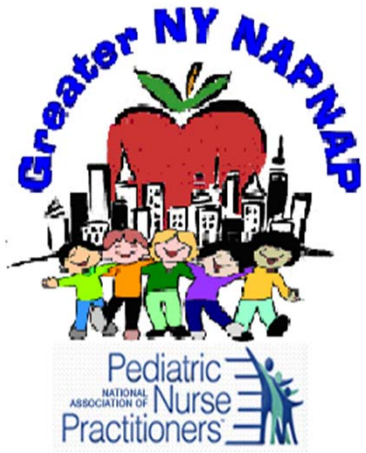

Making Sense of Immunization Recommendations 2013

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Disclosure Statement

- I have no conflicts of interest to report.
- I have no relevant financial relationships with any manufacturer(s) or commercial product(s) and/or provider of commercial services discussed in this activity.

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Learning Objectives

- At the completion of this session, the participant will be able to:
  - Explain the fundamental concepts of storage and handling of vaccines
  - Indicate who should receive Tdap vaccine
  - Describe indications for pneumococcal vaccines (PCV 13 and PPSV23)
  - Describe recommendations for meningococcal vaccine

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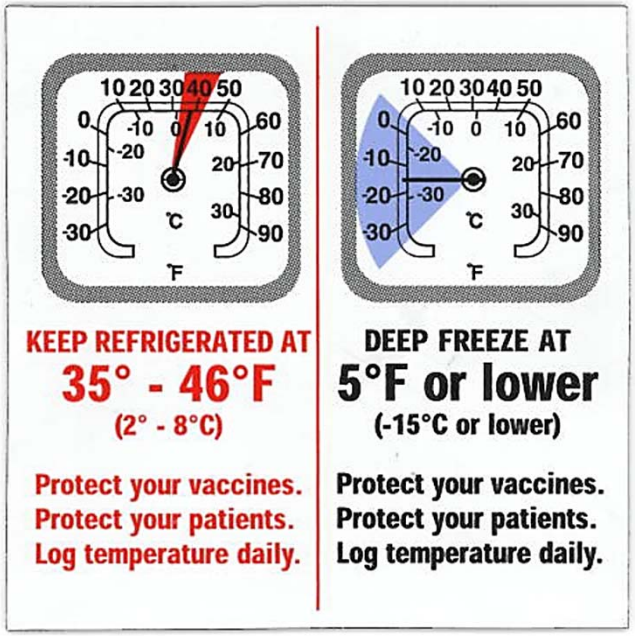
Vaccine Storage and Handling: The Basics

- Vaccines are fragile and must be kept at recommended temperatures at all times
- Vaccines are expensive
- If vaccine has been out of temperature range, DO NOT USE IT. Call for guidance.
- It is better to NOT VACCINATE than to administer a dose of vaccine that has been mishandled



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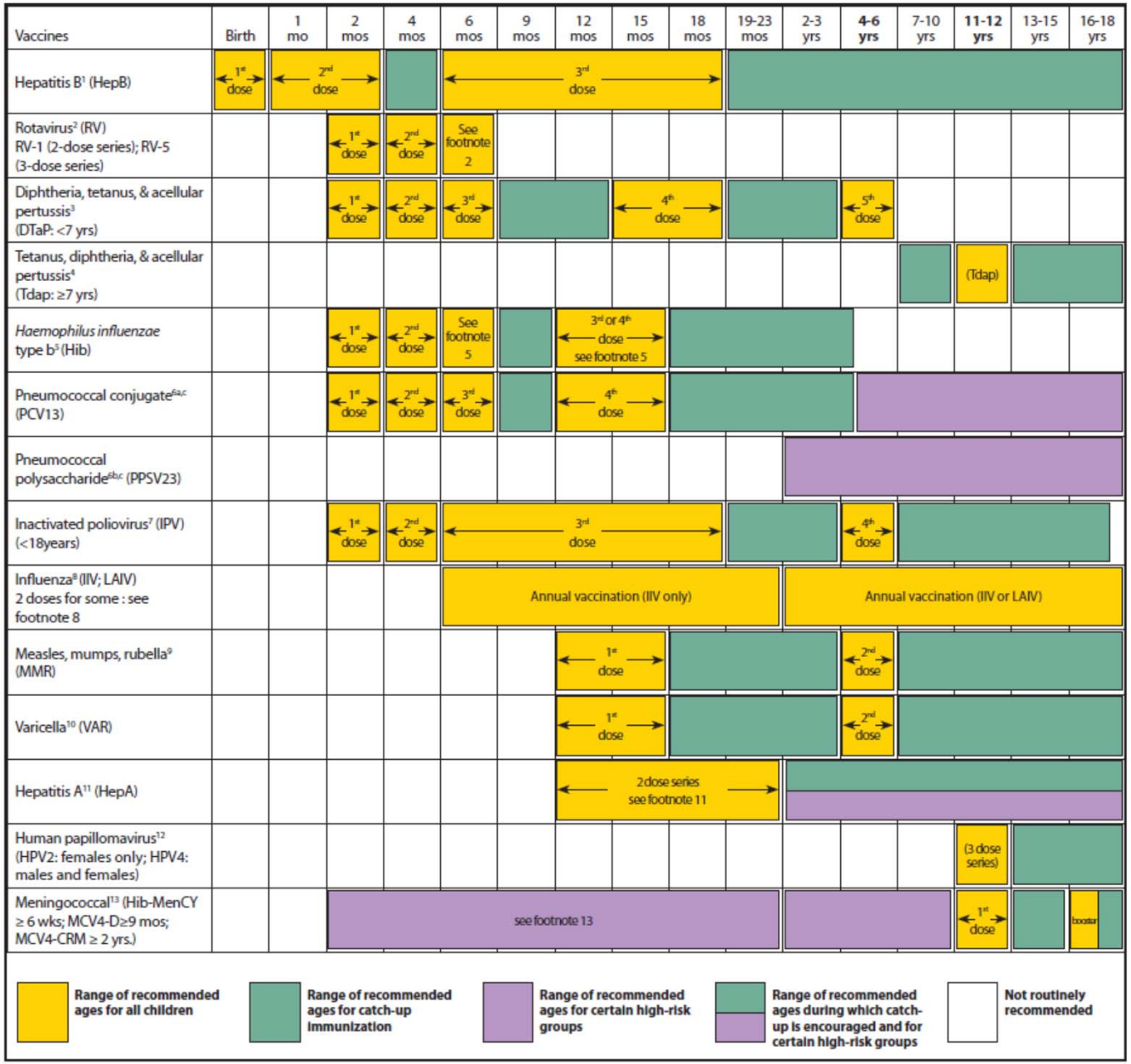
Recommended Immunization Schedule for Persons aged 0 through 18 years - 2013

