Unit-III
Computer Applications in Pharmacy

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➢ Barcode medicine identification

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Bar code medication Identification

➤ Bar code medication identification (BCMI) is a bar code system designed to prevent medication error in healthcare settings and to improve the quality and safety of medication administration.

➤ The goal of BCM is to make sure that patients are receiving the correct medications at the correct time by electronically validating and documenting medications.

➤ The information encoded in barcodes allows for the comparison of the medication being administered with what was ordered for the patient.

- A BCM system consists of a <u>barcode printer</u>, a <u>barcode reader</u>, a mobile or computer (with <u>Wi-Fi</u>), a computer server and software.

- Each drug in the hospital is labeled with a unique barcode.

- When a patient is prescribed medication, it is faxed, sent electronically or hand delivered to the hospital's pharmacy and entered into a computer system by a pharmacist.

- The pharmacist dispenses the barcoded dose of the drug to the patient's floor. Then checked by nurse and administered as per coded mode of administration.

- When it's time for the clinician to administer the medication, he uses a Handheld device to scan the barcodes on his identification badge, the patient's wristband and the drug.

- If the barcode point-of-care (BPOC) system cannot match the drug to be given with the order in the system, it alerts the clinician with a visual warning.

- Each patient's barcode holds all the vital information about the patient and his medication.

- The BCM system is designed to make sure that the right drug is given to the right patient via the right route in the right amount and at the right time.

- This information is referred to as the "Five Rights."

- Right medicine
- Right patient
- Right dose
- Right time
- Right mode of administration

Advantages of Barcode medication identification system

⬚ Reduced time gap between actual prescription and dispensing.

⬚ Useful for managing inventory as well as billing.

⬚ Barcode dispensing is faster, easier, more manageable and error free mode of dispensing medications.

Disadvantages

- No barcode available on medicine

- Sometimes unreadable the Barcode

- Poor quality wristband

Automated Dispensing Cabinets (ADC)

- An automated dispensing cabinet (ADC) is a computerized drug storage device or cabinet for hospitals and many other health care settings.

- ADCs allow medications to be stored and dispensed near the point of care while controlling and tracking drug distribution.

- They also are called unit-based cabinets (UBCs), automated dispensing devices (ADDs), automated distribution cabinets or automated dispensing machines (ADMs).

- The ADC is a computerized point of use medication –management system that is designed to replace or support the traditional unit-dose drug delivery system.

- Automation speed up the dispensing process, resulting in fewer medication error and improved patient outcomes.

Automated Dispensing Cabinets (ADC)
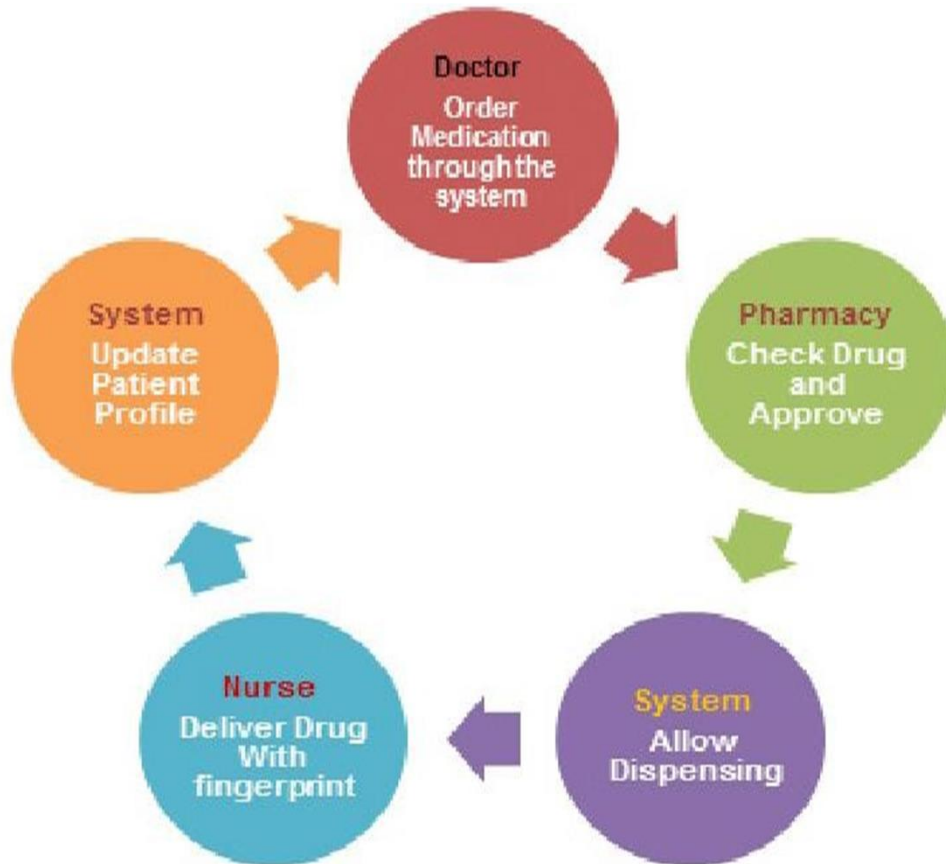
- It can be used only by authorized users who are authenticated by password.

