

The Association of Physicians of India

ADULT IMMUNIZATION 2014

Second Edition

Editors
A Muruganathan
Dilip Mathai
SK Sharma

Contents

1. Setting-up an Adult Immunization Clinic **1**
D Suresh Kumar, J Hemalatha
• Stepwise Approach in Setting Adult Immunization Clinic *1*

2. Principles of Immunization **3**
YP Munjal, Anupam Prakash, Manish
• Active and Passive Immunity *3* • Immunization and Vaccination *3*
• Immunization Strategies *4* • Vaccination *5* • Vaccine *5*

3. Adolescent Immunization **8**
Sumeet Singla, AK Agarwal, RK Singal
• Who are Adolescents? Why are they Important? *8* • Why Adolescent Vaccination? *8* • Concept of Adolescent Immunization *8*

4. Anthrax **13**
Ayan Basu, Manash Sarkar
• Epidemiology *13* • Transmission *13* • Clinical Features *13*
• Diagnosis *14* • Treatment *15* • Prevention *15* • Indications *16*
• Vaccine Future *18* • Vaccination Recommendations *19*

5. Cancer Vaccines **20**
TS Rao, Jyoti M Logani
• Cancer Epidemiology *20* • Need for a Vaccine *20*
• Cancer Vaccines *21* • Global Vaccine Scenario *24*

6. Chikungunya **25**
Sekhar Pal, Manab Kumar Ghosh, Bhaswati Banerjee, TS Rao, Jyoti M Logani
• Disease Burden *25* • Management Challenges *26*
• Newer Developments *27* • Cost-Effectiveness *28*

7. Cholera Vaccines **34**
RK Singal, Vivek Pal Singh, AK Agarwal
• Disease Epidemiology *34* • Need of Vaccine *34* • Cholera Vaccines *35*
• Global Scenario of Cholera Vaccines *35* • Vaccine Safety *36*
• Cost-Effectiveness *37* • Indian Perspective *37*

8. Dengue Fever and Present Status of Dengue Vaccine **38**
Arindam Naskar, Manab Kumar Ghosh, Umesh Chandra Chaturvedi
• Epidemiology *38* • Transmission of the Dengue Virus *38*
• Predisposition *39* • Clinical Manifestations *39*
• Associated Problems *40* • Dengue Virus Antigens and Immune Response *40* • Need for Vaccination *40* • Current Vaccination *40*
• Future of Vaccination *41*

9. Hepatitis A Vaccine **44**
Premashish Kar, Rajiv Singla
• Epidemiology *45* • Need of Vaccine *46* • Current Vaccines *46*
• Global Scenario of the Vaccine *48* • Vaccine Safety *50*
• Cost-Effectiveness *50* • Indian Recommendations *51*

10. Hepatitis B Vaccine **53**
Kumar M, Chetan R Kalal, Shiv S Sarin
• Epidemiology *53* • Need of Vaccine *54* • Current Vaccines *57*
• Indian Recommendations *61*

11. Hepatitis C Vaccine **64**
Vijay Bodh, Ajay Duseja, Yogesh Chawla
• Disease Epidemiology *64* • Need of Vaccine *64* • Challenges *64*
• Current HCV Vaccines *65* • Prophylactic Vaccines: Global Scenario *65*
• Therapeutic Vaccines: Global Scenario *66* • Vaccine Safety and Cost-Effectiveness *70* • Vaccine Future *70* • Indian Recommendations *70*

12. Hepatitis E Vaccine **73**
SPK Varma, SK Acharya, SK Panda
• Epidemiology *73* • Need of Vaccine *75* • Current Vaccine *75*
• Global Scenario of the Vaccines *75*

***13. Haemophilus Influenzae* Type B Vaccination for Adults** **89**
Dilip Mathai, A George Vasanthan
• Disease Epidemiology *89* • Risk Groups *90* • Need for Vaccine *91*
• Efficacy of Clinical Study *91* • Correlates of Protection *92*
• Current Vaccines *92*

