular purchase for medicines, housekeeping items like bed sheets curtains, surgical, non surgical instruments from regular suppliers or through tenders.
- Marketing: Though medical ethics disallow advertising of any sort but even then indirect advertising like having awareness camps, lectures from renowned foreign doctors, conferences, seminars, free checkups, splashing the same on radio, television are goodwill generation and publicity measures for the hospital, highlighting its areas of specialization and facilities offered.
- Research: Many hospitals are a center for research of various sorts in treatment, medicines clinical research, clinical psychology etc. which is largely useful to society.
- Teaching Affiliation: A number of community hospitals are affiliated with training programs for physicians, nurses or other health care givers. Some hospitals are academic medical centers owned by state or private universities, where education and research as well as health care are primary goals. Many hospitals are totally government run and charitable, and services are of utmost importance. Many people give huge donations to hospitals.
- Quality assurance: Ethics as well as a financially prudent management perspective to avoid malpractice settlements, require that managers of hospitals be certain that the care provided is at an acceptable level of quality.
In health care and related industries the consumer is not in position to evaluate the quality the service from a clinical point of view. In addition, the consequences of the lack of quality can have far reaching effects, since the product is the patients well being and perhaps his life. Hence care is to be taken by the government and guardians of the hospital, to assure that quality is of an adequate level.

- Financing health care: The primary source of payments to hospitals is through third-party payment. Only 10% payments are through self pay. Others are blue cross payments-30%, government agencies (Medicare, Medicaid etc.)- 30%, Commercial and independent insurance – 30%. Most people are covered by some form of health insurance either cashless or reimbursement type. These records have to be maintained and verified.

- Legislation and regulation: The external environment is important to any organization. One of the principal components of the external environment of the hospital industry is regulation. Regulations affecting the health care industry are not only governmental; hospitals are also subject to regulation by private agencies that set standards for accreditation or membership. Within the hospital, increasing regulation has the effect of reducing decision latitude of the administrator and the board of trustees and the medical staff. The hospital administrator must be aware of central, state and local regulations which influence financial management of a hospital, the amount of services offered, or the amount and use of resources available to provide these services. Medico-legal cases may also fall in this category, where the police and court come into the picture.

- Tie-ups or registration of hospitals under various government and industrial or organizational health care facilities or schemes to provide better health care for their employees. Notified or registered hospitals under various government and private health insurance schemes.

- Privacy and security of Data: The security aspect will be regarding the data of the patients that is stored with the hospitals. According to medical ethics where details of diagnosis of patients is concerned a very high level of secrecy is to be maintained. As can be explained some psychological disorder in the

---

*Howard J. Berman and Berman E. Weeks in “The financial Management of Hospitals” pg 86. 2005.*
past, some contagious disease suffered by the patient which is now cured. Some medico legal case he has been involved in. These are the kind of things which in India even now people don’t accept easily. Even where ethics are concerned a doctor will never discuss one patient’s case with the other patient of acquaintance. To quote an experience an elderly lady working in an organization went to the family doctor, when the doctor was asked what was wrong with the lady, he very strictly told he could not share that. Also a case in Philips India where the medical officer, a doctor, was called upon to enquire about the medical details of one of the laborers, very vehemently denied to tell the senior officer any details except how many days he was required to rest. The computer with its passwords, encryption and restricted access to private data will be a very effective way of keeping data safe. Even Biometrics is a security mechanism, medico legal cases would require this, as that data is prone to tampering by parties with vested interests.

• On-line diagnosis: Many doctors offer online diagnosis on their own and also with the help of the technology of ARTIFICIAL INTELLIGENCE. Some software are available e.g. Eliza and Mycin with the help of the internet a patient can communicate with the doctors overseas or distant places where they want to seek second opinion or the diagnosis of the renowned doctor. He can send his test reports through computer network, using a scanner and seek his guidance on the line of treatment and medical facilities and possibilities available in some areas of the globe or his country which he may not be aware of earlier.

1.14.2 Support infrastructure

Electrical

The reliability of the electrical power systems that serve a hospital is important. In order to provide higher electrical reliability, the National Institutes of Health, NIH, requires that all secondary substations at their Bethesda, MD campus be the spot network type. The spot network substations cost more than other arrangements. The surgical, special procedures, radiological, intensive care unit, and patient rooms typically have medical gases, emergency and normal electrical power, and heating, air conditioning and ventilation systems.
1.15 Earliest use of computers in medicine.

