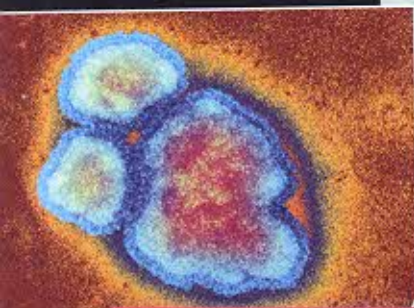


INTERNATIONAL EDITION

22nd Edition

# CURRENT

## Diagnosis & Treatment



# Pediatrics



10044065

ห้องสมุด วพบ. สุรินทร์

WILLIAM W. HAY JR. | MYRON J. LEVIN  
ROBIN R. DETERDING | MARK J. ABZUG

Mc  
Graw  
Hill  
Education

# LANGGE®

# Contents

Authors	xix		
Preface	xxvii		
<b>1. Advancing the Quality and Safety of Care</b>	<b>1</b>		
<i>Daniel Hyman, MD, MMM</i>			
Current Context	1		
Strategies and Models for Quality Improvement (QI)	4		
Principles of Patient Safety (Incident Reporting, Just Culture, Disclosure, FMEA, RCA, Reliability, Checklists)	7		
<b>2. The Newborn Infant</b>	<b>9</b>		
<i>Adam A. Rosenberg, MD</i>			
<i>Theresa Grover, MD</i>			
The Neonatal History	9		
Assessment of Growth & Gestational Age	9		
Examination at Birth	12		
Examination in the Nursery	13		
Care of the Well Neonate	15		
Feeding the Well Neonate	16		
Early Discharge of the Newborn Infant	18		
Circumcision	18		
Hearing Screening	19		
Common Problems in the Term Newborn	19		
Neonatal Jaundice	19		
Hypoglycemia	27		
Respiratory Distress in the term Newborn Infant	28		
Heart Murmurs	30		
Birth Trauma	31		
Infants of Mothers Who Abuse Drugs	32		
Multiple Births	34		
Neonatal Intensive Care	35		
Perinatal Resuscitation	35		
The Preterm Infant	40		
The Late Preterm Infant	50		
Cardiac Problems in the Newborn Infant	52		
Structural Heart Disease	52		
Persistent Pulmonary Hypertension	53		
Arrhythmias	53		
Gastrointestinal & Abdominal Surgical Conditions in the Newborn Infant	54		
Esophageal Atresia & Tracheoesophageal Fistula	54		
Intestinal Obstruction	54		
Abdominal Wall Defects	56		
Diaphragmatic Hernia	56		
Gastrointestinal Bleeding	57		
Gastroesophageal Reflux	57		
Infections in the Newborn Infant	58		
Bacterial Infections	58		
Fungal Sepsis	61		
Congenital Infections	62		
Perinatally Acquired Infections	65		
Hematologic Disorders in the Newborn Infant	67		
Bleeding Disorders	67		
Anemia	68		
Polycythemia	69		
Renal Disorders in the Newborn Infant	69		
Renal Failure	70		
Urinary Tract Anomalies	70		
Renal Vein Thrombosis	71		
Neurologic Problems in the Newborn Infant	71		
Seizures	71		
Hypotonia	72		
Intracranial Hemorrhage	72		
Metabolic Disorders in the Newborn Infant	73		
Hyperglycemia	73		
Hypocalcemia	73		
Inborn Errors of Metabolism	74		
Quality Assessment and Improvement in the Newborn Nursery and NICU	74		
<b>3. Child Development &amp; Behavior</b>	<b>75</b>		
<i>Edward Goldson, MD</i>			
<i>Ann Reynolds, MD</i>			
Normal Development	75		
The First 2 Years	75		
Ages 2–4 Years	92		
Early School Years: Ages 5–7 Years	92		
Middle Childhood: Ages 7–11 Years	92		
Behavioral & Developmental Variations	93		
Normality & Temperament	93		
Enuresis & Encopresis	94		
Enuresis	94		
Encopresis	95		
Common Developmental Concerns	96		
Colic	96		
Feeding Disorders in Infants & Young Children	97		
Sleep Disorders	99		
Temper Tantrums & Breath-Holding Spells	101		
Well-Child Surveillance & Screening	103		
Developmental Disorders	104		

Attention-Deficit Hyperactivity Disorder	105		
Autism Spectrum Disorders	107		
Intellectual Disability	112		
Specific Forms of Intellectual Disability & Associated Treatment Issues	114		
<b>4. Adolescence</b>	<b>117</b>		
<i>Amy E. Sass, MD, MPH</i>			
<i>David W. Kaplan, MD, MPH</i>			
Demography	117		
Mortality Data	117		
Morbidity Data	117		
Delivery of Health Services	119		
Guidelines for Adolescent Preventive Services	119		
Relating to the Adolescent Patient	119		
The Setting	119		
Confidentiality	120		
The Structure of the Visit	120		
Growth & Development	125		
Puberty	125		
Physical Growth	126		
Sexual Maturation	127		
Psychosocial Development	127		
Behavior & Psychological Health	129		
Psychophysiological Symptoms & Conversion Reactions	129		
Depression	130		
Adolescent Suicide	131		
Substance Abuse	132		
Eating Disorders	132		
Overweight & Obesity	132		
School Avoidance	134		
School Failure	135		
Breast Disorders	135		
Breast Masses	136		
Nipple Discharge & Galactorrhea	137		
Gynecomastia	138		
Gynecologic Disorders in Adolescence	139		
Physiology of Menstruation	139		
Pelvic Examination	140		
Menstrual Disorders	141		
Contraception	149		
Pregnancy	155		
<b>5. Adolescent Substance Abuse</b>	<b>158</b>		
<i>Paritosh Kaul, MD</i>			
Scope of the Problem	158		
Morbidity Data	163		
Predicting the Progression From Use to Abuse	164		
Evaluation of Substance Abuse	165		
Treatment & Referral	168		
Prevention	170		
<b>6. Eating Disorders</b>	<b>172</b>		
<i>Eric J. Sigel, MD</i>			
Etiology	172		
Incidence	173		
Predisposing Factors & Clinical Profiles	174		
Anorexia Nervosa	174		
Bulimia Nervosa	180		
Binge-Eating Disorder	182		
Eating Disorders Not Meeting Criteria for Categorization	183		
Avoidant/Restrictive Food Intake Disorder	183		
Prognosis	184		
Resources for Practitioners and Families	184		
<b>7. Child &amp; Adolescent Psychiatric Disorders &amp; Psychosocial Aspects of Pediatrics</b>	<b>185</b>		
<i>Adam Burstein, DO</i>			
<i>Ayelet Talmi, PhD</i>			
<i>Brian Stafford, MD, MPH</i>			
<i>Kimberly Kelsay, MD</i>			
Models of Care Encompassing Mental Health in the Primary Care Setting	186		
Early Identification & Prevention of Developmental & Socioemotional Problems	186		
Identification & Assessment During Health Maintenance Visits	187		
Consultation-Liaison Psychiatry	195		
The Chronically Ill Child	195		
The Terminally Ill Child	196		
Psychiatric Disorders of Childhood & Adolescence	199		
Pediatric Primary Care Behavioral Health Services	200		
Anxiety Disorders	202		
Attention-Deficit Hyperactivity Disorder	210		
Mood Disorders	215		
Suicide in Children & Adolescents	226		
Conduct Disorders	228		
High-Risk Patients and Homicide	232		
Somatoform Disorders	233		
Adjustment Disorders	234		
Psychotic Disorders	235		
Other Psychiatric Conditions	238		
<b>8. Child Abuse &amp; Neglect</b>	<b>239</b>		
<i>Antonia Chiesa, MD</i>			
<i>Andrew P. Sirotnak, MD</i>			
Prevention	240		
Clinical Findings	240		
Differential Diagnosis	245		
Treatment	246		
Prognosis	246		

