Drug Distribution

- The process:
  - Receipt/ transcription of orders
  - Interpretation/ evaluation of orders
  - Filling/packaging and checking
  - Delivery
  - Administration

New Orders

- Received as written, electronic/ fax or phone orders
- Communications between:
  - Physician
  - Nursing staff
  - Consultant pharmacists
Evaluation of orders

- Prospective review
- Ensure appropriate:
  - Indication
  - Dosage and dosage form
  - Route of administration
  - Dosing interval
- Check allergy profile and h/o adverse drug reactions
- Assess:
  - Concomitant disease states/ medications
  - Interactions: Drugs, disease, food

Filling and Packaging

- Manual and semi-manual systems:
  - Vials
  - Unit dose and cassettes
  - Modified unit dose: Bingo cards
  - Medisets
- Automated systems:
  - Pyxis: medication distribution
  - Robotics and other automation: dispensing and packaging

Traditional Vials

- Advantages:
  - Time efficient for dispensing pharmacist
  - Less costly
- Disadvantages:
  - Time consuming for facility
  - Increased chances for errors
  - More medication waste
  - Difficult to track usage, compliance
Unit Dose System
- First used in hospitals in 1960’s
- Used to decrease medication administration errors by nursing staff, and reduce medication waste
- Standard of practice in hospital setting today
- Used in some skilled nursing facilities

Unit Dose/Modified Unit Dose Systems
- Unit Dose examples:
  - Manufacturer’s unit dose packs/cards
  - Medication cassettes
- Modified Unit Dose examples:
  - Bingo cards/ blister packs
  - Medisets
  - Pharmacy-prepared administration packages

Examples of Unit Dose Packaging
Unit Dose and Modified Unit Dose Systems

- **Advantages:**
  - Improve accuracy, less errors
  - Easy to track usage
  - Less nursing time at dispensing
  - Less wastage, savings to facility and patient
- **Disadvantage:**
  - More pharmacy processing time and equipment cost
  - Requires more storage space and cassette cost
  - No cost savings to pharmacy
  - Limit nursing processing and checking ability

Mediset System

- **Advantages:**
  - Less waste
  - More flexibility
  - Less nursing time
  - Ease of use for patients
- **Disadvantages:**
  - Cost
  - Processing and packaging time
  - Oral dosage forms only
  - Difficult for nursing to check for accuracy
  - More errors

Automation

- **Advantages:**
  - Speed and output efficiency
  - Ease of operation, capacity, time required
  - Flexibility/ exception dose capabilities
    - 1/2 tab packaging, prn meds, dosage forms
  - Labeling capabilities
  - Batch processing capabilities
  - Accuracy and quality assurance safeguard
  - Reporting/ documentation capabilities
  - Training provision and technical support
Automation Examples

- **Small systems:**
  - Pyxis medstation
  - Baxter ATC
  - Script-pro 200

- **Larger systems:**
  - Baker cells
  - Baxter international

Pyxis medstation

- Used in hospitals and skilled nursing facilities
- Kept in nursing stations
- Pharmacy responsible for entering orders, and filling/stocking units with medications
- Nurses with access codes can obtain medications out of drawers
- All usages are recorded and tracked

Baxter ATC

- Usually installed in the pharmacy
- Medications stored in calibrated canisters
- An order is sent to the system and the medication is dispensed from the correct canister
- System packages unit dose tablets and capsules into labeled and sealed strips packs
- Found to be 99.98% accurate (vs. 92.62% for manual filling) – Kratz K. Hosp Pharm 1992
**Script-pro 200**

- Usually installed in the pharmacy
- Fills vials directly from dispensing cells
- Can print prescription and auxiliary labels

**Baker Cell**

- In pharmacy system
- Counts a 30-count vial in 3-5 seconds
- Option to use software that dispenses medication after a prescription is canned

**Quality Assurance: Automation**

- Order entry accuracy
- Backup system for downtime and system failure
- Adequate staff education and training
- Equipment service and technical support
- Error detection and safeguard
Automation

- **Advantages:**
  - Improve efficiency
  - Improve accuracy, reduce errors
  - Improve documentation
  - Authorized access only, enhance security
  - Reduce job stress and staff turnover
  - Shorten med pass time for nurses/ caregivers

- **Disadvantages:**
  - Additional training and technical help
  - Downtime, system failure and inflexibility
  - Cost and space issues

Drug Delivery and Administration

- **Drug delivery:**
  - On time delivery to
    - the correct facility
    - Correct nursing area
    - Ensure emergency back-up

- **Medication administration:**
  - Correct patient
  - Correct medication- dose, dosage form
  - Correct time
  - Correct route

Medication Administration

- **The medication administration record (MAR):**
  - Monthly record of dispensed medications for each specific patient
  - List of medications with administration times
  - Medication dispensing nursing/ facility staff initials/ signatures
  - May include list of prn medications
  - Tracks missed doses and changes in medications
Emergency Kit
- Supply of short term emergency meds tailored specific to nursing facility needs
- Allows timely dispensing of urgent meds
- Contents in the kit is determined by nursing supervisor and consultant pharmacist
- The “kit” is a sealed box with full supply of medications delivered daily to the facility
- A broken seal indicated usage
- Nurse documents usage and returns records to the pharmacy for refills

Medication distribution errors
- Human errors
  - Medication orders
    - Omission, incorrect transcription
  - Interpretation/evaluation
    - Dose appropriateness, concurrent meds and diseases, drug interactions
  - Filling and checking
  - Medication administration
    - Correct person, dose, dosage form, route, frequency
    - Missed dose documentation

Medication distribution errors
- System errors:
  - Inadequate staffing or untrained staff
  - Poor communication between providers, facility and pharmacy
  - Poor coordination between pharmacy and facility for drug ordering and delivery
  - Poor documentation and reporting system of patient specific concerns and human errors
Role of Consultant Pharmacist

- Order processing
  - Review patient health and medication profile
  - Perform prospective review
  - Consider economic issues
  - Ensure accurate order entry
  - Communicate with prescribers and other health care workers

Role of Consultant Pharmacist

- Medication dispensing and delivery
  - Ensure accurate packaging, labeling and timely delivery
  - Develop policy for dispensing, delivery and storage of medication in facilities
  - Track usage and monitor medication usage and returns, including initial doses, house supply stock and emergency kit contents
  - Monitor the reconciliation of controlled substance: record keeping of supply, usage and disposal
  - Ensure accuracy of MAR and documentation

Role of Consultant Pharmacist

- Formulate quality assurance policy for drug distribution catering to the needs of patients in each facility
- Provide patient specific recommendations on drug therapy and medication needs
- Coordinate interdisciplinary care plan sessions
- Provide drug information to staff, residence, family and other health care providers
- Ensure compliance with all applicable laws and regulations governing drug distribution