14. Human Papillomavirus Vaccine for Adults (HPV Vaccines) **95**
Dilip Mathai, A George Vasanthan
• Type of Vaccines Available *96* • Efficacy Data *96* • Measuring Vaccine Effectiveness *97* • Human Papillomavirus Vaccine: Global Scenario *98*
• Safety of Human Papillomavirus Vaccine *99* • PATH Study in India 101
• Cost-Effectiveness *101* • Economic Evaluation Based on Transmission Model *102* • Future in Human Papillomavirus Vaccine *102*
• Guidelines for Special Population: Adolescents and Adults *103*
• Recommendation *103*

15. Human Immunodeficiency Virus Vaccine: Changing Paradigms **107**
RS Paranjape, Milind Y Nadkar, BB Rewari
• Structure of Human Immunodeficiency Virus and Vaccine Targets *107*
• Other Initiatives and Programs *116* • Vaccine Recommendations *117*

16. Influenza Vaccines **119**
Anupam Prakash, YP Munjal, Ghan Shyam Pangtey
• Disease Epidemiology *119* • Need of Vaccination-Strategies for Controlling Influenza *120* • Current Influenza Vaccines: Global and Indian Scenario *120* • Safety Issues *122* • Efficacy, Effectiveness and Protection *123* • Avian or Swine Influenza *124*

17. Immunization in Pregnant Women **126**
RK Sharma, Vivek Ruhela
• Vaccines Contraindicated in Pregnancy *126* • Food and Drug Administration Pregnancy Categories *132*

18. Japanese Encephalitis Vaccines **134**
SK Sharma, YP Munjal, Anupam Prakash
• Disease Epidemiology *134* • Need of Vaccine *135*
• Global Scenario of JE Vaccines 136 • Vaccine Safety *137*
• Cost-Effectiveness *138* • Vaccine Future 138
• Indian Recommendations *139*

19. Leprosy Vaccines **141**
Vishwa Mohan Katoch, Umesh Datta Gupta
• Immunomodulatory Agents Available or Tried in Leprosy *142*
• Subunit and Deoxyribonucleic Acid Vaccines *145*
• Future Perspective *145*

20. Malaria **149**
DK Kochar, Aparup Das, Ardhendu K Maji
• Disease Epidemiology *149* • Clinical Features *149* • Diagnosis *150*
• Treatment *150* • Antimalarial Drug Resistance *152*
• Need of Vaccine/Indication *152* • Current Vaccine *152*
• Vaccine Global Scenario *152* • Vaccine Safety 153
• Cost-Effectiveness *153* • Vaccine Future *154*

21. Measles, Mumps and Rubella (MMR) Vaccination **155**
Vikas Suri, Sanjay Jain
• Measles, Mumps and Rubella Vaccine *155*

22. Meningococcal Vaccine **160**
AK Agarwal, Sumeet Singla, SK Sharma
• Risk Factors for Meningococcal Disease *161* • Meningococcal Disease and Vaccination *161* • Vaccination Guidelines for Adults in India *164*
• Future Vaccine Development *165*

23. Newer Vaccines **167**
Yogiraj Ray, Bibhuti Saha
• Human African Trypanosomiasis *167* • Cytomegalovirus *167*
• Smallpox and Anthrax Combined Vaccine 168 • Hookworm *169*
• Schistosomiasis *169*

24. Pneumococcal Vaccine **171**
Sumeet Singla, SK Sharma, YP Munjal, AK Agarwal
• Burden of Pneumococcal Infections *171* • Risk Factors for Pneumococcal Infections *172* • *Streptococcus pneumoniae* and Pneumococcal Vaccines *172* • Pneumococcal Vaccine in High-Risk Groups *174* • Vaccine Administration and Adverse Effects *176* • Future Vaccine Development *179*

25. Immunization for Poliomyelitis in Adults: Indian Guidelines **182**
V Ramasubramanian
• Disease Epidemiology *182* • Need of Vaccines *182*
• Current Vaccines *182* • Vaccine Safety *184*
• Global Scenario of Polio *184* • The Future *185*
• Recommendations for India *186*