**9. Ambulatory & Office Pediatrics 248**

*Meaghan Treitz, MD*  
*Maya Bunik, MD, MSPH*  
*David Fox, MD*

Pediatric History	248
Pediatric Physical Examination	249
Health Supervision Visits	251
Developmental & Behavioral Assessment	251
Growth Parameters	254
Blood Pressure	255
Vision & Hearing Screening	256
Screening	257
Anticipatory Guidance	260
Nutrition Counseling	262
Counseling About Television & Other Media	262
Immunizations	263
Acute-Care Visits	263
Prenatal Visits	264
Sports Physicals	264
Chronic Disease Management	264
Medical Home	265
Mental & Behavioral Health	265
Consultations	266
Telephone Management & Web-Based Information	266
Advocacy & Community Pediatrics	267
Common General Pediatric Issues	267
Fever	267
Growth Deficiency	269

**10. Immunization 271**

*Matthew F. Daley, MD*  
*Sean T. O'Leary, MD, MPH*  
*Ann-Christine Nyquist, MD, MSPH*

Standards for Pediatric Immunization Practices	272
Routine Childhood & Adolescent Immunization Schedules	273
Vaccine Safety	273
Vaccination in Special Circumstances	277
Hepatitis B Vaccination	278
Rotavirus Vaccination	281
Diphtheria-Tetanus-Acellular Pertussis Vaccination	282
<i>Haemophilus Influenzae</i> Type B Vaccination	285
Pneumococcal Vaccination	286
Poliovirus Vaccination	288
Influenza Vaccination	289
Measles, Mumps, & Rubella Vaccination	291
Varicella Vaccination	293

Hepatitis A Vaccination	295
Meningococcal Vaccination	296
Tetanus-Reduced Diphtheria-Acellular Pertussis Vaccination (Adolescents & Adults)	298
Human Papillomavirus Vaccination	299
Vaccinations for Special Situations	299
Rabies Vaccination	299
Typhoid Fever Vaccination	301
Japanese Encephalitis Vaccination	301
Tuberculosis Vaccination	302
Yellow Fever Vaccination	303
Passive Prophylaxis	303

**11. Normal Childhood Nutrition & Its Disorders 305**

*Matthew A. Haemer, MD MPH*  
*Laura E. Primak, RD, CNSD, CSP*  
*Nancy F. Krebs, MD, MS*

Nutritional Requirements	305
Nutrition & Growth	305
Energy	305
Protein	307
Lipids	307
Carbohydrates	308
Major Minerals	309
Trace Elements	309
Vitamins	309
Infant Feeding	311
Breast-Feeding	311
Special Dietary Products for Infants	320
Nutrition for Children 2 Years & Older	321
Pediatric Undernutrition	321
Pediatric Overweight & Obesity	323
Nutrition Support	326
1. Enteral	326
2. Parenteral Nutrition	327
Nutrient Requirements & Delivery	329

**12. Emergencies & Injuries 334**

*Maria J. Mandt, MD*  
*Joseph A. Grubenhoff, MD*

Assessment & Management of the Acutely Ill Infant or Child	334
The ABCs of Resuscitation	334
Management of Shock	338
Summary of Resuscitating the Acutely Ill Infant or Child	339
Emergency Pediatric Drugs	340
Approach to the Acutely Ill Infant or Child	340
Preparation for Emergency Management	340
Reception & Assessment	340

Approach to the Pediatric Trauma Patient	342
Mechanism of Injury	342
Initial Assessment & Management	342
Primary Survey	343
Secondary Survey	345
Head Injury	347
Burns	349
Thermal Burns	349
Electrical Burns	351
Disorders Due to Extremes of Environment	351
Heat-Related Illnesses & Heat Stroke	351
Hypothermia	352
Submersion Injuries	353
Animal & Human Bites	354
Dog Bites	354
Cat Bites	355
Human Bites	355
Procedural Sedation & Analgesia	355

### 13. Poisoning

357

*George Sam Wang, MD*

*Barry H. Rumack, MD*

*Richard C. Dart, MD, PhD*

Pharmacologic Principles of Toxicology	357
Preventing Childhood Poisonings	358
General Treatment of Poisoning	358
Initial Telephone Contact	358
Initial Emergency Department Contact	361
Definitive Therapy of Poisoning	361
Management of Specific Common Poisonings	363
Acetaminophen (Paracetamol)	363
Alcohol, Ethyl (Ethanol)	363
Amphetamines & Related Drugs (Methamphetamine, MDMA)	365
Anesthetics, Local	366
Antihistamines & Cough & Cold Preparations	367
Arsenic	367
Barbiturates & Benzodiazepines	368
Belladonna Alkaloids (Atropine, Jimsonweed, Potato Leaves, Scopolamine, Stramonium)	368
$\beta$ -Blockers & Calcium Channel Blockers	369
Carbon Monoxide	369
Caustics	369
Central Alpha-2 Adrenergic Agonist	370
Cocaine	371
Contraceptive Pills	371
Cosmetics & Related Products	371
Cyclic Antidepressants	372
Digitalis & Other Cardiac Glycosides	372
Diphenoxylate with Atropine (Lomotil) & Loperamide (Imodium)	373
Disinfectants & Deodorizers	373

Disk-Shaped "Button" Batteries	373
Ethylene Glycol & Methanol	374
$\gamma$ -Hydroxybutyrate, $\gamma$ -Butyrolactone, & Butanediol	374
Hydrocarbons (Benzene, Charcoal Lighter Fluid, Gasoline, Kerosene, Petroleum Distillates, Turpentine)	374
Ibuprofen	375
Insect Stings (Bee, Wasp, & Hornet)	375
Insecticides	375
Iron	376
Lead	377
Magnets	378
Mushrooms	378
Nitrites, Nitrates, Aniline, Pentachlorophenol, & Dinitrophenol	378
Opioids & Opiates	379
Oral Hypoglycemics (Sulfonylureas, Metformin)	380
Antipsychotics (Typical & Atypical)	380
Plants	381
Psychotropic Drugs	381
Salicylates	382
Scorpion Stings	383
Serotonin Reuptake Inhibitors	383
Snakebite	384
Soaps & Detergents	385
Spider Bites	385
Thyroid Preparations (Thyroid Desiccated, Sodium Levothyroxine)	386
Vitamins	386
Warfarin (Coumadin) and Other Oral Anticoagulants	386

