

Vaccine Presentation

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IMMUNIZATIONS FOR CHILDREN

Update and Trends

2005

1. Vaccines

- Diphtheria and Tetanus Toxoids and Acellular Pertussis (DTaP)
- Diphtheria and Tetanus Toxoids (DT)
- Tetanus and Diphtheria Toxoids (Td)
- Tetanus and diphtheria and acellular pertussis (Tdap, Adolescent/ Adult: 10-18 y. or 11-64 y.)
- Inactivated Polio Vaccine (IPV)
- Meningococcal Vaccine (MCV4, Preadolescent)

2. Influenza Vaccine (killed: 6 m. & up, or live: 5 y. -59y.)

- Hemophilus influenza type B (HiB)
- Pneumococcal Conjugate Vaccine (PCV)
- Measles, Mumps and Rubella (MMR)
- Varicella
- Measles, Mumps, Rubella and Varicella (MMRV)
- Hepatitis A (HepA)
- Hepatitis B (HepB)
- Twinrix (>18 y. Hep A & B)

3. Vaccines on the Horizon

- Hib/DTaP/IPV (PENTACEL™) 2, 4, 6 and 15-18 m.
- HPV (Gardasil™) 11-26 y. (3 doses)
- Influenza
- FLUARIX™ 18 y. & up
- Cold Activated Influenza Vaccine-Trivalent (CAIV-T) 6 m. -49 y.
- MCV4 (Menactra™) 2-10 y.
- Rotavirus (ROTATEQ®) 2, 4, 6 m.
- Zoster vaccine (ZOSTAVAX™) older adults

4. Diphtheria, Tetanus and Pertussis

- Given at 2, 4, 6, 12-15 m.; 4-6 y.; 11-12 y.
- Infants and children up to 6 y.
- Diphtheria and Tetanus Toxoids and Acellular Pertussis (DTaP)
- Diphtheria and Tetanus Toxoids (DT)
- Children over 6 y., Adolescents and Adults

- Tetanus and Diphtheria Toxoids (Td)
- Adolescents
- Tetanus and diphtheria and acellular pertussis (Tdap, Adolescent/ Adult: 10-18 y. or 11-64 y.)

5. Diphtheria, Tetanus and Pertussis

- Infants and children up to 6 y.
- Requires a larger amount of Diphtheria than adults to induce an immune response
- DTaP
- This is the currently recognized standard
- DT
- This is for patients who have a history of seizures, a severe reaction to DTaP, or a brain problem that might predispose them to having a seizure

6. Children over 6 y., Adolescents and Adults

- This age group requires less Diphtheria antigen to induce an immune response
- Td
- Contains 1/10 the amount of Diphtheria antigen as DTaP/DT
- The standard until this summer

7. Diphtheria, Tetanus and Pertussis

- Infants and children up to 6 y.
- Giving these immunizations to the older age group can cause a very severe reaction
- DTaP
- DT
- Children over 6 y., Adolescents and Adults
- Giving this immunization to the younger age group will fail to induce an adequate immune response to Diphtheria

8. Td

Diphtheria, Tetanus and Pertussis

- Adolescents
- Tdap
- Preadolescent/Adolescent 10-18 y.
- BOOSTRIX® (GlaxoSmithKline)
- Preadolescent/Adolescent/ Adult: 11-64 y.
- ADACEL™ (Sanofi Pasteur)

9. Polio Vaccines

- History of Polio Vaccines
- 1955 Inactivated vaccine (Salk)
- 1961 Types 1 and 2 monovalent OPV
- 1962 Type 3 monovalent OPV

16. Pneumococcal 7-Valent Vaccine

- 2, 4, 6, 12-15 m.; 2-6 y. one dose catch up; 2-18 y. in selected situations.
- Minimum of 6 weeks between doses
- Indicated for active immunization of infants and toddlers against invasive diseases caused by *Streptococcus pneumoniae*
- The capsular serotypes: 4, 6B, 9V, 14, 18C, 19F, 23F
- PCV7, heptavalent pneumococcal conjugate vaccine

17. Types of Pneumococcal Vaccines

- Purified Capsular Polysaccharide Pneumococcal Vaccines
- 23 purified pneumococcal capsular polysaccharides of *S. pneumoniae* serotypes
- **Pnu-Immune 23** (Lederle Laboratories)
- **Pneumovax** (Merck)

18. Types of Pneumococcal Vaccines

- Protein Conjugate Pneumococcal Vaccines
- Heptavalent Pneumococcal CRM₁₉₇ Conjugate Vaccine (PCV7)
- **Prennar** (Lederle Laboratories/Wyeth-Ayerst Pharmaceuticals)

19. Measles, Mumps and Rubella

Measles/Rubella Vaccines

- Give at 12-15 m.; 4-6 y.
- MMR given before 12 months should not be counted as a valid dose
- Revaccinate at >12 months of age
- Second dose may be given any time >4 weeks after the first dose
- Composition: Live virus

20. Vaccine Licensed

Measles—United States, 1980-2002

Mumps
Acute viral illness

Mumps—United States, 1968- 2002

21. Mumps—United States, 1980-2002

Measles and Mumps Vaccines and Egg Allergy

- Measles and mumps viruses grown in chick embryo fibroblast culture
- Studies have demonstrated safety of MMR in egg allergic children
- Vaccinate without testing

22. Hepatitis B Virus Infection

- ≥200 million carriers worldwide
- Established cause of chronic hepatitis and cirrhosis
- Human carcinogen—cause of up to 80% of hepatocellular carcinomas

