Chapter 8

Computers have become an important necessity for the pharmacist over the past decade who is engaged in drug information services and patient counseling. So as to satisfy patient queries related to medicines including toxic effects, adverse drug reactions, and drug interactions and also about the disease, disorder, acute syndrome or new innovative therapies. The field of pharmacy is immensely benefited by the use of computer and it will continue to do so. The role of computers in hospital and clinical pharmacy is diversified. They help in patient record management, entry of medication errors, drug therapy monitoring, purchasing and inventory control, patient medication profile etc. Further development in computer technology will enable the pharmacist to discover new drugs for the complete care of dangerous of diseases like aids, cancer etc. and reduce the cost of production of drugs for diseases which are easily cured. Various hardware and software's have been developed without which drug discovery, designing, manufacturing and analyzing would become virtually impossible. Computer and computer programs are also aid in utilizing drug information. Thus, there are numerous applications of computer in clinical and hospital pharmacy and computers have become a necessary solution for optimizing patient care.

Applications of Computers in Pharmacy

1. Usage of computers in the retail pharmacy
2. Computer aided design of drugs (CADD)
3. Use of Computers in Hospital Pharmacy
4. Data storage and retrieval
5. Information system in Pharmaceutical Industry
6. Diagnostic laboratories
7. Computer aided learning
8. Clinical trial management
9. Adverse drug events control
10. Computers in pharmaceutical formulations
11. Computers in Toxicology and Risk Assessment

12. Computational modeling of drug disposition

13. Recent development in bio computation of drug development

14. In Research Publication

15. Digital Libraries

Use of computers in hospital pharmacy

1. In Both Hospital and Community Pharmacies, Computer applications are used in conjunction with drug administration, ambulatory care, clinical practice and drug distribution. Computers have become the main component of pharmacy practice. It is essential for pharmacist and pharmacy technicians to become computer literate, and comfortable using the common software programs made for pharmacies. Computer can help in reducing error and potential patient harm by keeping information up-to-date, accessible, accurate, standardized, concise and correct.

2. With computers we can keep track of drug inventory, narcotics use, changes in the drug formulary and personnel. Computers are used for patient billing, insurance billing and verification, pricing, maintenance of patient profiles, generation of medication administration record and a number of computational and repetitive tasks.

3. Computers can help to reduce medication errors with programs that are designed to alert the user of possible medication interactions or allergies, dose limitations, drug duplications, and other warnings.

4. Using Computers in Continuing Education makes the computer an excellent tool for the ongoing education of pharmacy personnel. There are internet sites that present the latest drug information and monograph.

5. Computers can provide the pharmacist and technician with information on a particular topic, references, communication with researches and pharmaceutical companies.

Few more applications of computer in hospital pharmacy are listed below:

- Storing the details of every individual
- Professional supplies
- In receiving and allotment of drugs
- Records of dispensed drugs to inpatient and outpatient
- Information of patients records
- Patient monitoring (blood pressure, pulse rate, temperature)
- Hospital administration computers help in storage of data and recovery of data (retrieval) as there would be persistent changes coming up.

Electronic Health Records

Electronic Health Records are electronic versions of patients' healthcare records. An electronic health record gathers, creates, and stores the health record electronically. The electronic health record has been slow to be adopted by healthcare providers. The federal government has recently passed legislation requiring the use of electronic records or face monetary penalties. The electronic health record will improve clinical documentation, quality, healthcare utilization tracking, billing and coding, and make health records portable. Hence an Electronic Health Record is computer software used to capture, store, and share patient data in a structured way. An EHR is able to share medical information among all the authorized parties involved in the patient's care: clinicians, labs, pharmacies, emergency facilities, nursing homes, state registries, and patients themselves. The first EHR prototype called a Problem-Oriented Medical Record appeared 50 years ago. It consisted of a database of a patient's complete clinical history, a problem list with the patient's medical complaints, initial plan of care in which a doctor decides what to do about the problem, daily progress notes, and a discharge summary that tells about the fullest resolution of a problem emphasizing the remaining concerns.

CLINICAL AND ADMINISTRATIVE NEED FOR AN ELECTRONIC HEALTH RECORD (EHR)

There are many clinical and administrative needs that a hospital or a physician's office requires an EHR to be able to perform. The EHR will be the central data base of information that will drive patient documentation, billing, quality, and clinical decision support. The benefits of an electronic health record include a gain in healthcare efficiencies, large gains in quality and safety, and lower healthcare costs for consumers. Electronic health record challenges include costly software packages, system security, patient confidentiality, and unknown future government regulations. Future technologies for electronic health records include bar coding, radio-frequency identification, and speech recognition.

APPLICATIONS OF ELECTRONIC HEALTH RECORDS

1. **Administrative Applications**

Electronic Health Records have some level of administrative applications. The administrative application is the part of the EHR that includes patient registrationwhere the patient demographics are recorded on the health record and this includes name, age, sex, address, contact information, insurance information, employer, and patient's chief complaint. The registration system assigns the patient a unique patient ID number that is only used by a particular healthcare provider.

2. **Computerized Physician Order Entry (CPOE)**

CPOE is an application used by physicians to order laboratory, pharmacy, radiology services, and other physician orders. CPOE holds great advantages to healthcare providers by allowing physicians to electronically order tests without having to write these orders on paper forms. This ensures accuracy of the orders and notifies the appropriate area that the patient will be arriving. It also lets healthcare professionals know what tests need to be performed. CPOE functions are also a provision of the government's meaningful use requirements.