26. Rabies Immunization **187**
Himanshu Chauhan, Manish, Vivek Pal Singh
• Disease Epidemiology *187* • Modes of Transmission *187*
• Need of Vaccination *188* • Postexposure Therapy for Previously Vaccinated Persons *193* • Pre-exposure Prophylaxis *193*
• Counseling of Patients and Attendants *193* • Effectiveness of Vaccination in Dogs *194* • Personal Safety Against Rabies *194*
• Possible Reasons for Antirabies Treatment Failure *194*
• Control of Rabies in Reservoir *194*

27. Rotavirus Vaccines **196**
Pooja Sharma, Nita Bhandari, TS Rao, Temsunaro Rongsen-Chandola
• Microbiology *196* • Rotavirus Epidemiology in India *197*
• Rotavirus Infection and Immune Response *197*
• Mechanism of Disease *197* • Development of Vaccines to Protect from Rotavirus Infection *197* • Vaccine Safety *202*
• Cost-Effectiveness *202* • Need for Rotavirus Vaccine *202*
• Introduction of Rotavirus Vaccine in India *203*

28. Tetanus, Diphtheria, Pertussis (Tdap Vaccine) Vaccination in Adults **205**
RK Sharma, Dharshan R
• Epidemiology of Disease *205* • Indications for Td or Tdap Vaccination *207* • Contraindications and Precautions *208*
• Adverse Effects *208* • Vaccine Preparations *208*
• Immunization for Patients with Injuries *209*
• Pertussis: Strategies to Prevent Outbreaks *210*

29. Tuberculosis Vaccine **213**
Ghan Shyam Pangtey, Anandh K
• Epidemiology of Tuberculosis *213* • Need for Vaccine *213*
• Current Vaccine: Bacillus Calmette-Guérin *214*
• Global Scenario of Tuberculosis Vaccine *214*
• Vaccine Candidates *215* • Indian Studies *217*
• Vaccine Safety and Cost-Effectiveness *217*
• Vaccine Future *217* • Indian and World Recommendation *218*

30. Typhoid Vaccines **220**
Vivek Pal Singh, RK Singal, Manish
• Disease Epidemiology *220* • Need of Vaccine *220*
• Current Typhoid Vaccines *221* • Global Scenario of Typhoid Vaccines *221* • Vaccine Safety *222*
• Cost-Effectiveness *222* • Indian Recommendations *223*

31. Vaccines for Travelers, Immigrants and Migrants: Indian Guidelines **225**
P Senthur Nambi, V Ramasubramanian
• Assessment of the Need for Travel Vaccines *225*
• Categories of Travel Vaccines *226* • Contraindications *233*
• Vaccinations for Mass Gathering *233*
• Travelers to India *234*

32. Vaccination Recommendations for Solid Organ Transplantation and Chronic Kidney Disease **237**
RK Sharma, Harsh Vardhan
• Timing of Immunizations *237* • Hepatitis B Vaccine *237*
• Hepatitis A Vaccine *240* • Pneumococcal Polysaccharide Vaccine *241*
• Influenza Vaccine *242* • Recommendations Regarding Other Routine Vaccines *243* • Zoster Vaccine *245*
• Measles, Mumps and Rubella Vaccine *245*
• Diphtheria and Tetanus Toxoids and Pertussis Vaccine *246*

33. Varicella and Herpes Zoster Vaccine: Indian Guidelines **249**
D Suresh Kumar, V Ramasubramanian
• Epidemiology of Varicella *249* • Current Vaccines *250*
• Global Scenario of Vaccine *250* • Vaccine Safety *250*
• Cost-Effectiveness *251* • Future of Vaccine *251*
• Indian Recommendations *251* • Herpes Zoster Vaccination *251*
• Global Scenario *252*

34. Visceral Leishmaniasis: Current Problems and Prospect of an Effective Vaccine **254**
Jaya Chakraborty, Abdus Sabur, Nahid Ali, RP Goswami
• Disease Burden *254* • Clinical Presentation *254* • Risk Factor *254*
• Epidemiology *255* • Drug Resistance Issues *255* • Need for Vaccine/Indication *255* • Types of Vaccine Candidates *255*
• Indian Recommendations *258*