The earliest use of computation for medicine was for dental projects in the 1950s at the United States National Bureau of Standards by Robert Ledley. The next step in the mid 1950s were the development of expert systems such as Mycin and Internist-I. In 1965, the National Library of Medicine started to use Medline and Medlars. At this time, Neil Pappalardo, Curtis Marble, and Robert Greenes developed Mumps (Massachusetts General Hospital Utility Multi-Programming System) in Octo Barnett's Laboratory of Computer Science at Massachusetts General Hospital in Boston. In the 1970s and 1980s it was the most commonly used programming language for clinical applications.

The MUMPS operating system was used to support MUMPS language specifications. As of 2004 update, a descendent of this system is being used in the United States Veterans Affairs (VA) hospital system. The VA has the largest enterprise-wide health information system that includes an electronic medical record, known as the Veterans Health Information Systems and Technology Architecture (VistA). A graphical user interface known as the Computerized Patient Record System (CPRS) allows health care providers to review and update a patient’s electronic medical record at any of the VA's over 1,000 health care facilities. Homer R. Warner, one of the fathers of medical informatics, founded the Department of Medical Informatics at the University of Utah in 1968, and the American Medical in the 1970s a growing number of commercial vendors began to market practice management and electronic medical records systems. Although many products exist, only a small number of health practitioners use fully featured electronic health care records systems. Informatics Association (AMIA) has an award named after him on application of informatics to medicine.

1.16 Hospital Information System

The massive and critical role of hospitals and data can be managed by using computers as a tool. Various software companies are catering to the needs of the hospitals and are offering comprehensive software which covers all aspects of

---

computerization. Most of the companies have customized software and some of the companies are offering tailor made packages as per the need and budget of the hospital. A hospital information system (HIS), variously also called clinical information system (CIS) is a comprehensive, integrated information system designed to manage the administrative, financial and clinical aspects of a hospital. This encompasses paper-based information processing as well as data processing machines. As an area of medical informatics the aim of an HIS is to achieve the best possible support of patient care and administration by electronic data processing.

It can be composed of one or a few software components with specialty-specific extensions as well as of a large variety of sub-systems in medical specialties (e.g. Laboratory Information System, Radiology Information System. CISs are sometimes separated from HISs in that the former concentrate on patient-related and clinical-state-related data (electronic patient record) whereas the latter keeps track of administrative issues. The distinction is not always clear and there is contradictory evidence against a consistent use of both terms. An online office suite or online productivity suite is a type of office suite offered by websites in the form of software as a service. They can be accessed online from any Internet-enabled device running any operating system. This allows people to work together worldwide and at any time, thereby leading to international web-based collaboration and virtual teamwork. Usually, the basic versions are offered for free and for more advanced versions one is required to pay a nominal subscription fee⁶.

1. Data security — All your data resides on a remote server: however, a back up can be taken regularly.
2. Speed — Most of the currently available online office suites require a high broadband Internet connection, they lack some features available on the offline office suites.
3. A network connection (usually Internet access) is required to send and receive changes. That is, internet dependence makes it more difficult to work offline.

An electronic health record (EHR) refers to an individual patient's medical record in digital format. Electronic health record systems co-ordinate the storage and retrieval of individual records with the aid of computers. EHRs are usually accessed on a computer, often over a network. It may be made up of electronic medical records (EMRs) from many locations and/or sources. A variety of types of healthcare-related information may be stored and accessed in this way. EDI is the Electronic Data Interchange that can take place. Encyclopedia Wikepedia (2005). EHR systems can reduce medical errors. EHR systems are believed to increase physician efficiency and reduce costs, as well as promote standardization of care. Even though EMR systems with computerized provider order entry (CPOE) have existed for more than 30 years. Health Information Technology is an even broader term that describes any computer-based electronic aid to healthcare delivery. An electronic health record is a patient’s health record that has been compiled into a digital format.

1.16.1 An electronic medical record might include:
1. Patient demographics.
2. Medical history, examination and progress reports of health and illnesses.
4. Laboratory test results.
5. Radiology images (X-rays, CTs, MRIs, etc.)
6. Photographs, from endoscopies or laparoscopy or clinical photographs.
7. Medication information, including side-effects and interactions.
8. Evidence-based recommendations for specific medical conditions.
9. A record of appointments and other reminders.
11. Eligibility
12. Advanced directives, living wills, and health powers of attorney.

Hospital Information Systems can be defined as massive, integrated systems that support the comprehensive information requirements of hospitals, including patient, clinical, ancillary and financial management. Hospitals are extremely complex institutions with large departments and units coordinate care for patients. Hospitals are becoming more reliant on the ability of hospital information system (HIS) to assist in the diagnosis, management and education for better and improved services and
practices. In health organization such as hospitals, implementation of HIS inevitable due to many mediating and dominating factors such as organization, people and technology.

