Contents

Section 1: General Topics

1.1 Magnitude of Pediatric Infectious Diseases: Indian and Global Scenario 3
Late A Parthasarathy, Hitt Sharma
- *Demography 3*
- *Reported Cases 3*
- *Magnitude 3*
- *Future of Vaccine-preventable Diseases Surveillance in India 16*

1.2 Role of GAVI in the Control of Vaccine-preventable Diseases in India 19
Ashish Pathak, Naveen Thacker
- *How does Global Alliance for Vaccines and Immunization Work? 19*
- *Global Alliance for Vaccines and Immunization's Strategy 19*
- *Principles 19*
- *GAVI's Health System Strengthening Grants 19*
- *GAVI's Estimated Impact in 2016–2020 Period 19*
- *GAVI's Support to India 20*
- *Inactivated Polio Vaccine Introduction Support 20*
- *Health System Strengthening Support to India 20*
- *GAVI's Support for Pneumococcal Vaccine Globally 20*
- *Targeted Country Assistance for India for 2019–2020 21*

1.3 Rational Drug Therapy in Pediatric Infectious Diseases 22
YK Amdekar, Late Anand Shandilya
- *General Principles of Rational Drug Selection 22*
- *Rational Antibiotic Therapy 23*
- *When should an Antibiotic be Prescribed? 23*
- *When there is no Clue to Diagnosis? 23*
- *When there is no Clue to Diagnosis but is Safe to Wait? 24*
- *Principle of Choosing an Antibiotic 24*
- *Dosage, Duration, and Frequency of Administration of Antibiotics 24*
- *Anticipating Initial Response to Antibiotic 25*
- *When Antibiotic Fails in Suspected Bacterial Infection? 25*
- *When not to Prescribe an Antibiotic? 25*
- *Present Scenario of Irrational Antibiotic Use 25*
- *Why do Doctors Overprescribe Antibiotics? 25*
- *Rational Drug Therapy: Rational Prescriber a Priority! 26*
- *How to Prevent Misuse of Antibiotics? 26*

Section 2: Diagnosis and Management

2.1 Principles of Management of Bacterial Infection and Drug Resistance 29
Ritabrata Kundu
- *Mechanism of Action of Antibiotics 29*
- *Antibiotics Commonly Used in Children 29*
- *Principle of Antibiotic Selection 30*
- *Mechanism of Resistance to Different Antibiotics 31*
- *Multiple Antibiotic Resistance 32*
- *Indications of Antibiotic Therapy 32*

2.2 Infection Control in Hospital and Office Practice 34
Jaydeep Choudhury
- *Standard Precautions in Outpatient Setting 34*
- *Infection Control in Hospitalized Children 34*
- *Prevention of Antibiotic Resistance 39*

2.3 Laboratory Diagnosis of Infection 42
Rumpa Saha
- *Specimens and Collection 42*
- *Quality of Specimen 46*
- *Detection Methods 46*

2.4 Methicillin-resistant *Staphylococcus aureus* Infections 58
Dhanya Dharmapalan, Vijay Yewale
- *Epidemiology 58*
- *Mechanism of Resistance 58*
- *Transmission 58*
- *Clinical Spectrum 58*
- *Laboratory Diagnosis 58*
- *Management 59*
- *Infection Prevention and Surveillance 60*

2.5 Extended-Spectrum Beta-Lactamase Infections 62
Kheya Ghosh Uttam
- *Epidemiology 62*
- *Risk Factors 63*

- *Quality Control Strains Recommended 66*
- *Molecular Methods 66*
- *Prevention and Control 68*

2.6 Sepsis and Septic Shock in Children 71
Tanu Singhal
- *Epidemiology 72*
- *Etiology 72*
- *Pathogenesis 74*
- *Clinical Features 75*
- *Diagnosis 75*
- *Antimicrobial Management 78*
- *Source Control 80*
- *Supportive Care in Severe Sepsis and Septic Shock 80*
- *Prognosis 80*
- *Prevention 80*

2.7 Infections in the Immunocompromised..... 82
Sagar Bhattad
- *Normal Immune Defense 82*
- *Immune Deficiency 82*

2.8 Healthcare-associated Infections 87
Raju C Shah, Meet Patel
- *Epidemiology 87*
- *Microbiology 88*
- *Prevention for Healthcare-associated Infections 88*
- *Major Types of Healthcare-associated Infection 88*
- *Catheter-related Bloodstream Infection 89*
- *Ventilator-associated Pneumonia 94*
- *Catheter-associated Urinary Tract Infection 98*
- *Surgical Site Infection 100*

