Student Practice
Software Included

Durgin & Hanan's

PHARMACY PRACTICE FOR TECHNICIANS

Fourth Edition

Jane M. Durgin Zachary I. Hanan

Contents

cviii
RE™ xxiv

PART I: OVERVIEW OF HEALTH CARE

Chapter 1	A History of Pharmacy3
	Introduction 4
	Greek Influence 4
	Hippocrates (circ. 460–377 B.C.) 4
	Theophrastus (circ. 370–287 B.C.) 5
	Pedanios Dioscorides (A.D. 100) 6
	Roman Influence 7
	Claudius Galen (A.D. 130–200) 7
	Jewish Influence 8
	Biblical Records (1200 B.C.) 8
	Ancient Hebrews (1200 B.C.) 9
	Moses ben Maimon (Maimonides) (A.D. 1135–1204) 9
	Christian Influence 9
	Cosmas and Damian (d. A.D. 303) 9
	Monastic Manuscripts (A.D. 500–1200) 9
	Christian Renaissance Period (A.D. 1300–1550) 11
	Eastern Influence 11
	Clay Tablets of Mesopotamia (3000–2500 B.C.) 11
	Pen T'sao (3000 B.C.) 11
	China (500 B.C.) 11
	Mithradates VI (d. 63 B.C.) 12
	Arabia and Persia (A.D. 700–800) 12
	India (1000 B.C.) 12
	Egyptian Influence 13
	Military Influence 13
	Influences of Western Europe (A.D. 500–1200) 14
	Swiss Influence 15
	German Influence 15

	Swedish Influence 16 English Influence 17
	French Influence 18
	Other Influences 18
	Canadian Contributions 18
	World Health Organization 18
	Developments in the United States Related to Health Care and Drug Therapy 18
	·
	Contemporary Medical Practices 19
	Polio Vaccine 19
	Streptomycin 20
	Review of Therapeutic Advances Discovered in the 19th and 20th Centuries 20
	Drug Standards Set by Pharmacopoeias 21
	Biologicals 21 Hormones 21
	Anti-Infectives 21
	Synthetics 21
	Immunomodulators 21
	Drug Development 22
Chapter 2	
Chapter 2	Organizational Structure and Function of the Hospital and Pharmacy Department
	Introduction 26
	Hospital Functions 26
	Hospital Organization 27
	Hospital Pharmacy Technicians: A Changing Role 31
	Structure and Organization of a Pharmacy Department
	Within a Hospital Organization 32
Chapter 3	Home Health Care35
	Introduction 36
	The Evolution of Home Health Care 36
	Home Health Care 37
	Home Health Services 37
	Personal Care and Support Services 38
	Home Equipment Management Services 38
	Home Pharmacy Services 39
	Home Infusion Therapy 40
	Pharmacy Services 40
	Home Nursing Services 41
	Equipment Management Services 41
	Types of Home Infusion Providers 42
	Physician-Based Practices 42
	Retail or Community Pharmacies 42
	Institutional or Long-Term Care Pharmacies 43
	Hospital Pharmacies 43
	Home Health Agencies 43
	HME-Based Providers 43
	Infusion Therapy Specialty Providers 44
	Ambulatory Infusion Centers 44
	Preparing and Dispensing Medications for Home Care 44

		State Boards of Pharmacy 81 Federal Laws Regulating Drug Control and Pharmacy 82 Federal Food, Drug, and Cosmetic Act (FDCA) 82 The Controlled Substances Act 83	
		Federal Versus State Drug Control Laws 81 State Regulatory Agencies 81	
		Statutes, Rules, Regulations, and Quasi-Legal Standards 80	
		Introduction 80°	
	Chapter 6	Regulatory Standards in Pharmacy Practice	79
PART II:	THE PRO	FESSION OF PHARMACY	
		Patient Care 73	
	•	The Pharmacy Technician in the Community Pharmacy 72	
		Prescription Processing 71	
		Outpatient Pharmacies in Hospitals 71	
		Internet Pharmacy 71	
		Mail-Order Pharmacies 70	
		Home Infusion 69 Specialty Compounding Services 69	
		Long-Term Care 69	
		Surgical Supply/Durable Medical Equipment 69	
		Community Pharmacy Services 69	
		Types of Community Pharmacies 68	
		Community Pharmacy Practice 66	
	•	Introduction 66	
	Chapter 5	Community Pharmacy	65
		The Future of Pharmacy in Long-Term Care 60	
		Emerging Challenges for the Pharmaceutical and Nursing Professional 59	
		Consultant Pharmacist 58	
		Pharmaceutical Personnel in Long-Term Care 57	
		Nursing Home Operation 56	
		Private Pay 55 Third-Party Payors 55	
		Medicare and Medicaid 54	
		Funding for Long-Term Care 54	
		Regulation of Long-Term Care Facilities 53	
		Business Models for Nursing Homes or Skilled Nursing Facilities 53	
		Long-Term Care 52	
	chapter 1	Introduction 52	
	Chapter 4	Long-Term Care	51
		Home Infusion Delivery Representative 47	
		Warehouse Supervisor/Technician 47 Billing Clerk/Case Manager 47	
		Purchasing Agent or Manager 47	
		Patient Service Representative 46	
		Equipment Management Technician 46	
		Role of Technicians in Home Infusion Therapy 45	

