Application of computers in Pharmacy:

Computer are now a days used in pharmaceutical in industries, hospitals and in various departments for drug information, education, evaluation, analysis, medication history and for maintenance of financial records. They have become indispensable in the development of clinical pharmacy, hospital pharmacy and pharmaceutical research. Computers are also useful for patient profile monitoring, medication, database management and material management. It is useful in providing on drug interactions, drug information services and patient counseling.

Drug information storage and retrieval

(A computer system is described which stores patients data relating to clinical pharmacokinetic assessments made by clinical pharmacists, who are participating in a clinical pharmacokinetics service. The system was developed to assist in the documentation of service activities and storage of patients' pharmacokinetic data. An additional component of the system is the ability for retrospective review of the stored data. Application of this system to the derivation of new information on drug pharmacokinetics and drug efficacy/toxicity in various patient groups is discussed. The implications for phase IV drug studies and toxicity screening studies is also described.)

The storage, retrieval, and dissemination of information constitutes a major function of any drug information service (DIS). We developed a computerized system for the storage and retrieval of data from drug information requests (DIR) using a MUMPS-based information system. In the past, DIR forms were stored in looseleaf binders and filed chronologically. Due to the success and increased use of our DIS, this manual filing system became inadequate and awkward to use. Our solution was to develop a computer system where data could be entered from DIR forms and retrieved rapidly and easily. Each DIR was reviewed and key data elements were selected for input. The DIS files may now be searched online rapidly and efficiently. The MUMPS-based information system has provided open access for all staff pharmacists, 24 hours a day. The benefits have been an increase in both the quantity and quality of drug information provided.

Pharmacokinetics:

Over the past 20 years, pharmacokinetic programs have been developed for clinical decision making. These clinical pharmacokinetic software programs are designed to assist the clinician in the analysis, interpretation and reporting of serum drug concentration data for a variety of medications. The programs vary in the extent of features and range of medications supported and thus warrant careful review before selecting or purchasing such a program for routine use. A series of programs which are commercially available in the United States was reviewed for this article. The focus of the review is not to recommend a single program or to provide a ranked list of commercially available programs. Information is presented to clinicians to better their understanding of the features of these computer-based clinical resources. As an introduction to this topic, the information presented concentrates on the system and support features.

Those programs that were reviewed demonstrate the ability to assist in the analysis of serum or plasma drug concentration data for most of the medications that warrant therapeutic drug monitoring. They provide both Bayesian and non-Bayesian methods for predicting serum drug concentrations. Standard personal computers were sufficient to run each of the programs reviewed. In addition, most programs offered technical and clinical support. However, the quality of the user manuals and training material varies among software programs. In-depth analytical comparisons are currently being conducted for future publication.

Drug Designing:

Mathematical model in drug design

A mathematical model is a description of a system using mathematical concepts and language. The process of developing a mathematical model is termed mathematical modeling . Drug is considered as one of the most important necessity to all of us. A mathematical model plays an important role in drug development and drug discovery. In this short survey we have presented a brief note on the contribution of mathematical models to drug discovery, development and several therapies.

Computational approaches are useful tools to interpret and guide experiments to expedite the antibiotic drug design process. Computer-aided design (CAD) is the use of computers (or workstations) to aid in the creation, modification, analysis, or optimization of a design.CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing. CAD output is often in the form of electronic files for print, machining, or other manufacturing operations. The term CADD (for Computer Aided Design and Drafting) is also used.Structure based drug design (SBDD) and ligand based drug design (LBDD) are the two general types of computer-aided drug design (CADD) approaches in existence.

Hospital and clinical pharmacy:

Hospital pharmacy is division of hospital which monitors on the receiving and allotment of drugs and medicines and professional supplies, stores them and dispenses to inpatient, outpatient and may have a manufacturing extension to manufacture pharmaceuticals and parenteral in bulk.

Clinical pharmacy is the branch of Pharmacy where pharmacists and pharmaconomists provide patient care that optimizes the use of medication and promotes health, wellness, and disease prevention.