2.9 Prophylactic Antimicrobials 102
Jaydeep Choudhury
- *Prophylaxis in Neonates 102*
- *Disease-specific Prophylaxis 102*

Section 3: Fever

3.1 Fever: Pathogenesis and Treatment 111
Vikram Bhaskar, Piyush Gupta
- *Pathogenesis 111*
- *Etiology 111*
- *Measurement of Body Temperature 111*
- *Clinical Features 112*
- *Evaluation of a Febrile Child 113*
- *Laboratory Investigations 113*
- *Treatment 113*

3.2 Fever of Short Duration 115
Abhay K Shah, Bhaskar Shenoy
- *Clinical Approach 115*
- *Classification 116*
- *Management 119*

3.3 Long Duration Fever 121
Rajesh Chokhani
- *Understanding the Terminology 121*
- *General Approach 121*
- *History 121*
- *Physical Examination 123*
- *Making a Provisional Diagnosis: Etiology 124*
- *Investigations 125*
- *Management 127*
- *Prognosis 127*

3.4 Fever without Focus 129
Upendra Kinjawadekar
- *Dangers of Indiscriminate Antibiotic Use 129*
- *Approach 129*
- *Etiology 129*
- *Evaluation and Approach 130*
- *Clinical Judgment over Protocols 130*
- *Utility of Laboratory Parameters 131*
- *Fever without Focus in Older Infants and Children 132*

3.5 Fever with Rash 134
M Indrashekhar Rao, S Venkat Reddy
- *History and Clinical Examination 134*
- *Investigations in Fever with Rash 135*
- *Maculopapular Rashes 135*
- *Vesicular Rashes 143*
- *Hemorrhagic Rash (Petechiae and Purpura) 145*
- *Severe Cutaneous Adverse Drug Reactions 145*
- *Diffuse Erythema with Desquamation 146*
- *Images of Some other Conditions with Rashes in Children 147*

3.6 Febrile Neutropenia 148
Priyankar Pal
- *Initial Assessment and Investigation 148*
- *Management 149*

3.7 Periodic Fever 151
Kheya Ghosh Uttam
- *Hereditary Periodic Fever Syndrome 151*
- *Familial Mediterranean Fever 151*
- *Tumor Necrosis Factor Receptor-associated Periodic Syndrome 153*
- *Hyper-IgD Periodic Fever Syndrome or Mevalonate Kinase Deficiency 154*
- *Cryopyrin-associated Periodic Syndromes 154*
- *Periodic Fever, Aphthous Stomatitis, Pharyngitis and Adenitis or Marshall's Syndrome 156*

Section 4: Common Systemic Infections

4.1 Congenital Infections 159
Sanjay Deshpande
- *Congenital Toxoplasmosis 159*
- *Congenital Syphilis 163*
- *Congenital Rubella 169*
- *Congenital Cytomegalovirus Infection 172*
- *Congenital/Neonatal Herpes Infection 176*
- *Congenital Zika Virus Syndrome 178*

4.2 Neonatal Sepsis 182
Rhishikesh Thakre
- *Epidemiology 182*
- *Etiopathogenesis 182*
- *Clinical Features 182*
- *Investigations 183*
- *Management 187*
- *Prevention 189*
- *Prognosis 189*

4.3 Upper Respiratory Tract Infections 191
Ravishankara Marpalli
- *Acute Respiratory Infection 191*
- *Common Cold 191*
- *Pharyngitis 193*
- *Acute Rhinosinusitis 195*
- *Acute Otitis Media 197*
- *Acute Inflammatory Upper Airway Obstruction 198*
- *Croup Syndrome 198*

4.4 Cervical Lymphadenopathy in Children 202
Sudip Dutta, Sumit Periwal
- *Lymphatic System and Lymph Nodes 202*
- *Differential Diagnosis 204*
- *Diagnostic Approach 204*
- *History 204*
- *Clinical Examination 204*
- *Indications for Admission 205*
- *Investigations 205*
- *Selected Individual Conditions 206*
- *Prognosis 207*

4.5 Bronchiolitis 208
BS Sharma, Hari Mohan Meena, Pankaj Jain
- *Etiology 208*
- *Pathophysiology 208*
- *History 208*
- *Signs and Symptoms 208*
- *Complications 209*
- *Diagnosis 209*
- *Differential Diagnosis 210*
- *Admission Criteria 210*
- *Initial Management 211*
- *Supportive Therapy 211*
- *Mechanical Ventilation 211*
- *Complications of Therapy 213*
- *Discharge Criteria 213*
- *Follow-Up 213*
- *Prognosis 213*
- *Prevention 213*