Architecture
Hospital Information System architecture has three main levels, Central Government Level, Territory Level, and Patient Carrying Level. Generally all types of hospital information system (HIS) are supported in client-server architectures for networking and processing. Most work positions for HIS are currently resident types. Mobile computing began with wheeled PC stands. Now tablet computers and Smartphone applications are used.

Enterprise HIS with Internet architectures have been successfully deployed in Public Healthcare Territories and have been widely adopted by further entities. The Hospital Information System (HIS) is a province-wide initiative designed to improve access to patient information through a central electronic information system. HIS’s goal is to streamline patient information flow and its accessibility for doctors and other health care providers. These changes in service will improve patient care quality and patient safety over time.

The patient carries system record patient information, patient laboratory test results, and patient’s doctor information. Doctors can access easily person information, test results, and previous prescriptions. Patient schedule organization and early warning systems can provide by related systems.

A cloud computing alternative is not recommended, as data security of individual patient records services are not well accepted by the public.

HIS can be composed of one or several software components with specialty-specific extensions, as well as of a large variety of sub-systems in medical specialties, for example Laboratory Information System (LIS), Policy and Procedure Management System, Radiology Information System (RIS) or Picture archiving and communication system (PACS).
CISs are sometimes separated from HISs in that one focuses the flow management and clinical-state-related data and the other focuses the patient-related data with the doctor's letters and the electronic patient record. However, the naming differences are not standardized between suppliers.

Architecture in based on a distributed approach and on the utilization of standard software products complying with the industrial and market standards must be utilized (such as: UNIX operating systems, MS-Windows, local area network based on Ethernet and TCP/IP protocols, relational database management systems based on SQL language or Oracle databases, C programming language).

Aim

As an area of medical informatics the aim of an HIS is to achieve the best possible support of patient care and outcome and administration by presenting data where needed and acquiring data when generated with networked electronic data processing. Hospital Information Systems main demands are correct data storage, reliable usage, fast to reach data, secure to keep data on storage and lower cost of usage.

Hospital Information Systems provide a common source of information about a patient’s health history. The system have to keep data in secure place and controls who can reach the data in certain circumstances. These systems enhance the ability of health care professionals to coordinate care by providing a patient’s health information and visit history at the place and time that it is needed. Patient’s laboratory test information also visual results such as X-ray may reachable from professionals. HIS provide internal and external communication among health care providers.

The HIS may control organizations, which is Hospital in these case, official documentations, financial situation reports, personal data, utilities and stock amounts, also keeps in secure place patients information, patients medical history, prescriptions, operations and laboratory test results.

The HIS may protect organizations, handwriting error, overstock problems, conflict of scheduling personnel, official documentation errors like tax preparations errors.
Organizational Structure

The head of the HIS department is a person who is qualified and experienced in computer systems. Graduate and postgraduate computer diploma/degree holders are available. Depending on the set-up and the extent of computerization and its sophistication, the department may have some or all of the following staff in addition to the head of the department.

Organizational Structure refers to levels of management within a hospital and these levels allow efficient management of hospital departments. The structure helps one understand the hospital’s chain of command and work flows. Common organizational structure groups are Administrative Services, Information system Services, Therapeutic Services, Diagnostic Services, and Support Services. Hospital Information systems also can extend as Database administrator, interface developer, and users which are patients and official users.

Systems Administrator/Database Administrator

The systems administrator—cum—database administrator is responsible for systems administration to ensure high uptime of the system and for handling all database back-up and restoration activities.

Application Specialist and Trainer

The hospital’s application specialist together with the software vendor is involved in all the activities required for implementing the application software. Trainers train and retrain new employees in the hospital.

Hardware/Network Engineers

Hardware/Network engineers are responsible for maintaining the hardware and network systems in the hospital. They undertake all troubleshooting activities that may be required to keep the system online and patient data available to doctors and nurses.

Standardization

There is no standardization but for data formats and for data interchange, as with the HL7 initiative supported by ISO.
1.16.2 Benefits of HIS

- Easy access to doctors' data to generate varied records, including classification based on demographic, gender, age, and so on. It is especially beneficial at ambulatory (out-patient) point, hence enhancing continuity of care. As well as, Internet-based access improves the ability to remotely access such data.
- It helps as a decision support system for the hospital authorities for developing comprehensive health care policies.
- Efficient and accurate administration of finance, diet of patient, engineering, and distribution of medical aid. It helps to view a broad picture of hospital growth
- Improved monitoring of drug usage, and study of effectiveness. This leads to the reduction of adverse drug interactions while promoting more appropriate pharmaceutical utilization.
- Enhances information integrity, reduces transcription errors, and reduces duplication of information entries.
- Hospital software is easy to use and eliminates error caused by handwriting. New Technology computer systems give perfect performance to pull up information from server or cloud servers.