### 14. Critical Care

387

*Todd C. Carpenter, MD,*

*Angela S. Czaja, MD, MSc,*

*Jennifer Exo, DO, Eva N. Grayck, MD,*

*Cameron F. Gunville, DO, Carleen Zebuhr, MD*

Introduction	387
Respiratory Critical Care	387
Acute Respiratory Failure	387
Conventional Mechanical Ventilation	391
Major Respiratory Diseases in the Pediatric ICU	395
Acute Respiratory Distress Syndrome	395
Status Asthmaticus	399
Cardiovascular Critical Care	402
Shock	402
Sepsis	405
Neurocritical Care	409
Traumatic Brain Injury	409
Hypoxic-Ischemic Encephalopathy	413
Additional Therapeutic Considerations in the Pediatric ICU	414

Acute Kidney Injury and Renal Replacement Therapy	414	Ophthalmic Examination	449
Fluid Management and Nutritional Support of the Critically Ill Child	415	History	449
Sedation & Analgesia in the Pediatric ICU	418	Visual Acuity	449
End-of-Life Care and Death in the PICU	422	External Examination	450
Quality Improvement Initiatives in the PICU	424	Pupils	451
		Alignment & Motility Evaluation	451
		Ophthalmoscopic Examination	453
<b>15. Skin</b>	<b>426</b>	Ocular Trauma	453
<i>Joseph G. Morelli, MD</i>		Ocular Foreign Bodies	453
<i>Lori D. Prok, MD</i>		Corneal Abrasion	454
General Principles	426	Intraocular Foreign Bodies & Perforating Ocular Injuries	455
Diagnosis of Skin Disorders	426	Blunt Orbital Trauma	455
Treatment of Skin Disorders	426	Lacerations	456
Disorders of the Skin in Newborns	428	Burns	457
Transient Diseases in Newborns	428	HypHEMA	457
Pigment Cell Birthmarks, Nevi, & Melanoma	429	Abusive Head Trauma & Nonaccidental Trauma	458
Melanocytic Nevi	430	Prevention of Ocular Injuries	459
Vascular Birthmarks	430	Disorders of the Ocular Structures	459
Epidermal Birthmarks	431	Diseases of the Eyelids	459
Connective Tissue Birthmarks (Juvenile Elastoma, Collagenoma)	432	Viral Eyelid Disease	460
Hereditary Skin Disorders	432	Miscellaneous Eyelid Infections	461
Common Skin Diseases in Infants, Children, & Adolescents	432	Eyelid Ptosis	461
Acne	432	Horner Syndrome	462
Bacterial Infections of the Skin	435	Eyelid Tics	463
Fungal Infections of the Skin	436	Disorders of the Nasolacrimal System	463
Viral Infections of the Skin	437	Nasolacrimal Duct Obstruction	463
Virus-Induced Tumors	438	Congenital Dacryocystocele	463
Insect Infestations	438	Dacryocystitis	464
Dermatitis (Eczema)	439	Diseases of the Conjunctiva	465
Common Skin Tumors	442	Ophthalmia Neonatorum	465
Papulosquamous Eruptions	443	Bacterial Conjunctivitis	466
Hair Loss (Alopecia)	444	Viral Conjunctivitis	466
Reactive Erythemas	445	Allergic Conjunctivitis	467
Miscellaneous Skin Disorders Seen in Pediatric Practice	445	Mucocutaneous Diseases	467
		Disorders of the Iris	469
		Iris Coloboma	469
		Aniridia	469
		Albinism	470
		Miscellaneous Iris Conditions	470
		Glaucoma	470
		Uveitis	471
		Anterior Uveitis/Iridocyclitis/Iritis	471
		Posterior Uveitis	472
		Intermediate Uveitis	473
		Ocular Manifestations of AIDS	473
		Disorders of the Cornea	474
		Cloudy Cornea	474
		Viral Keratitis	474
		Corneal Ulcers	475
		Disorders of the Lens	475
		Cataracts	476
		Dislocated Lenses/Ectopia Lentis	476
<b>16. Eye</b>	<b>447</b>		
<i>Rebecca Sands Braverman, MD</i>			
Common Nonspecific Signs & Symptoms	447		
Red Eye	447		
Tearing	447		
Discharge	447		
Pain & Foreign Body Sensation	447		
Photophobia	447		
Leukocoria	448		
Refractive Errors	448		
Myopia (Nearsightedness)	449		
Hyperopia (Farsightedness)	449		
Astigmatism	449		

Disorders of the Retina	477
Retinal Hemorrhages in the Newborn	477
Retinopathy of Prematurity	477
Retinoblastoma	478
Retinal Detachment	479
Diabetic Retinopathy	479
Diseases of the Optic Nerve	480
Optic Neuropathy	480
Optic Nerve Hypoplasia	480
Papilledema	481
Optic Neuritis	482
Optic Atrophy	482
Periorbital & Orbital Cellulitis	483
Craniofacial Anomalies	483
Orbital Tumors	484
Nystagmus	485
Amblyopia	485
Strabismus	486
Unexplained Decreased Vision in Infants & Children	488
Learning Disabilities & Dyslexia	488

## 17. Oral Medicine & Dentistry 490

*Ulrich Klein, DMD, DDS, MS*

Issues in Pediatric Oral Health	490
Dental Caries	492
Oral Examination of the Newborn & Infant	495
Eruption of the Teeth	497
Periodontal Disease	498
Dental Emergencies	499
Antibiotics in Pediatric Dentistry	500
Special Patient Populations	500
Orthodontic Referral	501

## 18. Ear, Nose, & Throat 502

*Norman R. Friedman, MD*

*Melissa A. Scholes, MD*

*Patricia J. Yoon, MD*

The Ear	502
Infections of the Ear	502
Acute Trauma to the Middle Ear	512
Cerumen Impaction and Ear Canal Foreign Body	512
Auricular Hematoma	512
Congenital Ear Malformations	513
Identification & Management of Hearing Loss	513
The Nose & Paranasal Sinuses	515
Acute Viral Rhinitis	515
Rhinosinusitis	518
Choanal Atresia	520
Recurrent Rhinitis	520

Epistaxis	521
Nasal Infection	521
Nasal Trauma	521
Foreign Bodies in the Nose	522
The Throat & Oral Cavity	522
Acute Stomatitis	522
Pharyngitis	523
Peritonsillar Cellulitis or Abscess (Quinsy)	526
Retropharyngeal Abscess	526
Ludwig Angina	527
Acute Cervical Adenitis	527
Snoring, Mouth Breathing, & Upper Airway Obstruction	528
Tonsillectomy & Adenoidectomy	530
Disorders of the Lips	531
Disorders of the Tongue	531
Halitosis	532
Salivary Gland Disorders	532
Congenital Oral Malformations	532