35. Yellow Fever Vaccine for Adults **260**
Dilip Mathai, A George Vasanthan
• Epidemiology of Yellow Fever *260* • Geographic Distribution and Spread *260* • Incidence and Burden of Disease *261*
• Age-Specific Patterns *261* • Yellow Fever Vaccine *262*
• Administration of Yellow Fever Vaccine *263* • Recommendation for Vaccination *264* • API Recommendations *266*

36. Technical Aspects of Vaccination Administration **268**
Gaurav Mathur, Dilip Mathai
• Staff Training and Education *268* • Patient Preparation and Care *268*
• Route and Site *269* • Vaccines with Diluents *274*

Index *277*

3 Adolescent Immunization

Sumeet Singla, AK Agarwal, RK Singal

Who are Adolescents? Why are they Important?

Internationally, and as is with most United Nations (UN) agencies like World Health Organization (WHO), United Nations International Children's Emergency Fund (UNICEF), United Nations Fund for Population Activities (UNFPA), etc., the age group of 10–19 years, is considered to be the age of adolescents. Adolescents are often thought of as a healthy group. Nevertheless, many adolescents do die prematurely due to accidents, suicide, violence, pregnancy related complications and other illnesses that are either preventable or treatable. Many more suffer chronic ill-health and disability. In addition, many serious diseases in adulthood have their roots in adolescence. For example, tobacco use, sexually transmitted infections including human immunodeficiency virus (HIV), poor eating and exercise habits, lead to illness or premature death later in life. So far, adolescents have not received the attention they deserve because of the relatively low morbidity and mortality rates of this age group. However, in view of the sheer numbers (243 million in India), adolescents as a group, merit special attention. Also, since adolescents comprise a major part of the reproductive age group, they will play a significant role in determining the future size and growth pattern of India's population.

Why Adolescent Vaccination?

Even though adolescents may have been vaccinated as a child, immunity to certain diseases can decrease over time. Also, new vaccines have been developed which can mean, there are now some recommended vaccinations that were not available when adolescents were receiving vaccines as infants. Further, the intensive childhood immunization program has shifted the epidemiology of diseases to the adolescent age group. When these diseases occur in the older age group of 10–19 years, their severity is often much more with increased morbidity and often mortality.

Many developed countries have immunization programs/guidelines for adolescents. Sadly, Indian guidelines are missing even while India has a high number of adolescent population which, if kept healthy, can contribute to the nation building process. The Indian Academy of Pediatrics (IAP), has published some guidelines for the immunization of children and adolescents aged 7–18 years.

Concept of Adolescent Immunization

These recommendations for the immunization of adolescents were developed to improve vaccination coverage among adolescents. Two types of vaccinations are recommended in adolescents: (1) routine and (2) catch-up.

The vaccines to be administered in adolescents have been discussed in detail in the relevant chapters. However, salient features, especially those relevant to adolescents, will be discussed below.

Before determining the vaccines to be administered to a particular adolescent boy/girl, it is imperative to enquire about the past vaccination history (complete/incomplete), health status, any coexisting diseases, immuno-

JAYPEE BROTHERS

suppressive conditions, prior affliction with the diseases to be vaccinated for, and previous adverse effects of immunization, especially allergies. The need for vaccination, possible side-effects and the necessity to complete the vaccination series should be emphasized. Also, this opportunity must be taken to discuss and educate these adolescents about the need to adopt healthy lifestyle practices.

Human Papilloma Virus Vaccine

Routine vaccination is recommended, ideally before commencement of sexual activity, for females aged 11–12 years with three doses of either *Gardasil*™ or *Cervarix*™. The series can be started as early as 9 years of age. Catch-up vaccination may be offered for girls/women up to 26 years, who have not been vaccinated/incompletely vaccinated. It is not recommended for females less than 9 years and more than 26 years. In certain special situations such as abnormal Papanicolaou (Pap) smear test, known human papilloma virus (HPV) infection, genital warts and sexual assault, the HPV vaccine should be given. HPV vaccines are not recommended for use in pregnant women. However, pregnancy testing is not needed before vaccination. If a woman is found to be pregnant after initiating the vaccination series, no intervention is needed; the remainder of the three-dose series should be delayed until completion of pregnancy.

