

EXAM CRAM

NCLEX-PN[®]



Fourth Edition

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CERTIFICATION

WILDA RINEHART GARDNER
DIANN SLOAN
CLARA HURD

FREE SAMPLE CHAPTER



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What Nursing Instructors Say About the Authors:

The Item Writing for Success workshop presented by Rinehart & Associates was a great experience. The presenters were informed, helpful, and worked well with the faculty. We are using the test construction hints provided in the workshop to restructure future exams.

Cathy Dearman Ph.D., MSN, RN
Dean, School of Nursing, University of South Alabama

The test construction workshop Item Writing for Success presented by Rinehart & Associates was excellent. The faculty were very knowledgeable about their content area.

Rosemary Rhodes Ph.D., MSN, RN
University of South Alabama

I would enthusiastically recommend the Rinehart & Associates Item Writing for Success workshop to all nursing faculty. The expertise and commitment of the workshop faculty to reach both novice and experienced colleagues was very refreshing! We plan to include them in our faculty development plan every year.

Linda Whitenton, RN, MSN, CS
Nursing Program Director, Okaloosa-Walton Community College, Niceville, Florida

What Nursing Students Say About the Authors:

I passed my NCLEX®! I wanted to let you know I passed my NCLEX®, and I'm now an RN. I can't thank you and Ms. Sloan enough for providing the content material I needed!

Thank You So Much,

Janice Kiefer

I just checked online for my results and I passed! Thank you so much for your help. After being out of school for eight years, I wasn't sure I could do it. Thank you again; your class was wonderful. I feel really blessed to say I passed the NCLEX®.

Cherri Wilson

Thank you both so much for the great review course; it was just what I needed. I know without it there's no way I would have passed the first time. You guys helped me focus on the things that I really needed to focus on. I am highly recommending your course to everyone I know who is getting ready for boards!

Again, thank you both so much.

Lori Marchant, RN

Thank you so much for your expertise. I just received my NCLEX® results and I passed! I was afraid about them because my test only gave me 80 questions. I truly believe that taking your course secured my passing.

Jammie Corona, RN

I studied nothing but your material for two weeks until I felt prepared to take the NCLEX®. I took it June 24th, and just received my results today. I passed with 75 questions. I just wanted to say thank you so much for offering your class at Wallace State. Studying your material gave me the confidence I needed to pass. Thanks again!

Sincerely,

Rayena

I wanted to let you know that I took my boards on the 18th, and I found out yesterday that I passed. I really feel like your class helped me a lot, it was an excellent review, and I think that it made the difference.

Sincerely,

Tania Salinas

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EXAM ✓ CRAM

NCLEX-PN[®]

Fourth Edition

**Wilda Rinehart Gardner
Diann Sloan
Clara Hurd**

NCLEX-PN® Exam Cram, Fourth Edition

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Contents at a Glance

Introduction	xxi
Self-Assessment	1
CHAPTER 1 Preparing for the National Council Exam for Licensed Practical Nurses	3
CHAPTER 2 Simplifying Pharmacology	13
CHAPTER 3 Caring for the Client with Disorders of the Respiratory System	41
CHAPTER 4 Caring for the Client with Disorders of the Renal and Genitourinary System	57
CHAPTER 5 Caring for the Client with Disorders of the Hematopoietic System	73
CHAPTER 6 Caring for the Client with Disorders of Fluid and Electrolyte Balance and Acid/Base Balance	85
CHAPTER 7 Caring for the Client with Burns	101
CHAPTER 8 Caring for the Client with Sensorineural Disorders	119
CHAPTER 9 Caring for the Client with Cancer	137
CHAPTER 10 Caring for the Client with Disorders of the Gastrointestinal System	155
CHAPTER 11 Caring for the Client with Disorders of the Musculoskeletal System	183
CHAPTER 12 Caring for the Client with Disorders of the Endocrine System	205
CHAPTER 13 Caring for the Client with Disorders of the Cardiovascular System	225
CHAPTER 14 Caring for the Client with Disorders of the Neurological System	245
CHAPTER 15 Caring for the Client with Psychiatric Disorders	269
CHAPTER 16 Caring for Maternal/Infant Client	295
CHAPTER 17 Caring for Pediatric Client	323
Practice Exam I	361
Answers to Practice Exam I	405
Practice Exam II	427
Answers to Practice Exam II	469
APPENDIX A Things You Forgot	491
APPENDIX B Need to Know More?	499
APPENDIX C Calculations	507
Glossary	511
Index	531

Table of Contents

Introduction	xxi
Welcome to the NCLEX-PN® Exam Cram	xxi
Taking the Computerized Adaptive Test.....	xxii
The Cost of the Exam.....	xxii
How to Prepare for the Exam	xxiii
How to Use This Book.....	xxiii
Self-Assessment	1
Testing Your Exam Readiness.....	2
Chapter 1 Preparing for the National Council Exam for Licensed Practical Nurses	3
Preparing for the Exam	4
The Computer Adaptive Test	4
Testing Strategies.....	5
Reading the Question Carefully	6
Look for Keywords.....	6
Watch for Specific Details.....	6
Exam Prep Questions	9
Answer Rationales.....	11
Chapter 2 Simplifying Pharmacology	13
Pharmacology.....	14
Three Areas of Pharmacology	14
How Nurses Work with Pharmacology.....	15
Time-Released Drugs.....	16
Administering Medications	17
Understanding and Identifying the Various Drugs	18
Angiotensin-Converting Enzyme Inhibitors	18
Beta Adrenergic Blockers	19
Anti-Infectives (Aminoglycosides)	20
Benzodiazepines (Anticonvulsants/Antianxiety)	22
Phenothiazines (Antipsychotic/Antiemetic)	24

Glucocorticoids.....	25
Antivirals	26
Cholesterol-Lowering Agents.....	28
Angiotensin Receptor Blockers.....	29
Histamine 2 Antagonists	30
Proton Pump Inhibitors	31
Anticoagulants	32
More Drug Identification Helpers	33
Herbals	34
Drug Schedules.....	35
Pregnancy Categories for Drugs.....	35
Exam Prep Questions	36
Answer Rationales.....	38

Chapter 3 Caring for the Client with Disorders of the Respiratory System 41

Chronic Obstructive Pulmonary Disease	42
Chronic Bronchitis.....	42
Emphysema.....	42
Asthma	43
Acute Respiratory Infections	44
Pneumonia	44
Pleurisy.....	45
Tuberculosis	46
Influenza	46
Acute Respiratory Failure.....	47
Acute Respiratory Distress Syndrome.....	47
Pulmonary Embolus.....	48
Emerging Infections	50
Severe Acute Respiratory Syndrome	50
Legionnaire’s Disease	51
Diagnostic Tests for Review	51
Pharmacology Categories for Review.....	52
Exam Prep Questions	53
Answer Rationales.....	55
Suggested Reading and Resources	56

Chapter 4 Caring for the Client with Disorders of the Renal and Genitourinary System57

Acute Glomerulonephritis58

Chronic Glomerulonephritis.....59

End Stage Renal Disease60

 Peritoneal Dialysis.....60

 Hemodialysis.....60

 Renal Transplantation61

Nephrotic Syndrome61

Urinary Calculi62

Urinary Tract Infections.....63

Genitourinary Disorders63

 Prostatitis63

Benign Prostatic Hyperplasia.....64

Bladder Cancer66

Diagnostic Tests for Review67

Pharmacology Categories for Review.....67

Exam Prep Questions68

 Answer Rationales.....70

Suggested Reading and Resources71

Chapter 5 Caring for the Client with Disorders of the Hematopoietic System73

Anemia.....74

 Pernicious Anemia74

 Aplastic Anemia75

 Sickle Cell Anemia76

 Iron Deficiency Anemia77

 Cooley’s Anemia (Thalassemia Major)77

Hemophilia77

Polycythemia Vera78

Diagnostic Tests for Review79

Pharmacology for Review.....79

Exam Prep Questions80

 Answer Rationales.....82

Suggested Reading and Resources83

Chapter 6 Caring for the Client with Disorders of Fluid and Electrolyte Balance and Acid/Base Balance	85
Basic Knowledge of Fluid and Electrolyte Balance.....	86
Regulation of pH and Its Effect on Fluid and Electrolytes	87
How the Body Regulates pH	87
Metabolic Acidosis	87
Causes of Metabolic Acidosis.....	87
Symptoms of Metabolic Acidosis.....	88
Care of the Client with Metabolic Acidosis	88
Respiratory Acidosis.....	89
Causes of Respiratory Acidosis	89
Symptoms of Respiratory Acidosis	90
Caring for the Client with Respiratory Acidosis.....	90
Metabolic Alkalosis	91
Causes of Metabolic Alkalosis	91
Symptoms of Metabolic Alkalosis	91
Caring for the Client with Metabolic Alkalosis	92
Respiratory Alkalosis.....	92
Symptoms of Respiratory Alkalosis.....	92
Care of the Client with Respiratory Alkalosis.....	93
Normal Electrolyte Values	93
Changes Associated with Aging	94
Exam Prep Questions	96
Answer Rationales.....	98
Suggested Reading and Resources	99
Chapter 7 Caring for the Client with Burns	101
Burn Classifications	102
Burn Measurement with TBSA	104
Nursing Care for Burn Victims.....	105
The Emergent Phase.....	106
The Intermediate Phase	110
Dressings for Burns	111
The Rehabilitative Phase.....	112
Diagnostic Tests for Review	112
Pharmacology Categories for Review	112

- Exam Prep Questions114
- Answer Rationales.....116
- Suggested Reading and Resources117

- Chapter 8 Caring for the Client with Sensorineural Disorders119**
- Disorders of the Eyes120
- Intraocular Disorders120
- Retinal Disorders.....123
- Refractive Errors125
- Traumatic Injuries126
- Visual Tests for Review.....127
- Pharmacology Categories for Review127
- Ear Disorders127
- Otitis Externa.....128
- Otitis Media128
- Meniere’s Disease128
- Otosclerosis.....129
- Presbycusis129
- Ear Trauma130
- Assisting Clients with Hearing Loss130
- Diagnostic Tests for Review130
- Pharmacology Categories for Review131
- Exam Prep Questions132
- Answer Rationales.....134
- Suggested Reading and Resources135

- Chapter 9 Caring for the Client with Cancer137**
- Cancer138
- American Cancer Society’s Seven Warning Signs of Cancer.....138
- The Four Major Categories of Cancer.....138
- Risk Factors for Specific Cancers139
- Cancer Prevention.....140
- Patient Teaching141
- Management of the Client with Cancer141
- Radiation142
- Chemotherapy143

Bone Marrow Transplantation and Peripheral Stem Cell Transplantation (PSCT)...145
 Types of Transplants.....145
 Nursing Care After Transplantation.....146
Hodgkin's Lymphoma147
 Diagnosis of Hodgkin's Lymphoma.....147
 Prognosis of Hodgkin's Lymphoma.....148
 Treatment of Hodgkin's Lymphoma.....148
Diagnostic Tests for Review148
Pharmacology for Review.....149
Exam Prep Questions151
 Answer Rationales.....153
Suggested Reading and Resources154

Chapter 10 Caring for the Client with Disorders of the Gastrointestinal System..... 155

Ulcers156
 Types of Ulcers156
 Treatment of Ulcers157
Inflammatory Bowel Disorders159
 Crohn's Disease (Regional Enteritis).....159
 Ulcerative Colitis.....160
Diverticulitis.....161
 Diagnosis of Diverticulitis.....161
 Treatment of Diverticulitis.....161
Gastroesophageal Reflux Disease (GERD)162
Diseases Associated with the Liver163
 Hepatitis.....163
 Cirrhosis.....168
 Pancreatitis.....170
Cholecystitis/Cholelithiasis172
 Symptoms of Cholecystitis and Cholelithiasis172
 Diagnosis of Cholecystitis/Cholethiasis173
 Treatment of Cholecystitis173
 Treatment of Cholethiasis174
Clostridium Difficile.....175
Food-Borne Illnesses175

Diagnostic Tests for Review176
Pharmacology for Review.....177
Exam Prep Questions178
 Answer Rationales.....180
Suggested Reading and Resources181

Chapter 11 Caring for the Client with Disorders of the Musculoskeletal System183

Fractures.....184
 Treating Fractures184
 Compartment Syndrome.....187
 Osteomyelitis188
Osteoporosis.....189
 Treatment of Osteoporosis.....190
Gout190
 Treatment of the Client with Gout191
Rheumatoid Arthritis.....192
 Treatment of Rheumatoid Arthritis.....192
Musculoskeletal Surgical Procedures.....193
 Fractured Hip and Hip Replacement193
 Total Knee Replacement194
 Amputations195
Assistive Devices for Ambulation196
 Crutches.....197
 Canes.....197
 Walkers198
Diagnostic Tests for Review198
Pharmacology for Review.....199
Exam Prep Questions201
 Answer Rationales.....203
Suggested Reading and Resources204

Chapter 12 Caring for the Client with Disorders of the Endocrine System205

The Endocrine System206
Pituitary Disorders.....206
 Tumors of the Pituitary.....207

Thyroid Disorders	209
Hypothyroidism	209
Hyperthyroidism	210
Parathyroid Disorders	212
Hypoparathyroidism	212
Hyperparathyroidism	213
Adrenal Gland Disorders.....	214
Adrenocortical Insufficiency (Addison’s Disease)	214
Adrenocortical Hypersecretion (Cushing’s Syndrome) or Cushing’s Disease....	215
Diabetes Mellitus	215
Diagnostic Tests for Review	219
Pharmacology Categories for Review	219
Exam Prep Questions	220
Answer Rationales.....	222
Suggested Reading and Resources	223

Chapter 13 Caring for the Client with Disorders of the Cardiovascular System 225

Hypertension.....	226
Medications Used to Treat Hypertension	227
Heart Block.....	227
Toxicity to Medications	229
Malfunction of the Conduction System	229
Myocardial Infarction	230
Diagnosis of Myocardial Infarction	231
Management of Myocardial Infarction Clients	232
Inflammatory Diseases of the Heart	235
Infective Endocarditis.....	235
Pericarditis	235
Buerger’s Disease	236
Thrombophlebitis	236
Raynaud’s Syndrome.....	237
Aneurysms	237
Congestive Heart Failure	238
Diagnostic Tests for Review.....	238
Pharmacology Categories for Review	239

- Exam Prep Questions240
 - Answer Rationales.....242
- Suggested Reading and Resources243

- Chapter 14 Caring for the Client with Disorders of the Neurological System245**
 - Seizures.....246
 - Types of Seizures246
 - Treatment of Seizure Clients248
 - Status Epilepticus.....249
 - Brain Injuries.....249
 - Epidural Hematomas.....250
 - Subdural Hematoma.....250
 - Treatment of Epidural and Subdural Hematomas250
 - Increased Intracranial Pressure251
 - Treatment of ICP253
 - Neurological Assessment.....253
 - Cranial Nerve Assessment.....254
 - Glasgow Coma Scale255
 - Intracranial Pressure Monitors256
 - Care of the Client with Intracranial Surgery (Craniotomy)256
 - Cerebrovascular Accident/Stroke.....257
 - Spinal Cord Injury.....258
 - Treatment of Spinal Cord Injuries.....259
 - Potential Complications with SCI Clients260
 - Guillain-Barré261
 - Treating Clients with Guillian-Barré.....261
 - Degenerative Neurological Disorders261
 - Diagnostic Tests for Review263
 - Pharmacology for Review.....263
 - Exam Prep Questions265
 - Answer Rationales.....267
 - Suggested Reading and Resources268

- Chapter 15 Caring for the Client with Psychiatric Disorders269**
 - Anxiety-Related Disorders270
 - Generalized Anxiety Disorder.....270
 - Post-traumatic Stress Disorder271

Dissociative Identity Disorder	271
Somatoform Disorder.....	272
Panic Disorder	272
Phobic Disorders	273
Obsessive-Compulsive Disorder	273
Personality Disorders	274
Cluster A	274
Cluster B	275
Cluster C.....	276
Managing Clients with Personality Disorders	277
Psychotic Disorders	277
Schizophrenia	277
Bipolar Disorders.....	280
Substance Abuse.....	282
Alcoholism	282
Other Commonly Abused Substances	285
Disorders of Childhood and Adolescence.....	287
Conduct Disorder.....	287
Oppositional Defiant Disorder	287
Attention Deficit Hyperactive Disorder	288
Autistic Disorder.....	288
Eating Disorders.....	289
Diagnostic Tests for Review	289
Pharmacology Categories for Review	290
Exam Prep Questions	291
Answer Rationales.....	293
Suggested Reading and Resources	294

Chapter 16 Caring for the Maternal/Infant Client.....295

Signs of Pregnancy	296
Presumptive Signs	296
Probable Signs	296
Positive Signs.....	297
Prenatal Care	297
Prenatal Diet and Weight Maintenance	297
Alpha-Fetoprotein Screening.....	297