	Federal Hazardous Substances Act 93
	Occupational and Safety Act 93
	Omnibus Budget Reconciliation Act of 1990 95
	Health Insurance Portability and Accountability Act of 1996 96
	Regulatory Standards for Marketed Drugs 97
	Prescription Drug Labeling 97
	Unit-Dose Labeling and Packaging 98
	Package Insert 98
	Patient Package Inserts 98
	National Drug Code Number 99
	Bar Codes 99
	Switch of Prescription Drugs to Over-the-Counter Drugs 99
	Orange Book 99
	Investigational Drugs and the New Drug Approval Process 100
	Preclinical Studies 100
	Phase I Clinical Studies 101
	Phase II Clinical Studies 101
	Phase III Clinical Studies 101
	Informed Consent 101
	Institutional Review Board 101
	Handling of Investigational Drugs 101
	Use of Marketed Products for Unapproved Uses 102
	Reporting of Adverse Drug Reactions 102
	Drug Quality Reporting System (DQRS) 103
	Drug Recalls 103
	Repackaging of Drugs 106
	Expiration Dating for Repackaged Drugs 106
	Product Tampering 106
	The United States Pharmacopoeia and the National Formulary 106
	Medicare 107
	Long-Term Care Facility Regulation 107
	Tax-Free Alcohol 107
	The Joint Commission 108
	Accreditation 109
	The Joint Commission Standards 109
	Quality Improvement 109
	Survey Process 109
	Survey Results 111
	Patients' Bill of Rights 111
	-
Chapter 7	Drug-Use Control: The Foundation of Pharmaceutical Care
	Introduction 116
	The Drug Use Process 116
	Manufacturing the Drug 116
	Drug Distribution 116
	Prescribing Drugs 118
	Preparing and Dispensing the Drug 119
	Patient Counseling 123
	Medication Administration 123
	Monitoring the Patient 125
	Quality Drug Therapy 127

		Medication Safety and Drug Misadventures 127 Side Effects 127 Adverse Drug Reactions 128 Allergic Drug Reactions 128 Drug-Drug Interactions 128 Medication Errors 129 Medication Use in the United States 129 Self-Care and the Role of Over-the-Counter Medication 130 Self-Care 130 Over-the-Counter (OTC) Medication 130 Control of the Drug Use Process 130 Current Issues in the Drug Use Process 131 The Rising Number of Prescriptions and Limited Number of Pharmacists 131 Pharmacy Automation 131
	Chapter 8	Ethical Considerations for the Pharmacy Technician
Paper III.	Chapter 9	Pharmacy Associations
FART III:		
	Chapter 10	The Prescription
		Methods of Receiving a Prescription 167

	Medication Orders 167 Medication Errors 169
Chapter 11	Medical Terminology
Chapter 12	Pharmaceutical Dosage Forms 197 Introduction 198 Classification of Dosage Forms 199 Liquid Dosage Forms 199 Solid Dosage Forms 206 Semisolid Dosage Forms 216 Miscellaneous Dosage Forms 218 Gastrointestinal Therapeutic System 222 Fast-Dissolving/Disintegrating Tablets (FDDTs) 222 Ocular System 222 Transdermal Drug Delivery System 223 Intranasal Drug Delivery 225
Chapter 13	Pharmaceutical Calculations

	Calculation of Fractional Doses 242 Calculation of Dosages Based on Weight 243 Pediatric Dosage Calculations 244 Calculations Involving Intravenous Administration 246 Calculating the Rate of IV Administration 247 Calculations Involving Piggyback IV Infusion 248 Prevention of Medication Errors 249	
Chapter 14	Extemporaneous Compounding	š5
Chapter 15	Introduction 276 Parenteral Routes of Administration 276 Intravenous Route 276 Intrawnous Route 276 Intrawnous Route 277 Intradermal Route 277 Intradermal Route 277 Other Parenteral Routes of Administration 277 Definitions for Compounding Sterile Preparations 278 United States Pharmacopoeia 31/National Formulary 26 279 Low-Risk Level CSPs 279 Medium-Risk Level CSPs 280 High-Risk Level CSPs 280 Immediate-Use CSPs 280 Sterile Product Preparation Area 281 Buffer Area 283 Antearea 283 Personnel Cleansing and Garbing 284 Introduction of Supplies into the Antearea 286	'5