- It is placed in wards, ICU rather than in central pharmacy.

- The devices require staff to enter a unique logon and password to access the system using a touch screen monitor or   using fingerprint identifications.

- Once logged into the system , the nurse can obtain patient- specific medications from drawers or bins that open after a drug is chosen from a pick list

ADVANTAGES:

1. The commonly needed pharmaceuticals are at the point of care.

2. This will reduce the workload of nurses.

3. Controlled substances remain in secure lock box until needed and access is secured by multi-factor authentication.

4. ADM can improve patient safety by providing drug allergy alerts, drug-drug interaction and advice on high risk medication.

Mobile Technology and Adherence monitoring

➢ Medication non-adherence is a prevalent, complexproblem.

➢ Failure to follow medication schedules may lead to major health complications, including death.

➢ Proper medication adherence is thus required in order to gain the greatest possible drug benefit during a patient's treatment

➢ Mobile Technology and adherence monitoring refers to the process of monitoring medical practices that have been included in improving patient care in medical practices.

Mobile Technology and Adherence monitoring

- It has been made possible to keep a track of one's own health and wellness through various portable devices that assess medical information. Every body can monitor his /her vital signs on daily basis.

- Adherence monitoring is related to evaluation of patient's commitment level to the doctor related to a particular medical services.

- A doctor can evaluate important events for any patient like whether the patients is following diet instructions or not, taking medications or not, has refilled his medication or not, has got his lab tests done or not.

Advantages of Mobile Technology

➤ All such information is available on the click of button because of technology.

➤ By these information doctor can actually check whether a patient is adhering to advised treatment or not and accordingly evaluate change in treatment.

➤ Increased medication leads to improved patient health.

➤ With these technology patient can directly interact with his service provider without even visiting the hospital.

➤ Patient can discuss problems or side effects if any. Changes in drug therapy can be implemented through electronic prescription

Android App for patient monitoring

➢ Mobile has capability to collect sensor data from heterogeneous wearable sensors, process the data, analyze the data and trigger warming messages to doctors ,relatives etc.

➢ The system will provide the capability to visualize the signal in doctors mobile.