- Other Prenatal Diagnostic Tests298
- Assessing Fetal Heart Tones.....299
- Ultrasonography299
- Signs of Complications of Pregnancy299
- Types of Abortions.....300
- Complications Affecting Pregnancy.....301
 - Diabetes in Pregnancy.....301
 - Preeclampsia302
 - Disseminated Intravascular Coagulation303
 - Cord Prolapse303
 - Abruptio Placenta303
 - Placenta Previa.....303
- Maternal Infections.....304
- Preterm Labor306
- Intrapartal Care.....307
 - Stages of Labor307
 - Phases of Labor308
 - Important Terms You Should Know.....308
- Prelabor Testing.....309
- Fetal Monitoring.....310
- Pharmacologic Management of Labor312
- Postpartum Care313
- Terms Associated with the Normal Newborn313
- Rh Incompatibility.....314
- Contraception315
- Diagnostic Tests for Review316
- Pharmacology Categories for Review.....317
- Exam Prep Questions318
 - Answer Rationales.....320
- Suggested Reading and Resources321

Chapter 17 Caring for the Pediatric Client323

- Growth and Development.....324
 - Infant (28 Days to 1 Year)324
 - Toddler (1–3 Years).....326
 - Preschooler (3–5 Years)327

School Age (6–12 Years)	328
Adolescence (12–18 Years).....	329
Congenital Anomalies.....	329
Anomalies of the Gastrointestinal System.....	330
Anomalies of the Musculoskeletal System.....	334
Anomalies of the Cardiovascular System.....	336
Inborn Errors of Metabolism.....	339
Respiratory Disorders.....	340
Acute Otitis Media	341
Tonsillitis.....	342
Laryngotracheobronchitis	343
Acute Epiglottitis.....	343
Bronchiolitis.....	344
Cystic Fibrosis (Mucoviscidosis).....	345
Gastrointestinal Disorders.....	345
Gastroenteritis	346
Pyloric Stenosis.....	346
Intussusception	346
Celiac (Gluten-Induced Enteropathy, Celiac Sprue).....	347
Cardiovascular Disorders	347
Rheumatic Fever.....	347
Kawasaki's Disease (Mucocutaneous Lymph Node Syndrome)	348
Musculoskeletal Disorders.....	350
Scoliosis.....	350
Legg-Calve-Perthes Disease (Coxa Plana).....	351
Muscular Dystrophies.....	351
Childhood Cancer	352
Wilms Tumor (Nephroblastoma)	352
Leukemia.....	352
Osteogenic Sarcoma (Osteosarcoma)	352
Ingestion of Hazardous Substances.....	353
Salicylate Overdose.....	353
Acetaminophen (Tylenol) Overdose	353
Lead (Plumbism)	353
Iron Poisoning.....	354

Diagnostic Tests for Review	354
Pharmacology Categories for Review	355
Exam Prep Questions	356
Answer Rationales.....	358
Suggested Reading and Resources	359
Practice Exam 1	361
Answers to Practice Exam 1	405
Answer Rationales.....	408
Practice Exam 2	427
Answers to Practice Exam 2	469
Answer Rationales.....	472
Appendix A Things You Forgot.....	491
Therapeutic Drug Levels	491
Vital Signs	491
Anticoagulant Therapy	492
Intrapartal Normal Values	492
Standard Precautions	493
Airborne Precautions.....	494
Droplet Precautions	494
Contact Precautions	494
Revised Life Support Guidelines (American Heart Association).....	494
Defense Mechanisms	495
Nutrition Notes	495
Immunization Schedule	497
Appendix B Need to Know More?	499
Pharmacology.....	499
Care of the Client with Respiratory Disorders	499
Care of the Client with Genitourinary Disorders	500
Care of the Client with Hematological Disorders	500
Fluid and Electrolytes and Acid/Base Balance.....	501
Care of the Client with Burns	501

Care of the Client with Sensory Disorders	501
Care of the Client with Neoplastic Disorders.....	502
Care of the Client with Gastrointestinal Disorders	502
Care of the Client with Musculoskeletal and Connective Tissue Disorder	503
Care of the Client with Endocrine Disorders	503
Care of the Client with Cardiac Disorders.....	504
Care of the Client with Neurological Disorders.....	504
Care of the Client with Psychiatric Disorders	505
Maternal-Newborn Care.....	505
Care of the Pediatric Client	505
Cultural Practices Influencing Nursing Care.....	506
Legal Issues in Nursing Practice.....	506
Appendix C Calculations.....	507
The Apothecary System of Measurement.....	507
The Household System of Measurement	507
Metric Measurements	508
Test Your Math Skills.....	508
Answers	509
Glossary	511
Index	531

About the Authors

Wilda Rinehart Gardner received an Associate Degree in Nursing from Northeast Mississippi Community College in Booneville, Mississippi. After working as a staff nurse and charge nurse, she became a public health nurse and served in that capacity for a number of years. In 1975, she received her nurse practitioner certification in the area of obstetrics-gynecology from the University of Mississippi Medical Center in Jackson, Mississippi. In 1979, she completed her Bachelor of Science degree in Nursing from Mississippi University for Women. In 1980, she completed her Master of Science degree in Nursing from the same university and accepted a faculty position at Northeast Mississippi Community College, where she taught medical-surgical nursing and maternal-newborn nursing. In 1982, she founded Rinehart and Associates Nursing Consultants. For the past 26 years, she and her associates have worked with nursing graduates and schools of nursing to assist graduates to pass the National Council Licensure Exam for Nursing. She has also worked as a curriculum consultant with faculty to improve test construction. Ms. Rinehart has served as a convention speaker throughout the southeastern United States and as a reviewer of medical-surgical and obstetric texts. She has co-authored materials used in seminars presented by Rinehart and Associates Nursing Review.

Dr. Diann Sloan received an Associate Degree in Nursing from Northeast Mississippi Community College, a Bachelor of Science degree in Nursing from the University of Mississippi, and a Master of Science degree in Nursing from Mississippi University for Women. In addition to her nursing degrees, she holds a Master of Science in Counseling Psychology from Georgia State University and a Doctor of Philosophy in Counselor Education, with minors in both Psychology and Educational Psychology, from Mississippi State University. She has completed additional graduate studies in healthcare administration at Western New England College and the University of Mississippi. Dr. Sloan has taught pediatric nursing, psychiatric mental health nursing, and medical-surgical nursing in both associate degree and baccalaureate nursing programs. As a member of Rinehart and Associates Nursing Review, Dr. Sloan has conducted test construction workshops for faculty and nursing review seminars for both registered and practical nurse graduates. She has co-authored materials used in the item-writing workshops for nursing faculty and Rinehart and Associates Nursing Review. She is a member of Sigma Theta Tau nursing honor society.

Clara Hurd received an Associate Degree in Nursing from Northeast Mississippi Community College in Booneville, Mississippi (1975). Her experiences in nursing are clinically based, having served as a staff nurse in medical-surgical nursing. She has worked as an oncology, intensive care, orthopedic, neurological, and pediatric nurse. She received her Bachelor of Science degree in Nursing from the University of North Alabama in Florence, Alabama, and her Master of Science degree in Nursing from the Mississippi University for Women in

Columbus, Mississippi. Ms. Hurd is a certified nurse educator. She currently serves as a nurse educator consultant and an independent contractor. Ms. Hurd has taught in both associate degree and baccalaureate degree nursing programs. She was a faculty member of Mississippi University for Women; Austin Peay State University in Clarksville, Tennessee; Tennessee State University in Nashville, Tennessee; and Northeast Mississippi Community College. Ms. Hurd joined Rinehart and Associates in 1993. She has worked with students in preparing for the National Council Licensure Exam and with faculty as a consultant in writing test items. Ms. Hurd has also been a presenter at nursing conventions on various topics, including item-writing for nursing faculty. Her primary professional goal is to prepare the student and graduate for excellence in the delivery of healthcare.

About the Technical Reviewer

Steven M. Picray is a medical-surgical registered nurse in a major metropolitan hospital. He has also been a Baptist pastor and a computer programmer. He has bachelor's and master's degrees in Theology, a BSN, and is currently pursuing his master's degree in nursing to become a nurse practitioner.

Dedication

We would like to thank our families for tolerating our late nights and long hours. Also, thanks to Gene Sloan for his help without pay. Special thanks to all the graduates who have attended Rinehart and Associates Review Seminars. Thanks for allowing us to be a part of your success.

Acknowledgments

Our special thanks to our editors, support staff, and nurse reviewers for helping us to organize our thoughts and experiences into a text for students and practicing professionals. You made the task before us challenging and enjoyable.

We Want to Hear from You!

As the reader of this book, *you* are our most important critic and commentator. We value your opinion and want to know what we're doing right, what we could do better, what areas you'd like to see us publish in, and any other words of wisdom you're willing to pass our way.

We welcome your comments. You can email or write to let us know what you did or didn't like about this book—as well as what we can do to make our books better.

Please note that we cannot help you with technical problems related to the topic of this book.

When you write, please be sure to include this book's title and author as well as your name and email address. We will carefully review your comments and share them with the author and editors who worked on the book.

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Introduction

Welcome to the NCLEX-PN® Exam Cram

This book will help you prepare to take and pass the Licensure Exam for Practical Nurses. This Introduction discusses the NCLEX® exam in general and how the Exam Cram can help you prepare for the test. It doesn't matter whether this is the first time you're going to take the exam or if you have taken it previously; this book gives you the necessary information and techniques to obtain licensure.

Exam Cram books help you understand and appreciate the subjects and materials you need to pass. The books are aimed at test preparation and review. They do not teach you everything you need to know about the subject of nursing. Instead they present materials you are likely to encounter on the exam.

Using a simple approach, we help you understand the need-to-know information. First, you learn content as it applies to medical-surgical nursing, psychiatric-mental health nursing, obstetric nursing, and pediatric nursing, with an emphasis on pharmacology, skills, and management of these disorders. In a well-organized format, you learn the pathophysiology of the most common problems affecting clients, the treatment of these disorders, and the nursing care required.

The NCLEX-PN® consists of questions from the cognitive levels of knowledge, comprehension, application, and analysis. The majority of questions are written at the application and analysis levels. Questions incorporate the five stages of the nursing process (assessment, diagnosis, planning, implementation, and evaluation) and the four categories of client needs. Client needs are divided into subcategories that define the content within each of the four major categories. These categories and subcategories are

- ▶ A. Safe, effective care environment:
 - ▶ Coordinated care: 16–22%
 - ▶ Safety and infection control: 10–16%
- ▶ B. Health promotion and maintenance: 7%–13%
- ▶ C. Psychosocial integrity: 8–14%

- ▶ D. Physiological integrity:
 - ▶ Basic care and comfort: 7–13%
 - ▶ Pharmacological and parenteral therapy: 11%–17%
 - ▶ Reduction of risk: 10–16%
 - ▶ Physiological adaptation: 7–11%

Taking the Computerized Adaptive Test

Computer Adaptive Testing offers the candidate several advantages. The graduate can schedule the exam at a time that is convenient for him. The Pearson VUE testing group is responsible for administering the exam. Because you might not be familiar with the Pearson VUE testing centers, we recommend that you arrive at least 30 minutes early to acclimate yourself to the surroundings and learn what you need to do while testing at the center. If you are late, you will not be allowed to test. Bring two forms of identification with you, one of which must be a picture ID. Be sure that your form of identification matches your application. You will be photographed and fingerprinted upon entering the testing site, so don't let this increase your stress. The allotted time is 5 hours. The candidate can receive results within approximately 7 days (in some states even sooner). Remember that the exam is written at approximately the 10th-grade reading level so keep a good dictionary handy during your studies.

The Cost of the Exam

The candidate wanting to take the licensure exam must fill out two applications, one to the National Council and one to the state in which she wants to be licensed. A separate fee must accompany each application. There are separate fees for both the National Council and the state where the candidate wishes to be licensed. The candidate should contact his/her state for a list of fees for that specific state. Licensure applications can be obtained on the National Council's website at www.ncsbn.org. Several states are members of the multistate licensure compact. This means that, if you are issued a multistate license, you pay only one fee. This information can also be obtained by visiting the National Council's website at <https://www.ncsbn.org/contactbon.htm>.

How to Prepare for the Exam

Judicious use of this book, either alone or with a review seminar, such as that provided by Rinehart and Associates, will help you to achieve your goal of becoming a practical nurse. As you review for the NCLEX® Exam, we suggest that you find a location where you can concentrate on the material each day. A minimum of 2 hours per day for at least 2 weeks is suggested. We have provided you with exam alerts, tips, notes, and sample questions, both multiple-choice and alternative items. These questions will acquaint you with the type of questions you will see during the exam. We have also formulated a mock exam, with those difficult management and delegation questions, which you can score to determine your readiness to test. Pay particular attention to the Exam Alerts and the Cram Sheet. Using these will help you gain and retain knowledge and help reduce your stress as you prepare to test.

How to Use This Book

Each topical Exam Cram chapter follows a regular structure and includes cues about important or useful information. Here's the structure of a typical chapter:

- ▶ **Opening hotlists**—Each chapter begins with a list of terms you'll need to understand and nursing skills you'll need to master. The hotlists are followed by an introductory section to set the stage for the rest of the chapter.
- ▶ **Topical coverage**—After the opening hotlists, each chapter covers a series of topics related to the chapter's subject title.

Even though the book is structured to the exam, these flagged items are often particularly important:

- ▶ **Exam Alert**—Exam alerts normally stress concepts, terms, or activities that are related to one or more test questions. Anything found in exam alert format is worthy of greater attention on your part. This is what an exam alert looks like:

CAUTION

Exam alerts are provided as a heads up that the content mentioned here might appear on the NCLEX-PN® exam.

- ▶ **Notes**—Throughout each chapter additional information is provided that, although not directly related to the exam itself, is still useful and will aid your preparation. A sample note is shown here:

NOTE

This is how notes are formatted. Notes direct your attention to important pieces of information that relate to nursing and nursing certification.

- ▶ **Tips**—A tip might tell you another way of accomplishing something in a more efficient or time-saving manner. An example of a tip is shown here:

TIP

This is how tips are formatted. Keep your eyes open for these, and you'll learn some interesting nursing tips!

- ▶ **Exam Prep Questions**—Although we talk about test questions and topics throughout the book, the section at the end of each chapter presents a series of mock test questions and explanations of both correct and incorrect answers.
- ▶ **Practice Exams**—This book offers two exams written in the NCLEX[®] format. These have been provided to help you evaluate your readiness to test. Answers and rationale to these questions have also been provided. We suggest that you score the exam by subtracting the missed items from the total and dividing the total answered correctly by the total number of questions. This will give you the percentage of correct answers. We suggest that you achieve a score of at least 77% before you schedule your exam.
- ▶ **The CD**—The CD includes a testing engine with many practice questions that you should use repeatedly to practice your test-taking skills and measure your level of learning. New alternative format questions have been added to reflect changes in the new test plan. You should be able to correctly answer more than 77% of the questions on the practice tests before trying the real exam. The CD also contains Appendix A, “Things You Forgot,” Appendix B, “Need to Know More?” and Appendix C, “Calculations.”
- ▶ **Cram Sheet**—At the beginning of the book is a tear card we call the Cram Sheet. This is a helpful tool that gives you distilled, compressed facts and is a great tool for last-minute study and review.

About the Book

The topics in this book have been structured using the systems approach to nursing. We believe that a simple approach to learning the disease process, treatments, and diagnostic studies is best. We review material related to diseases of each body system; the related nursing skills; and the diagnostic tests, nutrition, and pharmacology associated with each. We also consider cultural and religious aspects as they relate to the care of clients with specific illnesses.

Aside from being a test preparation book, this book is also useful if you are brushing up on your nursing knowledge. It is an excellent quick reference for the licensed nurse.

Contact the Authors

The authors of this text are interested in you and want you to pass on the first attempt. If, after reviewing with this text, you would like to contact the authors, you can do so at Rinehart and Associates, PO Box 124, Booneville, MS 38829 or by visiting our website at www.nclexreview.net.

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Self-Assessment

Before you take this Self-Assessment exam, let's talk about the concerns you might have:

- ▶ Am I required to answer all 205 questions to pass?

No. If you run out of time, the computer looks at the last 60 items. If the candidate is consistently above the pass point on the last 60 items, a passing report is registered.

- ▶ What score do I have to make to pass the NCLEX-PN[®] Exam?

There is not a set score. When you were in nursing school, you might have been required to score 75% or 80% to pass and progress onto the next level. The licensure exam is not scored in percentages. The computer looks for consistency above or below the pass point. When the candidate shows this consistency, the computer stops asking questions.

- ▶ How do they develop the test plan?

Every 3 years a survey is sent out to approximately 4,000 newly licensed nurses. These nurses are asked questions based on the Activity Statements for nursing practice. Based on the results of the survey, the test plan is set by the National Council and members of the Licensure Committee. These members are appointed from representative states.

