

PHARMACY PRACTICE (BP703T)
UNIT 1
CASE STUDY AND PUZZLES

a) Hospital and Its Organization

Puzzle Questions

1. Upgrading to Tertiary Hospital

The hospital needs to handle 500 patients with a 10:1 patient-to-specialist ratio, requiring 50 specialists ($500 / 10$). With 15 current specialists, 35 additional specialists are needed. Organizational changes: Introduce a board of directors for oversight, add department heads for cardiology and ICU, and create multidisciplinary teams reporting to the medical director for better coordination.

2. New Radiology Department New hierarchical structure: CEO at top, with medical director below; department heads for surgery, pediatrics, nursing, and radiology (new) reporting to the medical director; radiology head oversees three technicians. For 300 beds at 2:1 staff-to-bed ratio, 600 total staff are needed. Adding 1 head + 3 technicians = 4 additional staff.

3. Adding Surgical Unit Referrals: 20% of 100 patients = 20 referrals monthly. Adding surgical unit (2 surgeons + 4 nurses) allows handling these cases internally, reducing referrals to 0 (assuming full capacity). Reorganization: Shift general physicians to pre/post-op care, integrate surgeons into medical staff under the medical director, and assign nurses to surgical rotations for efficient workflow.

Case Study Questions: Expansion of a Rural Primary Hospital

1. Feasibility of Upgrading Feasible, as primary hospitals focus on basic care, while secondary add specialties like pediatrics/radiology. Key changes: Clinical – add specialists (e.g., pediatricians, radiologists) and equipment; Non-clinical – establish a board of directors, upgrade infrastructure (e.g., labs, wards), and enhance administrative support for increased load.

2. Revised Organizational Structure

- CEO: Overall management and expansion oversight.
 - Board of Directors: Strategic decisions and funding.
 - Medical Director: Supervise clinical operations, including new departments.
 - Department Heads: Pediatrics (specialist consultations), Radiology (diagnostic services), Nursing (patient care coordination).
 - Support Staff: Add administrative roles for billing/logistics.
- Medical staff functions: General physicians handle referrals;

specialists provide targeted care; nurses focus on maternity/pediatrics.

3. **Challenges in Integrating New Staff**Challenges: Resistance to change, training gaps, rural recruitment difficulties. Alignment: Train on hospital goals (e.g., improved access); integrate via cross-department teams; monitor via performance metrics to ensure expanded services meet population needs.



b) Hospital Pharmacy and Its Organization

Puzzle Questions

1. **Improving Efficiency**At 50% efficiency, current output: 1,000 prescriptions. To reach 100% (2,000 potential), but actual need is 1,000, so focus on staff. Each staff handles 200/day; 3 staff handle 600. For 1,000: Need 5 total staff ($1,000 / 200 = 5$), so 2 additional. New layout: Circular design with separate stations for intake, compounding, dispensing, and counseling to streamline workflow.
2. **Processing IV Admixtures**500 admixtures at 10 min each = 5,000 min (83.33 hours) daily. 4 staff (1 pharmacist + 3 technicians) at 8 hours each = 32 hours. Insufficient; need overtime or more staff. Additional technicians: $(83.33 - 32) / 8 \approx 6.4$, so 7 more to avoid overtime.
3. **Reducing Delivery Time**New location: Satellite pharmacy near ICU. Layout: Zoned areas for storage, dispensing, and urgent prep to cut time to 7.5 min. Impact: For 30 urgent patients (10% of 300), time saved = 225 min daily, improving care efficiency by faster response (e.g., reduced adverse events).

Case Study Questions: Inpatient Medication Error in a Tertiary Hospital

1. **Assessment and Improvements**Structure is centralized but linear layout causes bottlenecks. Improvements: Relocate to a modular layout with parallel stations; add 2-3 technicians for shortages; integrate EHR for real-time checks to prevent errors like mislabeling.
2. **Responsibilities of Hospital Pharmacist**
 - Monitor drug interactions and allergies.

- Conduct drug utilization review (e.g., assess antibiotic appropriateness).
- Role in safety: Error reporting, counseling, and collaboration with physicians to avoid reactions.

3. Plan to Enhance Functions

- Integrate EHR for automated alerts and workflow.
- Staff training: Regular sessions on error prevention and compounding.
- Monitor outcomes: Reduce overtime via staffing, track error rates post-implementation.



c) Adverse Drug Reaction

Puzzle Questions

1. **Improving Detection** Reported: 50/month. Missed 30%: Total estimated = $50 / 0.7 \approx 71.43$ /month. Method: Implement record linkage studies to cross-reference patient records with pharmacy data for comprehensive detection.
2. **New Monitoring System** Current: 100/year. +25% detection: New count = 125/year. Additional 25 cases: Assume proportional – 10 allergic (40%), 7.5 excessive (30%), rest others.
3. **Combined Probability** Combined probability (independent): $1 - (1 - 0.0001)^3 \approx 0.0003$ (0.03%). Confirmation: Spontaneous reports for initial flags; record linkage to analyze patterns and causality.

Case Study Questions: Polypharmacy in an Elderly Patient

1. Classification and Mechanisms

- Excessive effects: Ibuprofen worsening hypertension (pharmacodynamic).
- Drug interaction: Ibuprofen reducing metformin efficacy (pharmacokinetic).
- Idiosyncratic: Mild NSAID reaction (unpredictable). Beneficial interactions: None here; adverse dominate via competition/enhanced effects.

2. **Detection and Management Methods** Methods: Spontaneous reporting for immediate flags; record linkage for pattern analysis. Reporting process: Document via hospital form, submit to regulatory body (e.g., FDA) with details on drug, reaction, and patient.
3. **Management Plan**
 - Dose adjustments: Reduce ibuprofen or switch to alternative.
 - Monitoring: Regular BP/glucose checks.
 - Education: Inform patient on symptoms, interactions; provide written guides.



d) Community Pharmacy

Puzzle Questions

1. **Staff and Records** 200 prescriptions at 5 min each = 1,000 min (16.67 hours) daily. 2 pharmacists at 6 hours each = 12 hours. Need additional staff: $(16.67 - 12)/6 \approx 0.78$, so 1 more. System: Digital ledger for proprietary products, tracking batch/sales per legal standards.
2. **Compliance for Wholesale** Temperature-sensitive: 200 units/week. Monitoring: 2 hours/day = 14 hours/week. Staff needed: $14/40$ (full-time week) ≈ 0.35 FTE, so 1 part-time. Layout: Dedicated cold storage zone with logs and alarms.
3. **Reducing Errors** New design: Separate locked storage for controlled substances. Error reduction: From 10% to 5%. For 5,000 transactions: Errors drop from 500 to 250, improving accuracy to 95%.

Case report



- Clinical presentation
- Diagnosis
- Treatment
- Follow-up

Case Study Questions: Compliance Issues in a Retail Drug Store

1. **Evaluation and Improvements** Structure mixes retail/wholesale without separation. Improvements: Add partitions for controlled storage; ensure temperature-controlled areas; redesign for compliant maintenance per legal standards.
2. **Dispensing Process Analysis** Violations: No prescription for antibiotics (Schedule H); incomplete records. Retail: Maintain purchase/sale registers; Wholesale: Bulk order logs with verification.
3. **Compliance Plan**
 - Training: Sessions on laws, dispensing, records.
 - Maintenance: Digital registers for accuracy.
 - Redesign: Separate counters/sections for retail/wholesale to minimize errors.