## 19. Respiratory Tract & Mediastinum 534

*Monica J. Federico, MD, Christopher D. Baker, MD*

*Vivek Balasubramaniam, MD, Emily M. DeBoer, MD*

*Robin R. Deterding, MD, Ann Halbower, MD*

*Oren Kupfer, MD, Stacey L. Martiniano, MD*

*Scott D. Sagel, MD, Paul Stillwell, MD*

*Edith T. Zemanick, MD*

Respiratory Tract	534
Growth & Development	534
Diagnostic AIDS	535
Physical Examination of the Respiratory Tract	535
Pulmonary Function Tests	536
Assessment of Oxygenation & Ventilation	537
Diagnosis of Respiratory Tract Infections	539
Imaging of the Respiratory Tract	540
Laryngoscopy & Bronchoscopy	540
General Therapy of Pediatric Lung Diseases	541
Oxygen Therapy	541
Inhalation of Medications	541
Airway Clearance Therapy	542
Avoidance of Environmental Hazards	542
Disorders of the Conducting Airways	543
Laryngomalacia & Congenital Disorders of the Extrathoracic Airway	544
Laryngomalacia	544
Other Causes of Congenital Extrathoracic Obstruction	544
Acquired Disorders of the Extrathoracic Airway	544
Foreign Body Aspiration in the Extrathoracic Airway	545
Croup Syndromes	545
Vocal Cord Paralysis	548
Subglottic Stenosis	548

Congenital Causes of Intrathoracic Airway	
Obstruction	548
Malacia of Airways	548
Vascular Rings and Slings	549
Bronchogenic Cysts	549
Acquired Causes of Intrathoracic Airway	
Obstruction	550
Foreign Body Aspiration in the Intrathoracic Airway	550
Disorders of Mucociliary Clearance	551
Cystic Fibrosis	551
Primary Ciliary Dyskinesia	552
Bronchiolitis Obliterans	553
Bronchiectasis	554
Congenital Malformations of the Lung Parenchyma	555
Pulmonary Agenesis & Hypoplasia	555
Pulmonary Sequestration	556
Congenital Lobar Emphysema	557
Congenital Pulmonary Airway Malformation (Cystic Adenomatoid Malformation)	557
Acquired Abnormalities of the Lung Parenchyma	559
Bronchopulmonary Dysplasia	559
Community-Acquired Bacterial Pneumonia	561
Parapneumonic Effusion & Empyema	562
Atypical Pneumonias	563
Viral Pneumonia	563
Bronchiolitis	564
Mycoplasma Pneumonia	566
Tuberculosis	566
Aspiration Pneumonia	568
Pneumonia in the Immunocompromised Host	569
Lung Abscess	571
Children's Interstitial Lung Disease Syndrome	572
Hypersensitivity Pneumonitis	573
Diseases of the Pulmonary Circulation	574
Pulmonary Hemorrhage	574
Pulmonary Embolism	576
Pulmonary Edema	576
Congenital Pulmonary Lymphangiectasia	577
Disorders of the Chest Wall & Diaphragm	578
Scoliosis	578
Pectus Carinatum	578
Pectus Excavatum	578
Neuromuscular Disorders	578
Eventration of the Diaphragm	579
Disorders of the Pleura & Pleural Cavity	579
Hemothorax	580
Chylothorax	580
Pneumothorax & Related Air Leak Syndromes	580
Mediastinum	581
Mediastinal Masses	581
Sleep-Disordered Breathing	582
Obstructive & Central Sleep Apnea	582
Apparent Life-Threatening Events	583
Sudden Infant Death Syndrome	586

## 20. Cardiovascular Diseases

588

Jeffrey R. Darst, MD

Kathryn K. Collins, MD

Shelley D. Miyamoto, MD

Diagnostic Evaluation	588
History	588
Physical Examination	588
Electrocardiography	591
Chest Radiograph	593
Echocardiography	594
Nuclear Cardiology	595
Magnetic Resonance Imaging	595
Cardiopulmonary Stress Testing	595
Arterial Blood Gases	595
Cardiac Catheterization & Angiocardiology	596
Perinatal & Neonatal Circulation	598
Heart Failure	598
Genetic Basis of Congenital Heart Disease	601
Acyanotic Congenital Heart Disease	601
Defects in Septation	601
Patent (Persistent) Ductus Arteriosus	605
Right-Sided Obstructive Lesions	607
Left-Sided Lesions	610
Diseases of the Aorta	614
Coronary Artery Abnormalities	615
Cyanotic Congenital Heart Disease	616
Tetralogy of Fallot	616
Pulmonary Atresia with Ventricular Septal Defect	618
Pulmonary Atresia with Intact Ventricular Septum	618
Tricuspid Atresia	619
Hypoplastic Left Heart Syndrome	620
Transposition of the Great Arteries	621
Total Anomalous Pulmonary Venous Return	623
Truncus Arteriosus	625
Quality Improvement in Congenital Heart Disease	626
Acquired Heart Disease	626
Rheumatic Fever	626
Kawasaki Disease	628
Infective Endocarditis	629
Pericarditis	631
Cardiomyopathy	632
Myocarditis	634
Preventive Cardiology	635
Hypertension	635
Atherosclerosis & Dyslipidemias	636
Chest Pain	636
Cardiac Transplantation	637
Quality Improvement for Pediatric Heart Transplantation	639
Primary Pulmonary Hypertension	639
Disorders of Rate & Rhythm	640

Disorders of the Sinus Node	640
Sinus Arrhythmia	640
Sinus Bradycardia	641
Sinus Tachycardia	641
Sinus Node Dysfunction	641
Premature Beats	641
Supraventricular Tachycardia	641
Ventricular Tachycardia	646
Long QT Syndrome	647
Sudden Death	647
Disorders of Atrioventricular Conduction	648
Syncope (Fainting)	650

## 21. Gastrointestinal Tract 651

*Edward Hoffenberg, MD*

*David Brumbaugh, MD*

*Glenn T. Furuta, MD*

*Gregg Kobak, MD*

*Edwin Liu, MD*

*Jason Soden, MD*

*Robert Kramer, MD*

Disorders of the Esophagus	651
Gastroesophageal Reflux & GERD	651
Eosinophilic Esophagitis	653
Achalasia of the Esophagus	654
Caustic Burns of the Esophagus	655
Foreign Bodies in the Alimentary Tract	656
Disorders of the Stomach & Duodenum	658
Hiatal Hernia	658
Pyloric Stenosis	658
Gastric & Duodenal Ulcer	659
Congenital Diaphragmatic Hernia	661
Congenital Duodenal Obstruction	661
Disorders of the Small Intestine	662
Intestinal Atresia & Stenosis	662
Intestinal Malrotation	663
Short Bowel Syndrome	664
Intussusception	665
Inguinal Hernia	666
Umbilical Hernia	667
Patent Omphalomesenteric Duct	667
Meckel Diverticulum	667
Acute Appendicitis	668
Duplications of the Gastrointestinal Tract	669
Disorders of the Colon	669
Congenital Aganglionic Megacolon (Hirschsprung Disease)	669
Constipation	670
Anal Fissure	672
Congenital Anorectal Anomalies	672
<i>Clostridium difficile</i> Infection in Children	673
Disorders of the Peritoneal Cavity	674
Peritonitis	674
Chylous Ascites	675