Patient record maintenance is vital job in hospitals but with the help of computers, data can be maintained easily and also updated time to time. Maintenance of stock means inventory control can be achieved very well by using computers. For this purpose, periodic or perpetual inventory control systems may be adapted. Computers can play role like,

• To detect the items which have reached minimum order level.
• To prepare list of items to be purchased and their quantities.
• To prepare purchase orders for vendors and to avoid duplication.
• To detect the infrequently purchased items for possible return or elimination from pharmacy’s drug supply.
• To produce periodic summary and purchasing and inventory control statistics.
• Maintaining patient medical record.
• Drug information services.
• Patient monitoring.

Softwares like Microsoft Excel are useful in maintenance of all type of numerical data.Clinical pharmacist may use computers for therapeutic drug monitoring; which are very potent and having very narrow therapeutic range like cardiac glycosides, anticonvulsants. Computer program are designed to calculate drug dosage to suit individual patients need. Apart from this, drug interactions may be screened by using programs like MEDIPHOR (monitoring and Evaluating of Drug interactions by a pharmacy oriented reporting) and PAD (Pharmacy Automated Drug Interaction Screening).

Electronic prescribing and discharge

Electronic prescribing (EP) systems automate prescribing, supply and administration of medicines in hospitals, where they have been shown to reduce medication errors and have a major impact on patient safety. However, the effect on error reduction is dependent on system design and a poorly implemented system can actually increase error rates.

EP systems were pioneered in the US in the early 1990s, but there are still relatively few hospitals in the UK with whole-hospital EP systems. The Technology Fund, announced by the Government in May 2013, will, hopefully, increase the adoption and use of EP in hospitals.

Timely and accurate transmission of a patient's discharge prescription from secondary to primary care is important to ensure seamless patient care, and also to prevent errors arising from miscommunications. Recently, many hospitals have adopted electronic discharge systems (sometimes as a "quick-win" compared with a whole-hospital EP system). However, these systems may have inadequate decision support functions, and data fields that are not in a standard format. Furthermore, they route the discharge information to GPs, not to community pharmacists.

There are a number of local and national initiatives being developed to address these issues, such as the NHS Connecting for Health Electronic Discharge Implementation Toolkit with standard discharge headings, schemes such as the East Lancashire "Refer to pharmacy" system, designed to ensure that community pharmacists are in the discharge communication process and the Royal Pharmaceutical Society's standard pharmaceutical care record programme.

Barcode medicine identification

Barcode identification of medicines has been used with EP systems and has been shown to reduce medicine administration errors, as well as improve the completeness of the medication history. However, barcode medicine identification at the point of administration is an interruptive process and, for this reason, health professionals often develop "work arounds" to circumvent barcode scanning.

The Falsified Medicines Directive (FMD), due to be implemented in 2017, calls for unique identification of medicines at the point of dispensing, in order to combat counterfeiting. Although the exact UK system to support FMD has not yet been developed, this process is likely to involve barcode scanning of medicines and will therefore have a major impact on pharmacy workflow.

Automated dispensing

Robots have been used in logistics and distribution for many years, but only recently in pharmacy. In 2001, the Audit Commission's "Spoonful of sugar" report advocated the use of automation to transform pharmacy services and, since then, many UK hospitals installed dispensary robots. Pharmacy robots have been shown to reduce the incidence of dispensing errors, improve the speed and efficiency of the dispensing process, and optimise use of space in the pharmacy.

Robot use in community pharmacy in the UK is still relatively limited. However, robots have the potential to handle high volumes of dispensing in community pharmacies, or dispensing "hubs", and to release pharmacists to develop and deliver patient-centred services.

As newer, smaller and more efficient machines become available, robot use in all sectors of pharmacy is likely to increase. Similarly, automated methadone dispensing machines (eg, Methameasure, Methadose) offer accuracy and efficiency in the laborious methadone dispensing process and their use is likely to increase, too, especially in pharmacies with a high volume of methadone dispensing.

The use of electronic ward cabinets is the next level of automation in hospitals. These have been shown to provide benefits such as reduced number of medication errors, reduction in number of missed doses, supply delays and stock outages, and reduction of stock-holding and wastage.
However, installation of ward cabinets constitutes a considerable expense, a major implementation project and a significant change in working practice for both pharmacy and nursing staff. For these reasons, ward cabinets have not been installed in many UK hospitals to date.

Mobile technology

The use of mobile telephones is widespread in society. Some pharmacies are using text alerts to remind patients that repeat prescriptions are ready or to offer services, but sophisticated apps have been developed for disease monitoring, for example, recording of peak flow readings in asthma, monitoring of blood glucose levels, medication adherence support and health education. These apps will have a greater impact on pharmacy practice in future.