1.16.3 Advantages of electronic medical records over paper records

A medical record includes any of an individual's health documents of the types listed above. Medical records may be on "physical" media such as film (X-rays), paper (notes), or photographs, often of different sizes and shapes. Physical storage of documents is problematic, as not all document types fit in the same size folders or storage spaces. In the recent global medical environment, patients are shopping for their procedures. Many international patients travel to US cities with academic research centers for specialty treatment or to participate in Clinical Trials. Co-coordinating these appointments via paper records is a time-consuming procedure and may violate the patient's HIPAA privacy. Lumension solutions^ (2009). Physical records usually require significant amounts of space to store them. When physical records are no longer maintained, the large amounts of storage space are no longer required. Paper, film, and other expensive physical media usage (and therefore cost) is also reduced with electronic record storage. When paper records are stored in different locations, furthermore, collecting and transporting them to a single location
for review by a healthcare provider is time-consuming. When paper or other types of records are required in multiple locations, copying, faxing, and transporting costs are significant, as are the concerns of HIPAA compliance. Handwritten paper medical records can be associated with poor legibility, which can contribute to medical errors. Pre-printed forms, the standardization of abbreviations, and standards for penmanship were encouraged to improve reliability of paper medical records. Electronic records help with the standardization of forms, terminology and abbreviations, and data input. Digitization of forms facilitates the collection of data for epidemiology and clinical studies. Electronic records keeping and order entry were found to reduce errors associated with handwritten documents and were recommended for widespread adoption.

1.17 Ideal characteristics of an electronic health record (EHR)

1. Information needs to be continuously updated.

2. The data from an electronic health records system requires that it must be able to be used anonymously for statistical reporting for purposes of quality improvement, outcome reporting, resource management, and public health communicable disease surveillance.

3. The ability to exchange records between different electronic health records systems ("interoperability") would facilitate the co-ordination of healthcare delivery in non-affiliated healthcare facilities.

1.17.1 Reduction in duplication of services

Duplication of lab tests, diagnostic imaging, work-ups, and other services can be prevented by good record-keeping of any type. However, because electronic records can be available at many locations at once, integration of services and awareness of duplication is facilitated.

1.17.2 Facilitation of clinical trials

Clinicians and researchers suggest benefits to integrating electronic health records with data collection and analysis in clinical trials. Potential clinical trial participants may be more easily identified, administrative overhead costs may be lessened, data errors may be reduced, and adverse outcomes may more rapidly identified.
1.17.3 Difficulty in adding older records to an EHR system

Older paper medical records ought to be incorporated into a patient's electronic health record. One method is to merely scan the documents and retain them as images. However, surveys suggest that 22-25% of physicians are less satisfied with records systems that use scanned documents alone rather than fully electronic data-based systems. Walker J, Pan E,⁷ (2005). The Value of Health Care Information Exchange And Interoperability.

EHR systems with image archival capability (such as VistA Imaging) are able to integrate these scanned records (along with other types of image-based records) into fully electronic health records systems. Another method to convert written records (such as notes) into electronic format is to scan the documents then perform optical character recognition. For typed documents accurate recognition may only achieve 90-95% accuracy, requiring extensive corrections. Furthermore, illegible handwriting is poorly recognized by optical character readers. Some states have proposed making existing statewide database data (such as immunization records) available for download into individual electronic medical records.

1.17.4 Long-term preservation and storage of records

An important consideration in the process of developing electronic health records is to plan for the long-term preservation and storage of these records. The field will need to come to consensus on the length of time to store EHRs, methods to ensure the future accessibility and compatibility of archived data with yet-to-be developed retrieval systems, and how to ensure the physical and virtual security of the archives. Additionally, considerations about long-term storage of electronic health records are complicated by the possibility that the records might one day be used longitudinally and integrated across sites of care. Records have the potential to be created, used, edited, and viewed by multiple independent entities. These entities include, but are not limited to, primary care physicians, hospitals, insurance companies, and patients. It is noted that choices about the structure and ownership of these records will have profound impact on the accessibility and privacy of patient information. The required length of storage of an individual electronic health record will depend on national and

state regulations, which are subject to change over time. In one example of how an EHR archive might function, their research "describes a co-operative trusted notary archive (TNA) which receives health data from different EHR-systems, stores data together with associated meta-information for long periods and distributes EHR-data objects. TNA can store objects in XML-format and prove the integrity of stored data with the help of event records, timestamps and archive e-signatures. Prof. Arjuna Aluvihare\(^6\)(1993).