Gastrointestinal Tumors & Malignancies	676
Juvenile Polyps	676
Cancers of the Esophagus, Small Bowel, & Colon	676
Mesenteric Cysts	677
Intestinal Hemangiomas and Vascular Malformations	677
Major Gastrointestinal Symptoms & Signs	678
Acute Diarrhea	678
Chronic Diarrhea	679
Gastrointestinal Bleeding	681
Vomiting	684
Recurrent Abdominal Pain	685
Acute Abdomen	686
Malabsorption Syndromes	687
Inflammatory Bowel Disease	691

## 22. Liver & Pancreas 695

*Ronald J. Sokol, MD*

*Michael R. Narkewicz, MD*

*Shikha S. Sundaram, MD MSCI*

*Cara L. Mack, MD*

Liver Disorders	695
Prolonged Neonatal Cholestatic Jaundice	695
Intrahepatic Cholestasis	695
Extrahepatic Neonatal Cholestasis	703
Other Neonatal Hyperbilirubinemic Conditions (Noncholestatic Nonhemolytic)	706
Hepatitis A	708
Hepatitis B	710
Hepatitis C	712
Hepatitis D (Delta Agent)	713
Hepatitis E	714
Other Hepatitis Viruses	714
Acute Liver Failure	714
Autoimmune Hepatitis	716
Nonalcoholic Fatty Liver Disease	717
$\alpha_1$ -Antitrypsin Deficiency Liver Disease	719
Wilson Disease (Hepatolenticular Degeneration)	720
Drug-Induced Liver Disease	721
Cirrhosis	722
Portal Hypertension	723
Biliary Tract Disease	726
Pyogenic & Amebic Liver Abscess	730
Liver Tumors	732
Liver Transplantation	733
Pancreatic Disorders Acute Pancreatitis	734
Chronic Pancreatitis	735
Gastrointestinal & Hepatobiliary Manifestations of Cystic Fibrosis	736

Syndromes with Pancreatic Exocrine Insufficiency	740
Isolated Exocrine Pancreatic Enzyme Defect	740
Pancreatic Tumors	740

### 23. Fluid, Electrolyte, & Acid-Base Disorders & Therapy 742

*Douglas M. Ford, MD*

Regulation of Body Fluids, Electrolytes, & Tonicity	742
Acid-Base Balance	744
Fluid & Electrolyte Management	745
Dehydration	746
Hyponatremia	748
Hypernatremia	748
Potassium Disorders	749
Acid-Base Disturbances	750
Metabolic Acidosis	750
Metabolic Alkalosis	751
Respiratory Acidosis	751
Respiratory Alkalosis	751

### 24. Kidney & Urinary Tract 752

*Gary M. Lum, MD*

Evaluation of the Kidney & Urinary Tract	752
History	752
Physical Examination	752
Laboratory Evaluation of Renal Function	752
Laboratory Evaluation of Immunologic Function	754
Radiographic Evaluation	755
Renal Biopsy	756
Congenital Anomalies of the Urinary Tract	756
Renal Parenchymal Anomalies	756
Distal Urinary Tract Anomalies	757
Hematuria & Glomerular Disease	757
Microhematuria	757
Glomerulonephritis	757
Acute Interstitial Nephritis	760
Proteinuria & Renal Disease	760
Congenital Nephrosis	760
Idiopathic Nephrotic Syndrome of Childhood (Minimal Change Disease)	760
Focal Glomerular Sclerosis	761
Mesangial Nephropathy (Mesangial Glomerulonephritis)	761
Membranous Nephropathy (Membranous Glomerulonephritis)	761
Diseases of the Renal Vessels	761
Renal Vein Thrombosis	761
Renal Arterial Disease	762
Hemolytic-Uremic Syndrome	762

Renal Failure	763
Acute Renal Failure	763
Chronic Renal Failure	765
Hypertension	767
Inherited or Developmental Defects of the Kidneys	769
Disorders of the Renal Tubules	769
Oculocerebrorenal Syndrome (Lowe Syndrome)	771
Hypokalemic Alkalosis (Bartter Syndrome, Gitelman Syndrome, & Liddle Syndrome)	771
Cystinosis	772
Nephrogenic Diabetes Insipidus	772
Nephrolithiasis	772
Urinary Tract Infections	773

### 25. Neurologic & Muscular Disorders 776

*Sita Kedia, MD, Kelly Knupp, MD*

*Teri Schreiner, MD, MPH, Michele L. Yang, MD*

*Paul M. Levisohn, MD, Paul G. Moe, MD*

Neurological Assessment & Neurodiagnostics	776
History & Examination	776
Diagnostic Testing	776
Pediatric Neuroradiologic Procedures	778
Disorders Affecting the Nervous System in Infants & Children	782
Altered States of Consciousness	782
Seizure Disorders (Epilepsies)	786
Sleep Disorders	800
Headaches	801
Pseudotumor Cerebri (Idiopathic Intracranial Hypertension)	804
Cerebrovascular Disease	806
Congenital Malformations of the Nervous System	809
Abnormal Head Size	812
Neurocutaneous Dysplasias	814
Central Nervous System Degenerative Disorders of Infancy & Childhood	818
Ataxias of Childhood	824
Acute Ataxias of Childhood	824
Congenital Causes of Chronic & Episodic Ataxias	827
Intermittent/Episodic Ataxias	827
Progressive Ataxias	828
Extrapyramidal Disorders	829
Cerebral Palsy	833
Infections & Inflammatory Disorders of the Central Nervous System	835
Bacterial Meningitis	836
Brain Abscess	837
Viral Infections	838