www.cdc.gov/mmwr/pdf/mm62e0128.pdf



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Catch –up Immunization Schedule for Persons aged 4 months through 18 years - 2013

www.cdc.gov/mmwr/pdf/mm62e0128.pdf

Persons aged 4 months through 6 years					
Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses			
		Dose 1 to dose 2	Dose 2 to dose 3	Dose 3 to dose 4	Dose 4 to dose 5
Hepatitis B[1]	Birth	4 weeks	8 weeks and at least 16 weeks after first dose; minimum age for the final dose is 24 weeks		
Rotavirus[2]	6 weeks	4 weeks	4 weeks[2]		
Diphtheria, tetanus, pertussis[3]	6 weeks	4 weeks	4 weeks	6 months	6 months[3]
Haemophilus influenzae type b[5]	6 weeks	4 weeks if first dose administered at younger than age 12 months 8 weeks (as final dose) if first dose administered at age 12–14 months No further doses needed if first dose administered at age 15 months or older	4 weeks[5] if current age is younger than 12 months 8 weeks (as final dose)[5] if current age is 12 months or older and first dose administered at younger than age 12 months and second dose administered at younger than 15 months No further doses needed if previous dose administered at age 15 months or older	8 weeks (as final dose) This dose only necessary for children aged 12 through 59 months who received 3 doses before age 12 months	
Pneumococcal[6]	6 weeks	4 weeks if first dose administered at younger than age 12 months 8 weeks (as final dose for healthy children) if first dose administered at age 12 months or older or current age 24 through 59 months No further doses needed for healthy children if first dose administered at age 24 months or older	4 weeks if current age is younger than 12 months 8 weeks (as final dose for healthy children) if current age is 12 months or older No further doses needed for healthy children if previous dose administered at age 24 months or older	8 weeks (as final dose) This dose only necessary for children aged 12 through 59 months who received 3 doses before age 12 months or for children at high risk who received 3 doses at any age	
Inactivated poliovirus[7]	6 weeks	4 weeks	4 weeks	6 months[7] minimum age 4 years for final dose	
Meningococcal[13]	6 weeks	8 weeks[13]	see footnote 13	see footnote 13	
Measles, mumps, rubella[9]	12 months	4 weeks			
Varicella[10]	12 months	3 months			
Hepatitis A[11]	12 months	6 months			
Persons aged 7 through 18 years					
Tetanus, diphtheria; tetanus, diphtheria, pertussis[4]	7 years[4]	4 weeks	4 weeks if first dose administered at younger than age 12 months 6 months if first dose administered at 12 months or older	6 months if first dose administered at younger than age 12 months	
Human papillomavirus[12]	9 years	Routine dosing intervals are recommended[12]			
Hepatitis A[11]	12 months	6 months			
Hepatitis B[1]	Birth	4 weeks	8 weeks (and at least 16 weeks after first dose)		
Inactivated poliovirus[7]	6 weeks	4 weeks	4 weeks[7]	6 months[7]	
Meningococcal[13]	6 weeks	8 weeks[13]			
Measles, mumps, rubella[9]	12 months	4 weeks			
Varicella[10]	12 months	3 months if person is younger than age 13 years 4 weeks if person is aged 13 years or older			

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Footnotes

Footnotes: Recommended Immunization Schedule for Persons Aged 0 Through 18 Years — United States, 2013

Additional guidance for use of the vaccines described in this publication is available at http://www.cdc.gov/vaccines/pubs/acip-list.htm

1. **Hepatitis B (HepB) vaccine. (Minimum age: birth)**
   Routine vaccination:
   At birth
   - Administer monovalent HepB vaccine to all newborns before hospital discharge.
   - For infants born to hepatitis B surface antigen (HBsAg)–positive mothers, administer HepB vaccine and 0.5 mL of hepatitis B immune globulin (HBIG) within 12 hours of birth. These infants should be tested for HBsAg and antibody to HBsAg (anti-HBs) 1 to 2 months after completion of the HepB series, at age 9 through 18 months (preferably at the next well-child visit).
   - If mother's HBsAg status is unknown, within 12 hours of birth administer HepB vaccine to all infants regardless of birth weight. For infants weighing <2,000 grams, administer HBIG in addition to HepB within 12 hours of birth. Determine mother's HBsAg status as soon as possible and, if she is HBsAg-positive, also administer HBIG for infants weighing ≥2,000 grams (no later than age 1 week).