- ▶ What types of questions will I be asked?

The majority of questions are multiple-choice; however, alternative items are also a portion of the exam. These items are fill-in-the-blank, identify-a-diagram, place-in-sequence, or check-all-that-apply questions. Some examples of these are shown here:

1. Figure the 8-hour intake and output.
2. Identify the area where the mitral valve is heard the loudest.
3. Place in sequence the tasks that you would use in the skill of washing your hands.
4. Work the math problem.
5. Check all that apply to the care of the client after a cardiac catheterization.
6. Exhibit questions can include additional information provided in a drop-down box. Be sure to read all information provided in the drop-down boxes because there will be information that can help you to make the correct choice.

- ▶ Will I have a calculator for math problems?

Yes, a drop-down calculator is provided.

- ▶ Will I have something to write on in the testing area?

Yes, a magic slate or paper will be provided. Don't worry about them thinking you are cheating. They clean and secure the area after each candidate.

- ▶ What if I get sick and cannot take my exam?

You have a period of time allowed during which you can cancel your appointment and reschedule. If, however, you do not contact your Pearson VUE testing center in that allotted time and do not attend to take the exam, you forfeit your money and must reapply.

- ▶ Can I carry a purse or bag into the testing center?

No, there will be lockers for your use in the testing center. Also, be sure to dress warmly because the area is usually cool.

- ▶ Can I take breaks?

There are optional breaks throughout the test.

- ▶ If I should fail, when could I retest?

The required time for rewriting the exam is 45 days in most states. If you are unsuccessful, you should contact the state where you want to obtain licensure for its required retest time.

Testing Your Exam Readiness

Whether you attend a formal review seminar or use written material such as this book, or use a combination of both, preparation is essential. Costing as much as \$400 a try—pass or fail—you should do everything you can to pass on your first attempt. Spend time each day studying and taking exam questions. The more questions you take, the more prepared you will be. I recommend that you consistently score at least 77% on our practice questions before you attempt to take the exam. With these facts in mind, let's get ready to take the NCLEX-PN[®] Exam. Good luck!

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CHAPTER THREE

Caring for the Client with Disorders of the Respiratory System

Terms you'll need to understand:

- ✓ Acute respiratory failure
- ✓ Apnea
- ✓ Asthma
- ✓ Atelectasis
- ✓ Bronchitis
- ✓ Continuous positive airway pressure (CPAP)
- ✓ Cor pulmonale
- ✓ Cyanosis
- ✓ Dyspnea
- ✓ Emphysema
- ✓ Empyema
- ✓ Hemoptysis
- ✓ Hypoxemia
- ✓ Hypoxia
- ✓ Pleural effusion
- ✓ Pleurisy
- ✓ Pneumonia
- ✓ Pulmonary embolus
- ✓ Tachypnea

Nursing skills you'll need to master:

- ✓ Assessing breath sounds
- ✓ Providing tracheostomy care
- ✓ Collecting sputum
- ✓ Teaching proper use of an inhaler
- ✓ Performing postural drainage
- ✓ Assisting with thoracentesis
- ✓ Obtaining a throat culture
- ✓ Performing venopuncture
- ✓ Administering medication
- ✓ Managing chest tubes
- ✓ Maintaining oxygen therapy

Chronic Obstructive Pulmonary Disease

Chronic obstructive pulmonary disease (COPD) exists when prolonged disease or injury has made the lungs less capable of meeting the body's oxygen needs. Examples of COPD include chronic bronchitis, emphysema, and asthma.

Chronic Bronchitis

Chronic bronchitis, an inflammation of the bronchi and bronchioles, is caused by continuous exposure to infection and non-infectious irritants, such as cigarette smoke. The condition is most common in those ages 40 to 55. Chronic bronchitis might be reversed with the removal of noxious irritants, although it is often complicated by chronic lung infections. These infections, which are characterized by productive cough and dyspnea, can progress to right-sided heart failure and pulmonary hypertension. Chronic bronchitis and emphysema have similar symptoms that require similar interventions.

Emphysema

Emphysema is the irreversible overdistention of the airspaces of the lungs, which results in destruction of the alveolar walls. Clients with emphysema are classified as *pink puffers* or *blue bloaters*. Pink puffers may complain of exertional dyspnea without cyanosis. Blue bloaters develop chronic hypoxia, cyanosis, polycythemia, cor pulmonale, pulmonary edema, and eventually respiratory failure.

Physical assessment reveals the presence of a barrel chest, use of accessory muscles, coughing with the production of thick mucoid sputum, prolonged expiratory phase with grunting respirations, peripheral cyanosis, and digital clubbing.

In identifying emphysema, a chest x-ray reveals hyperinflation of the lungs with flattened diaphragm. Pulmonary studies show that the residual volume is increased while vital capacity is decreased. Arterial blood gases reveal hypoxemia.

Many symptoms of chronic bronchitis and emphysema are the same; therefore, medications for the client with chronic bronchitis and emphysema include bronchodilators, steroids, antibiotics, and expectorants. Oxygen should be administered via nasal cannula at 2–3 liters/minute. Close attention should be given to nutritional needs, avoidance of respiratory irritants, prevention of respiratory infections, providing oral hygiene, and teaching regarding medications.

CAUTION

When administering antibiotics and aminophylline, a separate IV line should be established for the administration of aminophylline—a bronchodilator—because incompatibilities can exist with some antibiotics and the administration of a bronchodilator. If only one access is established, the SAS (saline, administer drug, saline) procedure should be used.

CAUTION

The client receiving aminophylline should be placed on cardiorespiratory monitoring because aminophylline affects heart rate, respiratory rate, and blood pressure. In this scenario, toxicity can occur rapidly. Toxic symptoms include nausea, vomiting, tachycardia, palpitations, hypotension, shock, coma, and death.

CAUTION

The therapeutic range for aminophylline is as follows: 10–20 mcg/mL.

Asthma

Asthma is the most common respiratory condition of childhood. *Intrinsic (nonallergenic) asthma* is precipitated by exposure to cold temperatures or infection. *Extrinsic (allergenic or atopic) asthma* is often associated with childhood eczema. Both asthma and eczema are triggered by allergies to certain foods or food additives. Introducing new foods to the infant one at a time helps decrease the development of these allergic responses. Easily digested, hypoallergenic foods and juices should be introduced first. These include rice cereal and apple juice.

Symptoms of asthma include expiratory wheeze; shortness of breath; and a dry, hacking cough, which eventually produces thick, white, tenacious sputum. In some instances an attack may progress to status asthmaticus, leading to respiratory collapse and death.

Management of the client with asthma includes maintenance therapy with mast cell stabilizers and leukotriene modifiers. Treatment of acute asthmatic attacks includes the administration of oral or inhaled short-term or long-term B₂ agonist and anti-inflammatories as well as supplemental oxygen. Methylxanthines, such as aminophylline, are rarely used for the treatment of asthma. These drugs, which can cause tachycardia and dysrhythmias, are administered as a last resort. Antibiotics are frequently ordered when a respiratory infection is present.

Acute Respiratory Infections

Acute respiratory infections, such as pneumonia, are among the most common causes of death from infectious diseases in the United States. Pneumonia is a major cause of death in persons over age 65.

Pneumonia

Pneumonia is an inflammation of the parenchyma of the lungs. Causative organisms include bacteria, viruses, and fungi. Some of these organisms are listed here:

- ▶ Pneumococcus
- ▶ Group A beta hemolytic streptococcus
- ▶ Staphylococcus
- ▶ Pseudomonas
- ▶ Influenza types A and B
- ▶ Cytomegalovirus
- ▶ Aspergillus fungiatus
- ▶ Pneumocystis carinii

Presenting symptoms depend on the causative organism. The client with viral pneumonia tends to have milder symptoms, whereas the client with bacterial pneumonia might have chills and fever as high as 103°. Clients with cytomegalovirus, pneumocystis carinii, or aspergillus will be acutely ill. General symptoms of pneumonia include

- ▶ Hypoxia
- ▶ Tachypnea
- ▶ Tachycardia
- ▶ Chest pain
- ▶ Malaise
- ▶ Fever
- ▶ Confusion (especially in the elderly)

Care of the client with pneumonia depends on the causative organism. The management of bacterial pneumonias includes antibiotics, antitussives, antipyretics, and oxygen. Antibiotics that may be ordered include penicillin G, tetracycline, garamycin, and erythromycin. Viral

pneumonias do not respond to antimicrobial therapy but are treated with antiviral medication, such as Symmetrel (amantadine). Fungal pneumonias are treated with antifungal medication such as Nizoral (ketoconazole). Additional therapies for the client with pneumonia include providing for fluid and nutritional needs, obtaining frequent vital signs, and providing oral hygiene. Supplemental oxygen and chest percussion and drainage should be performed as ordered by the physician.

CAUTION

Some medications used in the treatment of pneumonia require special attention:

- ▶ **Tetracycline**—Should not be given to women who are pregnant or to small children because of the damage it can cause to developing teeth and bones.
- ▶ **Garamycin**—An aminoglycoside, it is both ototoxic and nephrotoxic. It is important to monitor the client for signs of toxicity. Serum peak and trough levels are obtained according to hospital protocol. Peak levels for garamycin are drawn 30 minutes after the third or fourth IV or IM dose. Trough levels for garamycin are drawn 30 minutes before the third or fourth IV or IM dose. The therapeutic range for garamycin is 4–10 mcg/mL.

Pleurisy

Pleurisy, an inflammation of the pleural sac, can be associated with upper respiratory infection, pulmonary embolus, thorotomy, chest trauma, or cancer. Symptoms include

- ▶ Sharp pain on inspiration
- ▶ Chills
- ▶ Fever
- ▶ Cough
- ▶ Dyspnea

Chest x-ray reveals the presence of air or fluid in the pleural sac. Management of the client with pleurisy includes the administration of analgesics, antitussives, antibiotics, and oxygen therapy. The presence of pleural effusion can require the client to have a thoracentesis. It is the nurse's responsibility to prepare the client and monitor for signs of complications related to the procedure. The nurse should assess the client's vital signs, particularly changes in respirations and blood pressure, which can reflect impending shock from fluid loss or bleeding. The nurse should also observe the client for signs of a pneumothorax.

Nursing Skill: Positioning the client for a thoracentesis

- ▶ Sitting on the edge of the bed with feet supported and with the head and arms resting on a padded over bed table

- ▶ Sitting astride a chair with the arms and head resting on the back of the chair
- ▶ Lying on the unaffected side with the head of the bed elevated 30 to 45 degrees (for clients unable to sit upright)

Tuberculosis

Tuberculosis (TB) is a highly contagious respiratory infection caused by the mycobacterium tuberculosis. It is transmitted by droplets from the respiratory tract. Airborne precautions, as outlined by the Centers for Disease Control (CDC), should be used when caring for the client with tuberculosis.

NOTE

Standard precautions and transmission-based precautions are provided in Appendix A, “Things You Forgot,” which is on the CD.

Diagnosis includes the administration of the Mantoux skin test, sometimes referred to as the Purified Protein Derivative (PPD), which is read in 48–72 hours. The presence of a positive Mantoux test indicates exposure to TB but not active infection. A chest x-ray should be ordered for those with a prior positive skin test. A definite diagnosis of TB is made if the sputum specimen is positive for the tubercle bacillus. Factors that can cause a false positive TB skin test include nontuberculous mycobacterium and inoculation with BCG vaccine. Factors that can cause a false negative TB skin test include anergy (a weakened immune system), recent TB infection, age, vaccination with live viruses, overwhelming TB, and poor testing technique. Management of the client with TB includes the use of ultraviolet light therapy and the administration of antimycobacterial drugs. Medication regimens can consist of several drugs including INH (isoniazid), Rifadin (rifampin), Myambutol (ethambutol), and PZA (pyrazinamide). The use of multiple drug therapy has reduced treatment time to as little as six months for clients who are compliant; however, drug resistant forms may require longer treatment periods. Clients are no longer considered infectious after three negative sputum samples have been obtained. Surgical management may include a wedge resection or lobectomy. Household contacts are treated with isoniazid.

Influenza

Influenza is an acute highly contagious viral infection that primarily affects the upper respiratory tract and is sometimes complicated by the development of pneumonia. Influenza is caused by one of three types of *Myxovirus influenzae*. Infection with one strain produces immunity to only that strain; therefore, annual immunization is needed to protect against the strain projected to be prevalent that year.

Symptoms of influenza include

- ▶ Chills and fever greater than 102° F.
- ▶ Sore throat and laryngitis
- ▶ Runny nose
- ▶ Muscle aches and headache

Complications associated with influenza include pneumonia, exacerbations of chronic obstructive pulmonary disease (COPD), and myositis. More serious complications include pericarditis and encephalitis. The elderly, children, and those with chronic illness are more likely to develop severe complications; therefore, it is recommended that these clients receive annual influenza immunization. The vaccine is given in the fall, prior to the onset of annual outbreaks that occur in the winter months. The vaccine is produced in eggs, so it should not be given to anyone who is allergic to egg protein. Children age two and older as well as adults can receive the nasal vaccine.

Treatment of influenza is aimed at controlling symptoms and preventing complications. Bed rest and increased fluid intake are important interventions during the acute phase. Decongestant nasal sprays, antitussives with codeine, and antipyretics help make the client more comfortable. Antibiotics are indicated if the client develops bacterial pneumonia. Clients with influenza as well as nonimmunized persons who have been exposed to influenza might receive chemoprophylaxis if an outbreak occurs. Antiviral medication such as Relenza (zanamivir) and Tamiflu (oseltamivir) are used in both the prevention and treatment of influenza A and B and can be used to reduce the duration and severity of symptoms. Symmetrel (amantadine) or Flumadine (rimantadine) are also used to prevent or decrease symptoms of the flu.

Acute Respiratory Failure

Acute respiratory failure can be defined as the lungs' failure to meet the body's oxygen requirements. One acute respiratory condition you need to be familiar with is acute respiratory distress syndrome, commonly known as ARDS.

Acute Respiratory Distress Syndrome

Acute respiratory distress syndrome, commonly known as *ARDS* or *noncardiogenic pulmonary edema*, occurs mostly in otherwise healthy persons. ARDS can be the result of anaphylaxis, aspiration, pulmonary emboli, inhalation burn injury, or complications from abdominal or thoracic surgery. ARDS may be diagnosed by a chest x-ray that will reveal emphysematous changes and infiltrates that give the lungs a characteristic appearance described as ground glass. Assessment of the client with ARDS reveals

- ▶ Hypoxia
- ▶ Sternal and costal retractions
- ▶ Presence of rales or rhonchi
- ▶ Diminished breath sounds
- ▶ Refractory hypoxemia

Care of the client with ARDS involves

- ▶ Use of assisted ventilation
- ▶ Monitoring of arterial blood gases
- ▶ Attention to nutritional needs
- ▶ Frequent change in position, placement in high Fowler's position, prone position, or use of specialized beds to minimize consolidation of infiltrates in large airways
- ▶ Investigational therapies, including the use of vitamins C and E, aspirin, interleukin, and surfactant replacements

Pulmonary Embolus

Pulmonary embolus refers to the obstruction of the pulmonary artery or one of its branches by a clot or some other undissolved matter, such as fat or a gaseous substance. Clots can originate anywhere in the body but are most likely to migrate from a vein deep in the legs, pelvis, kidney, or arms. *Fat emboli* are associated with fractures of the long bones, particularly the femur. *Air emboli*, which are less common, can occur during the insertion or removal of a central line. Common risk factors for the development of pulmonary embolus include immobilization, fractures, trauma, cigarette smoking, use of oral contraceptives, and history of clot formation.

TIP

Remember the three Fs associated with fat emboli:

- ▶ Fat
- ▶ Femur
- ▶ Football player

Fat emboli are associated with fracture of long bones (such as a fractured femur); most fractured femurs occur in young men 18–25, the age of most football players.

Symptoms of a pulmonary embolus depend on the size and location of the clot or undissolved matter. Symptoms include

- ▶ Chest pain
- ▶ Dyspnea
- ▶ Syncope
- ▶ Hemoptysis
- ▶ Tachycardia
- ▶ Hypotension
- ▶ Sense of apprehension
- ▶ Petechiae over the chest and axilla
- ▶ Distended neck veins

Diagnostic tests to confirm the presence of pulmonary embolus include chest x-ray, pulmonary angiography, lung scan, and ECG to rule out myocardial infarction. Management of the client with a pulmonary embolus includes

- ▶ Placing the client in high Fowler's position
- ▶ Administering oxygen via mask
- ▶ Giving medication for chest pain
- ▶ Using thrombolytics/anticoagulants

Antibiotics are indicated for those with septic emboli. Surgical management using umbrella-type filters is indicated for those who cannot take anticoagulants, as well as for the client who has recurrent emboli while taking anticoagulants. Clients receiving anticoagulant therapy should be observed for signs of bleeding. PT, INR, and PTT are three tests used to track the client's clotting time. You can refer to Chapter 13, "Caring for the Client with Disorders of the Cardiovascular System," for a more complete discussion of these tests.