Adherence monitoring

Various technologies are now available to support approaches to adherence monitoring. A number of vendors have developed “smart” packaging, where a microchip-containing tablet blister pack is able to monitor when doses are popped out (not necessarily taken) and prompt the patient to record side-effect monitoring information for the medicine in question. These data can then be transmitted to a mobile telephone or tablet device.
A more invasive adherence monitoring technology is the “smart” pill, for example, the Lifenote system, piloted by Lloydspharmacy. This consists of a sensor pill, ingested by the patient, which transmits data on doses taken, heart rate, body posture to a mobile telephone or tablet device, via a receiver patch on the patient’s skin. At present, this is available only as a dummy pill, but eventually it will be incorporated into medicines.

Diagnostics Systems

Systems is a global leader of products and instruments used for diagnosing infectious diseases. Our products are used in the clinical market to screen for microbial presence, grow and identify organisms, and test for antibiotic susceptibility. In the industrial market, Diagnostic Systems' products are used for the testing of sterile and non-sterile pharmaceuticals and medical devices, for environmental monitoring and to detect food pathogens.

Lab-diagnostic System

A medical laboratory or clinical laboratory is a laboratory where clinical pathology tests are carried out on clinical specimens to obtain information about the health of a patient to aid in diagnosis, treatment, and prevention of disease.[1] Clinical Medical laboratories are an example of applied science, as opposed to research laboratories that focus on basic science, such as found in some academicinstitutions.
Medical laboratories vary in size and complexity and so offer a variety of testing services. More comprehensive services can be found in acute-care hospitals and medical centers, where 70% of clinical decisions are based on laboratory testing.[2] Doctors offices and clinics, as well as skilled nursing and long-term care facilities, may have laboratories that provide more basic testing services. Commercial medical laboratories operate as independent businesses and provide testing that is otherwise not provided in other settings due to low test volume or complexity.[3]

Patient Monitoring System

The Patient Monitoring System (PMS) is a very critical monitoring systems, it is used for monitoring physiological signals including Electrocardiograph (ECG), Respiration , Invasive and Non-Invasive Blood Pressure, Oxygen Saturation in Human Blood (SpO2), Body Temperature and other Gases etc.

In PMS, the multiple sensor and electrodes is used for receiving physiological signals like as ECG Electrodes, SpO2Finger Sensor, Blood Pressure Cuff and Temperature Probe to measure the physiological signals.

During treatment, it is highly important to continuously monitor the vital physiological signs of the patient. Therefore , patient monitoring systems has always been occupying a very important position in the field of medical devices.

The continuous improvement of technologies not only helps us transmit the vital physiological signs to the medical personnel but also simplifies the measurement and as a result raises the monitoring efficiency of patients

CLASSES OF PATIENT MONITORING SYSTEM

In the past, the dominant products manufactured by medical device manufacturers are mainly those for single parameter measurement. Nowadays however, a multi-parameter patient monitor is commonly used.

1.Single-Parameters Monitoring Systems
2.Multi-Parameter Patient Monitoring Systems

Pharma Information System

The PMIS(pharmaceutical management information system) integrates pharmaceutical data collection, processing, and presentation of information that helps staff at all levels of a country's health system makeevidence-based decisions to manage pharmaceutical services.

Function

An effective PMIS is able to synthesize the large volume of data generated bypharmaceutical management operations. It then processes the data intoinformation for use in planning activities, estimating demand, allocating resources,and monitoring and evaluating pharmaceutical management operations. Thisinformation is often in the form of a few key indicators. Indicators should betargeted toward staff at all levels so that they can monitor both their ownperformance and that of the units for which they are responsible.Another important function of a PMIS is to improve accountability. Much of therecording and reporting in a PMIS is intended to create an audit trail for products asthey enter or leave a pharmaceutical supply system.

Importance of a pharmaceutical management information system

A good PMIS provides the necessary information to make sound decisions in thepharmaceutical sector. Effective pharmaceutical management requires policymakers, program managers, and health care providers to monitor informationrelated to patient adherence, drug resistance, availability of medicines andlaboratory supplies, patient safety, postmarket intelligence, product registration,product quality, financing and program management, among other issues.