   Doses following the birth dose
   - The second dose should be administered at age 1 or 2 months. Monovalent HepB vaccine should be used for doses administered before age 6 weeks.
   - Infants who did not receive a birth dose should receive 3 doses of a HepB-containing vaccine on a schedule of 0, 1 to 2 months, and 6 months starting as soon as feasible. See Figure 2.
   - The minimum interval between dose 1 and dose 2 is 4 weeks and between dose 2 and 3 is 8 weeks. The final (third or fourth) dose in the HepB vaccine series should be administered no earlier than age 24 weeks, and at least 16 weeks after the first dose.
   - Administration of a total of 4 doses of HepB vaccine is recommended when a combination vaccine containing HepB is administered after the birth dose.

   Catch-up vaccination:
   - Unvaccinated persons should complete a 3-dose series.
   - A 2-dose series (doses separated by at least 4 months) of adult formulation Recombivax HB is licensed for use in children aged 11 through 15 years.
   - For other catch-up issues, see Figure 2.
2. **Rotavirus (RV) vaccines. (Minimum age: 6 weeks for both RV-1 [Rotarix] and RV-5 [RotaTeq]).**
   Routine vaccination:
   - Administer a series of RV vaccine to all infants as follows:
     1. If RV-1 is used, administer a 2-dose series at 2 and 4 months of age.
     2. If RV-5 is used, administer a 3-dose series at ages 2, 4, and 6 months.
     3. If any dose in series was RV-5 or vaccine product is unknown for any dose in the series, a total of 3 doses of RV vaccine should be administered.

   Catch-up vaccination:
   - The maximum age for the first dose in the series is 14 weeks, 6 days.
   - Vaccination should not be initiated for infants aged 15 weeks 0 days or older.
   - The maximum age for the final dose in the series is 8 months, 0 days.
   - If RV-1(Rotarix) is administered for the first and second doses, a third dose is not indicated.
   - For other catch-up issues, see Figure 2.
3. **Diphtheria and tetanus toxoids and acellular pertussis (DTaP) vaccine. (Minimum age: 6 weeks)**
   Routine vaccination:
   - Administer a 5-dose series of DTaP vaccine at ages 2, 4, 6, 15–18 months, and 4 through 6 years. The fourth dose may be administered as early as age 12 months, provided at least 6 months have elapsed since the third dose.

   Catch-up vaccination:
   - The fifth (booster) dose of DTaP vaccine is not necessary if the fourth dose was administered at age 4 years or older.
   - For other catch-up issues, see Figure 2.
4. **Tetanus and diphtheria toxoids and acellular pertussis (Tdap) vaccine. (Minimum age: 10 years for Boostrix, 11 years for Adacel).**
   Routine vaccination:
   - Administer 1 dose of Tdap vaccine to all adolescents aged 11 through 12 years.
   - Tdap can be administered regardless of the interval since the last tetanus and diphtheria toxoid-containing vaccine.
   - Administer one dose of Tdap vaccine to pregnant adolescents during each pregnancy (preferred during 27 through 36 weeks gestation) regardless of number of years from prior Td or Tdap vaccination.

   Catch-up vaccination:
   - Persons aged 7 through 10 years who are not fully immunized with the childhood DTaP vacc
   - in the catch-up serie
   - these children, an ac
   - Persons aged 11 thr
   - should receive a do
   - booster doses every
   - An inadvertent dos
   - through 10 years ca
   - count as the adoles
   - booster dose at age
   - For other catch-up is
5. ***Haemophilus influenz***
   6 weeks)
   Routine vaccination:
   - Administer a Hib vac
   - The primary series d
   - age; however, if PRP-
   - 4 months of age, a do
   - should be administe
   - Hiberix (PRP-T) shou
   - aged 12 months thro

   Catch-up vaccination
   - If dose 1 was admini
   - final dose) at least 8
   - If the first 2 doses we
   - istered at age 11 mo
   - administered at age
   - second dose.
   - If the first dose was a
   - the second dose at le
   - months, regardless o
   - For unvaccinated chi
   - For other catch-up is

   Vaccination of perso
   - Hib vaccine is not ro
   - of age. However one
   - cinated or partially
   - leukemia, malignant
   - sickle cell disease), hu
   - immunocompromis
6. **Pneumococcal conju**

   Routine vaccination:
   - Administer a series o
   - at age 12 through 1
   - For children aged 1
   - appropriate series of
   - dose of 13-valent PC

   Catch-up vaccination
   - Administer 1 dose o
   - months who are not
   - For other catch-up is

6b. **Pneumococcal polysaccharide vaccine (PPSV23). (Minimum age: 2 years)**
Vaccination of persons with high-risk conditions:
- Administer PPSV23 at least 8 weeks after the last dose of PCV to children aged 2 years or older with certain underlying medical conditions (see footnote 6c). A single revaccination with PPSV should be administered after 5 years to children with anatomic or functional asplenia (including sickle cell disease) or an immunocompromising condition.

6c. **Medical conditions for which PPSV23 is indicated in children aged 2 years and older and for which use of PCV13 is indicated in children aged 24 through 71 months:**
- Immunocompetent children with chronic heart disease (particularly cyanotic congenital heart disease and cardiac failure); chronic lung disease (including asthma if treated with high-dose oral corticosteroid therapy), diabetes mellitus; cerebrospinal fluid leaks; or cochlear implant.
- Children with anatomic or functional asplenia (including sickle cell disease and other hemoglobinopathies, congenital or acquired asplenia, or splenic dysfunction);
- Children with immunocompromising conditions: HIV infection, chronic renal failure and nephrotic syndrome, diseases associated with treatment with immunosuppressive drugs or radiation therapy, including malignant neoplasms, leukemias, lymphomas and Hodgkin disease; or solid organ transplantation, congenital immunodeficiency.