CAUTION

Streptokinase is made from beta strep; therefore, clients with a history of strep infections might respond poorly to anticoagulant therapy with streptokinase, because they might have formed antibodies.

Streptokinase is not clot specific; therefore, the client might develop a tendency to bleed from incision or injection sites.

Emerging Infections

The CDC (1994) defines *emerging infections* as diseases of infectious origin with human incidences occurring within the past two decades. Emerging illnesses are likely to increase in incidence in the near future. Two respiratory conditions listed as emerging infections are Severe Acute Respiratory Syndrome (SARS) and Legionnaire's disease.

Severe Acute Respiratory Syndrome

Severe Acute Respiratory Syndrome (SARS) is caused by a coronavirus. Symptoms include

- ▶ Fever
- ▶ Dry cough
- ▶ Hypoxemia
- ▶ Pneumonia

In identifying SARS, a chest x-ray reveals “ground glass” infiltrates with bilateral consolidation occurring sometime within 24–48 hours, thus suggesting the rapid development of acute respiratory failure. SARS was first reported in Asia in February 2003. The disease spread to more than two dozen countries in Europe, Asia, North America, and South America before being contained in that same year. A history of recent travel is significant in the client's history.

The SARS virus can be found in nasopharyngeal and oropharyngeal secretions, blood, and stool. Diagnostic tests for SARS include

- ▶ Sputum cultures for Influenza A, B, and RSV
- ▶ Serum tests to detect antibodies IgM and IgG
- ▶ Reverse transcriptase polymerase chain reaction tests performed to detect RNA of SARS CoV

Two tests on two different specimens must be positive to confirm the diagnosis. Test results are considered negative if no SARS CoV antibodies are found 28 days after the onset of symptoms.

The client suspected of having SARS should be cared for using airborne and contact precautions. Management includes the use of antibiotics to treat secondary or atypical pneumonia.

Antivirals or retrovirals can be used to inhibit replication. Respiratory support, closed system for suctioning, and the use of surfactant replacement may be ordered.

Legionnaire's Disease

Legionnaire's disease is caused by gram negative bacteria found in both natural and manmade water sources. Bacterial growth is greater in stored water maintained at temperatures ranging from 77° to 107° F. Risk factors include

- ▶ Immunosuppression
- ▶ Diabetes
- ▶ Pulmonary disease

Legionnaire's involves the lungs and other organs. The symptoms include

- ▶ Productive cough
- ▶ Dyspnea
- ▶ Chest pain
- ▶ Diarrhea
- ▶ Fever

Diagnostic tests include a urinary antigen test that remains positive after initial antibiotic therapy. Management includes the use of antibiotics, oxygen, provision of nutrition, and hydration. The drug of choice for treating Legionnaire's disease is azithromycin. Transmission-based precautions are not necessary when caring for the client with Legionnaire's disease, because there is no indication of human to human transmission.

Diagnostic Tests for Review

These are simply some of the tests that are useful in diagnosing pulmonary disorders. You should review the normal lab values as well as any special preparations for the client undergoing those tests. In addition, think about the care given to clients after the procedures have been completed. For instance, the client who has undergone a bronchoscopy will have a depressed gag reflex, which increases the chance of aspiration. No food or fluid should be given until the gag reflex returns. The tests for diagnosing pulmonary disorders are as follows:

- ▶ CBC
- ▶ Chest x-ray
- ▶ Pulmonary function tests
- ▶ Lung scan
- ▶ Bronchoscopy

Pharmacology Categories for Review

The client with a respiratory disorder should be managed with several categories of medications. The client with an acute respiratory condition, such as bacterial pneumonia, is given an antibiotic to fight the infection, antipyretic medication for fever and body aches, and an antitussive for relief of cough. The client with a chronic respiratory condition may receive many of the same medications, with the addition of a steroid or bronchodilator. The following list contains the most commonly prescribed categories of medications used to treat clients with respiratory conditions:

- ▶ Antibiotics
- ▶ Antivirals
- ▶ Antituberculars
- ▶ Antitussives
- ▶ Bronchodilators
- ▶ Expectorants
- ▶ Leukotriene modifiers
- ▶ Mast-cell stabilizers
- ▶ Steroids

Exam Prep Questions

1. When performing an assessment on the client with emphysema, the nurse finds that the client has a barrel chest. The alteration in the client's chest is due to:
 - A. Collapse of distal alveoli
 - B. Hyperinflation of the lungs
 - C. Long-term chronic hypoxia
 - D. Use of accessory muscles
2. The nurse notes that a client with COPD demonstrates increased dyspnea in certain positions. Which position is most likely to lessen the client's dyspnea?
 - A. Lying supine with a single pillow
 - B. Standing or sitting upright
 - C. Side lying with the head elevated
 - D. Lying with head slightly lowered
3. When reviewing the chart of a client with long standing lung disease, the nurse should pay close attention to the results of which pulmonary function test?
 - A. Residual volume
 - B. Total lung capacity
 - C. FEV1/FVC ratio
 - D. Functional residual capacity
4. The physician has ordered O₂ at 3 liters/minute via nasal cannula. O₂ amounts greater than this are contraindicated in the client with COPD because:
 - A. Higher concentrations result in severe headache.
 - B. Hypercapnic drive is necessary for breathing.
 - C. Higher levels will be required later for pO₂.
 - D. Hypoxic drive is needed for breathing.

Chapter 3: Caring for the Client with Disorders of the Respiratory System

5. The client taking a bronchodilator tells the nurse that he is going to begin a smoking cessation program when he is discharged. The nurse should tell the client to notify the doctor if his smoking pattern changes because he will:
- A. Need his medication dosage adjusted
 - B. Require an increase in antitussive medication
 - C. No longer need annual influenza immunization
 - D. Not derive as much benefit from inhaler use
6. Lab results indicate that the client's serum aminophylline level is 17 mcg/mL. The nurse recognizes that the aminophylline level is:
- A. Within therapeutic range
 - B. Too high and should be reported
 - C. Questionable and should be repeated
 - D. Too low to be therapeutic
7. The morning weight for a client with emphysema indicates that the client has gained 5 pounds in less than a week, even though his oral intake has been modest. The client's weight gain may reflect which associated complication of COPD?
- A. Polycythemia
 - B. Cor pulmonale
 - C. Left ventricular failure
 - D. Compensated acidosis
8. The nurse is teaching the client the appropriate way to use a metered dose inhaler. Which observation indicates the client needs additional teaching?
- A. The client takes a deep breath while depressing the canister
 - B. The client holds the canister two finger widths from the mouth
 - C. The client waits 30 seconds before repeating the inhalation
 - D. The client exhales slowly and deeply

9. The client with COPD may lose weight despite having adequate caloric intake. When counseling the client in ways to maintain an optimal weight, the nurse should tell the client to:
- A. Continue the same caloric intake and decrease his activity level
 - B. Increase his activity level to stimulate his appetite
 - C. Increase the amount of complex carbohydrates and decrease the amount of fat, intake
 - D. Decrease the amount of complex carbohydrates while increasing calories, protein, fat, vitamins, and minerals
10. The client has been receiving garamycin 65 mg IVPB every 8 hours for the past 6 days. Which lab result indicates an adverse reaction to the medication?
- A. WBC 7500
 - B. Serum glucose 92
 - C. Protein 3.5
 - D. Serum Creatinine 2.0

Answer Rationales

1. Answer B is correct. Clients with emphysema develop a barrel chest due to the trapping of air in the lungs, causing them to hyperinflate. Answers C and D are common in those with emphysema but do not cause the chest to become barrel shaped. Answer A does not occur in emphysema.
2. Answer B is correct. The client with chronic obstructive pulmonary disease has increased difficulty breathing when lying down. His respiratory effort is improved by standing or sitting upright or by having the bed in high Fowler's position. Answers A, C, and D do not alleviate the client's dyspnea; therefore they are incorrect.
3. Answer C is correct. The FEV1/FVC ratio indicates disease progression. As COPD worsens, the ratio of FEV1 to FVC becomes smaller. Answers A and B reflect loss of elastic recoil due to narrowing and obstruction of the airway. Answer D is increased in clients with obstructive bronchitis.
4. Answer D is correct. In clients with COPD, respiratory effort is stimulated by hypoxemia. Answers A and C are incorrect because higher levels would rob the client of the drive to breathe. Answer B is an incorrect statement.
5. Answer A is correct. Changes in smoking patterns should be discussed with the physician because they have an impact on the amount of medication needed. Answer B is incorrect because clients with COPD are placed on expectorants, not antitussives. Answer C is incorrect because an annual influenza vaccine is recommended for all those with lung disease. Answer D is incorrect because benefits from inhaler use should be increased when the client stops smoking.

6. Answer A is correct. The therapeutic range for aminophylline is 10–20 mcg/mL. Answers B and D are incorrect. There are no indications that the results are questionable; therefore, repeating the test as offered by answer C is incorrect.
7. Answer B is correct. Cor pulmonale, or right sided heart failure, is a possible complication of emphysema. Answers A and D do not cause weight gain, so they're incorrect. Answer C would be reflected in pulmonary edema, so it's incorrect.
8. Answer C is correct. The client should wait 60 seconds before repeating the inhalation. Repeating the inhalation in 30 seconds indicates that the client needs further teaching. Answers A, B, and D indicate correct use of a metered dose inhaler; therefore, they are incorrect choices.
9. Answer D. The client with COPD needs additional calories, protein, fat, vitamins, and minerals. Answer A is incorrect because the client needs more calories.
10. Answer D is correct. The serum creatinine is elevated, indicating an adverse effect of the medication on the kidneys. Answers A, B, and C are within normal limits.

Suggested Reading and Resources

- ▶ Centers for Disease Control and Prevention: www.cdc.gov
- ▶ American Lung Association: www.lungusa.org
- ▶ The Pathology Guy: www.pathguy.com
- ▶ Ignatavicius, D., and M. Linda Workman. *Medical-Surgical Nursing: Patient-Centered Collaborative Care*. 7th ed. Philadelphia: Elsevier, 2013.
- ▶ Brunner, L., and D. Suddarth. *Textbook of Medical-Surgical Nursing*. 12th ed. Philadelphia: Lippincott Williams & Wilkins, 2009.
- ▶ Lehne, R. *Pharmacology for Nursing Care*. 8th ed. Philadelphia: Elsevier, 2011.
- ▶ Lemone, P., and K. Burke. *Medical-Surgical Nursing: Critical Thinking in Client Care*. 4th ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2011.
- ▶ Lewis, S., M. Heitkemper, S. Dirksen, P. O'Brien, and L. Bucher. *Medical-Surgical Nursing: Assessment and Management of Clinical Problems*. 8th ed. Philadelphia: Elsevier, 2011.

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Index

Numbers

90-90 traction, 186

A

ABCD (asymmetrical, border, colors, diameter) in assessing skin lesions, 140

abducens nerve, 254

abortions, 300-301

abruptio placenta, 303

absence seizures, 248

abstinence, 315

acetaminophen overdose, 353

acid/base balance, electrolyte balance, and fluid disorders, 86

changes associated with aging, 94

exam prep questions, 96-98

metabolic acidosis

care and treatment, 88-89

causes, 87-88

definition of, 87

symptoms, 88

metabolic alkalosis

care and treatment, 92

causes, 91

definition of, 91

symptoms, 91

normal electrolyte values, 93-94

pH regulation, 87

respiratory acidosis

care and treatment, 90

causes, 89-90

definition of, 89

symptoms, 90

acid/base balance, electrolyte balance, and fluid disorders

respiratory alkalosis

care and treatment, 93

definition of, 92

symptoms, 92

suggested reading and resources, 99, 501

acidosis

metabolic acidosis

care and treatment, 88-89

causes, 87-88

definition of, 87

symptoms, 88

respiratory acidosis

care and treatment, 90

causes, 89-90

definition of, 89

symptoms, 90

uncompensated acidosis, 87

acids, 86

acquired heart disorders

Kawasaki disease (KD), 348-350

rheumatic fever, 347-348

acquired immuno-deficiency syndrome (AIDS), 306

acrocyanosis, 313

acromegaly, 207

ACTH (adrenocorticoid stimulating hormone), 214

active transport, 86

acute diarrheal disease, 346

acute epiglottitis, 343-344

acute glaucoma, 122

acute glomerulonephritis, 58

acute otitis media (AOM), 341

acute PTSD, 271

acute respiratory distress syndrome (ARDS), 47-48

acute respiratory failure, 47

ARDS (acute respiratory distress syndrome), 47-48

pulmonary embolus, 48-49

acute respiratory infections, 44

influenza, 46-47

pleurisy, 45

pneumonia, 44-45

TB (tuberculosis), 46

acute subdural hematomas, 250

acyanotic, 337

Adams position, 350

Addiction Research Foundation Chemical Institute Withdrawal Assessment-Alcohol, 283

Addison's disease, 214-215

ADH (antidiuretic hormone), 207

ADHD (attention deficit hyperactive disorder), 288

adjustable canes, 197

administering medications, seven rights of, 17

adolescents

emotional/behavioral disorders, 287

ADHD, 288

autistic disorder, 288-289

conduct disorder, 287

eating disorders, 289

oppositional defiant disorder, 287

growth and development, 329

immunization schedule, 497

adrenal gland disorders, 214

Addison's disease, 214-215

Cushing's disease, 215

adrenocortical hypersecretion, 215

adrenocortical insufficiency, 214-215

adrenocorticoid stimulating hormone (ACTH), 214

adrenocorticotrophic hormone, 206

adults, immunization schedule, 497

adverse effects of medications, 14

angiotensin-converting agents, 19

anti-infectives, 20-22

antivirals, 27

benzodiazepines, 23

beta adrenergic blockers, 20

cholesterol-lowering agents, 28

- glucocorticoids, 25-26
- phenothiazines, 24
- proton pump inhibitors, 32
- affect (schizophrenia), 278**
- aging clients (fluid, electrolyte balance, and acid/base balance), 94**
- agoraphobia, 273**
- AHA (American Heart Association) life support guidelines, 494**
- AIDS (acquired immuno-deficiency syndrome), 306**
- air emboli, 48**
- airborne standard precautions, 494**
- alcoholism, 282-283**
- alkalosis**
 - metabolic alkalosis
 - care and treatment, 92
 - causes, 91
 - definition of, 91
 - symptoms, 91
 - respiratory alkalosis
 - care and treatment, 93
 - definition of, 92
 - symptoms, 92
 - uncompensated alkalosis, 87
- allergenic (extrinsic) asthma, 43**
- allogenic transplants, 146**
- allografts, 111**
- alopecia, 144**
- alpha-fetoprotein screening, 297-298**
- alpha interferon injections, 165**
- Alzheimer's disease, 261-262**
- ambivalence, 278**
- American Cancer Society's seven warning signs of cancer, 138**
- American Heart Association (AHA) life support guidelines, 494**
- aminoglycosides, 20-22**
- aminophylline, 43**
- amniocentesis, 298**
- amniotic membrane dressings (burns), 111**
- amputations, 195-196**
- analgesics, 16**
- anemia, 74**
 - aplastic anemia, 75-76
 - Cooley's anemia, 77
 - iron deficiency anemia, 77
 - pernicious anemia, 74-75
 - sickle cell anemia, 76
- aneurysms, 237**
- angina pectoris, 231**
- angiotensin-converting agents, 18-19**
- angiotensin converting enzyme inhibitors, 227**
- angiotensin receptor blockers, 29-30, 227**
- anions, 86**
- anorexia nervosa, 289**
- Antabuse (disulfiram), 283**
- antacids, 15**
- anti-infectives, 15, 20-22**
- antianemics, 15**
- antianxiety drugs, 22-24**
- anticholinergics, 16**
- anticoagulants, 15, 32-33, 234, 492**
- anticonvulsants, 16, 22-23**
- antidiarrheals, 15**
- antidiuretic hormone (ADH), 207**
- antidotes**
 - heparin, 492
 - sodium warfarin, 492
- antiemetics, 24**
- antihistamines, 15**
- antihypertensives, 15, 18-19, 227**
- antipsychotic medications, 24, 279**
- antipyretics, 15**
- antisocial personality disorder, 275**
- antivirals, 26-27**

anxiety-related disorders, 270

- DID (dissociative identity disorder), 271
- GAD (generalized anxiety disorder), 270
- OCD (obsessive-compulsive disorder), 273
- panic disorder, 272
- phobic disorders, 273
- PTSD (post-traumatic stress disorder), 271
- somatoform disorder, 272

AOM (acute otitis media), 341**aorta, coarctation of, 338****APGAR scoring, 313-314****aplastic anemia, 75-76****apothecary system of measurement, 507****ARDS (acute respiratory distress syndrome), 47-48****artificial skin, 111****Asperger's syndrome, 288****aspirin, 231****assessment, neurological system, 253**