4.6 Community-acquired Pneumonia 216
Sushil Kumar Kabra
- *Epidemiology 216*
- *Etiology 216*
- *Clinical Features 216*
- *Diagnosis 217*
- *Management 218*
- *Treatment of Pneumonia 220*
- *Prevention of Pneumonia 222*

4.7 Complications of Pneumonia 224
S Nagabhushana
- *Parapneumonic Effusion/Empyema 224*
- *Necrotizing Pneumonia 225*
- *Lung Abscess 226*
- *Pneumatocele 227*
- *Syndrome of Inappropriate Antidiuretic Hormone 227*

4.8 Acute Bacterial Meningitis 228
Chetan Trivedi
- *Epidemiology 228*
- *Causative Organisms 228*
- *Predisposing Factors 228*
- *Pathogenesis 228*
- *Clinical Features 229*
- *Examination 229*
- *Investigations 230*
- *Imaging 232*
- *Differential Diagnosis 232*
- *Complications 232*
- *Treatment 233*
- *Prognosis 234*
- *Follow-up 234*
- *Prevention 234*

4.9 Acute Encephalitis Syndrome 236
Apurba Ghosh, Aniruddha Ghosh
- *Epidemiology 236*
- *Etiology 237*
- *Clinical Features 237*
- *Evaluation and Management 238*
- *Prevention 244*

4.10 Brain Abscess 246
Ritesh Shah
- *Epidemiology 246*
- *Pathogenesis 246*
- *Etiology 246*
- *Pathology 247*
- *Clinical Features 247*
- *Diagnosis 247*
- *Differential Diagnosis 248*
- *Treatment 248*
- *Prognosis 248*

4.11 Acute Rheumatic Fever 249
Vidya Krishna
- *Epidemiology 249*
- *Etiopathogenesis 249*

- *Pathology 249*
- *Clinical Features 250*
- *Diagnosis of ARF by Modified Jones Criteria 251*
- *Differential Diagnosis 251*
- *Treatment 251*
- *Late Complications 253*
- *Prevention of Rheumatic Fever 253*

4.12 Infective Endocarditis 255
Debasree Gangopadhyay, Mahua Roy, Debabrata Nandi
- *Epidemiology 255*
- *Pathogenesis 255*
- *Clinical Features in Children and Adolescents 257*
- *Diagnosis 258*
- *Treatment 260*

4.13 Urinary Tract Infection and Pyelonephritis 268
RW Thergaonkar, Madhuri Kanitkar
- *Etiopathogenesis 268*
- *Clinical Features 269*
- *Diagnosis 269*
- *Treatment 270*
- *Further Evaluation after Urinary Tract Infection 270*
- *Prevention of Recurrent Urinary Tract Infection 272*
- *Long-term Follow-up 273*
- *Asymptomatic Bacteriuria 273*
- *UTI in Patients with Neurogenic Bladder 273*
- *Fungal Urinary Tract Infection 273*

4.14 Infective Diarrhea 275
Ashwani K Sood, Shruti Sharma
- *Epidemiology 275*
- *Acute Infectious Diarrhea 275*
- *Chronic Infectious Diarrhea 281*

4.15 Intra-abdominal Infections 283
Suhas V Prabhu
- *Peritonitis 283*
- *Acute Secondary Localized Peritonitis (Peritoneal Abscess) 287*

4.16 Skin and Soft Tissue Infections and Infestations 290
Sandipan Dhar, Sahana M Srinivas
- *Scabies 290*
- *Pediculosis 291*
- *Folliculitis 293*
- *Furunculosis 293*
- *Impetigo 293*
- *Ecthyma 294*
- *Cellulitis and Erysipelas 294*
- *Acute Lymphangitis 294*
- *Necrotizing Fasciitis 296*
- *Sycosis Barbae 296*
- *Lupus Vulgaris 297*
- *Scrofuloderma 297*
- *Tuberculosis Verrucosa Cutis 298*
- *Molluscum Contagiosum 298*
- *Pityriasis Rosea 299*
- *Tinea Corporis, Tinea Cruris and Tinea Faciei 300*
- *Tinea Pedis and Tinea Manuum 301*
- *Tinea Capitis 301*
- *Pityriasis Versicolor 302*