7. **Inactivated poliovirus vaccine (IPV). (Minimum age: 6 weeks)**
   Routine vaccination:
   - Administer a series of IPV at ages 2, 4, 6–18 months, with a booster at age 4–6 years. The final dose in the series should be administered on or after the fourth birthday and at least 6 months after the previous dose.

   Catch-up vaccination:
   - In the first 6 months of life, minimum age and minimum intervals are only recommended if the person is at risk for imminent exposure to circulating poliovirus (i.e., travel to a polio-endemic region or during an outbreak).
   - If 4 or more doses are administered before age 4 years, an additional dose should be administered at age 4 through 6 years.
   - A fourth dose is not necessary if the third dose was administered at age 4 years or older and at least 6 months after the previous dose.
   - If both OPV and IPV were administered as part of a series, a total of 4 doses should be administered, regardless of the child's current age.
   - IPV is not routinely recommended for U.S. residents aged 18 years or older.
   - For other catch-up issues, see Figure 2.
8. **Influenza vaccines. (Minimum age: 6 months for inactivated influenza vaccine [IIV]; 2 years for live, attenuated influenza vaccine [LAIV])**
   Routine vaccination:
   - Administer influenza vaccine annually to all children beginning at age 6 months. For most healthy, nonpregnant persons aged 2 through 49 years, either LAIV or IIV may be used. However, LAIV should NOT be administered to some persons, including 1) those with asthma, 2) children 2 through 4 years who had wheezing in the past 12 months, or 3) those who have any other underlying medical conditions that predispose them to influenza complications. For all other contraindications to use of LAIV see MMWR 2010; 59 (No. RR-8), available at http://www.cdc.gov/mmwr/pdf/rr/rr5908.pdf.
   - Administer 1 dose to persons aged 9 years and older.

   For children aged 6 months through 8 years:
   - For the 2012–13 season, administer 2 doses (separated by at least 4 weeks) to children who are receiving influenza vaccine for the first time. For additional guidance, follow dosing guidelines in the 2012 ACIP influenza vaccine recommendations, MMWR 2012; 61: 613–618, available at http://www.cdc.gov/mmwr/pdf/wk/mm6132.pdf.
   - For the 2013–14 season, follow dosing guidelines in the 2013 ACIP influenza
   - Administer 2 doses of MMR vaccine to children aged 12 months and older, before departure from the United States for international travel. The first dose should be administered on or after age 12 months and the second dose at least 4 weeks later.

   Catch-up vaccination:
   - Ensure that all school-aged children and adolescents have had 2 doses of MMR vaccine; the minimum interval between the 2 doses is 4 weeks.
10. **Varicella (VAR) vaccine. (Minimum age: 12 months)**
    Routine vaccination:
    - Administer the first dose of VAR vaccine at age 12 through 15 months, and the second dose at age 4 through 6 years. The second dose may be administered before age 4 years, provided at least 3 months have elapsed since the first dose. If the second dose was administered at least 4 weeks after the first dose, it can be accepted as valid.

    Catch-up vaccination:
    - Ensure that all persons aged 7 through 18 years without evidence of immunity (see MMWR 2007;56 [No. RR-4], available at http://www.cdc.gov/mmwr/pdf/rr/rr5604.pdf) have 2 doses of varicella vaccine. For children aged 7 through 12 years the recommended minimum interval between doses is 3 months (if the second dose was administered at least 4 weeks after the first dose, it can be accepted as valid); for persons aged 13 years and older, the minimum interval between doses is 4 weeks.
11. **Hepatitis A vaccine (HepA). (Minimum age: 12 months)**
    Routine vaccination:
    - Initiate the 2-dose HepA vaccine series for children aged 12 through 23 months; separate the 2 doses by 6 to 18 months.
    - Children who have received 1 dose of HepA vaccine before age 24 months, should receive a second dose 6 to 18 months after the first dose.
    - For any person aged 2 years and older who has not already received the HepA vaccine series, 2 doses of HepA vaccine separated by 6 to 18 months may be administered if immunity against hepatitis A virus infection is desired.

    Catch-up vaccination:
    - The minimum interval between the two doses is 6 months.

    Special populations:
    - Administer 2 doses of Hep A vaccine at least 6 months apart to previously unvaccinated persons who live in areas where vaccination programs target older children, or who are at increased risk for infection.
12. **Human papillomavirus (HPV) vaccines. (HPV4 [Gardasil] and HPV2 [Cervarix]). (Minimum age: 9 years)**
    Routine vaccination:
    - Administer a 3-dose series of HPV vaccine on a schedule of 0, 1-2, and 6 months to all adolescents aged 11-12 years. Either HPV4 or HPV2 may be used for females, and only HPV4 may be used for males.
    - The vaccine series can be started beginning at age 9 years.
    - Administer the second dose 1 to 2 months after the **first** dose and the third dose 6 months after the **first** dose (at least 24 weeks after the first dose).

