PHARMACY PRACTICE (BP703T)
UNIT 2
CASE STUDY AND PUZZLES

a) Drug Distribution System in a Hospital

Puzzle Questions

1. **Optimizing Inpatient Dispensing** The hospital dispenses 800 prescriptions daily to inpatients using a floor stock system, with a 15% error rate due to manual charging. Switching to unit dose system reduces errors by 80%. Calculate new error rate: Original errors = 120 (15% of 800). Reduced = 120 * 0.2 = 24 errors. For labelling, add barcodes; charging policy: Implement flat fee per dose to simplify billing, reducing administrative time by 25% (from 4 hours to 3 hours daily per staff).
2. **Ambulatory Patient Efficiency** Ambulatory clinic sees 200 patients/day, dispensing via central system taking 10 min/patient (33.33 hours total). Adopt decentralized satellites: 4 stations at 5 min/patient = 16.67 hours. Staff needed: 3 (assuming 6-hour shifts). For controlled drugs: Secure lockers with dual-key access, cutting unauthorized access risk by 50%.
3. **Controlled Drugs Management** Hospital handles 100 controlled drug orders/week at 20 min each = 33.33 hours. Current staff: 2 pharmacists (16 hours/week). Additional needed: (33.33 - 16)/8 ≈ 2.17, so 3 more for full coverage. Policy: Automatic stop orders after 72 hours; labelling with tamper-evident seals to enhance security.

Case Study Questions: Overstocking Issue in a Secondary Hospital

1. **Evaluation of Current System** Current floor stock leads to 20% overstock (wasted $10,000/year). Types: Switch to unit dose for accuracy. Improvements: Integrate RFID for tracking; update charging policy to cost-plus model; label with patient-specific info to reduce errors.
2. **Dispensing to Ambulatory and Controlled Drugs** Ambulatory: Use drive-thru windows for quick dispensing. Controlled: Require e-prescriptions with biometric verification. Legal: Comply with DEA schedules, maintaining logs for audits.
3. **Implementation Plan** Train staff on new systems; monitor via inventory audits; revise policy for ambulatory (e.g., co-pay collection at dispensing); ensure controlled drugs have emergency protocols.

b) Hospital Formulary

Puzzle Questions

1. **Formulary Revision** Current formulary has 500 drugs; add 50 new, delete 30 outdated. Revision process: Committee reviews evidence, cost (e.g., new drug saves 20% on alternatives). Differentiation: Formulary includes guidelines, drug list is basic inventory. Contents: Generic names, dosages, indications.
2. **Addition/Deletion Criteria** For addition: Drug X efficacy 90%, cost $5/dose vs. alternative $8. Probability of approval: If >20% savings and evidence-based, 80%. Deletion: If usage <5% annually (e.g., 10 prescriptions/year out of 10,000), remove to cut costs by $2,000.
3. **Preparation Cost Analysis** Preparation: 20 committee hours at $50/hour = $1,000. Revision annually: Add/delete 10% of 600 drugs. Impact: Standardized prescribing reduces variations by 30%, saving $15,000 in procurement.

Case Study Questions: Outdated Formulary in a Tertiary Hospital

1. **Assessment and Differentiation** Formulary outdated, missing 15% new drugs. Diff from drug list: Formulary has therapeutic equivalents, list is alphabetical. Improvements: Digital version with updates; include contents like contraindications.
2. **Preparation and Revision Process** Steps: Gather requests, evaluate (efficacy, cost), vote. Addition: Evidence from trials; deletion: Low usage or safety issues. Role: Pharmacist leads evaluation.
3. **Management Plan** Annual revisions; train on changes; monitor adherence via audits to ensure 95% compliance.

c) Therapeutic Drug Monitoring

Puzzle Questions

1. **TDM Optimization** For drug Y (narrow index), monitor 100 patients. Need: Prevent toxicity (30% risk without TDM). Factors: Age (elderly adjust dose 20% lower), renal function. Indian scenario: Limited labs, but PvPI monitors nationally.
2. **Factor Impact Calculation** Patient Z: Clearance reduced 50% due to liver issue, dose halve from 100mg to 50mg. Indian: 40% non-adherence due to cost; TDM coverage in urban 60%, rural 20%.
3. **Scenario Analysis** In India, TDM for antibiotics: Factors like genetics (CYP variations). Need: For 200 cases, TDM reduces resistance by 25% (from 80 to 60 cases).

Case Study Questions: Vancomycin Overdose in Renal Patient

1. **Need and Factors** Need: Narrow therapeutic window. Factors: Renal clearance, age, co-meds. Indian: Reliance on government labs, challenges in rural access.
2. **Monitoring Methods** Assays for levels; adjust based on troughs. Indian scenario: PvPI reporting, but underutilized (only 10% cases monitored).
3. **Plan** Educate on factors; implement protocol for high-risk; track via EMR in Indian context.

d) Medication Adherence

Puzzle Questions

1. **Non-Adherence Reduction** 40% non-adherence in 500 patients = 200 cases. Causes: Forgetfulness (50%), cost (30%). Pharmacist role: Counseling reduces by 25% (to 150 cases).
2. **Monitoring Efficiency** Methods: Pill counts for 300 patients, 20 min each = 100 hours. Digital apps cut time 50% to 50 hours. Pharmacist: Reminders via SMS.
3. **Impact Calculation** Monitoring weekly: Adherence rises 15% (from 60% to 75%), reducing hospitalizations by 10 (from 50).

Case Study Questions: Non-Adherence in Diabetic Patient

1. **Causes Analysis** Causes: Complexity, side effects. Pharmacist: Simplify regimens, educate.
2. **Role and Monitoring** Role: MTM sessions. Methods: Self-reports, refill rates.
3. **Improvement Plan** Tools like adherence aids; follow-up calls; measure via HbA1c improvements.

e) Patient Medication History Interview

Puzzle Questions

1. **Interview Efficiency** 150 interviews/day at 10 min = 25 hours. Forms: Standardize to cut 20% time (to 20 hours). Need: Identify 15% interactions.
2. **Form Components** Forms include allergies, OTC use. For 200 patients, detect 40 issues (20%).
3. **Special Cases** Elderly: 30% more questions on polypharmacy. Need: Prevent 10% errors.

Case Study Questions: Incomplete History Leading to Interaction

1. **Need Evaluation** Need: Avoid ADRs (25% preventable). Improvements: Structured forms.
2. **Interview Forms Analysis** Components: Current meds, allergies, adherence. Use open-ended questions.

3. **Plan** Train on interviewing; integrate into EMR; monitor via error rates.