4.17 Bone and Joint Infections 304
Nupur Ganguly
- *Osteomyelitis 304*
- *Pyogenic Arthritis 309*

Section 5: Common Bacterial Infections

5.1 *Staphylococcus* 315
Shyam Kukreja, Tapisha Gupta
- *History 315*
- *Clinical Microbiology 315*
- *Virulence Factors 315*
- *Antibiotic Resistance 316*
- *Detection of Methicillin Resistance 316*
- *Prevalence of Methicillin Resistance 317*
- *Vancomycin Resistance: The Most Feared Genetic Adaptation 317*
- *Host Defense 318*
- *Nasal Colonization 318*
- *Clinical Manifestations 318*
- *Skin and Soft-tissue Infections 319*
- *Pneumonia 319*
- *Meningitis 320*
- *Osteoarticular Infections 320*
- *Infective Endocarditis 320*
- *Other Infections 320*
- *Toxin-mediated Staphylococcal Illnesses 321*
- *Coagulase-negative Staphylococcus aureus 321*

5.2 Salmonella Infections: Typhoid and Nontyphoidal Salmonellosis 323
Abhay K Shah
- *Historical Background 323*
- *Enteric Fever 323*
- *Nontyphoidal Salmonella Infections 332*

5.3 Diphtheria 336
Ketan Bharadva
- *Etiology 336*
- *Pathophysiology 336*
- *Epidemiology 337*
- *Clinical Features 337*
- *Complications 338*
- *Differential Diagnosis 338*
- *Investigations 338*
- *Treatment 339*
- *Prevention 341*

5.4 Pertussis 345
Shweta Chitkara, Bharat Mehra, AJ Chitkara
- *Epidemiology 345*
- *Agent, Host, and Environment 345*
- *Host Factors 345*

- *Clinical Course 346*
- *Complications 346*
- *Laboratory Diagnosis 346*
- *Management 347*
- *Prevention 347*

5.5 Tetanus 349
Shivananda
- *Epidemiology 349*
- *Agent 349*
- *Pathogenesis 349*
- *Clinical Features 350*
- *Complications 351*
- *Laboratory Investigations 351*
- *Differential Diagnosis 352*
- *Management 352*
- *Prognosis 353*
- *Prevention 353*
- *Wound Management 353*

5.6 Cholera 354
Jaydeep Choudhury
- *Epidemiology 354*
- *Etiopathogenesis 354*
- *Clinical Features 354*
- *Diagnosis 355*
- *Treatment 355*
- *Complications 356*
- *Prognosis 356*
- *Prevention 357*

5.7 *Mycoplasma* Infection 358
Somu Sivabalan, Srinath MV
- *Pathogenesis 358*
- *Clinical Features 359*
- *Diagnosis 361*
- *Treatment 361*
- *Prognosis 362*

5.8 Aspergillosis 363
Narayanappa D, Sinchana N
- *Etiopathogenesis 363*
- *Clinical Features 364*
- *Aflatoxin 366*
- *Keratitis 366*
- *Otomycosis 366*
- *Sinusitis 367*
- *Central Nervous System 367*
- *Cutaneous Aspergillus Fumigatus Infection in Newborn 367*
- *Diagnosis 368*
- *Treatment 369*

5.9 Tuberculosis 372
Sangeeta Sharma
- *Epidemiology 372*
- *Etiopathogenesis 372*
- *High-risk Factors for Active TB 373*
- *Diagnosis 374*
- *Diagnostic Algorithms 379*
- *Notification 380*
- *Treatment 380*
- *Tuberculosis Prevention 382*

5.10 Leprosy 386
Rajeshwar Dayal, Madhu Sonkar
- *Epidemiology 386*
- *Etiology 387*
- *Source of Infection and Mode of Transmission 387*
- *Clinical Manifestations 387*
- *Classification 387*
- *Reactions 388*
- *Diagnosis 389*
- *Management 390*
- *Prophylaxis 391*

Section 6: Common Viral Infections

6.1 Transmission for Infection 395
Ritabrata Kundu
- *Agent 395*
- *Host 395*
- *Environment 395*
- *Basics of Transmission 395*

6.2 Measles 399
Digant D Shastri, Abhay K Shah
- *Epidemiology 399*
- *Etiopathogenesis 399*
- *Pathogenesis 399*
- *Mode of Transmission 400*
- *Infectivity Period 400*
- *Risk Factors 400*
- *Signs and Symptoms 400*
- *Diagnosis 401*
- *Differential Diagnosis 401*
- *Complications 402*
- *Subacute Sclerosing Panencephalitis 402*
- *Treatment 402*
- *Prognosis 403*
- *Prevention of Measles 403*