    Catch-up vaccination:
    - Administer the vaccine series to females (either HPV2 or HPV4) and males (HPV4) at age 13 through 18 years if not previously vaccinated.
    - Use recommended routine dosing intervals (see above) for vaccine series catch-up.
13. **Meningococcal conjugate vaccines (MCV). (Minimum age: 6 weeks for Hib-MenCY, 9 months for Menactra [MCV4-D], 2 years for Menveo [MCV4-CRM]).**
    Routine vaccination:
    - Administer MCV4 vaccine at age 11–12 years, with a booster dose at age 16 years.
    - Adolescents aged 11 through 18 years with human immunodeficiency

Vaccination of persons with high-risk conditions:
- For children younger than 19 months of age with anatomic or functional asplenia (including sickle cell disease), administer an infant series of Hib-MenCY at 2, 4, 6, and 12-15 months.
- For children aged 2 through 18 months with persistent complement component deficiency, administer either an infant series of Hib-MenCY at 2, 4, 6, and 12 through 15 months or a 2-dose primary series of MCV4-D starting at 9 months, with at least 8 weeks between doses. For children aged 19 through 23 months with persistent complement component deficiency who have not received a complete series of Hib-MenCY or MCV4-D, administer 2 primary doses of MCV4-D at least 8 weeks apart.
- For children aged 24 months and older with persistent complement component deficiency or anatomic or functional asplenia (including sickle cell disease), who have not received a complete series of Hib-MenCY or MCV4-D, administer 2 primary doses of either MCV4-D or MCV4-CRM. If MCV4-D (Menactra) is administered to a child with asplenia (including sickle cell disease), do not administer MCV4-D until 2 years of age and at least 4 weeks after the completion of all PCV13 doses. See MMWR 2011;60:1391–2, available at http://www.cdc.gov/mmwr/pdf/wk/mm6040.pdf.
- For children aged 9 months and older who are residents of or travelers to countries in the African meningitis belt or to the Hajj, administer an age appropriate formulation and series of MCV4 for protection against serogroups A and W-135. Prior receipt of Hib-MenCY is not sufficient for children traveling to the meningitis belt or the Hajj. See MMWR 2011;60:1391–2, available at http://www.cdc.gov/mmwr/pdf/wk/mm6040.pdf.
- For children who are present during outbreaks caused by a vaccine serogroup, administer or complete an age and formulation-appropriate series of Hib-MenCY or MCV4.
- For booster doses among persons with high-risk conditions refer to http://www.cdc.gov/vaccines/pubs/acip-list.htm#mening.

Recommended Immunization Schedule for Adults By Vaccine and Age Group - 2013

FIGURE 1. Recommended adult immunization schedule, by vaccine and age group[1]

These recommendations must be read with the footnotes that follow.

VACCINE ▼ / AGE GROUP ►	19-21 years	22-26 years	27-49 years	50-59 years	60-64 years	≥ 65 years
Influenza [2,*]	1 dose annually					
Tetanus, diphtheria, pertussis (Td/Tdap) [3,*]	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs					
Varicella [4,*]	2 doses					
Human papillomavirus (HPV) Female [5,*]	3 doses					
Human papillomavirus (HPV) Male [5,*]	3 doses					
Zoster [6]					1 dose	
Measles, mumps, rubella (MMR) [7,*]	1 or 2 doses					
Pneumococcal polysaccharide (PPSV23) [8,9]	1 or 2 doses					1 dose
Pneumococcal 13-valent conjugate (PCV13) [10]	1 dose					
Meningococcal [11,*]	1 or more doses					
Hepatitis A [12,*]	2 doses					
Hepatitis B [13,*]	3 doses					

*Covered by the Vaccine Injury Compensation Program

For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection; zoster vaccine recommended regardless of prior episode of zoster

Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indication)

No recommendation

Report all clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions on filing a VAERS report are available at www.vaers.hhs.gov or by telephone, 800-822-7967.
Information on how to file a Vaccine Injury Compensation Program claim is available at www.hrsa.gov/vaccinecompensation or by telephone, 800-338-2382. To file a claim for vaccine injury, contact the U.S. Court of Federal Claims, 717 Madison Place, N.W., Washington, D.C. 20005; telephone, 202-357-6400.
Additional information about the vaccines in this schedule, extent of available data, and contraindications for vaccination is also available at www.cdc.gov/vaccines or from the CDC-INFO Contact Center at 800-CDC-INFO (800-232-4636) in English and Spanish, 8:00 a.m. - 8:00 p.m. Eastern Time, Monday - Friday, excluding holidays.
Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), American College of Obstetricians and Gynecologists (ACOG) and American College of Nurse-Midwives (ACNM).

www.cdc.gov/mmwr/pdf/other/su6201.pdf

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Recommended Immunization Schedule for Adults Based on Medical and Other Indications - 2013

FIGURE 2. Recommended vaccinations indicated for adults based on medical and other indications[1]

VACCINE ▼ INDICATION ►	Pregnancy	Immuno-compromising conditions (excluding human immunodeficiency virus [HIV])[4,6,7,10,15]	HIV infection CD4+ T lymphocyte count[4,6,7,10,14,15] < 200 cells/μL	HIV infection CD4+ T lymphocyte count[4,6,7,10,14,15] ≥ 200 cells/μL	Men who have sex with men (MSM)	Heart disease, chronic lung disease, chronic alcoholism	Asplenia (including elective splenectomy and persistent complement component deficiencies)[10,14]	Chronic liver disease	Kidney failure, end-stage renal disease, receipt of hemodialysis	Diabetes	Healthcare personnel
Influenza[2,*]	1 dose IIV annually				1 dose IIV or LAIV annually	1 dose IIV annually					1 dose IIV or LAIV annually
Tetanus, diphtheria, pertussis (Td/Tdap)[3,*]	1 dose Tdap each pregnancy	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs									
Varicella[4,*]	Contraindicated			2 doses							
Human papillomavirus (HPV) Female[5,*]		3 doses through age 26 yrs				3 doses through age 26 yrs					
Human papillomavirus (HPV) Male[5,*]		3 doses through age 26 yrs				3 doses through age 21 yrs					
Zoster[6]	Contraindicated				1 dose						
Measles, mumps, rubella (MMR)[7,*]	Contraindicated			1 or 2 doses							
Pneumococcal polysaccharide (PPSV23)[8,9]						1 or 2 doses					
Pneumococcal 13-valent conjugate (PCV13)[10]					1 dose						
Meningococcal[11,*]	1 or more doses										
Hepatitis A[12,*]	2 doses										
Hepatitis B[13,*]	3 doses										