- cranial nerves, 254
- Glasgow coma scale, 255
- increased intracranial pressure, 256

assistive devices, 196

- canes, 197-198
- crutches, 197
- walkers, 198

association, 278**asthma, 43****astigmatism, 125****atopic asthma, 43****atrioventricular (AV) node, 227****atropic (dry) macular degeneration, 124****attention deficit hyperactive disorder (ADHD), 288****aura, 247****autism, 278****autistic disorder, 288-289****autologous transplants, 145****automaticisms, 248****autonomic hyperreflexia, 260****AV (atrioventricular) node, 227****avoidant personality disorder, 276****B****B vitamins, 75****background diabetic retinopathy, 123****bacterial endocarditis, 235****bacterial pneumonia, 44****bacterial prostatitis, 63****balanced suspension traction, 185****barbiturate withdrawal, 285****barrier methods of contraception, 316****bases, 86****basilar skull fractures, 249****Battle's sign, 249****behavioral disorders**

- ADHD, 288
- autistic disorder, 288-289
- conduct disorder, 287
- eating disorders, 289
- oppositional defiant disorder, 287

benign prostatic hyperplasia (BPH), 64-65**benzodiazepines, 22-23****beta adrenergic blockers, 19-20****beta blockers, 227****biliary atresia, 333****biologic dressings, 111-112****biosynthetic dressings, 111-112****bipolar disorders, 280**

- acute mania, 280
- major depression, 281-282

birth control pills, 316**birth defects. *See* congenital anomalies****bivalve treatment, 188****bladder cancer, 66**

blood pressure

- diastolic pressure, 226
- hypertension, 226-227
 - medications, 227
 - primary, 226
 - secondary, 226
- normal range, 491
- systolic pressure, 226

blood urea nitrogen (BUN), 58

blue bloaters, 42

blue spells, 338

bone marrow transplantation, 145

- allogenic transplants, 146
- autologous transplants, 145
- nursing care following, 146-147
- syngeneic transplants, 146

borderline personality disorder, 276

botulism, 176

bovine valves, 235

BP. See blood pressure

BPH (benign prostatic hyperplasia), 64-65

bradycardia, 310

brain injuries, 249

- epidural hematomas, 250
- subdural hematomas, 250

breathing, burn treatment, 107

Brethine (terbutaline sulfate), 306

Bromocriptine mesylate (Parlodel), 209

bronchiolitis, 344-345

bronchitis, chronic, 42

bronchodilators, 15, 43

Buerger's disease, 236

bulimia nervosa, 289

BUN (blood urea nitrogen), 58

burns, 101-102

- carbon monoxide poisoning, 107
- debridement, 110
- deep partial thickness (second degree), 103

diagnostic tests, 112

dressings, 111

- biologic or biosynthetic dressings, 111-112
- standard wound dressings, 111

electrical burns, 103

emergent phase, 106

- additional interventions, 109
- assessment, 106-107

fluid replacement formulas, 107-109

exam prep questions, 114-117

fluid replacement formulas

- Consensus formula, 108-109
- Parkland formula, 107-108

full thickness (third degree), 103-104

infections, 110

intermediate phase, 110-111

Lund and Browder classification method, 104

major burns, 105

minor burns, 105

moderate burns, 105

palm classification method, 105

pharmacology categories, 112

psychological care, 106

rehabilitative phase, 112

Rule of Nines, 104

suggested reading and resources, 117

superficial partial thickness (first degree), 103

total body surface area (TBSA), 102, 104-105

C

C. difficile, 175

calcium, normal electrolyte values, 93

calcium channel blockers, 227

calculations, 507

- apothecary system of measurement, 507
- fluid requirements (burns)
 - Consensus formula, 108-109
 - Parkland formula, 107-108

calculations

- household system of measurement, 507-508
- metric measurements, 508
- practice, 508

cancer, 352

- bone marrow transplantation
 - allogenic transplants, 146
 - autologous transplants, 145
 - nursing care following, 146-147
 - syngeneic transplants, 146
- carcinoma, 138
- chemotherapy, 142-144
- diagnostic tests, 148-149
- exam prep questions, 151-154
- leukemia, 138, 352
- lymphoma
 - definition of, 138
 - Hodgkin's lymphoma, 147-148
- metastasis, 138
- osteogenic sarcoma, 352
- patient teaching, 141
- pharmacology categories, 149-150
- prevention, 140-141
- PSCT (peripheral stem cell transplantation), 145-147
- radiation therapy, 142-143
- risk factors, 139-140
- sarcoma, 138
- suggested reading and resources, 154, 502
- surgery, 142
- TPN (total parenteral nutrition), 144-145
- warning signs, 138
- Wilms tumor, 352

canes, 197-198**cannabis abuse, 286****caput succedaneum, 314****carbon monoxide poisoning, 107****carcinoma, 138****cardiac catheterization, 233****cardiac tamponade, 234****cardiovascular disorders, 225-226**

- acquired heart disorders
 - Kawasaki disease (KD), 348-350
 - rheumatic fever, 347-348
- aneurysms, 237
- Buerger's disease, 236
- congenital anomalies, 336
- congenital heart defects (CHD), 336-338
 - acyanotic, 337
 - coarctation of the aorta (COA), 338
 - cyanotic, 337
 - symptoms, 337
 - tetralogy of Fallot (TOF), 338-339
- congestive heart failure, 238
- diagnostic tests, 238-239
- exam prep questions, 240-243
- heart block, 227
 - first-degree, 228
 - pacemakers/internal defibrillators, 229-230
 - second-degree, 228
 - third-degree, 228
 - toxicity to medications, 229
- hypertension, 226
 - medications, 227
 - primary, 226
 - secondary, 226
- inflammatory diseases of the heart
 - infective endocarditis, 235
 - pericarditis, 235-236
- myocardial infarction, 230
 - diagnosis, 231-232
 - managing, 232
 - ventricular fibrillation (V-fib), 233-234
 - ventricular tachycardia, 232-233
- pharmacology categories, 239
- Raynaud's Syndrome, 237
- suggested reading and resources, 243, 504
- thrombophlebitis, 236

carditis, 348**casts, 187**

- CAT (Computer Adaptive Test)**, xxiv, 4-5
- cataracts**, 120-121
- Category A (pregnancy drug category)**, 35
- Category B (pregnancy drug category)**, 35
- Category C (pregnancy drug category)**, 35
- Category D (pregnancy drug category)**, 35
- Category X (pregnancy drug category)**, 35
- cations**, 86
- celiac**, 347
- central nervous system (CNS)**, 246
congenital anomalies, 335
- central venous pressure (CVP)**, 110
- cephalocaudal – proximodistal development**, 324
- cephalohematoma**, 314
- cerebral edema**, 60
- cerebral perfusion pressure (CPP)**, 256
- cerebrovascular accidents (strokes)**, 257-258
diagnostic tests, 257
symptoms, 258
treatment, 258
- cervical mucus method of contraception**, 315
- CHD (congenital heart defects)**, 336
cyanotic, 337
coarctation of the aorta (COA), 338
cyanotic, 337
symptoms, 337
tetralogy of Fallot (TOF), 338-339
- Chemical Institute Withdrawal Assessment-Alcohol (CIWA-Ar)**, 283
- chemical names**, 18
- chemotherapy**, 142-144
- childbirth. *See also* pregnancy**
labor
definition of, 307
dilation, 309
dystocia, 309
effacement, 309
factors influencing, 307
fetal lie, 309
fetal monitoring, 310-312
pharmacologic management, 312-313
phases, 308
position, 308
precipitate delivery, 309
prelabor testing, 309
presentation, 308
preterm labor, 306-307
stages, 307
station, 309
postpartum care, 313
terms associated with newborns, 313-314
- children. *See also* pediatric clients**
emotional/behavioral disorders
ADHD, 288
autistic disorder, 288-289
conduct disorder, 287
eating disorders, 289
oppositional defiant disorder, 287
immunization schedule, 497
- Chlamydia trachomatis**, 304
- chloride, normal electrolyte values**, 93
- cholecystitis**, 172
causes and risk factors, 172
symptoms, 172-173
treatment, 173-174
- cholelithiasis**
diagnosis, 173
symptoms, 172
treatment, 174
- cholesterol levels**, 226
- cholesterol-lowering agents**, 28-29
- chronic bronchitis**, 42
- chronic glomerulonephritis**, 59
- chronic obstructive pulmonary disease (COPD)**
asthma, 43
chronic bronchitis, 42
emphysema, 42-43

chronic subdural hematomas, 250

Chvostek's sign, 92, 212

circulation, burn treatment, 107

cirrhosis

diagnosis, 169

symptoms, 168-169

treatment, 169-170

CIWA-Ar (Chemical Institute Withdrawal Assessment-Alcohol), 283

classifications of burns, 102

deep partial thickness (second degree), 103

full thickness (third degree), 103

Lund and Browder method, 104

palm method, 105

Rule of Nines, 104

superficial partial thickness (first degree), 103

cleft lip, 330-331

cleft palate, 330-331

client needs, 4

exam prep questions, 9-12

clinical manifestations. See symptoms

closed fractures, 184

Clostridium difficile (C. difficile), 175

clots, 48

clubfoot, congenital, 335

Cluster A personality disorders, 274-275

Cluster B personality disorders, 275-276

Cluster C personality disorders, 276-277

CNS (central nervous system), 246

congenital anomalies, 335

COA (coarctation of the aorta), 338

coitus interruptus, 315

coma scale, Glasgow, 255

comminuted fractures, 184

compartment syndrome, 187-188

compensation (defense mechanism), 495

complete abortions, 300

complete spinal injuries, 258

complex partial seizures, 248

complications

pregnancy, 299-300

maternal infections, 305-306

SCIs (spinal cord injuries), 260-261

compound fractures, 184

Computer Adaptive Test (CAT), xxiv, 4-5

condoms, 316

conduct disorder, 287

Condylomata acuminata, 305

congenital aganglionic megacolon (Hirschsprung disease), 332-333

congenital anomalies, 329-330

biliary atresia, 333

cleft lip and cleft palate, 330-331

congenital clubfoot, 335

congenital heart defects (CHD), 336

acyanotic, 337

coarctation of the aorta (COA), 338

cyanotic, 337

symptoms, 337

tetralogy of Fallot (TOF), 338-339

developmental hip dysplasia (DHD), 334

esophageal atresia (EA), 331

galactosemia, 340

Hirschsprung disease (congenital aganglionic megacolon), 332-333

imperforate anus, 332

phenylketonuria (PKU), 339-340

spina bifida, 335-336

tracheoesophageal fistula (TEF), 331

congenital clubfoot, 335

congenital heart defects (CHD), 336-338

acyanotic, 337

coarctation of the aorta (COA), 338

cyanotic, 337

symptoms, 337

tetralogy of Fallot (TOF), 338-339

congestive heart failure, 238

connective tissue disorders. *See* musculoskeletal system

Consensus formula, 108-109

contact standard precautions, 494

continuous passive motion (CPM), 194

contraception, 315-316

contraction stress test, 309

contractions, intrapartal normal ranges, 492

control levels, anticoagulants, 492

Controlled Substances Act, 286

contusions of eyes, 126

conversion disorder, 272

conversion factors

- apothecary system of measurement, 507
- household system of measurement, 507-508
- metric measurements, 508

conversion reaction (defense mechanism), 495

Cooley's anemia, 77

COPD (chronic obstructive pulmonary disease)

- asthma, 43
- chronic bronchitis, 42
- emphysema, 42-43

cord prolapse, 303

coronary artery bypass grafts, 234

corticotrophin releasing hormone, 206

cost of NCLEX-PN exam, xxiv, 2

Cotrel-Duboussat approach, 351

coxa plana, 351

CPM (continuous passive motion), 194

CPP (cerebral perfusion pressure), 256

cranial nerves, assessment, 254

craniotomy care, 256-257

Crohn's disease, 159

crutch-walking gaits, 197

crutches, 197

Crutchfield tong traction, 186

cultural practices influencing nursing care, 506

cultured skin dressings, 111

Cushing's disease, 215

Cushing's Syndrome, 26

CVP (central venous pressure), 110

cyanotic, 337

Cyclogyl, 121

cyclosporine modified, 61

cyclosporine non-modified, 61

cystectomy, 66

cystic fibrosis, 345

D

debridement, 110

deceleration of fetal heart tones, 310-312

- early decelerations, 310
- late decelerations, 311
- variable decelerations, 311

decerebrate posture, 251

decorticate posture, 251

deep partial thickness (second degree) burns, 103

defense mechanisms (stress response), 495

defibrillators, internal, 229-230

degenerative neurological disorders, 261-262

delayed PTSD, 271

demand pacemakers, 229

Demerol, 14

denial (defense mechanism), 495

dependent personality disorder, 276

depressed skull fractures, 250

depression, 281-282

determiners, 7

development and growth

- adolescents, 329
- infants, 324-325
- preschoolers, 327-328
- school age children, 328-329
- toddlers, 326

developmental hip dysplasia (DHD), 334

dextrostix, 217-219

diabetes during pregnancy, 301

Diabetes Insipidus (DI), 207-208

diabetes mellitus, 215-218

diabetic retinopathy, 123-124

Diagnostic and Statistical Manual of Mental Disorders (DSM V), 270

diagnostic tests

Addison's disease, 214

burns, 112

cancer, 148-149

cardiovascular disorders, 238-239

diabetes mellitus, 216-217

ear disorders, 130

endocrine system disorders, 219

gastrointestinal disorders, 176-177

hematopoietic disorders, 79

hyperthyroidism, 211

musculoskeletal system disorders, 198-199

neurological system disorders, 263

obstetric clients, 316-317

parathyroid disorders, 212

pediatric clients, 354

prenatal care, 298-299

psychiatric system disorders, 289

RA (rheumatoid arthritis), 192

renal/genitourinary disorders, 67

respiratory disorders, 51-52

strokes, 257

ulcers, 157

visual tests, 127

dialysis

hemodialysis, 60

peritoneal dialysis, 60

Diamox, 121

diaphragms, 316

diastolic pressure, 226

DIC (disseminated intravascular coagulation), 303

DID (dissociative identity disorder), 271

diet. *See* nutrition

dietary interventions, nutrition notes, 495-497

dietary recommendations

gout, 191

osteoporosis, 190

dilation, 309

disease transmission, standard precautions, 493

airborne, 494

contact, 494

droplets, 494

disequilibrium syndrome, 60

displacement (defense mechanism), 495

dissecting aneurysm, 237

disseminated intravascular coagulation (DIC), 303

dissociative identity disorder (DID), 271

distractors, 7

disulfiram (Antabuse), 283

diuretics, 15, 227

diverticulitis, 161

dressings

burn dressings

biologic or biosynthetic dressings, 111-112

standard wound dressings, 111

TPN (total parenteral nutrition), 144

droplet standard precautions, 494

drug levels, therapeutic, 491

drug schedules, 35

drugs. *See* pharmacology

dry (atropic) macular degeneration, 124

DSM V (Diagnostic and Statistical Manual of Mental Disorders), 270

dumping syndrome, 158

duodenal ulcers, 156

dysreflexia, 260

dysrhythmias

ventricular fibrillation (V-fib), 233-234

ventricular tachycardia, 232-233

dystocia, 309

E

e. coli, 176

EA (esophageal atresia), 331

ear disorders, 127

diagnostic tests, 130

ear trauma, 130

exam prep questions, 132-134

hearing loss, 130

Meniere's disease, 128-129

otitis externa, 128

otitis media, 128

otosclerosis, 129

pharmacology categories, 131

presbycusis, 129

suggested reading and resources, 135, 501

early deceleration of fetal heart tones, 310

eating disorders, 289

ECCE (extracapsular cataract extraction), 121

echinacea, 34

effacement, 309

elective abortions, 300

electrical burns, 103

electrocardiograms, 228-229

electrolyte balance, acid/base balance, and fluid disorders, 86

changes associated with aging, 94

exam prep questions, 96-98

metabolic acidosis

care and treatment, 88-89

causes, 87-88

definition of, 87

symptoms, 88

metabolic alkalosis

care and treatment, 92

causes, 91

definition of, 91

symptoms, 91

normal electrolyte values, 93-94

pH regulation, 87

respiratory acidosis

care and treatment, 90

causes, 89-90

definition of, 89

symptoms, 90

respiratory alkalosis

care and treatment, 93

definition of, 92

symptoms, 92

suggested reading and resources, 99, 501

emergent phase (burns), 106

additional interventions, 109

assessment, 106-107

fluid replacement formulas

Consensus formula, 108-109

Parkland formula, 107-108

emerging infections, 50

Legionnaire's Disease, 51

SARS (Severe Acute Respiratory Syndrome),
50-51

emotional disorders, 287

ADHD

autistic disorder, 288-289

conduct disorder, 287

eating disorders, 289

oppositional defiant disorder, 287

emphysema, 42-43

end stage renal disease (ESRD)

hemodialysis, 60

peritoneal dialysis, 60

renal transplants, 61

endocarditis, infective, 235

endocrine system, 205

adrenal gland disorders

Addison's disease, 214-215

Cushing's disease, 215

anatomy, 206

diabetes mellitus, 215-218

endocrine system

- diagnostic tests, 219
- exam prep questions, 220-223
- parathyroid disorders
 - hyperparathyroidism, 213
 - hypoparathyroidism, 212-213
- pharmacology, 219
- pituitary disorders, 206
 - tumors, 207-209
- suggested reading and resources, 223, 503
- thyroid disorders, 209
 - hyperthyroidism, 210-211
 - hypothyroidism, 209-210

engrafts, 146**enteric-coated tablets, 16****epidural block, 312****epidural hematomas, 250****epiglottitis, acute, 343-344****equivalents**