1.17.5 Synchronization of records
When care is provided at two different facilities, it may be difficult to update records at both locations in a co-coordinated fashion. This is a problem that plagues distributed computer records in all industries. Two models have been used to satisfy this problem, a centralized data server solution, and a peer-to-peer file synchronization program. Synchronization programs for distributed storage models, however, are only useful once record standardization has occurred. Merging of already existing public healthcare databases is a common software challenge. The ability of electronic health record systems to provide this function is a key benefit and can improve healthcare delivery.

1.17.6 Privacy
Privacy concerns in healthcare apply to both paper and electronic records. Roughly 150 people (from doctors and nurses to technicians and billing clerks) have access to at least part of a patient's records during a hospitalization, and 600,000 payers, providers and other entities that handle providers' billing data have some access also. Recent revelations of secure data breaches at centralized data repositories, in banking and other financial institutions, in the retail industry, and from government databases, have caused concern about storing electronic medical records in a central location. Records that are exchanged over the Internet are subject to the same security concerns as any other type of data transaction over the Internet. The Health Insurance Portability and Accountability Act (HIPAA) was passed in the US in 1996 to establish rules for access, authentications, storage and auditing, and transmittal of electronic medical records. This standard made restrictions for electronic records more stringent than those for paper records. However, there are concerns as to the adequacy of implementation of these standards. Vipulkar\(^7\)(2008).
In the European Union (EU), several Directives of the European Parliament and of the Council protect the processing and free movement of personal data, including for purpose of health care. Personal Information Protection and Electronic Documents Act (PIPEDA) was given Royal Assent in Canada on April 13, 2000 to the health sector in Stage 2 of the law's implementation. Privacy and Security of the Electronic Health Record: As the ever-changing healthcare establish rules on the use, disclosure and collection of personal information. The personal information includes both non-digital and electronic form. In 2002, PIPEDA extended to industry evolves, one key topic within the electronic health record (EHR) is privacy. The Central government has set guidelines that all healthcare organizations will have to comply with in regards to electronic health transactions. Most supporters believe that the EHR will improve care and reduced costs, while transforming the health care system, but whether the privacy of the records will be upheld is yet to be determined. A successful partnership for administrative health data standards can promote the development of clinical data standards and their application in computer based patient record systems. One major issue that has risen on the privacy of the U.S. network for electronic health records is the strategy to secure the privacy of patients. The then President Bush calls for the creation of networks, but central investigators report that there is no clear strategy to protect the privacy of patients as the promotions of the electronic medical records expands throughout the United States. In 2007, the Government Accountability Office reports that there is a “jumble of studies and vague policy statements but no overall strategy to ensure that privacy protections would be built into computer networks linking insurers, doctors, hospitals and other health care providers.” Not enough attention is being placed on the security of the information in EHR.

This is a significant barrier for the adoption of an EHR. At the central level, there needs to be a fundamental shift in “attitudes, awareness, habits, and capabilities in the areas of privacy and security” of individual’s health records if adoption of an Electronic Health Record is to occur. Within the private sector, many companies are moving forward in the development, establishment and implementation of medical record banks and health information exchange. By law, companies are required to follow all HIPAA standards and adopt the same information-handling practices that

---

8 "Hospital Management System" by Vipukan May 22, 2008.
have been in effect for the central government for years. This includes two ideas, standardized formatting of data electronically exchanged and centralization of security and privacy practices among the private sector. Private companies have promised to have “stringent privacy policies and procedures.” If protection and security are not part of the systems developed, people will not trust the technology nor will they participate in it. So, the private sector knows the importance of privacy and the security of the systems and continue to advance well ahead of the central government with electronic health records. Central investigators report that there is no clear strategy to protect the privacy of patients as the promotions of the electronic medical records.

1.17.7 Hardware limitations
Computer access is required to use an electronic health record system. A sufficient number of workstations, laptops, or other mobile computers must be available to accommodate the number of healthcare providers at any one facility. EHR software ought to be backwards compatible with older technology so that existing technology infrastructure can be used. Furthermore, most healthcare facilities have at least some degree of existing computerization, whether in the lab or in billing services. EHR systems need to interface with existing systems, again mandating a modular approach. In the past, poor networking technology was a limiting factor in the adoption of EHR software. There are now solutions which profit from new networking and mobile technology. Vipulkann(2008).