➢ The system also considering involvement of doctors for assessing risk level in patients
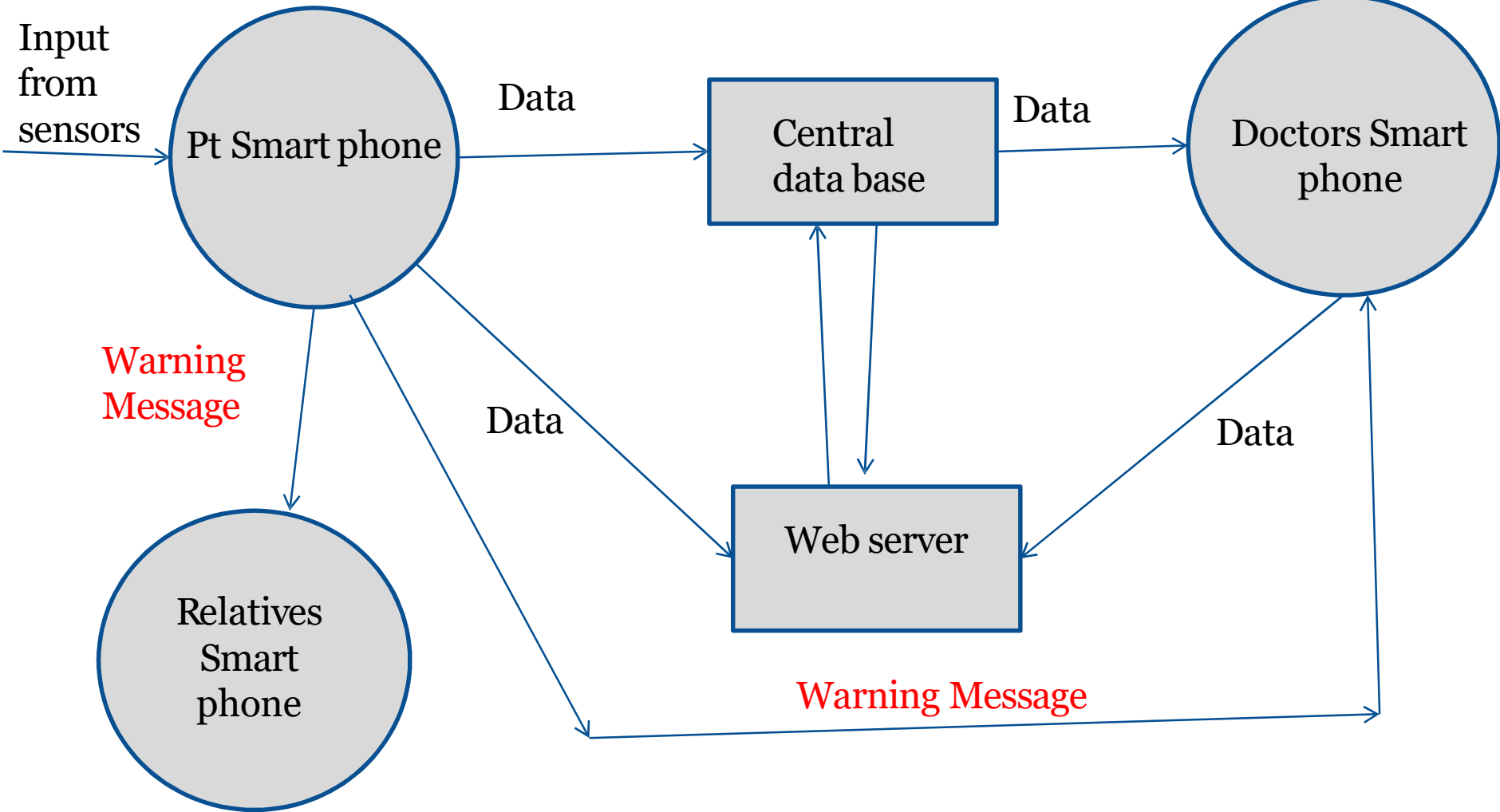
Process of patient monitoring

1. System (smart phone of patient) able to collect data to monitor the basic vital parameter from wireless body sensors to patients smart phone using high speed bluetooth technology.

2. Collected data should be saved in database of smart phone and analyzed itself to find warning level.

3. If result is above threshold a warning message should be send to doctors and relatives.

4. The warning message and stored data transmitted to central database situated in hospital.

5. If doctors need to see the patients ECG signals in her or his mobile phone the system view the ECG report in her or his smart phone

6. If require doctor can suggest change in treatment via message

Diagnostic system

➤ A diagnostic system is a program which is used to evaluate & analyze a particular problem based on its symptoms , functioning & issues being faced by the person.

➤ In a healthcare, such system is used to provide diagnosis to any patient

➤ It starts with the arrival of patient having chief compliant in the form of discomfort or other symptoms.

➤ Depending on the patient's history, lab tests or radio diagnosis is recommended.

➤ Diagnostic system provide Faster solution to a problem.

➤ It helps in providing the accurate diagnosis and best treatment to the patient.

Computer-aided diagnosis

➢Computer-aided diagnosis, are systems that assist doctors in the interpretation of medical images.

➢Imaging techniques in X-Ray, MRI, and ultrasound diagnostics yield a great deal of information that the radiologist or other medical professional has to analyze and evaluate comprehensively in a short time.

➢CAD systems process digital images for typical appearances and to highlight conspicuous sections, such as possible diseases, in order to offer input to support a decision taken by the professional.

Eg with help of X-ray Doctor can decide fracture in bones and bronchitis, obstruction in intestine etc.

Lab Diagnostic System

➢ It is a system that records, manages & stores data related to clinical lab test results of various patients.

➢ A wide range of lab tests are available which are conducted under specified conditions.

➢ The clinical values are compared to standard values and results are provided.

➢ This system provide appropriate diagnosis as per the condition of the patient.

➢ They help in early detection of medical condition which if not diagnosed & treated properly can become a deadly disease.

➢ Different lab diagnostic tests include detection of sugar, cholesterol in blood, etc.

Lab Diagnostic system

➢ Physician order laboratory test for their patients.

➢ The request are displayed in clinical laboratory.

➢ Work sheet are created to a laboratory personnel in planning blood –drawing schedule and performing tests. (for indoor patients)

➢ As test results are available display them on the screen of any workstation.

➢ Physician go through the laboratory results and prescribe suitable medicine to patients

➢ Different equipments such as cell counter and analyzer used in laboratory are operated using computer based software's.