*Covered by the Vaccine Injury Compensation Program

- For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection; zoster vaccine recommended regardless of prior episode of zoster
- Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)
- No recommendation

These schedules indicate the recommended age groups and medical indications for which administration of currently licensed vaccines is commonly indicated for adults ages 19 years and older, as of January 1, 2013. For all vaccines being recommended on the Adult Immunization Schedule: a vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Licensed combination vaccines may be used whenever any components of the combination are indicated and when the vaccine's other components are not contraindicated. For detailed recommendations on all vaccines, including those used primarily for travelers or that are issued during the year, consult the manufacturers' package inserts and the complete statements from the Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/pubs/acip-list.htm). Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

www.cdc.gov/mmwr/pdf/other/su6201.pdf

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Footnotes

Footnotes: Recommended Immunization Schedule for Adults Aged 19 Years and Older — United States, 2013

1. **Additional information**
   - Additional guidance for the use of the vaccines described in this supplement is available at http://www.cdc.gov/vaccines/pubs/acip-list.htm.
   - Information on vaccination recommendations when vaccination status is unknown and other general immunization information can be found in the General Recommendations on Immunization at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6002a1.htm.
   - Information on travel vaccine requirements and recommendations (e.g., for hepatitis A and B, meningococcal, and other vaccines) are available at http://wwwnc.cdc.gov/travel/page/vaccinations.htm.
2. **Influenza vaccination**
   - Annual vaccination against influenza is recommended for all persons aged 6 months and older.
   - Persons aged 6 months and older, including pregnant women, can receive the inactivated influenza vaccine (IIV).
   - Healthy, nonpregnant persons aged 2–49 years without high-risk medical conditions can receive either intranasally administered live, attenuated influenza vaccine (LAIV) (FluMist), or IIV. Health-care personnel who care for severely immunocompromised persons (i.e., those who require care in a protected environment) should receive IIV rather than LAIV.
   - The intramuscularly or intradermally administered IIV are options for adults aged 18–64 years.
   - Adults aged 65 years and older can receive the standard dose IIV or the high-dose IIV (Fluzone High-Dose).
3. **Tetanus, diphtheria, and acellular pertussis (Td/Tdap) vaccination**
   - Administer one dose of Tdap vaccine to pregnant women during each pregnancy (preferred during 27–36 weeks' gestation), regardless of number of years since prior Td or Tdap vaccination.
   - Administer Tdap to all other adults who have not previously received Tdap or for whom vaccine status is unknown. Tdap can be administered regardless of interval since the most recent tetanus or diphtheria-toxoid containing vaccine.
   - Adults with an unknown or incomplete history of completing a 3-dose primary vaccination series with Td-containing vaccines should begin or complete a primary vaccination series including a Tdap dose.
   - For unvaccinated adults, administer the first 2 doses at least 4 weeks apart and the third dose 6–12 months after the second.
   - For incompletely vaccinated (i.e., less than 3 doses) adults, administer remaining doses.
   - Refer to the Advisory Committee on Immunization Practices (ACIP) statement for recommendations for administering Td/Tdap as prophylaxis in wound management (see footnote #1).
4. **Varicella vaccination**
   - All adults without evidence of immunity to varicella (as defined below) should receive 2 doses of single-antigen varicella vaccine or a second dose if they have received only 1 dose.
   - Special consideration for vaccination should be given to those who have close contact with persons at high risk for severe disease (e.g., health-care personnel and family contacts of persons with immunocompromising conditions) or are at high risk for exposure or transmission (e.g., teachers; child care employees; residents and staff members of institutional settings, including correctional institutions; college students; military personnel; adolescents and adults living in households with children; nonpregnant women of childbearing age; and international travelers).
   - Pregnant women should be assessed for evidence of varicella immunity. Women who do not have evidence of immunity should receive the first dose of varicella vaccine upon completion or termination of pregnancy and before discharge from the health-care facility. The second dose should be administered 4–8 weeks after the first dose.
   - Evidence of immunity to varicella in adults includes any of the following:
     - —documentation of 2 doses of varicella vaccine at least 4 weeks apart;
     - —U.S.-born before 1980 except health-care personnel and
     women;
     - —history of varicella based on diagnosis or verification
     disease by a health-care provider;
     - —history of herpes zoster based on diagnosis or verificatio
     zoster disease by a health-care provider; or
     - —laboratory evidence of immunity or laboratory confirmatio
5. **Human papillomavirus (HPV) vaccination**
   - Two vaccines are licer
   quadrivalent HPV vacc
   - For females, either H
   routine vaccination a
   26 years, if not previo
   - For males, HPV4 is rec
   at age 11 or 12 years,
   ously vaccinated. Ma
   - HPV4 is recommende
   26 years for those wh
   - Vaccination is recomr
   those with HIV infect
   any or all doses wher
   - A complete series for
   dose should be admi
   should be administe
   after the first dose).
   - HPV vaccines are not
   pregnancy testing is
   to be pregnant afte
   is needed; the rema
   completion of pregn
   - Although HPV vaccin
   personnel (HCP) bas
   vaccine as recomme
6. **Zoster vaccination**
   - A single dose of zost
   and older regardless
   Although the vaccin
   (FDA) for use among
   and older, ACIP recor
   - Persons aged 60 yea
   vaccinated unless th
   pregnancy or severe
   - Although zoster vacc
   should receive the va
7. **Measles, mumps, rub**
   - Adults born before 19
   mumps. All adults bo
   more doses of MMR
   to the vaccine, or lab
   diseases. Documenta
   acceptable evidence
   Measles component:
   - A routine second do
   days after the first do
     - —are students in p
     - —work in a health
     - —plan to travel int
   - Persons who receive
   cine of unknown typ
   doses of MMR vaccin
   Mumps component:
   - A routine second do
   days after the first do
     - —are students in a
     - —work in a health
     - —plan to travel int
   - Persons vaccinated
   mumps vaccine of u