6.3 Rubella 407
P Ramachandran
- *Virus 407*
- *Epidemiology 407*
- *Etiopathogenesis 407*
- *Postnatal Infection 407*
- *Congenital Rubella Syndrome 408*
- *Management 409*
- *Prevention 409*

6.4 Mumps 411
Ashok Rai
- *Etiology 411*
- *Pathogenesis 411*
- *Epidemiology 411*
- *Clinical Features 411*
- *Complications 412*
- *Diagnosis 412*
- *Differential Diagnosis 412*
- *Treatment 412*
- *Prognosis 413*
- *Prevention 413*

6.5 Poliomyelitis 414
Ashok Kumar Dutta
- *Etiopathogenesis 414*
- *Epidemiology 414*
- *Clinical Features 414*
- *Laboratory Diagnosis 415*
- *Treatment 415*
- *Prognosis 416*
- *Prevention 416*
- *Polio Eradication 417*
- *Post-polio Syndrome 418*

6.6 Acute Viral Hepatitis 419
Malathi Sathiyasekaran
- *Epidemiology 419*
- *Viral Characteristics and Pathogenesis 419*
- *Clinical Features 421*
- *Complications 422*
- *Investigations 422*
- *Differential Diagnosis 423*
- *Management 425*
- *Prevention 426*

6.7 Herpes Simplex Virus Infection in Children 427
Niranjan Mohanty, Jyoti Ranjan Behera
- *Etiology 427*
- *Pathogenesis 427*
- *Clinical Features 428*
- *Laboratory Diagnosis 430*
- *Viral-specific Studies 431*
- *Differential Diagnosis 431*
- *Treatment 432*
- *Prognosis and Complications 432*
- *Prevention 433*

6.8 Parvovirus B19 435
Lalitha Kailas
- *Etiology 435*
- *Epidemiology 435*
- *Pathogenesis 435*
- *Immunology 436*
- *Clinical Manifestations 436*
- *Diagnosis 437*
- *Differential Diagnosis 438*
- *Treatment 438*
- *Complications 438*
- *Prevention 438*

6.9 Varicella Zoster 440
Parang N Mehta
- *Chickenpox 440*
- *Varicella Zoster (Shingles) 443*

6.10 Respiratory Syncytial Virus Infection 445
Jagdish Chinnappa, Archana Mahalingam
- *Virology 445*
- *Immunology 445*
- *Epidemiology 445*
- *Pathogenesis 446*
- *Investigations 446*
- *Management 446*
- *Prevention 447*

6.11 Influenza 450
Rohit Agrawal, Mithila Amin
- *Historical Background 450*
- *Influenza Virus 450*
- *Epidemiology and Influenza Burden 451*
- *Clinical Picture 452*
- *Diagnosis 453*
- *Treatment 454*
- *Prevention 454*

6.12 Rotavirus 458
Monjori Mitra
- *Epidemiology 458*
- *Pathogenesis 458*
- *Clinical Features 459*
- *Diagnosis 460*
- *Prevention 460*
- *Dose and Schedule: Recommendations 461*
- *Special Situations 462*
- *Contraindications 462*
- *Future of Rotavirus Vaccine Development 462*

6.13 Human Papillomavirus 464
Swati Y Bhave
- *Epidemiology 464*
- *Human Papillomavirus Burden in Men 464*
- *Etiopathogenesis 465*
- *Transmission 466*
- *Clinical Features 466*
- *Modalities of Diagnosis 466*
- *Treatment 466*
- *Prevention 466*
- *Current Recommendations of Advisory Committee on Immunization Practices in 2019 Children and Adults Aged 9 through 26 Years 468*
- *What is New in Advisory Committee on Immunization Practices Guidelines? 468*
- *Cervical Cancer Screening 469*

6.14 Dengue Illnesses and Viral Hemorrhagic Fever 471
Satish Pandya
- *Dengue Prevalence In india 471*
- *Dengue Virus 471*
- *Clinical Features 473*
- *Classification of Dengue 476*
- *Differential Diagnosis 476*
- *Laboratory Diagnosis 476*
- *Management 478*
- *Monitoring of Patients with Shock 480*
- *Critical Interpretation of Hematocrit 481*
- *When to Stop Intravenous Fluid Therapy? 481*
- *Treatment of Hemorrhagic Complications 482*
- *Management of Fluid Overload 482*