➢ Cell counter- counts different types of cells in the body

➢ Analyser- Estimated different biochemicals in the body (serum calcium, urea, uric acidetc)

Patient monitoring system

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

➢ Patients which are at high risk require close monitoring e.g. Cancer & stroke patients.

➢ Patients with unstable conditions also require constant monitoring in order to avoid any unavoidable condition or circumstances.
   E.g. Overdose of anaesthesia, supply of oxygen needs to be monitored in patient.

➢ Some of these devices are used as bed side devices in the hospital & some can be owned by the patient for regular monitoring like BP check or blood sugar checking device, etc.

➢ Most diseases of the heart and of the circulatory system , referred to as cardiovascular diseases, strike with out warning and prompt treatment is required if death is to be averted.

➢ Such treatment is best provided in a specialized area of hospital referred to as "intensive care unit."(ICU).

➢ These specialized hospital units provide constant observation of the subject, constant monitoring of the subject's physiological condition and provide immediate emergency treatment whenever it is required.

Components of patient monitoring system

1. Sensor

➢ Sensors of medical monitors include biosensors and mechanical sensors.

2. Translating component

➢ The translating component of medical monitors is responsible for converting the signals from the sensors to a format that can be shown on the display device or transferred to an external display or recording device.

3. Display device

➢ Physiological data are displayed continuously on a CRT, LED or LCD screen as data channels along the time axis, They may be accompanied by numerical readouts of computed parameters on the original data, such as maximum, minimum and average values, pulse and respiratory frequencies, and so on.

Components of patient monitoring system

4. Communication links

Several models of multi-parameter monitors are networkable, i.e., they can send their output to a central ICU monitoring station, where a single staff member can observe and respond to several bedside monitors simultaneously.

5. Other components

A medical monitor can also have the function to produce an alarm (such as using audible signals) to alert the staff when certain criteria are set, such as when some parameter exceeds of falls the level limits.

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.

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- 1.Single-Parameters Monitoring Systems

- 2.Multi-Parameter Patient Monitoring Systems

Single-Parameters Monitoring Systems

☐The single parameter monitoring system is available for measuring blood pressure of a human body, ECG (Electrocardiograph) monitor, SpO2 (Oxygen Saturation in Blood) monitor et..

Multi-parameter patientmonitoring system

- A multi-parameter Patient Monitoring System (PMS) is used for multiple critical physiological signs of the patient to transmit the vital information like Electro cardiograph , Respiration Rate, Blood pressure etc. Therefore, multi parameter PMS has always been occupying avery significant position in the field of medical devices.

PulseOx- Measure pulse
and oxygen saturation

Glucometer

Pharma Information System

➢ It refers to use of information technology in the field of pharmaceutical industry

➢ The science that deals with storage ,retrieval and use of information related to medical industry and pharmaceutical drugs is known as Pharma Information System

➢ The data stored helps in safe pharmaceutical practice & patient care

➢ This information is necessary to ensure faster & accurate decision making regarding pharmaceutical practices

Importance of PIS

➤ A good PMIS provides the necessary information to make sound decisions in the pharmaceutical sector.

➤Effective pharmaceutical management requires policy makers, program managers and health care providers to monitor information related to patient adherence, drug resistance, availability of medicines and laboratory supplies, patient safety, product registration, product quality, financing and program management etc.

➢PIS basically deals with the maintenance of drugs and consumables in the pharmacy unit.

➢The system will ensure availability of sufficient quantity of drugs and consumable materials for the patient.

➢This will enhance the efficiency of clinical work, ease the patients convenience and process drug prescriptions effectively.

➢The system will help removing time wasting, saving resources, allow easy access to medicine, as well as bring on more security on the data compared to manual based system.

Functions of PIS

➢An effective PMIS is able to synthesize the large volume of data generated by pharmaceutical management operations.

➢It then processes the data into information for use in; – planning activities – estimating demand – allocating resources – monitoring and evaluating pharmaceutical management operations.

➢Another important function is to improve accountability.

➢Prescription Management: The PMIS can also be use to manage prescription for inpatients and/or outpatients.

➢Inventory Management: Pharmacies require a continuous inventory culture in order to ensure that drugs do not go out of stock.

Top PIS Software Products

- FSI Pharmacy Management System

- ApotheSoft-Rx

- Medeil

- Rx30 Pharmacy System

- PrescribeWellness

- PharmaCODE

- Speed Script

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BENEFITS

- ➤ Faster
- ➤ Easier
- ➤ Error –free
- ➤ High reach to people
- ➤ Expert advice
- ➤ Safer practice
- ➤ Increased efficacy
- ➤ Reduced cost
- ➤ Increased knowledge
- ➤ Qualitative assessment