



Modern Practice of Hospital Pharmacy

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Due to advancement in medical fields and technologies, range of hospital services has expanded from traditional to current modern services. Similar to hospitals the practice of pharmacy within the hospital setting has been transformed as a result of increasing complexity of drug therapy and financial restrictions to ensure maximum clinical outcomes with cost effective drug therapy, while ensuring the safe use of medications within the health care system.

The hospital is defined as an organized, integrated network of relationships with different disciplines, facilities and healthcare providers and practitioners, designed to improve the health of a community.

Today pharmacist and pharmacy technicians work closely with different departments in hospitals to assure the safe, efficient medications use.

The role of pharmacy has been as supplier of the medication with physicians controlling the ordering and nurses the administration. It is the prerogative of the pharmacist and pharmacy technician to ensure that appropriately selected medications are correctly prepared and made available for the patient.

Appropriate distribution of medication use system is an important part of the hospital pharmacy practice.

Therefore, any form of modern drug distribution systems in hospital such as unit dose system can improve the quality of care provided to the patients.

Another important aspect of hospital pharmacy practice is having financial independence and fixed annual budget in order to have more control of the purchasing and procurement of medicines and medical supplies for the pharmacy, so that the flow of pharmaceutical services would not be stopped.

The need for practice as a team with physicians, nurses, and other health care professionals to care for the patient is indicated. The increasing complexity of drug therapy continues to increase the need for pharmacists with the skills and expertise that meet the pharmaceutical care needs of hospitals.

Staffing in hospital pharmacy is another integral part of pharmacy department. Untrained and inefficient personnel could hinder the provision of services by the pharmacy. The advancement of pharmacist practice into the clinical domain requires skilled pharmacist and pharmacy technician. Skilled pharmacy technicians could provide the technical support for a hospital medication preparation and distribution systems. This support allows the pharmacist to expand their focus on enhancing patient outcomes by appropriate medication management.

There are opportunities and challenges related to pharmacy technicians in supporting optimal pharmacy practice model in health systems. The role of the pharmacy technician in most hospitals is drug purchasing,

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preparation, compounding and distribution with the pharmacist being responsible for direct oversight. There are many opportunities beyond the preparation and distribution of medications that may involve the pharmacy technician, for example; obtaining medication histories, conducting surveys, managing database, screening medical records for potential pharmacist interventions, and many others.^{1,2}

Another challenge in hospital pharmacy department is the prescription order from the patient area to the pharmacy. These orders can be transmitted to the pharmacy usually in one of the four ways:

1. The medical record has a duplicate copy so that the pharmacy can obtain a carbon copy of the physician's original medication order.
2. The original medication order is scanned and the image is electronically sent to the pharmacy to be printed or reviewed on monitor.
3. The physician writes the medication order on a separate prescription blank, commonly for home use.
4. Physician inputs the order directly into a computer. i.e., Computerized Provider Order Entry or CPOE.

Once the order is received by the pharmacist, it is reviewed and if appropriate the medication is made available to the patient. This can be accomplished using different distribution systems:

- Floor stock system
- Patient prescription system
- Unit dose system

Many of the drugs available today can come from the manufacturer already in unit dose form, such as oral solid medications; however, some oral liquids, topical and intravenous drug are packaged by the manufacturer as unit dose. Another option is to utilize outsourcing the repackaging or compounding of unit dose medication to third party pharmacies or compounding centers.

Pharmaceutical compounding is the heart of the pharmacy profession. It is a necessity in today's hospital pharmacy practice. This is especially true for specialized patient population such as pediatrics. Hospital pharmacy compounding includes non-sterile and sterile products and represents one of the highest risks or patient harm. The potential for human error is significant and can occur through miscalculations, missed steps, product contamination or incorrect selection of a base drug or diluent, which can lead to patient harm or death.

Ambulatory care services continue to increase within the hospital setting and pharmacists in hospital have become more involved in providing services to these patients. Pharmacists in some clinics have collaborative practice agreements with physicians that allow the pharmacist to monitor selected patients and prescribe or adjust specific medication therapy in accordance with the agreement or protocol (e.g., anticoagulation, hypertension, asthma, diabetes). Medication management therapy services can

be a collaborative practice agreement with physicians and they grant the qualified pharmacist a provider status.