Encephalopathy of Human			
Immunodeficiency Virus Infection	838		
Other Infections	838		
Noninfectious Inflammatory Disorders			
of the Central Nervous System	838		
Other Parainfectious Encephalopathies	839		
Multiple Sclerosis	839		
Syndromes Presenting as Acute			
Flaccid Weakness	841		
Disorders of Childhood Affecting Muscles	844		
Benign Acute Childhood Myositis	853		
Myasthenic Syndromes	853		
Peripheral Nerve Palsies	855		
Chronic Polyneuropathy	857		
Miscellaneous Neuromuscular Disorders	858		
Floppy Infant Syndrome	858		
Web Resources	861		
<b>26. Orthopedics</b>	<b>862</b>		
<i>Mark A. Erickson, MD, MMM</i>			
<i>Brendan Caprio, BS</i>			
Disturbances of Prenatal Origin	862		
Congenital Amputations & Limb Deficiencies	862		
Deformities of the Extremities	863		
Generalized Disorders of Skeletal or			
Mesodermal Tissues	865		
Growth Disturbances of the Musculoskeletal			
System	867		
Scoliosis	867		
Slipped Capital Femoral Epiphysis	868		
Genu Varum & Genu Valgum	869		
Tibial Torsion	869		
Femoral Anteversion	869		
Common Foot Problems	870		
Degenerative Problems (Arthritis, Bursitis,			
& Tenosynovitis)	871		
Trauma	871		
Soft Tissue Trauma (Sprains, Strains,			
& Contusions)	871		
Traumatic Subluxations & Dislocations	872		
Fractures	873		
Infections of the Bones & Joints	874		
Osteomyelitis	874		
Tuberculous Arthritis	877		
Diskitis	877		
Transient (Toxic) Synovitis & Septic Arthritis			
of the Hip	877		
Vascular Lesions & Avascular Necrosis			
(Osteochondroses)	878		
Avascular Necrosis of the Proximal Femur			
(Legg-Calvé-Perthes Disease)	878		
Osteochondritis Dissecans	879		
Neurologic Disorders Involving the			
Musculoskeletal System	879		
Orthopedic Aspects of Cerebral Palsy	879		
Orthopedic Aspects of Myelodysplasia	880		
Neoplasia of the Musculoskeletal System	880		
Osteochondroma	880		
Osteoid Osteoma	881		
Enchondroma	881		
Chondroblastoma	881		
Nonossifying Fibroma	881		
Osteosarcoma	881		
Ewing Sarcoma	881		
Miscellaneous Diseases of Bone and Joint	882		
Fibrous Dysplasia	882		
Unicameral Bone Cyst	882		
Aneurysmal Bone Cyst	882		
Infantile Cortical Hyperostosis			
(Caffey Syndrome)	882		
Ganglion	883		
Baker Cyst	883		
National QI/QA Initiatives in Orthopedics	883		
<b>27. Sports Medicine</b>	<b>884</b>		
<i>Rachel A. Coel, MD, PhD, FAAP, CAQSM</i>			
<i>Quynh B. Hoang, MD, FAAP, CAQSM</i>			
<i>Armando Vidal, MD</i>			
Basic Principles	884		
Fitness & Conditioning	885		
Sports Nutrition	885		
Preparticipation Physical Evaluation	885		
Rehabilitation of Sports Injuries	898		
Common Sports Medicine Issues & Injuries	899		
Infectious Diseases	899		
Head & Neck Injuries	900		
Spine Injuries	902		
Shoulder Injuries	904		
Elbow Injuries	906		
Hand & Wrist Injuries	908		
Hip Injuries	909		
Knee Injuries	912		
Foot & Ankle Injuries	915		
Prevention	917		
<b>28. Rehabilitation Medicine</b>	<b>918</b>		
<i>Pamela E. Wilson, MD</i>			
<i>Gerald H. Clayton, PhD</i>			
Pediatric Brain Injury	918		
Spinal Cord Injury	921		
Brachial Plexus Lesions	923		
Common Rehabilitation Problems	924		
Quality Assurance/Improvement Initiatives			
in Rehabilitation Medicine	926		

<b>29. Rheumatic Diseases</b>	<b>927</b>	Transfusion Medicine	981
<i>Jennifer B. Saep, MD</i>		Donor Screening & Blood Processing:	
Juvenile Idiopathic Arthritis	927	Risk Management	981
Systemic Lupus Erythematosus	930	Storage & Preservation of Blood & Blood	
Dermatomyositis	932	Components	981
Vasculitis	933	Pretransfusion Testing	986
Raynaud Phenomenon	934	Transfusion Practice	986
Noninflammatory Pain Syndromes	934		
<b>30. Hematologic Disorders</b>	<b>936</b>	<b>31. Neoplastic Disease</b>	<b>990</b>
<i>Daniel R. Ambruso, MD</i>		<i>Doug K. Graham, MD, PhD, John A. Craddock, MD</i>	
<i>Rachelle Nuss, MD</i>		<i>Ralph R. Quinones, MD, Amy K. Keating, MD</i>	
<i>Michael Wang, MD</i>		<i>Kelly Maloney, MD, Nicholas K. Foreman, MD, MRCP</i>	
Normal Hematologic Values	936	<i>Roger H. Giller, MD, Brian S. Greffe, MD</i>	
Bone Marrow Failure	936	Major Pediatric Neoplastic Diseases	990
Constitutional Aplastic Anemia		Acute Lymphoblastic Leukemia	990
(Fanconi Anemia)	936	Acute Myeloid Leukemia	993
Acquired Aplastic Anemia	937	Myeloproliferative Diseases	996
Anemias	938	Brain Tumors	997
Approach to the Child with Anemia	938	Lymphomas & Lymphoproliferative Disorders	1001
Pure Red Cell Aplasia	940	Neuroblastoma	1006
Nutritional Anemias	942	Wilms Tumor (Nephroblastoma)	1008
Anemia of Chronic Disorders	944	Bone Tumors	1010
Congenital Hemolytic Anemias: Red Cell		Rhabdomyosarcoma	1011
Membrane Defects	945	Retinoblastoma	1013
Congenital Hemolytic Anemias:		Hepatic Tumors	1014
Hemoglobinopathies	946	Langerhans Cell Histiocytosis	1015
Congenital Hemolytic Anemias:		Hematopoietic Stem Cell Transplant	1016
Disorders of Red Cell Metabolism	953	General Considerations	1016
Acquired Hemolytic Anemia	955	HSCT Complications	1017
Polycythemia & Methemoglobinemia	957	Late Effects of Pediatric Cancer Therapy	1018
Congenital Erythrocytosis		Growth Complications	1018
(Familial Polycythemia)	957	Endocrine Complications	1019
Secondary Polycythemia	957	Cardiopulmonary Complications	1019
Methemoglobinemia	957	Renal Complications	1020
Disorders of Leukocytes	958	Neuropsychological Complications	1020
Neutropenia	958	Second Malignancies	1020
Neutrophilia	960		
Disorders of Neutrophil Function	960	<b>32. Pain Management &amp; Pediatric</b>	
Lymphocytosis	962	<b>Palliative &amp; End-of-Life Care</b>	<b>1022</b>
Eosinophilia	963	<i>Brian S. Greffe, MD</i>	
Bleeding Disorders	963	<i>Jeffrey L. Galinkin, MD, FAAP</i>	
Abnormalities of Platelet Number		<i>Nancy A. King, MSN, RN, CPNP</i>	
or Function	964	Pain Assessment	1022
Inherited Bleeding Disorders	968	Acute Pain	1022
Von Willebrand Disease	972	Chronic Pain Management	1024
Acquired Bleeding Disorders	973	Pediatric Palliative & End-of-Life Care	1026
Vascular Abnormalities Associated		Introduction	1026
with Bleeding	976	Children Who May Benefit From	
Thrombotic Disorders	977	Palliative Care Interventions	1027
Splenic Abnormalities	980	Pain Management in Pediatric Palliative Care	1027
Splenomegaly & Hypersplenism	980	Quality-of-Life Adjuncts & Symptom	
Asplenia & Splenectomy	981	Management in Pediatric Palliative Care	1027

Psychosocial Aspects of Pediatric Palliative Care	1029
Children's Concept of Death	1029
Spiritual & Cultural Support	1029
Withdrawal of Medical Life Support	1029
Advance Care Planning	1031