For males, routine immunization with the quadrivalent *Gardasil*™, is recommended for age 11–12 years for the prevention of genital warts. It can be given from 9 years of age. Catch-up immunization can be given up to 21 years of age for those who have not been vaccinated/incompletely vaccinated. Males aged 22 through 26 years may be vaccinated. *Gardasil*™ is recommended for men who have sex with men through age 26 years; for those who did not get any or all doses when they were younger. Vaccination is recommended for immunocompromised persons (including those with HIV infection) through age 26 years for those who did not get any or all doses when they were younger.

Tetanus, Diptheria, Acellular Pertussis (Tdap) Vaccine

All adolescents aged 10–12 years must be routinely given, one dose of tetanus, diptheria, acelluar pertussis (Tdap) vaccine. Catch-up immunization is recommended for those who are unvaccinated or whose vaccine status is unknown: a three dose series is started consisting of at least one dose of Tdap and the rest Td. For those who received incomplete three dose series of vaccine, catch-up immunization is recommended to complete the series ensuring at least one dose of Tdap. Schedule is as follows: three doses, first being Tdap, followed by Td at 4 weeks and third Td dose 6–12 months later. Booster dose of Td may be given, every 10 years. For pregnant women, one dose of Tdap should be administered, preferably between 27 weeks and 33 weeks of gestation, in each pregnancy, regardless of the timing of the previous Tdap or Td dose. Stable neurological disorders, brachial neuritis and immunosupression are not contraindications for the vaccine. Minimum age: 10 years for *Boostrix*™ and 11 years for *Adacel*™.

Meningococcal Vaccine

Routine meningococcal vaccination with a single dose of the conjugate vaccine is recommended for all adolescents in the age group 10–12 years, especially for those living in endemic areas such as Northern India, North-East India, Gujarat, Mumbai, Kolkata. Catch-up immunization is recommended for those aged 13–18 years. Those who were vaccinated at less than 16 years should receive one dose, with booster after 5 years, and those who were immunized at more than or equal to 16 years should receive only one dose. Meningococcal vaccination, with the quadrivalent vaccine, is also advisable for students going for study abroad (mandatory in most universities in the USA).

Outbreaks of meningococcal disease occur in crowded living conditions such as in dormitories; in military recruits and in jail inmates. All adolescents living in such conditions must be prophylactically, vaccinated. Immunization should be also be offered to high-risk populations

JAYPEE BROTHERS

(congenital deficiencies in complement components (C5 to C9), deficiency of properdin, asplenia (anatomical or functional) or for travelers to meningococcal endemic areas (Sub-Saharan Africa "meningitis belt"), pilgrims (Hajj, Umrah) and people attending fairs and festivals (Kumbh). Those with persistent complement component deficiency or anatomic/functional asplenia, should be given two primary doses of quadrivalent vaccine 8 weeks apart and one dose every 5 years, thereafter. Adolescents aged 11 through 18 years with HIV infection should receive a two dose primary series of quadrivalent vaccine, at least 8 weeks apart.

Hepatitis B Vaccine

Adolescents are a high-risk group for acquiring hepatitis B [injuries, surgeries, blood product use, intravenous (IV) drug abuse and promiscuity]. They must be made to realize that hepatitis B is a devastating, yet completely preventable, disease.

All unvaccinated individuals aged less than 19 years, should receive the full three dose course of hepatitis B virus (HBV) vaccine. Also, travelers who have not completed their hepatitis B vaccination series should be offered the vaccine before leaving for endemic areas. Mandatory hepatitis B vaccination for school and university entry has been implemented in some settings and has resulted in rapid adoption of hepatitis B vaccination among school-aged children and adolescents across entire communities. The dosage for adolescents is 5 mcg (0.5 mL)* (*Recombivax-HB*™) per dose over 0, 1 and 6 months.