The practice of hospital pharmacy has changed over the past 20 years. The practice was centered on preparation, compounding, and distribution of medications. Then, the practice of clinical pharmacy emerged. The clinical services provided medications to the patients in the most safe, effective, and rational manner possible, while individualizing care to the patient. Today, the modern practice of pharmacy in hospitals often integrates the traditional distribution functions with the clinical services of the pharmacist. Orders that are entered into the computer system by physicians must be verified or released by the pharmacist to appear on the medication administration record. During verification process of orders, hospital pharmacist review patient information such as: age, gender, weight, height, diagnosis, current medications, allergies, laboratory information, and pregnancy or lactation status. If any concern or intervention indicated, will inform the physician.

Other common clinical activities of the hospital pharmacist, by the scope of practice policies, include the following³:

1. Therapeutic Drug Monitoring – Practice of obtaining blood/serum concentration of medications, in order to maintain the drug doses in the therapeutic range.
2. Drug information: medication therapies in hospital systems are growing increasingly complex and are frequently changing. The pharmacist is a valuable asset to the physicians for providing drug dosing and monitoring information.
3. Adverse drug events: despite medication safety efforts, medication can still cause adverse outcomes in hospitalized patients. The pharmacist has a key role in the prevention, detection, and mitigation of adverse drug events.
4. Formulary: Pharmacist promote adherence to the hospital formulary list of medications.
5. Nutrition: The pharmacist calculate the nutritional formula according to the amount of protein, carbohydrate, and fat that is appropriate for the patient's body weight and medical condition. Also pharmacist calculates electrolyte, vitamin and trace element needs for the nutritional formula.
6. Anti-infective Stewardship: Pharmacists are an integral part of anti-infective stewardship teams.
7. Managing transitions of care: Medication reconciliation. Medications prescribed in the hospital should be consistent and compatible with the medications they were taking at home, as well as with their current medical condition and new medications prescribed. Patient transitions from home to hospital, within the hospital and from hospital back to home are considered high-risk processes.⁴
8. Narcotic Stewardship: A growing concern in

hospitals is the misuse of narcotic medications. Opioid medications have a narrow therapeutic index. The role of the pharmacist in the hospital is to determine therapy for chronic or acute pain upon admission to the hospital, to manage acute pain during their admission, and to stabilize therapy and convert therapy back to oral medications when patient leaves the hospital.

9. Medication therapy management services (MTM): are services that optimize therapeutic outcomes for individual patients, usually in a clinic setting. Which includes medication therapy reviews, pharmacotherapy consults, anticoagulation management, immunizations, and health and wellness program.⁵
10. Documentation: Documentation in the patient record is one of the means by which health-care professionals communicate with one another and document care received by a patient. Pharmacists are expected to document in the patient record information such as physician consultations of the pharmacist, drug information questions results, relevant drug serum concentration and their interpretation, and patient education.

The practice of pharmacy in hospital has changed significantly in response to organizational standards, patient safety, advancement of technology and informatics, and complex medication regimens.

Information technology and automation significantly impact the delivery of hospital pharmacy services. Most all pharmacy services are supported in some way by these systems. The impact of such a technology on pharmacy services has also resulted in the need for pharmacists to develop skills in this practice area.

Due to the number of opportunities for medication errors and drug diversion, there are automated systems to ensure the accurate dispensation and administration

of medications as well as prevent diversion. Pharmacy related automation is represented by a variety of systems including: robots (IV and syringe compounding, retail prescription vial fill and delivery), automated dispensing machines, drug repackaging, bar code machine, IV infusion smart pumps.

The practice of hospital pharmacy continues to evolve as the medications therapies become more complex. The use of technology will bring the pharmacist's expertise closer to the patients, in order to facilitate optimal use of medications. Although the pharmacist is still accountable for overall supervision of the prescription process, their role are growing at a faster rate in areas such as clinical services, drug policy, medication safety, performance improvement, transitions of care, and pharmacy informatics.

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