### 33. Immunodeficiency 1033

*Pia J. Hauk, MD*

*Richard B. Johnston, Jr, MD*

*Andrew H. Liu, MD*

Immunodeficiency Evaluation:	
Primary Considerations	1033
Antibody Deficiency Syndromes	1038
Severe Combined	
Immunodeficiency Diseases	1042
Other Combined	
Immunodeficiency Disorders	1044
Phagocyte Disorders	1047
Complement Deficiencies	1048
Other Well-Defined	
Immunodeficiency Syndromes	1050
Genetic Syndromes	
Associated with Immunodeficiency	1052

### 34. Endocrine Disorders 1054

*Philip S. Zeitler, MD, PhD*

*Sharon H. Travers, MD*

*Kristen Nadeau, MD*

*Jennifer M. Barker, MD*

*Megan Moriarty Kelsey, MD*

*Michael S. Kappy, MD, PhD*

General Concepts	1054
Hormone Types	1054
Feedback Control of Hormone Secretion	1055
Disturbances of Growth	1056
Target Height & Skeletal Maturation	1056
Short Stature	1056
Tall Stature	1063
Disorders of the Posterior Pituitary Gland	1063
Arginine Vasopressin (Antidiuretic Hormone) Physiology	1063
Central Diabetes Insipidus	1064
Thyroid Gland	1065
Fetal Development of the Thyroid	1065
Physiology	1065
Hypothyroidism (Congenital & Acquired)	1065
Thyroiditis	1067
Hyperthyroidism	1068
Thyroid Cancer	1070
Disorders of Calcium & Phosphorus Metabolism	1071

Hypocalcemic Disorders	1071
Pseudohypoparathyroidism (Resistance to Parathyroid Hormone Action)	1075
Hypercalcemic States	1075
Familial Hypocalciuric Hypercalcemia (Familial Benign Hypercalcemia)	1077
Hypervitaminosis D	1077
Idiopathic Hypercalcemia of Infancy (Williams Syndrome)	1077
Immobilation Hypercalcemia	1077
Hypophosphatasia	1077
Gonads (Ovaries & Testes)	1078
Development & Physiology	1078
Disorders of Sexual Development	1078
Abnormalities in Female Pubertal Development & Ovarian Function	1081
Abnormalities in Male Pubertal Development & Testicular Function	1084
Adrenal Cortex	1086
Adrenocortical Insufficiency (Adrenal Crisis, Addison Disease)	1087
Congenital Adrenal Hyperplasias	1089
Adrenocortical Hyperfunction (Cushing Disease, Cushing Syndrome)	1091
Primary Hyperaldosteronism	1093
Uses of Glucocorticoids & Adrenocorticotropic Hormone in Treatment of Nonendocrine Diseases	1093
Adrenal Medulla Pheochromocytoma	1095

### 35. Diabetes Mellitus 1097

*Marian Rewers, MD, PhD*

*H. Peter Chase, MD*

General Considerations	1097
------------------------	------

### 36. Inborn Errors of Metabolism 1106

*Janet A. Thomas, MD*

*Johan L.K. Van Hove, MD, PhD, MBA*

Diagnosis	1106
Suspecting Inborn Errors	1106
Laboratory Studies	1107
Common Clinical Situations	1107
Management of Metabolic Emergencies	1110
Newborn Screening	1110
Disorders of Carbohydrate Metabolism	1111
Glycogen Storage Diseases	1111
Galactosemia	1112
Hereditary Fructose Intolerance	1113
Disorders of Energy Metabolism	1113
Disorders of Amino Acid Metabolism	1115
Disorders of the Urea Cycle	1115
Phenylketonuria & The Hyperphenylalaninemias	1116

Hereditary Tyrosinemia	1117
Maple Syrup Urine Disease (Branched-Chain Ketoaciduria)	1118
Homocystinuria	1118
Nonketotic Hyperglycinemia	1119
Organic Acidemias	1120
Propionic & Methylmalonic Acidemia (Ketotic Hyperglycinemias)	1120
Isovaleric Acidemia	1122
Carboxylase Deficiency	1122
Glutaric Acidemia Type I	1122
Disorders of Fatty Acid Oxidation & Carnitine	1123
Fatty Acid Oxidation Disorders	1123
Carnitine	1124
Purine Metabolism Disorders	1125
Lysosomal Diseases	1125
Peroxisomal Diseases	1129
Congenital Disorders of Glycosylation	1129
Smith-Lemli-Opitz Syndrome & Disorders of Cholesterol Synthesis	1130
Disorders of Neurotransmitter Metabolism	1131
Creatine Synthesis Disorders	1132
Quality Initiatives in the Field of Metabolic Disease	1132

### 37. Genetics & Dysmorphology 1134

<i>Margarita Saenz, MD</i>	
<i>Anne Chun-Hui Tsai, MD, MSc</i>	
<i>David K. Manchester, MD</i>	
<i>Ellen R. Elias, MD</i>	
Foundations of Genetic Diagnosis	1134
Cytogenetics	1134
Molecular Genetics	1140
Principles of Inherited Human Disorders	1142
Mendelian Inheritance	1142
Multifactorial Inheritance	1146
Nonmendelian Inheritance	1147
Family History & Pedigree	1148
Dysmorphology & Human Embryology	1149
Mechanisms	1149
Clinical Dysmorphology	1150
Chromosomal Disorders: Abnormal Number	1151
Trisomies	1151
Sex Chromosome Abnormalities	1153
Chromosomal Abnormalities:	
Abnormal Structure	1154
Chromosome Deletion Disorders	1155
Contiguous Gene Disorders	1155
Mendelian Disorders	1156
Autosomal Dominant Disorders	1156
Autosomal Recessive Disorders	1159
X-Linked Disorders	1160
Nonmendelian Disorders	1161

Disorders of Imprinting	1161
Disorders Associated with Anticipation	1162
Mitochondrial Disorders	1162
Disorders of Multifactorial Inheritance	1163
Cleft Lip & Cleft Palate	1163
Neural Tube Defects	1164
Common Recognizable Disorders with Variable or Unknown Cause	1165
Genetic Evaluation of the Child with Developmental Disabilities	1167
Perinatal Genetics	1168
Teratogens	1168
Assisted Reproduction	1169
Prenatal Diagnosis	1169

### 38. Allergic Disorders 1171

<i>Ronina A. Covar, MD</i>	
<i>David M. Fleischer, MD</i>	
<i>Christine Cho, MD</i>	
<i>Mark Boguniewicz, MD</i>	
Asthma	1171
Allergic Rhinoconjunctivitis	1186
Atopic Dermatitis	1190
Urticaria & Angioedema	1194
Anaphylaxis	1196
Adverse Reactions to Drugs & Biologicals	1199
Food Allergy	1203
Insect Allergy	1205

### 39. Antimicrobial Therapy 1207

<i>John W. Ogle, MD</i>	
Principles of Antimicrobial Therapy	1207
Antimicrobial Susceptibility Testing	1208
Alteration of Dose & Measurement of Blood Levels	1212
The Use of New Antimicrobial Agents	1215
Prophylactic Antimicrobial Agents	1216
Initial Empiric Antimicrobial Choices for Selected Conditions	1217
Specific Antimicrobial Agents	1219
Penicillins	1219
Glycopeptide Agents	1221
Oxazolidinones	1221
Quinupristin-Dalfopristin	1221
Cephalosporins	1222
Aztreonam	1222
Carbapenems	1222
Macrolides & Azalides	1223
Clindamycin	1223
Sulfonamides	1223
Tetracyclines	1224
Aminoglycosides	1224