1.17.8 Cost Advantages and Disadvantages of Electronic Health Record- Cost Perspective
Most practitioners and healthcare organizations will agree that both quality healthcare and medical error reduction take precedence over many other healthcare concerns. The implementation of electronic health records (EHR) can help lessen patient suffering due to medical errors and the inability of analysts to assess quality. If patients are aware of their opportunities, they are more likely to comply with their doctors’ recommendations; thus, reducing future hospital visits and saving money. Despite the advantages, many providers have not adopted EHR due to its high cost. The steep price of EHR and provider uncertainty regarding the value they will derive from adoption in the form of return on investment has a significant influence on EHR
adoption. In a project initiated by the Office of the National Coordinator for Health Information (ONC), surveyors found that hospital administrators and physicians who had adopted EHR noted that any gains in efficiency were offset by reduced productivity as the technology was implemented, as well as the need to increase information technology staff to maintain the system. Overall, physicians in the focus groups did not see any financial incentives for adopting an EHR. In other words, if providers do use an EHR system, not only do they have to pay for it, but they also have to pay for the maintenance of the system and classes to train staff. Moreover, technology is not perfect. On occasion systems crash and experience technical difficulties, which is very costly to repair. Such issues make providers question if EHR is a step they are willing to take. Overall, EHR systems provide more benefits than disadvantages to patients and the economy. These systems can improve savings and the quality of healthcare to a superior level. The use of Health Information Technology could reduce the number of duplicated diagnostic tests. However, that improvement in efficiency would be unlikely to increase the income of many physicians. If a physician performs tests in the office, it might reduce his or her income. Given the ease at which information can be exchanged between Health Information Technology systems, patients whose physicians use them may feel that their privacy is more at risk than if paper records were used.

1.17.9 Start-up costs and software maintenance costs.
In a 2006 survey, lack of adequate funding was cited by 729 health care providers as the most significant barrier to adopting electronic records. Vendor costs only account for 60-80% of these costs Vipulan (2008). There are exceptions published cost-savings claims, however. They believe the data is skewed by vendors and by others who have a stake in the success of EHR implementation. Many are resistant to invest in a system which they are not confident will provide them with a return on their investment.

1.18 The barrier of technology and training users.
Most large organizations resist change. The institutional stress of implementing any new large-scale system must be anticipated by management. According to the Agency for Healthcare Research and Quality's National Resource Center for Health Information Technology, EHR implementations follow the 80/20 rule; that is, 80% of
the work of implementation must be spent on issues of change management, while only 20% is spent on technical issues related to the technology itself. William Baeumont\(^8\) (2008). The healthcare industry has more licensed professionals with advanced degrees than any other industry. However, systems analysis and computer science has not, until recently, been an integral part of healthcare training. Most health administrators also lack training in computer science.

1.19 Legal barriers

Liability barriers
Legal liability in all aspects of healthcare in the 21st century was an increasing problem in the 1990s and 2000s. The surge in the per capita number of attorneys and changes in the tort system caused an increase in the cost of every aspect of healthcare, and healthcare technology was no exception. Failure or damages caused during installation or utilization of an EHR system has been feared as a threat in lawsuits. This liability concern was of special concern for small EHR system makers. Some smaller companies may be forced to abandon markets based on the regional liability climate. Larger EHR providers (or government-sponsored providers of EHRs) are better able to withstand legal assaults. In some communities, hospitals attempt to standardize EHR systems by providing discounted versions of the hospital’s software to local healthcare providers. A challenge to this practice has been raised as being a violation of Stark rules that prohibit hospitals from preferentially assisting community healthcare providers. In 2006, however, exceptions to the Stark rule were enacted to allow hospitals to furnish software and training to community providers, mostly removing this legal obstacle. William Baeumont\(^8\) (2008).

1.20 Ownership of electronic records

HIPAA (Health Insurance Portability and Accountability Act) standards allow patients the right to review the content of their medical records. When records are centralized, it is often difficult to determine whose responsibility it is to maintain the records. If a company agrees to manage and maintain records but goes mostly out of business, how does that impact the healthcare provider whose ultimate responsibility it is for record maintenance? If a healthcare provider retires or goes mostly out of business, what arrangements to convert records to archival formats are available? If an individual physician and a hospital system share a record database system but then
the individual physician leaves that healthcare system, how do they separate their practice's records from the hospital's central database to take them for archival, as often required by law?⁹

1.21 Determination of merging of Records.
A patient may store a portion of his/her health records online or with an independent storage service (in a health record trust), in which case that subset of records is no longer under the control of the healthcare provider. This transfers HIPAA liabilities to the databank that stores the records for the individual. Concerns about loss of data integrity and lessened HIPAA adherence arise, because these records are no longer part of the health record maintained by the healthcare provider. Alterability of records, spurious records, and digital signatures. Medical records must be kept in unaltered form and authenticated by the creator. However, simple mistakes often create spurious documents. How are spurious documents identified so that they do not clutter the medical record without altering or disposing of them illegally?