Adolescents having high-risk, e.g. injection drug users, males who have sex with males, patients with sexually transmitted diseases (STDs), patients of end stage renal disease (ESRD) and hemodialysis, HIV infection, chronic liver disease, developmentally disabled in long-term care centers, and household contacts/partners of HBsAg positive patients should also be vaccinated (if not already done so). Among the immunosuppressed adolescents, the dose of hepatitis B vaccine is 5 mcg (0.5 mL)* (*Recombivax-HB*™) per dose.

Measles, Mumps, Rubella Vaccine

Catch-up immunization is recommended for all school aged children, adolescents and nonpregnant women of child-bearing age without evidence of immunity (laboratory evidence of immunity, presence of virus specific immunoglobulin in serum, or laboratory confirmation of disease). The primary course consists of two dose of 0.5 mL each, given subcutaneously 4 weeks apart. A single dose is required if one dose has been taken earlier. Pregnant women, who do not have evidence of immunity, should receive MMR vaccine upon completion or termination of pregnancy and before discharge.

Varicella Vaccine

Catch-up immunization is recommended for all adolescents without evidence of immunity (documentation of two dose of vaccine 4 weeks apart, history of varicella or zoster diagnosed by healthcare provider or laboratory confirmation of disease or immunity). The primary course consists of two doses of 0.5 mL each, given subcutaneously at 0 and 4 weeks.

Hepatitis A Vaccine

All individuals less than 18 years of age should receive two dose of hepatitis A vaccine (*Havrix*™, Glaxo SmithKline). In addition, those adolescents at high-risk of suffering severe liver disease (e.g. chronic liver disease, males having sex with males, injection drug abusers) should also be immunized. The dose is 0.5 mL, intramuscularly in the deltoid region at 0 and 6 months. For catch-up vaccination, pre-vaccination screening for hepatitis A antibody is recommended in children older than 10 years as, at this age, the estimated seropositive rates exceed 50%. Combination of hepatitis B and hepatitis A may be used in 0, 1 and 6 months schedule.

*The dose is 10 mcg (0.5 mL) for *Engerix-B*™.

JAYPEE BROTHERS

Typhoid Vaccine

The vaccine should be given to all adolescents living in endemic areas or traveling to endemic areas or areas with an outbreak of typhoid. Only Vi polysaccharide (ViPS) vaccine may be used. ViPS is given as 0.5 mL intramuscular and may be repeated once, every 3 years for those at continued risk of exposure.

Japanese Encephalitis Vaccine

Japanese encephalitis (JE) is primarily a disease of children. No effective treatment is available for JE. The JE vaccine is primarily useful in the age group of 1–15 years. The Government of India, has decided on a mass vaccination strategy for the introduction of the JE vaccine in the endemic districts in India targeting all children in the age group of 1–15 years in these districts.

Accordingly, all adolescents living in JE endemic areas and short-term travelers (< 1 month) to endemic areas during the JE transmission season (May to October) should be vaccinated. The Chinese manufactured, primary hamster kidney (PHK) cell-cultured, live-attenuated vaccine, *SA 14-14-2*™, is used in a dose of 0.5 mL administered subcutaneously, as a single dose in India. The vaccine is safe and few adverse effects have been noted. An indigenously produced Vero-cell derived, inactivated Japanese encephalitis vaccine (*JENVAC*™) was recently launched on 4th October, 2013 by the Government of India. The vaccine will be administered as a 0.5 mL dose intramuscularly in a two dose schedule (0, 28 days). The cost per two doses of the vaccine is Rs. 985. The vaccine is expected to boost supplies for the new national JE program.

Haemophilus influenzae Type b Vaccine

Haemophilus influenzae type b (Hib) vaccine is not routinely recommended for patients older than 5 years of age. However, one dose of Hib vaccine should be administered to unvaccinated or partially vaccinated adolescents who have leukemia, malignant neoplasms, anatomic or functional asplenia (including sickle cell disease), HIV infection, or other immunosuppresive conditions.

Influenza Vaccine

The routine use of annual vaccination for seasonal influenza for immunization of adolescents is not supported by various Cochrane meta-analyses of efficacy. However, current trivalent/quadrivalent seasonal influenza vaccine contains the H1N1 pandemic influenza (swine flu) strain, and for this indication it may be administered to all adolescents. Additional risk groups to be considered for vaccination are pregnant women and individuals with specific chronic medical conditions.