Fluoroquinolones	1225		
Metronidazole	1225		
Daptomycin	1225		
<b>40. Infections: Viral &amp; Rickettsial</b>	<b>1227</b>		
<i>Myron J. Levin, MD</i>			
<i>Adriana Weinberg, MD</i>			
Viral Infections	1227		
Respiratory Infections	1227		
Viruses Causing the Common Cold	1227		
Infections Due to Adenoviruses	1233		
Influenza	1234		
Parainfluenza (Croup)	1236		
Respiratory Syncytial Virus Disease	1236		
Human Metapneumovirus Infection	1238		
Infections Due to Enteroviruses	1239		
Acute Febrile Illness	1239		
Respiratory Tract Illnesses	1239		
Rashes (Including Hand-Foot- and-Mouth Disease)	1240		
Central Nervous System Illnesses	1241		
Infections Due to Herpesviruses	1243		
Herpes Simplex Infections	1243		
Varicella & Herpes Zoster	1246		
Roseola Infantum (Exanthem Subitum)	1249		
Cytomegalovirus Infections	1250		
Infectious Mononucleosis (Epstein-Barr Virus)	1253		
Viral Infections Spread by Insect Vectors	1255		
Encephalitis	1255		
Dengue	1255		
Colorado Tick Fever	1259		
Other Major Viral Childhood Exanthems	1259		
Erythema Infectiosum	1259		
Measles (Rubeola)	1261		
Rubella	1262		
Infections Due to Other Viruses	1264		
Hantavirus Cardiopulmonary Syndrome	1264		
Mumps	1265		
Rabies	1266		
Rickettsial Infections	1267		
Human Ehrlichiosis	1267		
Rocky Mountain Spotted Fever	1268		
Endemic Typhus (Murine Typhus)	1269		
Q Fever	1270		
<b>41. Human Immunodeficiency   Virus Infection</b>	<b>1271</b>		
<i>Elizabeth J. McFarland, MD</i>			
Perinatally HIV-Exposed Infant	1273		
Acute Retroviral Syndrome	1274		
Progressive HIV Disease	1274		
Prevention	1281		
<b>42. Infections: Bacterial &amp; Spirochetal</b>	<b>1283</b>		
<i>John W. Ogle, MD</i>			
<i>Marsha S. Anderson, MD</i>			
Bacterial Infections	1283		
Group A Streptococcal Infections	1283		
Group B Streptococcal Infections	1287		
Streptococcal Infections with Organisms other than Group A or B	1293		
Pneumococcal Infections	1294		
Staphylococcal Infections	1298		
Meningococcal Infections	1303		
Gonococcal Infections	1305		
Botulism	1308		
Tetanus	1310		
Gas Gangrene	1312		
Diphtheria	1313		
Infections Due to Enterobacteriaceae	1315		
<i>Pseudomonas</i> Infections	1317		
<i>Salmonella</i> Gastroenteritis	1318		
Typhoid Fever & Paratyphoid Fever	1320		
Shigellosis (Bacillary Dysentery)	1322		
Cholera	1323		
<i>Campylobacter</i> Infection	1325		
Tularemia	1326		
Plague	1327		
<i>Haemophilus Influenzae</i> Type B Infections	1328		
Pertussis (Whooping Cough)	1331		
Listeriosis	1333		
Tuberculosis	1335		
Infections with Nontuberculous Mycobacteria	1338		
Legionella Infection	1339		
<i>Chlamydomydia</i> Infections (Psittacosis [Ornithosis], <i>C. Pneumoniae</i> & <i>C. Trachomatis</i> )	1341		
Cat-Scratch Disease	1343		
Spirochetal Infections	1344		
Syphilis	1344		
Relapsing Fever	1348		
Leptospirosis	1349		
Lyme Disease	1350		
<b>43. Infections: Parasitic &amp; Mycotic</b>	<b>1353</b>		
<i>Kevin Messacar, MD</i>			
<i>Samuel R. Dominguez, MD, PhD</i>			
<i>Myron J. Levin, MD</i>			
Parasitic Infections	1353		
Protozoal Infections	1357		
Systemic Infections	1357		
Gastrointestinal Infections	1369		
Trichomoniasis	1374		
Metazoal Infections	1374		
Nematode Infections	1374		

Cestode Infections (Flukes)	1380		
Trematode Infections	1383		
<i>Pneumocystis</i> and Other Opportunistic Fungal Infections	1395		
<i>Pneumocystis jirovecii</i> Infection	1397		
<b>44. Sexually Transmitted Infections</b>	<b>1400</b>		
<i>Daniel H. Reirden, MD</i>			
<i>Ann-Christine Nyquist, MD, MSPH</i>			
Adolescent Sexuality	1400		
Risk Factors	1401		
Prevention of Sexually Transmitted Infections	1401		
Screening For Sexually Transmitted Infections	1402		
Signs & Symptoms	1402		
The Most Common Antibiotic-responsive Sexually Transmitted Infections	1403		
<i>Chlamydia trachomatis</i> Infection	1403		
<i>Neisseria gonorrhoeae</i> Infection	1409		
The Spectrum of Signs & Symptoms of Sexually Transmitted Infections	1410		
Cervicitis	1410		
Pelvic Inflammatory Disease	1410		
Urethritis	1412		
Epididymitis	1412		
Proctitis, Proctocolitis, & Enteritis	1413		
Vaginal Discharge	1413		
Genital Ulcerations	1415		
Genital Warts & Human Papillomavirus	1419		
Other Viral Infections	1420		
Ectoparasitic Infections	1422		
<b>45. Travel Medicine</b>		<b>1423</b>	
<i>Suchitra Rao, MBBS</i>			
<i>Sarah K. Parker, MD</i>			
Introduction		1423	
Preparing Children and Infants for Travel		1423	
Vaccinations—Routine Childhood Vaccines Modified for Travel		1425	
Vaccinations—Travel-Specific		1427	
Traveler's Diarrhea		1429	
Malaria Prophylaxis & Prevention		1430	
Visits to Friends & Relatives (VFR) in High-Risk Areas		1431	
HIV & Sexually Transmitted Diseases		1434	
Fever in the Returned Traveler		1434	
<b>46. Chemistry &amp; Hematology Reference Intervals</b>		<b>1439</b>	
<i>Georgette Siparsky, PhD</i>			
<i>Frank J. Accurso, MD</i>			
Challenges in Determining & Interpreting Pediatric Reference Intervals		1439	
Guidelines for Use of Data in a Reference Range Study		1439	
Statistical Computation of Reference Intervals		1440	
Why Reference Intervals Vary		1441	
Sensitivity & Specificity		1442	
Pediatric Reference Intervals		1442	
Index		1455	