- apothecary system of measurement, 507
- household system of measurement, 507-508
- metric measurements, 508

erythema marginatum, 348**erythroblastosis fetalis, 314****esophageal atresia (EA), 331****ESRD (end stage renal disease)**

- hemodialysis, 60
- peritoneal dialysis, 60
- renal transplants, 61

exam prep questions

- burns, 114-117
- cancer, 151-154
- cardiovascular disorders, 240-243
- endocrine system disorders, 220-223
- fluid, electrolyte balance, and acid/base balance, 96-98
- gastrointestinal disorders, 178-181
- hematopoietic disorders, 80-83
- musculoskeletal and connective tissue disorders, 201-204

- neurological system disorders, 265-268
- nursing process/client needs, 9-12
- obstetric clients, 318-321
- pediatric clients, 356-358
- pharmacology, 36-39
- practice exam 1, 361-426
- practice exam 2, 427-490
- psychiatric disorders, 291-294
- renal/genitourinary disorders, 68-71
- respiratory disorders, 53-56
- sensorineural disorders, 132-134

extracellular cataract extraction (ECCE), 121**extracellular fluid, 86****extrinsic (allergenic) asthma, 43****exudative (wet) macular degeneration, 124****eye disorders**

- exam prep questions, 132-134
- intraocular disorders
 - cataracts, 120-121
 - glaucoma, 121-123
- pharmacology categories, 127
- refractory errors, 125-126
- retinal disorders
 - diabetic retinopathy, 123-124
 - hypertensive retinopathy, 123
 - macular degeneration, 124
 - retinal detachment, 124
- suggested reading and resources, 135, 501
- traumatic injuries, 126
- visual tests, 127

F**facial nerve, 254****farsightedness, 125****fasciotomy, 188****fasting blood glucose, 216, 219****fat emboli, 48**

fetal heart tones, measuring, 299

fetal lie, 309

fetal monitoring, 312

early decelerations, 310

late decelerations, 311

variable decelerations, 311

feverfew, 34

filtration, 86

first degree (superficial partial thickness) burns, 103

first-degree heart block, 228

floppy iris syndrome, 65

flu, 46-47

fluid replacement formulas (burns)

Consensus formula, 108-109

Parkland formula, 107-108

fluid, electrolyte balance, and acid/base balance disorders, 86

changes associated with aging, 94

exam prep questions, 96-98

metabolic acidosis

care and treatment, 88-89

causes, 87-88

definition of, 87

symptoms, 88

metabolic alkalosis

care and treatment, 92

causes, 91

definition of, 91

symptoms, 91

normal electrolyte values, 93-94

pH regulation, 87

respiratory acidosis

care and treatment, 90

causes, 89-90

definition of, 89

symptoms, 90

gallbladder inflammation, causes and risk factors

respiratory alkalosis

care and treatment, 93

definition of, 92

symptoms, 92

suggested reading and resources, 99, 501

focal seizures, 248

follicle-stimulating hormone, 206

food-borne illnesses, 175-176

foreign bodies in eye, 126

four-foot adjustable canes, 197

four-point gait (crutch-walking), 197

fractures

basilar skull, 249

compartment syndrome, 187-188

depressed skull fractures, 250

hip replacement, 193-194

nondepressed skull fractures, 250

osteomyelitis, 188-189

treatment, 184

casts, 187

traction, 185-186

full thickness (third degree) burns, 103-104

fusiform aneurysm, 237

G

GAD (generalized anxiety disorder), 270

gait belt, 198

gaits, crutches, 197

galactosemia, 340

gallbladder disease

causes and risk factors, 172

diagnosis, 173

symptoms, 172

treatment, 173-174

gallbladder inflammation, causes and risk factors, 172

garamycin

garamycin, 45

gastric ulcers, 157

gastroenteritis, 346

gastroesophageal reflux disease (GERD), 162

gastrointestinal disorders

celiac, 347

cholecystitis

causes and risk factors, 172

diagnosis, 173

symptoms, 172

treatment, 173

cholelithiasis

diagnosis, 173

symptoms, 172

treatment, 174

cirrhosis

diagnosis, 169

symptoms, 168-169

treatment, 169-170

Clostridium difficile (*C. difficile*), 175

congenital anomalies

biliary atresia, 333

cleft lip and cleft palate, 330-331

esophageal atresia (EA), 331

Hirschsprung disease (congenital aganglionic megacolon), 332-333

imperforate anus, 332

tracheoesophageal fistula (TEF), 331

Crohn's disease, 159

diagnostic tests, 176-177

diverticulitis, 161

exam prep questions, 178-181

food-borne illnesses, 175-176

gastroenteritis, 346

GERD (gastroesophageal reflux disease), 162

hepatitis

general management techniques, 163

hepatitis A, 163-164

hepatitis B, 164-166

hepatitis C, 166

hepatitis D, 167

hepatitis E, 167

hepatitis G, 167

icteric stage, 167-168

prodromal stage, 167-168

intussusception, 346

pancreatitis

causes, 170

diagnosis, 171

symptoms, 170

treatment, 171

pharmacology categories, 177

pyloric stenosis, 346

suggested reading and resources, 181, 502

ulcerative colitis, 160

ulcers

diagnostic tools, 157

dumping syndrome, 158

duodenal ulcers, 156

gastric ulcers, 157

treatment, 157-158

general anesthesia, childbirth, 313

generalized anxiety disorder (GAD), 270

generalized seizures

absence seizures, 248

tonic-clonic seizures, 246-247

generic names, 18

genital herpes, 305

genitourinary disorders, 57

acute glomerulonephritis, 58

bladder cancer, 66

BPH (benign prostatic hyperplasia), 64-65

chronic glomerulonephritis, 59

diagnostic tests, 67

ESRD (end stage renal disease)

hemodialysis, 60

peritoneal dialysis, 60

renal transplants, 61

exam prep questions, 68-71

nephrotic syndrome, 61-62
 pharmacology categories, 67
 prostatitis, 63-64
 suggested reading and resources, 71, 500
 urinary calculi, 62
 UTIs (urinary tract infections), 63

GERD (gastroesophageal reflux disease), 162

GH-RH (growth hormone releasing hormone), 206

gigantism, 207

ginko, 34

ginseng, 34

Glasgow coma scale, 255

glaucoma, 121

- acute glaucoma, 122
- management of, 122-123
- POAG (primary open-angle glaucoma), 121
- secondary glaucoma, 122

glomerulonephritis

- acute, 58
- chronic, 59

glossopharyngeal nerve, 254

glucocorticoids, 25

glucose tolerance test (GTT), 216, 219

gluten-induced enteropathy, 347

glycosylated hemoglobin assays (HbA1c), 217-219

goiter, 210

gonadotrophic hormone, 207

gonorrhea, 304

gout, 190-191

Gower's maneuver, 351

grand mal seizures, 246

Grave's disease, 210-211

green stick fractures, 184

growth and development

- adolescents, 329
- infants, 324-325
- preschoolers, 327-328

- school age children, 328-329
- toddlers, 326

growth hormone, 206

growth hormone releasing hormone (GH-RH), 206

GTT (glucose tolerance test), 216, 219

Guillain-Barré, 261

Guthrie test, 340

H

H Pylori bacteria, 156

H.influenza B conjugate vaccine, 343

hallucinogen abuse, 286

halo vest, 259

Harrington rods, 351

Havrix, 164

hazardous substances, ingestion of

- acetaminophen overdose, 353

- iron poisoning, 354

- lead, 353-354

- salicylate overdose, 353

HbA1c (glycosylated hemoglobin assays), 217-219

HBIG (hepatitis B immune globulin), 166

hearing loss, assisting clients with, 130. *See also* ear disorders

heart block, 227

- first-degree, 228

- pacemakers/internal defibrillators, 229-230

- second-degree, 228

- third-degree, 228

- toxicity to medications, 229

heart rate, normal range, 491

HELLP syndrome, 302

hematopoietic disorders, 73

- anemia

- aplastic anemia, 75-76

- Cooley's anemia, 77

- iron deficiency anemia, 77

hematopoietic disorders

- pernicious anemia, 74-75

- sickle cell anemia, 76

- diagnostic tests, 79

- exam prep questions, 80-83

- hemophilia, 77-78

- pharmacology categories, 79

- polycythemia vera, 78-79

- suggested reading and resources, 83, 500

hemodialysis, 60**hemolysis, 302****hemophilia, 77-78****hemorrhage, brain injuries, 250****hemorrhagic strokes, risk factors, 257****heparin, 234**

- antidote, 492

hepatitis

- general management techniques, 163

- hepatitis A, 163-164

- hepatitis B, 164-166

- hepatitis C, 166

- hepatitis D, 167

- hepatitis E, 167

- hepatitis G, 167

- icteric stage, 167-168

- prodromal stage, 167-168

hepatitis B immune globulin (HBIG), 166**Heptovax, 165****herbals, 34-35****heterograftsw, 111****HEV (hepatitis E), 167****HGV (hepatitis G), 167****HHNKS (hyperosmolar hyperglycemic nonketotic syndrome), 216****hip replacement, 193-194****Hirschsprung disease (congenital aganglionic megacolon), 332-333****histamine 2 antagonists, 30-31****histrionic personality disorder, 275****HIV (Human immunodeficiency virus), 306****Hodgkin's lymphoma**

- diagnosis, 147-148

- prognosis, 148

- treatment, 148

hormonal contraception, 316**hormones, 206****household system of measurement, 507-508****human immunodeficiency virus (HIV), 306****hydatidiform moles, 300****hyperbilirubinemia, 314****hyperemesis gravidarum, 299****hyperkalemia, 59, 88****hyperopia, 125****hyperosmolar hyperglycemic nonketotic syndrome (HHNKS), 216****hyperparathyroidism, 213****hypertension, 226**

- medications, 227

- primary, 226

- secondary, 226

hypertensive retinopath, 123**hyperthyroidism, 210-211****hyphema, 126****hypochondriasis, 272****hypoglossal nerve, 254****hypoparathyroidism, 212-213****hypothalamus, 206****hypothyroidism, 209-210**

ICP (intracranial pressure), 250

- increased, 251-252

- assessment, 256

- treatment, 253

icteric stage (hepatitis), 167-168**identifying drug types, 18, 33-34****Imferon, 77**

immunization schedule, 497

imperforate anus, 332

incompetent cervix, 299

incomplete abortions, 300

incomplete spinal injuries, 258

increased intracranial pressure, 251-252

assessment, 256

treatment, 253

inevitable abortions, 300

infants. *See also* obstetric clients; pediatric clients; pregnancy

acrocyanosis, 313

APGAR scoring, 313-314

blood pressure, normal range, 492

caput succedaneum, 314

cephalohematoma, 314

growth and development, 324-325

heart rate, 491

hyperbilirubinemia, 314

hypothyroid symptoms, 210

immunization schedule, 497

increase intracranial pressure symptoms, 252

milia, 314

Mongolian spots, 314

physiologic jaundice, 315

prematurity, 307

infection control, 8

infections

maternal, 305-306

during pregnancy, 304

infective endocarditis, 235

inflammatory bowel disorders

Crohn's disease, 159

diverticulitis, 161

ulcerative colitis, 160

inflammatory diseases of the heart

infective endocarditis, 235

pericarditis, 235-236

influenza, 46-47

infratentorial surgery, positioning, 257

ingestion of hazardous substances

acetaminophen overdose, 353

iron poisoning, 354

lead, 353-354

salicylate overdose, 353

INR (International normalizing ratio), 236

insulin, 217

intact corneal rings, 126

Integra, 111

intermediate phase (burns), 110-111

internal defibrillators, 229-230

International normalizing ratio (INR), 236

intracellular fluid, 86

intracranial pressure (ICP), 250

increased, 251-252

assessment, 256

treatment, 253

intramuscular iron, 77

intraocular disorders

cataracts, 120-121

glaucoma

acute glaucoma, 122

management of, 122-123

POAG (primary open-angle glaucoma),
121

secondary glaucoma, 122

intraocular pressure, 122

intrapartal care

dilation, 309

dystocia, 309

effacement, 309

fetal lie, 309

fetal monitoring, 312

early decelerations, 310

late decelerations, 311

variable decelerations, 311

intrapartal care

labor

definition of, 307

factors influencing, 307

pharmacologic management, 312-313

phases, 308

stages, 307

position, 308

precipitate delivery, 309

prelabor testing, 309

presentation, 308

station, 309

intrapartal normal ranges, 492

intrauterine devices (IUDs), 316

intrinsic (nonallergenic) asthma, 43

intussusception, 346

iron deficiency anemia, 77

iron poisoning, 354

ischemic strokes, risk factors, 257

IUDs (intrauterine devices), 316

J-K

jaundice, 334

physiologic jaundice, 315

kava-kava, 35

Kawasaki disease (KD), 348-350

kernicterus, 314

ketonuria, 216

keywords, looking for, 6

kidney stones, 62

kidneys. *See* renal/genitourinary disorders

knee replacements, 194-195

L

lacerations of eye, 126

laryngotracheobronchitis (LTB), 343

LASIK (laser in-situ keratomileusis), 126

laxatives, 15

lead poisoning, 353-354

left occiput anterior (LOA), 308

legal issues in nursing practice, 506

Legg-Calve-Perthes disease, 351

Legionnaire's Disease, 51

Leopold's maneuver, 309

leukemia, 138, 352

lithium, 281

liver disorders, 163

cirrhosis

diagnosis, 169

symptoms, 168-169

treatment, 169-170

hepatitis

general management techniques, 163

hepatitis A, 163-164

hepatitis B, 164-166

hepatitis C, 166

hepatitis D, 167

hepatitis E, 167

hepatitis G, 167

icteric stage, 167-168

prodromal stage, 167-168

LOA (left occiput anterior), 308

local infiltration, 312

LTB (laryngotracheobronchitis), 343

Lund and Browder classification method (burns), 104

lungs. *See* respiratory disorders

Luque wires, 351

luteinizing hormone, 206

lymphoma

definition of, 138

Hodgkin's lymphoma

diagnosis, 147-148

prognosis, 148

treatment, 148

M

ma huang, 35

macular degeneration, 124

magnesium, normal electrolyte values, 94

magnesium gluconate, 302

magnesium sulfate, 302, 306

major burns, 104-105

emergent phase

additional interventions, 109

assessment, 106-107

fluid replacement formulas, 107-109

fluid replacement formulas

Consensus formula, 108-109

Parkland formula, 107-108

major depression (bipolar disorders), 281-282

malignant cells. *See* cancer

management

Addison's disease, 214

anxiety disorders, 273

autism, 289

cannabis abuse, 286

casts, 187

Cushing's disease, 215

DI (diabetes insipidus), 208

diabetes mellitus, 217

dysreflexia, 260

epidural hematomas, 250

fractured hip, 193

gout, 191

Guillain-Barré, 261

hallucinogen abuse, 286

hyperparathyroidism, 213

hyperthyroidism, 211

hypoparathyroidism, 213

hypothyroidism, 210

increased intracranial pressure, 253

opiate abuse, 285

osteoporosis, 190

personality disorders, 277

pituitary tumors, 208

RA (rheumatoid arthritis), 192-193

sedative-hypnotic abuse, 285

seizures, 248

SIADH (syndrome of inappropriate antidiuretic hormone), 207

stimulant abuse, 286

strokes, 258

subdural hematomas, 250

manic episodes (bipolar disorders), 280

Mantoux skin tests, 46

manual traction, 185

MAOIs (monoamine oxidase inhibitors), 281

MAP (mean arterial pressure), 256

marijuana abuse, 286

maternal infections, 305-306

maternal/infant clients, 295-296

abortions, 300-301

abruptio placenta, 303

complications

maternal infections, 305-306

of pregnancy, 299-300

contraception, 315-316

cord prolapse, 303

diagnostic tests, 316-317

disseminated intravascular coagulation (DIC), 303

exam prep questions, 318-321

labor

definition of, 307

dilation, 309

dystocia, 309

effacement, 309

factors influencing, 307

fetal lie, 309

fetal monitoring, 310-312

pharmacologic management, 312-313

phases, 308

position, 308

maternal/infant clients

- precipitate delivery, 309
- prelabor testing, 309
- presentation, 308
- preterm labor, 306-307
- stages, 307
- station, 309