HCP born before 1957:
- For unvaccinated health-care personnel born before 1957 who lack laboratory evidence of measles, mumps, and/or rubella immunity or laboratory confirmation of disease, health-care facilities should consider vaccinating personnel with 2 doses of MMR vaccine at the appropriate interval for measles and mumps or 1 dose of MMR vaccine for rubella.

8. **Pneumococcal polysaccharide (PPSV23) vaccination**
   - Vaccinate all persons with the following indications:
     - —all adults aged 65 years and older;
     - —adults younger than age 65 years with chronic lung disease (including chronic obstructive pulmonary disease, emphysema, and asthma); chronic cardiovascular diseases; diabetes mellitus; chronic renal failure; nephrotic syndrome; chronic liver disease (including cirrhosis); alcoholism; cochlear implants; cerebrospinal fluid leaks; immunocompromising conditions; and functional or anatomic asplenia (e.g., sickle cell disease and other hemoglobinopathies, congenital or acquired asplenia, splenic dysfunction, or splenectomy [if elective splenectomy is planned, vaccinate at least 2 weeks before surgery]);
     - —residents of nursing homes or long-term care facilities; and
     - —adults who smoke cigarettes.
   - Persons with immunocompromising conditions and other selected conditions are recommended to receive PCV13 and PPSV23 vaccines. See footnote #10 for information on timing of PCV13 and PPSV23 vaccinations.
   - Persons with asymptomatic or symptomatic HIV infection should be vaccinated as soon as possible after their diagnosis.
   - When cancer chemotherapy or other immunosuppressive therapy is being considered, the interval between vaccination and initiation of immunosuppressive therapy should be at least 2 weeks. Vaccination during chemotherapy or radiation therapy should be avoided.
   - Routine use of PPSV23 is not recommended for American Indians/Alaska Natives or other persons younger than age 65 years unless they have underlying medical conditions that are PPSV23 indications. However, public health authorities may consider recommending PPSV23 for American Indians/Alaska Natives who are living in areas where the risk for invasive pneumococcal disease is increased.
   - When indicated, PPSV23 should be administered to patients who are uncertain of their vaccination status and there is no record of previous vaccination. When PCV13 is also indicated, a dose of PCV13 should be given first (see footnote #10).
9. **Revaccination with PPSV23**
   - One-time revaccination 5 years after the first dose is recommended for persons aged 19 through 64 years with chronic renal failure or nephrotic syndrome; functional or anatomic asplenia (e.g., sickle cell disease or splenectomy); and for persons with immunocompromising conditions.
   - Persons who received 1 or 2 doses of PPSV23 before age 65 years for any indication should receive another dose of the vaccine at age 65 years or later if at least 5 years have passed since their previous dose.
   - No further doses are needed for persons vaccinated with PPSV23 at or after age 65 years.
10. **Pneumococcal conjugate 13-valent vaccination (PCV13)**
    - Adults aged 19 years or older with immunocompromising conditions (including chronic renal failure and nephrotic syndrome), functional or anatomic asplenia, CSF leaks or cochlear implants, and who have not previously received PCV13 or PPSV23 should receive a single dose of PCV13 followed by a dose of PPSV23 at least 8 weeks later.
    - Adults aged 19 years or older with the aforementioned conditions who have previously received one or more doses of PPSV23 should receive a dose of PCV13 one or more years after the last PPSV23 dose was received. For those that require additional doses of PPSV23, the first such dose should be given no sooner than 8 weeks after PCV13 and at least 5 years since the most recent dose of PPSV23.
    - When indicated, PCV13 should be administered to patients who are uncer-
    - HIV-infected persons who are vaccinated also should receive 2 doses.
    - Administer a single dose of meningococcal vaccine to microbiologists routinely exposed to isolates of *Neisseria meningitidis*, military recruits, and persons who travel to or live in countries in which meningococcal disease is hyperendemic or epidemic.
    - First-year college students up through age 21 years who are living in residence halls should be vaccinated if they have not received a dose on or after their 16th birthday.
    - MCV4 is preferred for adults with any of the preceding indications who are aged 55 years and younger; meningococcal polysaccharide vaccine (MPSV4) is preferred for adults aged 56 years and older.
    - Revaccination with MCV4 every 5 years is recommended for adults previously vaccinated with MCV4 or MPSV4 who remain at increased risk for infection (e.g., adults with anatomic or functional asplenia or persistent complement component deficiencies).
12. **Hepatitis A vaccination**
    - Vaccinate any person seeking protection from hepatitis A virus (HAV) infection and persons with any of the following indications:
      - —men who have sex with men and persons who use injection or non-injection illicit drugs;
      - —persons working with HAV-infected primates or with HAV in a research laboratory setting;
      - —persons with chronic liver disease and persons who receive clotting factor concentrates;
      - —persons traveling to or working in countries that have high or intermediate endemicity of hepatitis A; and
      - —unvaccinated persons who anticipate close personal contact (e.g., household or regular babysitting) with an international adoptee during the first 60 days after arrival in the United States from a country with high or intermediate endemicity. (See footnote #1 for more information on travel recommendations). The first dose of the 2-dose hepatitis A vaccine series should be administered as soon as adoption is planned, ideally 2 or more weeks before the arrival of the adoptee.
    - Single-antigen vaccine formulations should be administered in a 2-dose schedule at either age 0 and 6–12 months (Havrix), or age 0 and 6–18 months (Vaqta). If the combined hepatitis A and hepatitis B vaccine (Twinrix) is used, administer 3 doses at 0, 1, and 6 months; alternatively, a 4-dose schedule may be used, administered on days 0, 7, and 21–30, followed by a booster dose at month 12.
13. **Hepatitis B vaccination**
    - Vaccinate persons with any of the following indications and any person seeking protection from hepatitis B virus (HBV) infection:
      - —sexually active persons who are not in a long-term, mutually monogamous relationship (e.g., persons with more than one sex partner during the previous 6 months); persons seeking evaluation or treatment for a sexually transmitted disease (STD); current or recent injection-drug users; and men who have sex with men;
      - —health-care personnel and public-safety workers who are potentially exposed to blood or other infectious body fluids;
      - —persons with diabetes younger than age 60 years as soon as feasible after diagnosis; persons with diabetes who are age 60 years or older at the discretion of the treating clinician based on increased need for assisted blood glucose monitoring in long-term care facilities, likelihood of acquiring hepatitis B infection, its complications or chronic sequelae, and likelihood of immune response to vaccination;
      - —persons with end-stage renal disease, including patients receiving hemodialysis; persons with HIV infection; and persons with chronic liver disease;
      - —household contacts and sex partners of hepatitis B surface antigen-positive persons; clients and staff members of institutions for persons with developmental disabilities; and international travelers
      to countries with high or intermediate prevalence of chronic HBV