Most national and international standards now accept electronic signatures. However, a database of electronic signatures must be created as an EHR system is implemented.

1.22 Customization
Each healthcare environment functions differently, often in significant ways. It is difficult to create a "one-size-fits-all" EHR system. An ideal EHR system will have record standardization but interfaces that can be customized to each provider environment. Modularity in an EHR system facilitates this. Many EHR companies employ vendors to provide customization. This customization can often be done so that a physician's input interface closely mimics previously utilized paper forms⁹. At the same time they reported negative effects in communication, increased overtime, and missing records when a non-customized EMR system was utilized. Customizing the software when it is released yields the highest benefits because it is adapted for the users and tailored to workflows specific to the institution. Customization can have its disadvantages. There is of course, higher costs involved to implementation of a customized system initially. More time must be spent by both the implementation

⁹ "Information Technology" by William Baeumont. April 03 2008.
team and the healthcare provider to understand the workflow needs. Development and maintenance of these interfaces and customizations can also lead to higher software implementation and maintenance costs. These hurdles make customizations that can be made publicly available through an open source model more desirable.

1.23 Successful implementations of EHR systems
A graphical user interface known as the Computerized Patient Record System (CPRS) allows health care providers to review and update a patient’s electronic medical record. CPRS includes the ability to place orders, including medications, special procedures, X-rays, patient care nursing orders, diets, and laboratory tests. The Indian Health Service uses an EHR similar to VistA called RPMS. VistA Imaging is also being used to integrate images and co-ordinate Picture Archival Computer Systems into the EHR system.

1.24 Failures in Health Information Technology implementation
Many of the Electronic Health records have failed over the past few years for a variety of reasons including poor project management, technical challenges and a failure to create a compelling business model for the participants. Physicians were reported by nurses as being embarrassed by the number of errors the system caught and corrected, as well as being frustrated by the slow performance of the system. It is notable that the system had never been used or tested. Advocates of electronic health records hope that product certification will provide physicians and hospitals with the assurance they need to justify significant investments in new systems.

1.25 Related and supporting technologies
An unusual form of Health Information Technology is the Veri Chip system, an RFID microchip that can be implanted under the skin to give instant access to a patient’s records. The tiny electronic device, produced by Applied Digital Solutions Inc. of Delray Beach, Florida, transmits a unique code to a scanner that allows doctors to confirm a patient's identity and obtain detailed medical information from a database maintained by Applied Digital. Only the identification is provided by the implant, so the system remains limited to hospitals, doctors and patients having access to the scanner. William Baeumont (2008). Multiple terms have been used to define electronic patient care records, with overlapping definitions. Both electronic health
record (EHR) and electronic medical record (EMR) have gained widespread use, with some health informatics users assigning the term EHR to a global concept and EMR to a discrete localized record. For most users, however, the terms EHR and EMR are used interchangeably. An EHR system is also often abbreviated as EHR or EMR. Information in the section on EMRs electronic medical record may be more relevant to physician offices seeking a less expensive or comprehensive solution. Health Information Technology is an even broader term that describes any computer-based electronic aid to healthcare delivery. An electronic health record is a patient's health record that has been compiled into a digital format. Types of data stored in an electronic medical record

1.26 Software criteria of interoperability

There are four different categories and levels of data structuring at which health care data exchange can take place. While it can be achieved at any level, each has different technical requirements and offers different potential for benefits realization.

1) Non-electronic data eg. paper, mail, and phone call.
2) Machine transportable data eg Fax, email, and unindexed documents.
3) Machine organizable data, eg (structured messages, unstructured content) eg messages and indexed (labeled) documents, images, and objects.
4) Machine interpretable data eg automated transfer from an external lab of coded results into a provider's EHR. Data can be transmitted (or accessed without transmission) without need for further semantic interpretation or translation.