- *Blood Glucose Control 483*
- *Electrolyte and Acid–Base Imbalances 483*
- *Coinfections and Nosocomial Infections 483*
- *Hemophagocytic Syndrome 483*
- *Supportive Care and Adjuvant Therapy 483*
- *Criteria for Discharge 483*
- *Vertical Transmission and Neonatal Dengue 484*
- *Dengue Vaccines 484*
- *World Health Organization Position 484*
- *Dengue Management during COVID-19 Pandemic 484*

6.15 Chikungunya Fever....486
Rajniti Prasad
- *Epidemiology 486*
- *Chikungunya Virus 486*
- *Pathogenesis 486*
- *Clinical Manifestations 486*
- *Diagnosis 487*
- *Management 488*
- *Prevention 488*

6.16 Infectious Mononucleosis....490
Narendra Rathi
- *Epidemiology 490*
- *Etiopathogenesis 490*
- *Clinical Features 490*
- *Diagnosis 491*
- *Differential Diagnosis 492*
- *Treatment 492*
- *Complications 492*
- *Prognosis 493*
- *Prevention 493*

6.17 Adenovirus....494
Prabhas Prasun Giri
- *Properties of the Virus 494*
- *Epidemiology 494*
- *Clinical Spectrum 495*
- *Diagnosis 498*
- *Treatment 498*
- *Adenovirus in Gene Therapy and Vaccines 500*
- *Prevention 500*

6.18 Coronavirus/COVID-19 and Multisystem Inflammatory Syndrome....501
K Dhanalakshmi, Sumanth Amperayani, S Balasubramanian
- *Coronavirus 501*
- *Severe Acute Respiratory Syndrome in Children 502*
- *Middle East Respiratory Syndrome 503*
- *SARS-CoV-2 504*
- *Pathophysiology of COVID-19 508*
- *Pediatric Inflammatory Multisystem Syndrome: Temporally Associated with COVID-19 520*

6.19 Nipah and Zika Virus....526
Remesh Kumar R, Krishna Mohan R
- *Nipah Virus 526*
- *Zika Virus 527*

6.20 Rabies....529
Omesh Kumar Bharti
- *Epidemiology 529*
- *Pathophysiology 529*
- *Pet Vaccination 529*
- *Signs of Rabies in Animals 530*
- *Consumption of Raw Milk of a Rabid Cow 530*
- *Signs and Symptoms of Rabies 530*
- *Management 531*
- *Active Immunization 533*
- *Some Typical Situations 533*
- *Contraindications and Precautions 535*

6.21 Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome....537
Ira Shah
- *Epidemiology 537*
- *Transmission and Pathogenesis of Human Immunodeficiency Virus 537*
- *Perinatal Transmission of Human Immunodeficiency Virus 537*
- *Clinical Manifestations of Human Immunodeficiency Virus 538*
- *World Health Organization Staging System for Human Immunodeficiency Virus in Children 538*
- *Diagnosis of Human Immunodeficiency Virus 538*
- *Monitoring Human Immunodeficiency Virus Disease Progression in Children 540*
- *Antiretroviral Therapy 541*
- *Prevention of Parent-to-Child Transmission of Human Immunodeficiency Virus 545*
- *World Health Organization Rapid Advice for use of Antiretroviral Drugs for Treating Pregnant Women and Preventing Human Immunodeficiency Virus Infection in Infants, 2013 545*

Section 7: Protozoal, Parasitic and Fungal Infections

7.1 Malaria....549
Ritabrata Kundu
- *Life Cycle of Malaria 549*
- *Clinical Features 550*
- *Relapse of Malaria 552*
- *Recrudescence of Malaria 552*
- *Malaria in Special Situations 552*
- *Coexisting Morbidities 552*
- *Diagnosis of Malaria 553*
- *Management of Uncomplicated Malaria in Children 555*

- *Chemoprophylaxis 559*
- *Malarial Elimination in India (2017–2022) 559*
- *Malaria Vaccine 559*

7.2 Leishmaniasis 561

Nigam P Narain, Rajesh Kumar

- *Epidemiology 561*
- *Transmission 561*
- *Clinical Features 562*
- *Diagnosis 563*
- *Treatment 564*
- *Post-Kala-Azar Dermal Leishmaniasis 566*
- *Coinfection with HIV 566*
- *Prevention 566*
- *Vaccination 566*