3. **Laboratory Systems**

Most laboratories in healthcare settings already use lab information systems (LIS), which are usually interfaced into the EHR for patient data and testing results exchange. Almost all the lab

analyzers and lab testing equipment interface into the LIS. Lab information systems also contain lab orders, lab results, schedules, and other administrative functions.

4. **Radiology Systems**

Radiology information systems (RIS) are another department with information systems that interface with the EHR. Radiology information systems, like lab systems, contain patient information, the radiology orders, test results, schedules and image tracking. Radiology information systems also are used with picture archiving communications systems (PACS). This is the system that manages and stores the digital radiography image.

5. **Clinical Documentation**

Clinical documentation is a large part of an EHR, as physicians, nurses, and other healthcare professionals document an immense amount of information on a patient. This information ranges from clinical note's, clinical reports, assessments, and medication administration records (MAR). Other components of clinical documentation include vital signs, discharge summaries, transcription documents etc.

6. **Pharmacy Systems**

Pharmacies in large hospitals are highly automated, using robots to fill prescriptions and use electronically integrated med carts. Hospital pharmacies also utilize bar coding on medications and patients to ensure right dose, right patient, right time, drug administration. It is vitally important that pharmacy systems interface into the EHR as this is where drug interactions and drug allergies are tracked within an EHR. Drug errors in healthcare are the leading cause of medical errors that cause patient harm. An important component of EHR's pharmacy applications is e-prescribing which is a great tool for removing prescription errors.

7. **Other application**

Many EHR's contain other applications that help to make complete record. An important application is clinical decision support. Clinical decision support systems help physicians, and nurses choose the correct course of action on a particular patient and his/her condition. Another

important application is quality management systems. Quality management systems track patient outcomes and give healthcare providers tools to report the data to federal entities.

PRACTICE WORKFLOW WITH THE ELECTRONIC HEALTH RECORD SYSTEM
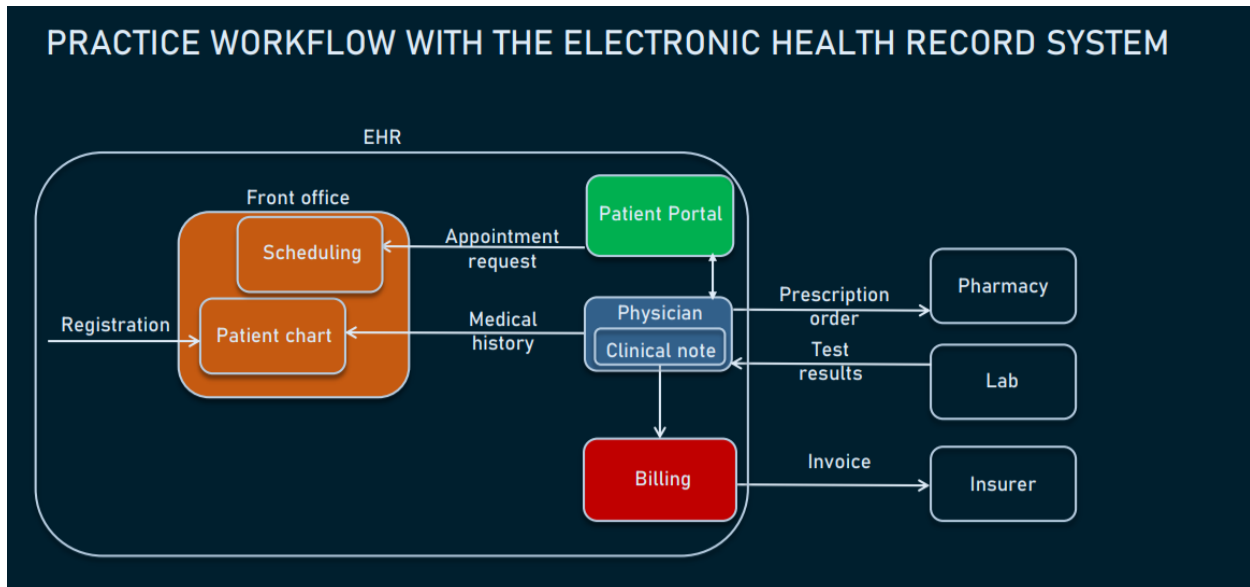
SOFTWARES USED IN HOSPITAL PHARMACY

1. **Ecogreen C Square**

Ecogreen C Square is a pharmacy software for managing pharma retail chain businesses. The software is suitable for handling multi-store operations in terms of inventory and expiry, purchase and sales, and customer management in organizations such as hospitals.Users can maintain ledgers, balance sheets and books related to accounting with the help of this software.

2. **eVitalRx**

It is a one-stop cloud-based pharmacy management software designed for pharmacies, medical stores, and e-pharma businesses. It helps pharmacies handle all aspects of their business efficiently, from inventory control and billing to accounting payment collection.eVitalRx pharmacy management system is used by chemists and medical stores to take offline and online orders, maintain an online database, generate valuable sales reports, and track the expired medicine stock.

3. Medicin Pharmacy Management Software

Medicin is a web-based pharmacy software in complete compliance with multiple GST rules and regulations. The software is compatible with the e-way billing system and owners can forward invoices to their customers via Email or SMS, directly from the software and also create loyalty cards for them.

4. PharmaSoft

PharmaSoft is one of the most effective pharmacy management software with advanced options for managing sale services. It aims to increase control in daily operations of managing a pharmacy store with various in-built modules like purchase & inventory management, sales management, accounting, prescription recording, home delivery, etc.

5.   **Prompt PharmaERP**

PromptPharmaERP is the best pharma erp software and allows you to make business decisions much more efficiently and supports every critical business function, allowing you to stay on top of your business and grow profitability.