1.27 Usage of electronic medical records.

A medical record includes any of an individual's health documents of the types listed above. Medical records may be on physical media such as film (X-rays), paper (notes), or photographs, often of different sizes and shapes. Physical storage of documents is problematic, as not all document types fit in the same size folders or storage spaces. In the current global medical environment, patients are shopping for their procedures. Many international patients travel to US cities with academic research centers for specialty treatment or to participate in Clinical Trials. Coordinating these appointments via paper records is a time-consuming procedure and may violate the patient's HIPAA privacy.
1.28 Ideal characteristics of an electronic health record (EHR)

- Information should be able to be continuously updated.
- The data from an electronic health records system should be able to be used anonymously for statistical reporting for purposes of quality improvement, outcome reporting, resource management, and public health communicable disease surveillance.
- The ability to exchange records between different electronic health records systems (interoperability) would facilitate the co-ordination of healthcare delivery in non-affiliated healthcare facilities.

1.29 Attempts to facilitate EMR compatibility.

The objective of the EMR patient details module is provide a facility for the user to enter and make changes to the personal details like name date of birth, social security number etc. along with demographic details like the addresses, and also insurance, pharmacy and guarantor details of a patient. This information recorded here is used in various clinical and billing modules. An efficient and comprehensive patient search serves as a pre cursor to the patient details functionality. William Baeumont^8(2008).

1.30 Benefits of EHR standardization/National Healthcare Information Network

1.30.1 Improved billing accuracy

Although billing is now largely accomplished electronically, these claims often require additional documentation from a patient's medical record. This is a tedious task when records are in an electronic format not compatible with the billing program, or when the records are in paper format. An integrated electronic medical record / billing system, therefore, both expedite and makes billing more accurate.

1.30.2 Reduction in duplication of services

Duplication of lab tests, diagnostic imaging, work-ups, and other services can be prevented by good record-keeping of any type. However, because electronic records can be available at many locations at once, integration of services and awareness of duplication is facilitated.
1.30.3 Data Collection
Clinicians and researchers suggest benefits to integrating electronic health records with data collection and analysis in clinical trials. Potential clinical trial participants may be more easily identified, administrative overhead costs may be lessened, data errors may be reduced, and adverse outcomes may more rapidly identified. Some institutions have already been partially successful in implementing and integrating coordinated data collection and analysis systems. For example, the Shared Pathology Network (SPIN) of the National Cancer Institute has effectively established a web-based network for locating pathological tissue samples at various institutions across the nation. The electronic nature of reports within the system allows the use of search engines to find specific text with the reports, facilitating analysis. William Baeumont (2008).

1.30.4 International and National Organizations to evaluate standardization of proposals.
Several models of standardization for electronic medical records and electronic medical record exchange have been proposed and multiple organizations formed to help evaluate and implement them.

1.30.5 International and National Organizations for standardization of EMR
1. CHI (Consolidated Health Informatics Initiative) - recommends nationwide central adoption of EHR standards in the United States
2. CCHIT (Certification Commission for Healthcare Information Technology) - a centrally funded, not-for-profit organization that evaluates and develops the certification for EHRs and interoperable EHR networks (USA)
3. IHE (Integrating the Healthcare Enterprise) - a consortium, sponsored by the HIMSS, that recommends integration of EHR data communicated using the HL7 and DICOM protocols
4. ANSI (American National Standards Institute) - accredits standards in the United States and co-ordinates US standards with international standards
5. Healthcare Information and Management Systems Society (HIMSS) - an international trade organization of health informatics technology providers
6. American Society for Testing and Materials - a consortium of scientists and engineers that recommends international standards

7. open EHR - provides open specifications and tools for the 'shared' EHR

8. Canada Health Infoway - a centrally funded, not-for-profit organization that promotes the development and adoption of EHRs in Canada

9. World Wide Web Consortium (W3C) - promotes Internet-wide communications standards to prevent market fragmentation

10. Clinical Data Interchange Standards Consortium (CDISC) - a non-profit organization that develops platform-independent healthcare data standards

11. EHR-Lab Interoperability and Connectivity Standards (ELINCS) - run by the HL7 group to help provide lab data and other EHR interoperability.

1.30.6 EMR Standards

1. ANSI X12 (EDI) - transaction protocols used for transmitting patient data. Popular in the United States for transmission of billing data.

2. CEN's TC/251 provides EHR standards in Europe including:

3. EN 13606, communication standards for EHR information

4. CONTSYS (EN 13940), supports continuity of care record standardization.

5. HISA (EN 12967), a services standard for inter-system communication in a clinical information environment.

6. Continuity of Care Record - ASTM International Continuity of Care Record standard

7. DICOM - an international communications protocol standard for representing and transmitting radiology (and other) image-based data, sponsored by NEMA (National Electrical Manufacturers Association)

8. HL7 - a standardized messaging and text communications protocol between hospital and physician record systems, and between practice management systems


************