- maternal diabetes, 301
- maternal infections, 304
- pharmacological categories, 317
- physiologic jaundice, 315
- Placenta Previa, 303
- postpartum care, 313
- preeclampsia, 302-303
- prematurity, 307
- prenatal care
 - alpha-fetoprotein screening, 297-298
 - amniocentesis, 298
 - diagnostic tests, 298-299
 - diet and weight maintenance, 297
 - fetal heart tones, measuring, 299
 - ultrasonography, 299
- Rh incompatibility, 314
- signs of pregnancy
 - positive signs, 297
 - presumptive signs, 296
 - probable signs, 296-297
- suggested reading and resources, 321, 505
- terms associated with newborns, 313-314

math calculations

- apothecary system of measurement, 507
- household system of measurement, 507-508
- metric measurements, 508
- practice, 508

mean arterial pressure (MAP), 256**medications. See pharmacology****melanocyte—stimulating hormone, 206****Meniere's disease, 128-129****meningitis, 336****meningocele spina bifida, 335****metabolic acidosis**

- care and treatment, 88-89
- causes, 87-88
- definition of, 87
- symptoms, 88

metabolic alkalosis

- care and treatment, 92
- causes, 91
- definition of, 91
- symptoms, 91

metabolic disorders

- galactosemia, 340
- phenylketonuria (PKU), 339-340

metastasis, 138**methicillin-resistant staphylococcus aureus (MRSA), 22****metric measurements, 508****milia, 314****minor burns, 105****miotics, 16****missed abortions, 300****moderate burns, 105****Mongolian spots, 314****monitors, intracranial pressure, 256****monoamine oxidase inhibitors (MAOIs), 281****MRSA (methicillin-resistant staphylococcus aureus), 22****mucocutaneous lymph node syndrome, 348-350****mucoviscidosis (cystic fibrosis), 345****multiple personality disorder, 271****multiple sclerosis, 261-262****muscular dystrophies, 351****musculoskeletal system, 183, 350**

- assistive devices, 196
 - canes, 197-198
 - crutches, 197
 - walkers, 198
- congenital anomalies

congenital clubfoot, 335
 developmental hip dysplasia (DHD), 334
 diagnostic tests, 198-199
 exam prep questions, 201-204
 fractures
 compartment syndrome, 187-188
 osteomyelitis, 188-189
 treatment, 184-187
 gout, 190-191
 Legg-Calve-Perthes disease, 351
 muscular dystrophies, 351
 osteoporosis, 189-190
 pharmacology, 199-200
 RA (rheumatoid arthritis), 192-193
 scoliosis, 350-351
 suggested reading and resources, 204, 503
 surgical procedures
 amputations, 195-196
 hip replacement, 193-194
 total knee replacements, 194-195

myasthenia gravis, 261-262**mydriatics, 16****myelomeningocele spina bifida, 335****myocardial infarction, 230-231**

diagnosis, 231-232
 managing, 232
 ventricular fibrillation (V-fib), 233-234
 ventricular tachycardia, 232-233

myopia, 125

N

names of medications, 18**narcissistic personality disorder, 275****narcotics, 16****narrow-angle glaucoma, 122****National Council Licensure Examination. *See* NCLEX-PN exam****NCLEX-PN exam. *See also* exam prep questions**

cost of, xxiv, 2
 preparing for, 4-5
 questions, types of, 1
 retaking, 2
 scheduling, 2
 scoring, 1
 self-assessment, 1-2
 test-taking strategies, 5
 looking for keywords, 6
 reading questions carefully, 6
 watching for specific details, 6-8

nearsightedness, 125**negative symptoms, schizophrenia, 278****Neo-Synephrine, 121****neoplastic disorders. *See* cancer****Neoral, 61****nephroblastoma, 352****nephrotic syndrome, 61-62****nerve blocks, 312****neurological system, 245**

assessment, 253
 cranial nerves, 254
 Glasgow coma scale, 255
 increased intracranial pressure, 256
 brain injuries, 249
 epidural hematomas, 250
 subdural hematomas, 250
 craniotomy care, 256-257
 degenerative disorders, 261-262
 diagnostic tests, 263
 exam prep questions, 265-268
 Guillain-Barré, 261
 increased intracranial pressure, 251-253
 pharmacology, 263-264
 SCIs (spinal cord injuries), 258
 complications, 260-261
 treatment, 259-260
 seizures
 generalized, 246-248

neurological system

- partial, 248

- status epilepticus, 249

- treatment, 248

strokes

- diagnostic tests, 257

- symptoms, 258

- treatment, 258

- suggested reading and resources, 268, 504

neurotic disorders. *See* anxiety-related disorders

neurotransmitters, 270

newborns. *See* infants

nitroglycerine, 231

non-stress test, 309

nonallergenic (intrinsic) asthma, 43

nonbacterial prostatitis, 63

noncardiogenic pulmonary edema, 47

nondepressed skull fractures, 250

normal electrolyte values, 93-94

normal ranges (vital signs), 491

Norplant, 316

NPH insulin, 217

nursing considerations

- alcohol withdrawal, 283

- anxiety disorders, 273

- contracture prevention, 196

- craniotomy care, 256-257

- eating disorders, 289

- increased intracranial pressure, 253

- major depression, 281

- mania, 280

- neurological system disorders, 263

- osteomyelitis treatment, 189

- post amputation surgery, 195

- post-operative care for fractured hips, 193

- post-operative care for total knee replacements, 194

- RA (rheumatoid arthritis), 193

- schizophrenia, 278

- SIADH (syndrome of inappropriate antidi-

- uretic hormone), 207

- spinal cord injuries, 259

- thyroid surgery, 211

- tonic-clonic seizures, 247

nursing process, 4

- exam prep questions, 9-12

nutrition

- prenatal diet and weight maintenance, 297

- TPN (total parenteral nutrition), 144-145

nutrition notes, 495-497

0

OA (occiput anterior), 308

obsessive-compulsive disorder (OCD), 273, 277

obstetric clients, 295-296

- abortions, 300-301

- abruptio placenta, 303

- complications

- maternal infections, 305-306

- of pregnancy, 299-300

- contraception, 315-316

- cord prolapse, 303

- diagnostic tests, 316-317

- disseminated intravascular coagulation (DIC), 303

- exam prep questions, 318-321

- labor

- definition of, 307

- dilation, 309

- dystocia, 309

- effacement, 309

- factors influencing, 307

- fetal lie, 309

- fetal monitoring, 310-312

- pharmacologic management, 312-313

- phases, 308

- position, 308

- precipitate delivery, 309

prelabor testing, 309
 presentation, 308
 preterm labor, 306-307
 stages, 307
 station, 309
 maternal diabetes, 301
 maternal infections, 304
 pharmacological categories, 317
 physiologic jaundice, 315
 Placenta Previa, 303
 postpartum care, 313
 preeclampsia, 302-303
 prematurity, 307
 prenatal care
 alpha-fetoprotein screening, 297-298
 amniocentesis, 298
 diagnostic tests, 298-299
 diet and weight maintenance, 297
 fetal heart tones, measuring, 299
 ultrasonography, 299
 Rh incompatibility, 314
 signs of pregnancy
 positive signs, 297
 presumptive signs, 296
 probable signs, 296-297
 suggested reading and resources, 321, 505
 terms associated with newborns, 313-314
occiput anterior (OA), 308
OCD (obsessive-compulsive disorder), 273, 277
offset adjustable canes, 197
olfactory nerve, 254
opiate abuse, 285
oppositional defiant disorder, 287
optic nerve, 254
osmosis, 86
osteogenic sarcoma, 352
osteomyelitis, 188-189
osteoporosis, 189-190
osteosarcoma, 352

otitis externa, 128

otitis media, 128

otorrhea, 249

otosclerosis, 129

overdose

 acetaminophen overdose, 353

 salicylate overdose, 353

oxytocin, 207

P

pacemakers, 229-230

pain disorder, 272

palm classification method (burns), 105

pancreatitis

 causes, 170

 diagnosis, 171

 symptoms, 170

 treatment, 171

panic disorder, 272

paradoxical pulses, 235

paranoid personality disorder, 274

parathormone, 212

parathyroid disorders, 212

 hyperparathyroidism, 213

 hypoparathyroidism, 212-213

Parkinson's disease, 261-262

Parkland formula, 107-108

Parlodel (Bromocriptine mesylate), 209

partial seizures

 complex partial, 248

 simple partial, 248

partial thromboplastin time (PTT), 234

pathological fractures, 184

pediatric clients, 324

 acquired heart disorders

 Kawasaki disease (KD), 348-350

 rheumatic fever, 347-348

childhood cancer

leukemia, 352

osteogenic sarcoma, 352

Wilms tumor, 352

congenital anomalies, 329

biliary atresia, 333

cleft lip and cleft palate, 330-331

congenital clubfoot, 335

congenital heart defects (CHD), 336-339

developmental hip dysplasia (DHD), 334

esophageal atresia (EA), 331

galactosemia, 340

Hirschsprung disease (congenital aganglionic megacolon), 332-333

imperforate anus, 332

phenylketonuria (PKU), 339-340

spina bifida, 335-336

tracheoesophageal fistula (TEF), 331

diagnostic tests, 354

exam prep questions, 356-358

gastrointestinal disorders

celiac, 347

gastroenteritis, 346

intussusception, 346

pyloric stenosis, 346

growth and development

adolescents, 329

infants, 324-325

preschoolers, 327-328

school age children, 328-329

toddlers, 326

ingestion of hazardous substances, 353

acetaminophen overdose

iron poisoning, 354

lead, 353-354

salicylate overdose, 353

musculoskeletal disorders

Legg-Calve-Perthes disease, 351

muscular dystrophies, 351

scoliosis, 350-351

pharmacology categories, 355

respiratory disorders

acute epiglottitis, 343-344

acute otitis media (AOM), 341

bronchiolitis, 344-345

cystic fibrosis, 345

laryngotracheobronchitis (LTB), 343

tonsillitis, 342-343

suggested reading and resources, 359, 505

penetrating injuries of eye, 126**pericarditis, 235-236****peripheral stem cell transplantation (PSCT), 145-147****peritoneal dialysis, 60****peritonitis, 60****pernicious anemia, 74-75****personality disorders**

Cluster A disorders, 274-275

Cluster B disorders, 275-276

Cluster C disorders, 276-277

management, 277

PEs (polyethylene tubes), 128**petit mal seizures, 248****pH regulation, 87****pharmacodynamics, 14****pharmacokinetics, 14****pharmacology, 13**

administering medications, seven rights of, 17

adverse effects, 14

angiotensin-converting agents, 18-19

angiotensin receptor blockers, 29-30

antacids, 15

anti-infectives, 15, 20-22

antianemics, 15

anticholinergics, 16

anticoagulants, 15, 32-33, 234

anticonvulsants, 16

antidiarrheals, 15

antihistamines, 15

- antihypertensives, 15, 18-19, 227
- antipyretics, 15
- antivirals, 26-27
- benzodiazepines, 22-23
- beta adrenergic blockers, 19-20
- beta blockers, 227
- Brethine (terbutaline sulfate), 306
- bronchodilators, 15
- burns, 112
- calcium channel blockers, 227
- cancer, 149-150
- cardiovascular disorders, 239
- chemical names, 18
- cholesterol-lowering agents, 28-29
- craniotomy care, 257
- diuretics, 15, 227
- drug identification, 18, 33-34
- drug schedules, 35
- ear disorders, 131
- endocrine system disorders, 219
- enteric-coated tablets, 16
- exam prep questions, 36-39
- eye disorders, 127
- gastrointestinal disorders, 177
- generic names, 18
- glucocorticoids, 25
- gout, 191
- hematopoietic disorders, 79
- herbals, 34-35
- histamine 2 antagonists, 30-31
- increased intracranial pressure, 253
- laxatives, 15
- miotics, 16
- musculoskeletal system disorders, 199-200
- mydriatics, 16
- narcotics/analgesics, 16
- neurological system disorders, 263-264
- obstetric clients, 317
- osteoporosis, 190
- pediatric clients, 355
- pharmacodynamics, 14
- pharmacokinetics, 14
- pharmacologic management of labor, 312-313
- pharmacotherapeutics, 14
- phenothiazines, 24
- pregnancy categories, 35
- proton pump inhibitors, 31-32
- psychiatric disorders, 290
- RA (rheumatoid arthritis), 192
- renal/genitourinary disorders, 67
- resources for information, 499
- respiratory disorders, 52
- schizophrenia, 279
- spansules, 16
- strokes, 258
- therapeutic drug levels, 491
- time-released drugs, 16
- trade names, 18
- trough drug levels, 22
- pharmacotherapeutics, 14**
- phases of labor, 308**
- Phenergan, 14**
- phenothiazines, 24**
- phenylketonuria (PKU), 339-340**
- phlebostatic axis, 110**
- phobic disorders, 273**
- phosphorus, normal electrolyte values, 94**
- photorefractive keratotomy (PRK), 125**
- physical therapy, knee replacements, 195**
- physiologic jaundice, 315**
- PIH (prolactin inhibiting hormone), 206**
- pink puffers, 42**
- Pitocin, 310**
- pituitary disorders, 206-207**
 - tumors, 207-209
- PKU (phenylketonuria), 339-340**
- Placenta Previa, 303**

placentas

- abruptio placenta, 303
- Placenta Previa, 303

plasmapheresis, 261**pleurisy, 45****plumbism, 353-354****pneumonia, 44-45****POAG (primary open-angle glaucoma), 121****poisoning**

- acetaminophen overdose, 353
- iron, 354
- lead, 353-354
- salicylate overdose, 353

polycythemia vera, 78-79**polydipsia, 216****polyethylene tubes (PEs), 128****polyphagia, 216****polyuria, 216****porcine valves, 235****position, 308****positional congenital clubfoot, 335****positive signs of pregnancy, 297****positive symptoms, schizophrenia, 278****post-traumatic stress disorder (PTSD), 271****postictal period (seizures), 247****postpartum care, 313****potassium, normal electrolyte values, 93****PPD (Purified Protein Derivative), 46****practice exam questions. *See* exam prep questions****practice math calculations, 508****precipitate delivery, 309****preeclampsia, 302-303****pregnancy**

- abortions, 300-301
- abruptio placenta, 303
- complications, 299-300
 - maternal infections, 304-306
- contraception, 315-316

cord prolapse, 303

disseminated intravascular coagulation (DIC), 303

drug categories, 35

labor

- definition of, 307
- dilation, 309
- dystocia, 309
- effacement, 309
- factors influencing, 307
- fetal lie, 309
- fetal monitoring, 310-312
- intrapartal normal ranges, 492
- pharmacologic management, 312-313
- phases, 308
- position, 308
- precipitate delivery, 309
- prelabor testing, 309
- presentation, 308
- preterm labor, 306-307
- stages, 307
- station, 309

maternal diabetes, 301

physiologic jaundice, 315

Placenta Previa, 303

postpartum care, 313

preeclampsia, 302-303

prenatal care

- alpha-fetoprotein screening, 297-298
- amniocentesis, 298
- diagnostic tests, 298-299
- diet and weight maintenance, 297
- fetal heart tones, measuring, 297
- ultrasonography, 299

Rh incompatibility, 314

signs of

- positive signs, 297
- presumptive signs, 296
- probable signs, 296-297

prelabor testing, 309

prematurity, 307**prenatal care**

- alpha-fetoprotein screening, 297-298
- amniocentesis, 298
- diagnostic tests, 298-299
- diet and weight maintenance, 297
- fetal heart tones, measuring, 299
- ultrasonography, 299

prep questions. See exam prep questions**preparing for NCLEX-PN exam, 4**

- CAT (Computer Adaptive Test), 4
- test-taking strategies, 5
 - looking for keywords, 6
 - reading questions carefully, 6
 - watching for specific details, 6-8

presbycusis, 129**presbyopia, 125****preschoolers, growth and development, 327-328****presentation, 308****presumptive signs of pregnancy, 296****preterm labor, 306-307****prevention of cancer, 140-141****primary hypertension, 226****primary open-angle glaucoma (POAG), 121****PRK (photorefractive keratotomy), 125****probable signs of pregnancy, 296-297****prodromal stage (hepatitis), 167-168****projection (defense mechanism), 495****prolactin, 206****prolactin inhibiting hormone (PIH), 206****proliferative diabetic retinopathy, 123****prostatitis, 63-64****protamine sulfate, 492****proton pump inhibitors, 31-32****PSCT (peripheral stem cell transplantation), 145-147****psychiatric disorders, 269**