7.3 Fungal Infections 568

S Balasubramanian, Sumanth Amperayani

- *High Index of Suspicion in Fungal Infections 568*
- *Fungal Infections of the Skin 568*
- *Opportunistic Fungal Infections 575*
- *Pneumocystis jirovecii Infection 575*
- *Pearls in Investigating a Fungal Infection 576*

7.4 Common Parasitic Infestations 579

Baldev S Prajapati, Rajal B Prajapati

Nematodes 579

- *Ascaris lumbricoides (Round Worm) 579*
- *Ancylostoma duodenale/Necator americanus (Hookworms) 579*
- *Enterobiosis (Enterobius vermicularis) 580*
- *Trichuris trichiura (Trichuriasis) (Whipworm) 582*
- *Strongyloides stercoralis (Strongyloidiasis) 583*

Cestodes (Tapeworms) *583*

- *Taenia solium (Pork Tapeworm) 583*
- *Taenia saginata (Beef Tapeworm) 585*
- *Echinococcus granulosus (Dog Tapeworm) (Hydatid Disease) 585*
- *Diphyllobothrium latum (Fish Tapeworm) 588*
- *Hymenolepis nana (Dwarf Tapeworm) 589*
- *Schistosomiasis 589*
- *Intestinal, Liver, and Lung Flukes 589*
- *Filariasis 589*
- *Tropical Pulmonary Eosinophilia 590*

7.5 Amebiasis and Giardiasis 593

Sutapa Ganguly

Amebiasis *593*

- *Life Cycle and Transmission 593*
- *Pathogenesis 593*
- *Clinical Manifestation 594*
- *Investigations 594*
- *Amebic Liver Abscess 594*
- *Treatment 595*
- *Prevention 595*

Giardiasis *595*

- *Life Cycle 596*
- *Transmission 596*
- *Pathogenesis 596*
- *Clinical Manifestations 596*
- *Investigations 597*
- *Treatment 597*
- *Prevention 597*

Section 8: Other Infections

8.1 Rickettsial Infections 601

Atul Kulkarni

- *Etiology and Microbiology 601*
- *Method of Transmission 602*
- *Pathophysiology 602*
- *Immunity 602*
- *Clinical Manifestations 602*
- *Complications 604*
- *Diagnosis 606*
- *Treatment 608*
- *Prevention 609*
- *Prognosis 609*

8.2 Leptospirosis in Children 611

Janani Sankar

- *Epidemiology 611*
- *Clinical Features 611*
- *Diagnosis 612*
- *Laboratory Investigations 613*
- *Treatment 613*
- *Complications 614*
- *Prevention 614*

8.3 Brucella Infection 615

Sanjay Krishna Ghorpade

- *Epidemiology 615*
- *Etiology 615*
- *Pathogenesis 615*
- *Clinical Manifestations 616*
- *Diagnosis 616*
- *Differential Diagnosis 617*
- *Treatment 617*
- *Complications 617*
- *Prognosis 618*
- *Prevention 618*

8.4 Anaerobic Infections 620

Anju Aggarwal

- *Neonatal Infections 620*
- *Central Nervous System Infections 620*
- *Head and Neck Infections 620*
- *Dental Infections 621*
- *Otitis Media 621*
- *Intra-abdominal Infections 621*
- *Pleuropulmonary Infections 621*
- *Skin and Soft Tissue Infections 621*
- *Bacteremia 622*
- *Diagnosis 622*
- *Treatment 622*
- *Tetanus 622*
- *Clostridium difficile Infection 624*
- *Botulism 625*

Section 9: Vaccines and Immunization

9.1 Immunology of Vaccines and Principles of Immunization 631

Vipin M Vashishtha, Chandra Mohan Kumar

- *Active and Passive Immunity 631*
- *Vaccination versus Immunization 632*
- *Biology of Vaccines 632*

Immunology of Vaccines *635*

- *Types of Immunity 635*
- *The Main Effectors of Vaccine Responses 640*
- *Immune Responses at Cellular Level 641*

Elementary Epidemiology *644*

- *Definition, Scope, and Uses of Epidemiology 644*
- *Cost Effectiveness of a Vaccine or Vaccination Program 647*

Adverse Events Following Immunization *648*

- *Classification of Adverse Event Following Immunization 648*
- *General Guidelines for Immunization 652*

Vaccination Schedules *656*

- *The Ideal Immunization Schedule 656*

9.2 Immunization Schedule and Immunization in a Normal Child 659

Jaydeep Choudhury

- *National Immunization Program in India 659*
- *Communicating with Parents 661*
- *IAP ACVIP Recommendation 661*
- *Technical Aspects of Injection 661*
- *Individual Vaccines 662*