Monovalent H1N1 vaccine may be used to vaccinate adolescents, as they fall under the priority groups as defined by WHO, in the event of an epidemic outbreak. A single dose of the vaccine provides protection starting as early as 3 weeks. Vaccine efficacy ranges from 70–90%. Available vaccines include a killed inactivated vaccine and a live-attenuated intranasal vaccine (LAIV). The former is given as a single dose of 0.5 mL [15 mcg hemagglutinin of A/California/7/2009 (H1N1) pdm] intramuscularly in the deltoid. The live- attenuated vaccine is given in a single dose of 0.2 mL divided equally between each nostril.

Pneumococcal Vaccine

Two types of vaccines (polysaccharide; PPV-23 and conjugate; PCV-13) are available for use. PPV-23 is recommended for adolescents with any one of the following risk factors for invasive pneumococcal disease (IPD), such as chronic pulmonary disease (including bronchial asthma, if treated with high-dose oral steroids), chronic cardiovascular diseases (particularly cyanotic congenital heart disease and cardiac failure but not hypertension), diabetes mellitus, chronic liver disease, chronic alcoholism, chronic kidney disease or nephrotic syndrome, functional or anatomic asplenia, immunosuppressive conditions, cochlear implants, cerebrospinal fluid leaks, and HIV infection. A one-time revaccination, after 5 years, with PPV-23 is also recommended for patients with highest risk for IPD viz., functional or anatomic asplenia, and other immunosuppressive conditions (not recommended for, otherwise

JAYPEE BROTHERS

immunocompetent adolescents with chronic illnesses such as chronic heart disease, chronic lung disease, diabetes mellitus, cerebrospinal fluid leaks, or cochlear implant).

The recommendations for PCV-13 are as follows: among adolescents with the above-mentioned high-risk conditions, pneumococcal vaccine-naïve persons should receive a dose of PCV-13 first, followed by a dose of PPV-23 at least 8 weeks later (persons with these conditions are at increased risk for IPD and might have infections caused by a broader range of serotypes than healthy people which may not be covered by PCV-13 alone. Therefore, it is recommended to administer PPV-23 after PCV-13. PPV-23 is not recommended to be used alone for this group of adolescents because conjugate vaccines have several advantages over PPV-23, including immunologic priming and induction of immunologic memory, reduction in nasopharyngeal carriage of vaccine type pneumococci, likely greater effectiveness against serotypes currently, causing most IPD, and evidence for effectiveness against noninvasive syndromes including nonbacteremic pneumonia and otitis media). Those who have already received a dose of PPV-23 earlier, should be given a single PCV-13 dose no earlier than 8 weeks after the last PPV-23 dose. If a second PPV-23 dose is indicated, it should be given at least 5 years after the first PPV-23 dose. These children should not receive more than two doses of PPV-23 before age of 65 years.

When indicated, PCV-13 should be administered to patients who are uncertain of their vaccination status history and there is no record of previous vaccination. The need for revaccination with a subsequent dose of PCV-13 has not been established. When elective splenectomy, immunosuppressive therapy, or cochlear implant placement is being planned, PCV-13 and/or PPV-23 vaccination should be completed at least 2 weeks before surgery or initiation of therapy. Standard dose of PPV-23 (0.5 mL) is administered by intramuscular or subcutaneous injection. PPV-23 can be safely co-administered with live vaccine(s) such as the influenza vaccine and other vaccines such as diphtheria, pertussis and tetanus (DPT). PCV-13 is administered intramuscularly as a 0.5-mL dose and is available in single-dose, prefilled syringes. PCV-13 has been administered concurrently with vaccines containing the following antigens with no adverse effects on immunogenicity or safety: diphtheria, tetanus, acellular pertussis, type b, hepatitis B, measles, mumps, rubella and varicella. PCV-13 can be administered at the same time as other routine childhood vaccinations, if administered in a separate syringe at a different injection site.

JAYPEE BROTHERS



ISBN 978-93-5152-190-7
9 789351 521907