23. Hepatitis B Complications

- Fulminant hepatitis
- Hospitalization
- Cirrhosis
- Hepatocellular carcinoma
- Death

24. Chronic Hepatitis B

Virus Infection

- Chronic viremia
- Responsible for most mortality
- Overall risk 10%
- Higher risk with early infection

25. Risk of Chronic HBV Carriage by Age of Infection

Strategy to Eliminate Hepatitis B Virus Transmission—United States

- Prevent perinatal HBV transmission
- Routine vaccination of all infants with Hep B
- Vaccination of children in high-risk groups
- Vaccination of adolescents
- Vaccination of adults in high-risk groups

26. Hepatitis B Vaccine Formulations

- Recombivax HB (Merck)
 - 5.0 mcg/0.5 mL (pediatric)
 - 10 mcg/1 mL (adult)
 - 40 mcg/1 mL (dialysis)
- Engerix-B (GSK)
 - 10 mcg/0.5 mL (pediatric)
 - 20 mcg/1 mL (adult)

27. Indications for Hepatitis B Vaccine

- Give at Birth (or 1-2 m.), 2-4 m., 6-18 m.
- Infants
- Adolescents 11-12 years of age
- Selected adults

28. Hepatitis A

- Entry into mouth
- Viral replication in the liver
- Children generally asymptomatic, adults symptomatic
- Hep A

29. Hepatitis A—United States, 1966-2002

Hepatitis A Vaccines

- Inactivated whole virus
 - HAVRIX (GlaxoSmithKline)
 - VAQTA (Merck Vaccine Division)
 - Pediatric and adult formulations
 - Licensed for persons >2 years
- Children 2 years of age in states, counties, or communities where the average annual hepatitis A rate during 1987-1997 was 10-20 cases per 100,000 population

30. Hepatitis A High Incidence States

31. MENACTRA

Meningococcal Conjugate Vaccine

32. MENACTRA

- Meningococcal (Groups A, C, Y and W-135) Polysaccharide Diphtheria Toxoid Conjugate Vaccine
- Contains *Neisseria meningitidis* serogroup A, C, Y and W-135 capsular polysaccharide antigens individually conjugated to diphtheria toxoid protein

33. Neisseria meningitidis

- Causes principally:
 - meningitis and
 - meningococemia
- Five serogroups (A, B, C, Y and W-135) are responsible for nearly all cases of meningococcal disease worldwide

34. Neisseria meningitidis

- The age-specific incidence of meningococcal disease:
 - highest among infants younger than one year old, among whom serogroup B predominates.
 - peaks during adolescence and early adulthood

35. Rates of Meningococcal Disease* by Age, 11-30yo, United States, 1991-2002

Types of Vaccine

- Menomune®-A/C/Y/W-135, Meningococcal Polysaccharide Vaccine, Groups A, C, Y and W-135 Combined (MPV)
- Menactra™, Meningococcal (Groups A, C, Y and W-135) Polysaccharide Diphtheria Toxoid Conjugate Vaccine (MCV4)
- Both produced by Sanofi Pasteur

36. Comparison MPV and MCV4

Menactra™, Meningococcal (Groups A, C, Y and W-135) Polysaccharide Diphtheria Toxoid **Conjugate** Vaccine (MCV4) is expected to have a longer duration of protection

37. INDICATIONS AND USAGE

➤ Recommended for:

- all persons at the preadolescent visit (ages 11-12 years)
- persons about to enter high school (age 15 years)
- college freshmen living in a dormitory
- other adolescents who wish to reduce their risk for meningococcal disease

38. CONTRAINDICATIONS

- Known hypersensitivity to any component of Menactra vaccine
- Known hypersensitivity to dry natural rubber latex
- stopper of the vial contains dry natural rubber latex, which may cause allergic reactions in latex-sensitive individuals

39. Caution

- The FDA and the CDC are investigating six cases of Guillain-Barré syndrome, which occurred after receipt of MCV4
- The AAP Committee on Infectious Diseases continues to recommend MCV4 for adolescents

40. Caution

- The risk of infection with *Neisseria meningitidis* is increased in adolescents and the mortality and morbidity of infection is substantial
- To date, evidence collected on all 6 reported cases is insufficient to determine whether Guillain-Barré syndrome was caused by the vaccine or is coincidental.

41. Combination Vaccines

➤ **Comvax**

- Hepatitis B and Hib vaccine

➤ **TriHIBit**

- Hib and DTaP

- 4th dose only

➤ **Pediarix**

- Diphtheria, Tetanus and acellular Pertussis (DTaP), Hepatitis B and inactivated Polio (IPV)

➤ **Adacel and Boostrix**

- Tetanus, diphtheria, acellular pertussis (Tdap)

42. Combination Vaccines in the Pipeline

- MMR and Varivax
- DTaP and IPV
- DTaP and Hepatitis B
- DTaP, IPV, and Hib (**Pentavac**)
 - Available in Europe since 1997
 - Immunologically effective
- DTaP, Hepatitis B, and Hib
- DTaP, IPV, Hib and Hepatitis B (**Hexavac**)
 - Approved for use in Europe
- DTaP, Hib, IPV, Hepatitis A, and Hepatitis B

43. National Immunization Program (NIP)

- Hotline 800.232.2522

- Email nipinfo@cdc.gov

- Website www.cdc.gov/nip