Fraining of Compounding Personnel 28/
Surface Cleaning and Disinfection 288
Working in the Primary Engineering Control (PEC) 288
Needles 289
Syringes 289
Preparing the Horizontal Laminar Flow Workbench (HLFW) 290
Aseptic Technique: Using a Needle and Syringe 291
Using Ampoules, Filter Needles, and an Intravenous Solution 293
Vials 297
Withdrawing Solution from a Vial 298
Reconstitution 300
Visual Inspection of Parenteral Solutions 301
Sterilization Methods 301
Filtration 301
Heat Sterilization 302
Administration of Medications307
Introduction 308
Medication Orders 308
Information Needed on Drug Orders 309
The Medication Administrator 309
Administration of the Drug 310
Patient Rights 310
The Right Drug 311
The Right Dose 311
The Right Route/Dosage Form 311
The Right Time 312
The Right Patient 312
Oral Drug Administration 313
Topical Drug Administration 315
Eye Drop and Eye Ointment Application 315
Administration of Ear and Nose Preparation 316
Application of Transdermal Drugs 317
Insertion of Suppositories 318
Injectable Drug Administration 318
Discontinuance of Drug Administration 318
Unit-Dose Drug Administration 319
Crushing Medications 319
Internal and External Medications 320
Medication Teaching 320
Readiness to Learn 321 Age and Education Level 321
Learning Method 321
Teaching Plan 322
Teaching Process 322
Reinforcement 323
Evaluation of Learning 323
Professional Responsibility for Drug Administration 323

329
349

A Caveat 368

ı	Chapter 19	Infection Control and Prevention in the Pharmacy
		Control of Infections 378 The Principles of Aseptic Techniques 378 Standard Precautions 379 Personal Protective Equipment (PPE) 379 Prevention of Needlestick and Other Sharps Injuries 380 Hand Hygiene 380 Cleaning and Decontamination of Surfaces and Spills 382 Engineering and Workplace Controls 383
		Hospital Isolation Precautions 384 Preventing Infections in Health Care Workers 387 Hepatitis B Vaccination 387 Infection Control Education 387 Pulmonary Tuberculosis Testing 389
		Occupational Exposures 390 What to Do If Exposed 390 Post-Bloodborne Pathogen Exposure Evaluation and Follow-Up 391 Health Care Worker Work Restrictions 391 Contamination of Pharmaceuticals 392 Intravenous Products 392
Part IV:	Part IV: Clinical	Multidrug-Resistant Organisms 394 ASPECTS OF PHARMACY TECHNOLOGY
A TITLE STATE OF THE STATE OF T		Introduction to Biopharmaceutics
	Chapter 21	The Actions and Uses of Drugs

		Gynecologic and Obstetric Disorders 428 Infectious Diseases 430 Neurologic Disorders 431 Respiratory Disorders 432	
	Chapter 22	Nonprescription Medications 4 Introduction 440 Dosage Forms 441 Pain 441 Cold and Allergy 443 Constipation 444 Diarrhea 446 Acid/Peptic Disorders 448	39
	Chapter 23	Natural Products Introduction 454 History of Herbal Preparations 454 Historical Review of Drug Regulations 455 Regulation of Herbals in the United States 457 Chemical Structure of Herbals 458 Preparation and Routes of Administration of Herbals 459 Safety of Herbals 459 Hypersensitivity (Allergic) Reactions 460 Content and Concentration of the Herbal Product 460 Potential Contamination of the Herbal Product 461 Potential Herbal-Drug Interactions 462 Therapeutic Value of Herbals 462 Where to Get More Information on Herbals 463 Some Traditional Uses of Herbals 464	153
PART V:	Administ	RATIVE ASPECTS OF PHARMACY TECHNOLOGY	*****
	Chapter 24	The Policy and Procedure Manual Introduction 478 Need for Policies and Procedures 478 Composing a Policy and Procedure Manual 484 Format 484 The Approval Process 486 Contents of a Policy and Procedure Manual 487 Distribution 488	177
	Chapter 25	Materials Management of Pharmaceuticals	191

Chapter 26	The Pharmacy Formulary System	9
Chapter 27	Computer Applications in Drug-Use Control	7
	Preventing and Managing Medication Errors: The Technician's Role	
Chapter 29	Reimbursement for Pharmacy Services	·5

		Reimbursement for Cognitive Services 560 The Role of Pharmacy Technicians in Increased Reimbursement 561	
	Chapter 30	Accreditation of Technician Training Programs	
	Chapter 31	Pharmacy Technician Certification Board 571 Introduction 572 Certification 572 Computer-Based Testing 573 NCCA Accreditation 573 Background 574 Examination Practices 574 Practice Test 574 Technology 575 Get Involved with the PTCB 575 Regulation of Pharmacy Technicians 575 Future for Pharmacy Technicians 576	
APPENDI			
	Appendix A	A: Long-Term Care	
	Appendix E	B: The Hospital Formulary System	
	Appendix C: Common Sound-Alike Drug Names5		
	Glossary589		
	Index	609	