- anxiety-related disorders

DID (dissociative identity disorder), 271

GAD (generalized anxiety disorder), 270

OCD (obsessive-compulsive disorder), 273

panic disorder, 272

phobic disorders, 273

PTSD (post-traumatic stress disorder), 271

somatoform disorder, 272

diagnostic tests, 289

emotional/behavioral disorders

ADHD, 288

autistic disorder, 288-289

conduct disorder, 287

eating disorders, 289

oppositional defiant disorder, 287

exam prep questions, 291-294

personality disorders

Cluster A disorders, 274-275

Cluster B disorders, 275-276

Cluster C disorders, 276-277

management, 277

pharmacology, 290

psychotic disorders, 277

bipolar disorders, 280-282

schizophrenia, 277-280

substance abuse

alcoholism, 282-283

cannabis, 286

hallucinogens, 286

opiates, 285

sedative-hypnotics, 285

stimulants, 286

suggested reading and resources, 294, 505

psychological care, burn patients, 106**psychotic disorders, 277**

bipolar disorders, 280

acute mania, 280

major depression, 281-282

schizophrenia, 277-280

PTSD (post-traumatic stress disorder), 271

PTT (partial thromoplastin time)

PTT (partial thromoplastin time), 234
pudendal blocks, 312
pulmonary disorders. See respiratory disorders
pulmonary embolus, 48-49
Purified Protein Derivative (PPD), 46
pyloric stenosis, 346

Q-R

questions on exam, types of, 1

RA (rheumatoid arthritis), 192-193
raccoon eyes, 249
radial keratotomy (RK), 125
radiation therapy, 142-143
rationalization (defense mechanism), 495
Raynaud's Syndrome, 237
reaction formation (defense mechanism), 495
reading questions carefully, 6
Recombivax, 165
red urine, 65
refractory errors, 125-126
regional enteritis (Crohn's disease), 159
regression (defense mechanism), 495
regular insulin, 217
regulation of pH, 87
rehabilitative phase (burns), 112
renal transplants, 61
renal/genitourinary disorders, 57
 acute glomerulonephritis, 58
 bladder cancer, 66
 BPH (benign prostatic hyperplasia), 64-65
 chronic glomerulonephritis, 59
 diagnostic tests, 67
 ESRD (end stage renal disease)
 hemodialysis, 60
 peritoneal dialysis, 60

renal transplants, 61
 exam prep questions, 68-71
 nephrotic syndrome, 61-62
 pharmacology categories, 67
 prostatitis, 63-64
 suggested reading and resources, 71, 500
 urinary calculi, 62
 UTIs (urinary tract infections), 63

repression (defense mechanism), 495

resources for information

burns, 117
 cancer, 154, 502
 cardiovascular disorders, 243, 504
 cultural practices influencing nursing care, 506
 endocrine system disorders, 223, 503
 fluid, electrolyte balance, and acid/base balance, 99, 501
 gastrointestinal disorders, 181, 502
 hematopoietic disorders, 83, 500
 legal issues in nursing practice, 506
 musculoskeletal and connective tissue disorders, 204, 503
 neurological disorders, 268, 504
 obstetric care, 321, 505
 pediatric care, 359, 505
 pharmacology, 499
 psychiatric disorders, 294, 505
 renal and genitourinary disorders, 71, 500
 respiratory disorders, 56, 499
 sensorineural disorders, 135, 501

respiratory acidosis

care and treatment, 90
 causes, 89-90
 definition of, 89
 symptoms, 90

respiratory alkalosis

care and treatment, 93
 definition of, 92
 symptoms, 92

respiratory disorders, 41, 340

- acute epiglottitis, 343-344
- acute otitis media (AOM), 341
- acute respiratory failure
 - ARDS (acute respiratory distress syndrome), 47-48
 - pulmonary embolus, 48-49
- acute respiratory infections
 - influenza, 46-47
 - pleurisy, 45
 - pneumonia, 44-45
 - TB (tuberculosis), 46
- bronchiolitis, 344-345
- COPD (chronic obstructive pulmonary disease)
 - asthma, 43
 - chronic bronchitis, 42
 - emphysema, 42-43
- cystic fibrosis, 345
- diagnostic tests, 51-52
- emerging infections
 - Legionnaire's Disease, 51
 - SARS (Severe Acute Respiratory Syndrome), 50-51
- exam prep questions, 53-56
- laryngotracheobronchitis (LTB), 343
- pharmacology, 52
- suggested reading and resources, 56, 499
- tonsillitis, 342-343

respiratory rate, normal range, 491**retaking NCLEX-PN exam, 2****retinal detachment, 124****retinal disorders**

- diabetic retinopathy, 123-124
- hypertensive retinopathy, 123
- macular degeneration, 124
- retinal detachment, 124

retinopathy

- diabetic retinopathy, 123-124
- hypertensive retinopathy, 123

Rett's disorder, 288**Rh incompatibility, 314****rhabdomyolysis, 28****rheumatic fever, 347-348****rheumatoid arthritis (RA), 192-193****rhinorrhea, 249****Rhythm method (contraception), 315****ribavirin, 344****right occiput anterior (ROA), 308****rights of administering medications, 17****risk factors**

- cancer, 139-140
- DI (diabetes insipidus), 208
- increased intracranial pressure, 251
- osteoporosis, 189
- SIADH (syndrome of inappropriate antidiuretic hormone), 207
- stroke
 - hemorrhagic stroke, 257
 - ischemic stroke, 257

RK (radial keratotomy), 125**ROA (right occiput anterior), 308****Rule of Nines, 104**

S
SA (sinoatrial) node, 227**saccular aneurysm, 237****safety, standard precautions, 493**

- airborne, 494
- contact, 494
- droplets, 494

salicylate overdose, 353**salmonella, 176****Sandimmune, 61****sarcoma, 138**

- osteogenic sarcoma, 352

SARS (Severe Acute Respiratory Syndrome), 50-51

saw palmetto

saw palmetto, 65

Schedule I (drugs), 35

Schedule II (drugs), 35

Schedule III (drugs), 35

Schedule IV (drugs), 35

Schedule V (drugs), 35

scheduling NCLEX-PN exam, 2

Schilling test, 79

schizoid personality disorder, 274

schizophrenia, 277-280

schizotypal personality disorder, 275

school age children, growth and development, 328-329

SCIs (spinal cord injuries), 258

complications, 260-261

treatment, 259-260

scoliosis, 350-351

scoring NCLEX-PN exam, 1

second degree (deep partial thickness) burns, 103

second-degree heart block, 228

secondary glaucoma, 122

secondary hypertension, 226

sedative-hypnotic abuse, 285

sedatives

benzodiazepines, 22-23

pregnancy, 312

seizures

generalized

absence seizures, 248

tonic-clonic seizures, 246-247

partial

complex partial, 248

simple partial, 248

status epilepticus, 249

treatment, 248

selective serotonin reuptake inhibitors (SSRIs), 281

self-assessment, 1-2

self-exams (cancer), 141

sensorineural disorders, 119

diagnostic tests, 130

ear trauma, 130

exam prep questions, 132-134

hearing loss, 129-130

intraocular disorders

cataracts, 120-121

glaucoma, 121-123

Meniere's disease, 128-129

otitis externa, 128

otitis media, 128

otosclerosis, 129

pharmacology categories, 127, 131

presbycusis, 129

refractory errors, 125-126

retinal disorders

diabetic retinopathy, 123-124

hypertensive retinopathy, 123

macular degeneration, 124

retinal detachment, 124

suggested reading and resources, 135, 501

traumatic injuries, 126

visual tests, 127

septic abortions, 300

septic emboli, 49

serotonin syndrome, 282

set pacemakers, 229

seven rights of administering medications, 17

Severe Acute Respiratory Syndrome (SARS), 50-51

SIADH (syndrome of inappropriate antidiuretic hormone), 207

sickle cell anemia, 76

side effects of medications

angiotensin-converting agents, 19

anti-infectives, 20-22

antivirals, 27

benzodiazepines, 23

beta adrenergic blockers, 20

cholesterol-lowering agents, 28

glucocorticoids, 25-26

- phenothiazines, 24
- proton pump inhibitors, 32
- simple fractures, 184**
- simple partial seizures, 248**
- sinoatrial (SA) node, 227**
- skeletal traction, 185**
- skin traction, 185**
- social phobia, 273**
- sodium, normal electrolyte values, 93**
- sodium warfarin antidote, 492**
- solymigratory arthritis, 348**
- somatization disorder, 272**
- somatiform disorder, 272**
- somatotropin, 206**
- southern belle syndrome, 275**
- spansules, 16**
- specific determiners, 7**
- specific phobia, 273**
- spina bifida, 335**
- spinal accessory nerve, 254**
- spinal (subarachnoid) anesthesia, 312**
- spinal cord injuries (SCIs), 258**
 - complications, 260-261
 - treatment, 259-260
- spinal shock, 260**
- spinal/epidural narcotics, 313**
- splitting (defense mechanism), 276**
- SSRIs (selective serotonin reuptake inhibitors), 281**
- St. John's wort, 35**
- stages**
 - alcohol withdrawal, 282
 - labor, 307
- stair gait (crutch-walking), 197**
- standard precautions, 493**
 - airborne, 494
 - contact, 494
 - droplets, 494
- standard wound dressings, 111**
- stapes, 129**
- staphylococcal, 176**
- station, 309**
- 'statin' drugs, 28**
- status epilepticus, 249**
- sterilization (contraception), 316**
- stimulant abuse, 286**
- strategies for successful test-taking, 5**
 - looking for keywords, 6
 - reading questions carefully, 6
 - watching for specific details, 6-8
- streptokinase, 49**
- stress, defense mechanisms, 495**
- string signs, 159**
- strokes**
 - diagnostic tests, 257
 - symptoms, 258
 - treatment, 258
- stump wrapping, 196**
- subacute subdural hematomas, 250**
- subarachnoid (spinal) anesthesia, 312**
- subcutaneous nodules, 348**
- subdural hematomas, 250**
- sublimation (defense mechanism), 495**
- substance abuse**
 - alcoholism, 282-283
 - cannabis, 286
 - hallucinogens, 286
 - opiates, 285
 - sedative-hypnotics, 285
 - stimulants, 286
- superficial partial thickness (first degree) burns, 103**
- suppression (defense mechanism), 495**
- supratentorial surgery, positioning, 257**
- surgical management**
 - cancer, 142
 - compartment syndrome, 188

surgical management

- craniotomy, 256-257
- hyperthyroidism, 211
- musculoskeletal issues
 - amputations, 195-196
 - hip replacement, 193-194
 - total knee replacements, 194-195
- strokes, 258

Swan-Ganz catheters, 234**swimmer's ear, 128****swing through gait (crutch-walking), 197****symptoms**

- absence seizures, 248
- Addison's disease, 214
- alcohol withdrawal, 282
- autism, 288
- basilar skull fractures, 249
- cannabis abuse, 286
- compartment syndrome, 187
- Cushing's disease, 215
- diabetes mellitus, 216
- dysreflexia, 260
- epidural hematomas, 250
- fractures, 184
 - hip fractures, 193
- gout, 191
- Guillain-Barré, 261
- hallucinogen abuse, 286
- hyperglycemia, 217
- hyperparathyroidism, 213
- hyperthyroidism, 210
- hypoglycemia, 218
- hypoparathyroidism, 212
- hypothyroidism, 209-210
- increased intracranial pressure, 251-252
- major depression, 281
- mania, 280
- opiate abuse, 285
- osteomyelitis, 188

- osteoporosis, 189
- pituitary tumors, 208
- PTSD, 271
- RA (rheumatoid arthritis), 192
- schizophrenia, 278
- sedative-hypnotic abuse, 285
- serotonin syndrome, 282
- spinal injuries, 258
- spinal shock, 260
- stimulant abuse, 286
- strokes, 258
- subdural hematomas, 250
- substance abuse, 282
- tonic-clonic seizures, 246

Sydeham's chorea, 348**syndrome of inappropriate antidiuretic hormone (SIADH), 207****syngeneic transplants, 146****synthroid (synthetic thyroid hormone), 210****syphilis, 304****systems of measurement**

- apothecary, 507
- household, 507-508
- metric, 508

systolic pressure, 226**T****talipes equinovarus (congenital clubfoot), 335****TB (tuberculosis), 46****TBSA (total body surface area), 102-105****TCAs (tricyclic antidepressants), 281****TEF (tracheoesophageal fistula), 331****temperature, normal range, 492****teratologic congenital clubfoot, 335****terbutaline sulfate, 306****test. See NCLEX-PN exam****test items, 6**

test-taking strategies, 5

- looking for keywords, 6
- reading questions carefully, 6
- watching for specific details, 6-8

tet attacks, 338

tetracycline, 34, 45

tetralogy of Fallot (TOF), 338-339

thalassemia major, 77

therapeutic drug levels, 491

thickness of the burn injuries, 103-104

third degree (full thickness) burns, 103-104

third-degree heart block, 228

thoracentesis, 45

threatened abortions, 300

three-point gait (crutch-walking), 197

thromboangilitis obliterans, 236

thrombophlebitis, 236

thyroid disorders

- hyperthyroidism, 210-211
- hypothyroidism, 209-210

thyroid stimulating hormone, 206

thyroid storm, 211

thyrotropin releasing hormone, 206

time-released drugs, 16

toddlers

- growth and development, 326
- immunization schedule, 497

TOF (tetralogy of Fallot), 338-339

tonic-clonic seizures, 246-247

tonsillitis, 342-343

tonsils, 342

total body surface area (TBSA), 102-105

total knee replacements, 194-195

total parenteral nutrition (TPN), 144-145

tracheoesophageal fistula (TEF), 331

traction, 185-186

trade names, 18

transphenoidal surgery, 209

transplants

- bone marrow transplantation
 - allogenic transplants, 146
 - autologous transplants, 145
 - nursing care following, 146-147
 - syngeneic transplants, 146
- PSCT (peripheral stem cell transplantation), 145-147
- renal transplants, 61

transurethral prostatectomy (TURP), 65

traumatic injuries

- eyes, 126
- ears, 130

treatment

- Addison's disease, 214
- anxiety disorders, 273
- cannabis abuse, 286
- compartment syndrome, 188
- Cushing's disease, 215
- diabetes mellitus, 217
- dysreflexia, 260
- epidural hematomas, 250
- fractures, 184
 - casts, 187
 - hip fractures, 193
 - traction, 185-186
- gout, 191
- Guillain-Barré, 261
- hallucinogen abuse, 286
- hyperparathyroidism, 213
- hyperthyroidism, 211
- hypoparathyroidism, 213
- hypothyroidism, 210
- increased intracranial pressure, 253
- opiate abuse, 285
- osteomyelitis, 188
- osteoporosis, 190
- RA (rheumatoid arthritis), 192-193

- SCIs (spinal cord injuries), 259-260
- sedative-hypnotic abuse, 285
- seizures, 248
- stimulant abuse, 286
- strokes, 258
- subdural hematomas, 250

tricyclic antidepressants (TCAs), 281**trigeminal nerve, 254****trough drug levels, 22**

- garamycin, 45

Trousseau's sign, 92, 212**true congenital clubfoot, 335****tubal ligation, 316****tuberculosis (TB), 46****tumors, pituitary disorders, 207-209.**

See also cancer

TURP (transurethral prostatectomy), 65**two-point gait (crutch-walking), 197****tyrosine, 339**

U

ulcerative colitis, 160**ulcers**

- diagnostic tools, 157
- dumping syndrome, 158
- duodenal ulcers, 156
- gastric ulcers, 157
- treatment, 157-158

ultrasonography, 299**umbilical cord prolapse, 303****uncompensated acidosis, 87****uncompensated alkalosis, 87****urinary calculi, 62****urinary disorders, 57**

- acute glomerulonephritis, 58
- bladder cancer, 66

BPH (benign prostatic hyperplasia), 64-65**chronic glomerulonephritis, 59****diagnostic tests, 67****ESRD (end stage renal disease)**

- hemodialysis, 60
- peritoneal dialysis, 60
- renal transplants, 61

exam prep questions, 68-71**nephrotic syndrome, 61-62****pharmacology categories, 67****prostatitis, 63-64****suggested reading and resources, 71, 500****urinary calculi, 62****UTIs (urinary tract infections), 63****urinary diversions, 66****UTIs (urinary tract infections), 63**

V

V-fib (ventricular fibrillation), 233-234**vaccines**

- H.influenza B conjugate, 343
- immunization schedule, 497

vagal nerve stimulator (VNS), 248**vaginal bleeding, 299****vagus nerve, 254****variability (fetal heart rate monitoring), 492****variable deceleration of fetal heart tones, 311****vasectomy, 316****vasopressin (antidiuretic hormone), 207****ventricular fibrillation (V-fib), 233-234****ventricular tachycardia, 232-233****vestibulocochlear nerve, 254****viral pneumonia, 44****vital signs, normal ranges, 491****vitamins, B, 75****VNS (vagal nerve stimulator), 248**

W

walkers, 198
warfarin antidote, 492
warning signs of cancer, 138
wet (exudative) macular degeneration, 124
Wilms tumor, 352
wrapping stumps (amputations), 196

X-Z

xenografts, 111