9.3 Immunization in Immune Compromised Children and Adolescents 677

Rukhsar Shemna, Nitin K Shah

- *Immunization of Household Contacts/Caregivers 677*
- *Vaccination in HIV Infected Child 677*
- *Vaccination Post Chemotherapy/ Radiotherapy 679*
- *Vaccination of a Child on Steroids 680*
- *Vaccination in a Child with Asplenia 680*
- *Vaccination in Primary Immunodefeciency 680*
- *Vaccination Post Hematopoietic Stem Cell Transplant 681*
- *Vaccination Post Solid Organ Transplant 681*

9.4 Delayed Immunization, Lapsed Immunization and Adolescent Immunization 683

Harish Pemde

- *Catch-up Immunization 683*
- *Immunization of Adolescents 686*

9.5 Future Vaccines 690

Srinivas G Kasi

- *Newer Technologies in Vaccine Development 690*
- *Reverse Vaccinology 691*
- *Deoxyribonucleic Acid Vaccines 692*
- *Ribonucleic Acid Vaccines 693*
- *Viral Vectors for Vaccines 693*
- *Chimeric Vaccines 694*
- *Newer Adjuvants 694*
- *Edible Vaccines 694*
- *Malaria, Tuberculosis, and Acquired Immunodeficiency Syndrome Vaccines 696*
- *Future Vaccines against Respiratory Pathogens 697*
- *Parainfluenza Virus Vaccines 698*
- *Newer Influenza Vaccines 698*
- *Newer Pneumococcal Vaccines 699*
- *Newer Pertussis Vaccines 699*
- *Future Vaccines against Enteric Pathogens 699*
- *Future Vaccines against Vector-borne Diseases 700*
- *Future Hepatitis Vaccines 701*
- *Vaccines against the Neglected Tropical Diseases 701*
- *Other Future Vaccines 702*

9.6 Vaccine Storage and Handling 705

Digant D Shastri

- *What is the Cold Chain? 705*
- *Importance of Maintaining the Cold Chain 705*
- *Vaccine Storage Equipment Supplied Under the Immunization Program 706*
- *Ice Lined Refrigerator 706*
- *Cold Chain Temperature Monitoring 710*
- *Vaccine Handling Personnel 711*
- *Efficient Vaccine Management Protocols 712*
- *Emergency Vaccine Retrieval and Storage 712*

9.7 Adverse Events Following Immunization 714

Yagnesh Popat, Swati Popat

- *Cause-specific Categorization of Adverse Events Following Immunization 714*
- *Categories of Adverse Events 715*
- *Managing Adverse Event Following Immunization 716*
- *Reporting 718*
- *Causality Assessment 719*

Section 10: Miscellaneous Topics

10.1 Sexually Transmitted Infections in Adolescents 725

Preeti M Galagali, Samipa Mukherjee

- *Global Scenario 725*
- *Indian Scenario 726*

- *Vulnerability of Adolescence to Sexually Transmitted Infection 726*
- *Essentials of Sexually Transmitted Infection Management 731*
- *Challenges in Management of Sexually Transmitted Infection 732*
- *Sexually Transmitted Infection Prophylaxis: Adolescent Sexual Assault 733*
- *Prevention of Sexually Transmitted Infection in Adolescents 733*

10.2 Infection-associated Hemophagocytic Lymphohistiocytosis 735
Priyankar Pal, Harshita Jagwani
- *Types of Hemophagocytic Lymphohistiocytosis 735*
- *Clinical Manifestations 735*
- *Investigations 736*
- *Pathophysiology 736*
- *Management 737*

10.3 Safe Injection Practices 739
SS Kamath
- *Safe and Appropriate Use of Injections 739*
- *Specifics of Safe Injection Practices 740*
- *Practical Guidance on Hand Hygiene 740*
- *Key Steps of Hand Washing 740*
- *Best Injection Techniques 741*
- *Needlestick Injury and Postexposure Prophylaxis 743*
- *Disposal of Injection Waste (Syringes and Needles) 745*
- *Newer Technologies 745*
- *Healthcare Worker Safety Devices 746*

Annexures

Annexure 1: Drug Dosage for Pediatric Infections *751*
Jeeson Unni

Annexure 2: Fluid Therapy in Infectious Diseases *833*
Shivananda, Prabhas Prasun Giri

Index 841