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dose should be administered 1 month after the first dose; the third dose should be given at least 2 months after the second dose (and at least 4 months after the first dose). If the combined hepatitis A and hepatitis B vaccine (Twinrix) is used, give 3 doses at 0, 1, and 6 months; alternatively, a 4-dose Twinrix schedule, administered on days 0, 7, and 21–30 followed by a booster dose at month 12 may be used.
- Adult patients receiving hemodialysis or with other immunocompromising conditions should receive 1 dose of 40 µg/mL (Recombivax HB) administered on a 3-dose schedule at 0, 1, and 6 months or 2 doses of 20 µg/mL (Engerix-B) administered simultaneously on a 4-dose schedule at 0, 1, 2, and 6 months.

14. **Selected conditions for which *Haemophilus influenzae* type b (Hib) vaccine may be used**
    - 1 dose of Hib vaccine should be considered for persons who have sickle cell disease, leukemia, or HIV infection, or who have anatomic or functional asplenia if they have not previously received Hib vaccine.
15. **Immunocompromising conditions**
    - Inactivated vaccines generally are acceptable (e.g., pneumococcal, meningococcal, and influenza [inactivated influenza vaccine]), and live vaccines generally are avoided in persons with immune deficiencies or immunocompromising conditions. Information on specific conditions is available at http://www.cdc.gov/vaccines/pubs/acip-list.htm.

www.cdc.gov/mmwr/pdf/other/su6201.pdf

NYC Health

Recommendation vs. Requirement

- Recommended Schedules
  - Developed nationally by ACIP and endorsed by professional societies
  - Defines the national standard of practice
- School Requirements
  - It is the law!
    - New York State mandate for school attendance
      - Immunizations are required to register for school and to remain in school (NYS PHL §2164)

NYC Health

MMRV

- ProQuad® (Merck)
- Combination of MMR and varicella
- Licensed for use in children 12 months through 12 yrs of age
  - ACIP: use only in children 4 years and older

NYC Health

MMRV

- As compared to children who received MMR and varicella vaccine, children aged 12-23 months of age who received MMRV had a slightly increased risk of febrile seizures after vaccination
  - Seizures in occurred 5-12 days after vaccine
  - Approximately one extra febrile seizure for every 2,300-2,600 MMRV vaccine doses administered

NYC Health

MMR and Varicella vs. MMRV

- MMR and varicella vaccines are recommended routinely at ages 12-15 months and 4-6 years
- For the first dose of MMR and varicella vaccines at 1 <4 years, either MMR and varicella vaccines or MMRV vaccine may be used.
  - CDC recommends separate MMR vaccine and varicella vaccines
- For the second dose of MMR and varicella vaccines at any age (15 months-12 years) and for the first dose at age ≥48 months, use of MMRV vaccine generally is preferred
- A personal or family (i.e., sibling or parent) history of seizures of any etiology is a precaution for MMRV vaccination.
  - Children with a personal or family history of seizures of any etiology generally should be vaccinated with MMR vaccine and varicella vaccine.

NYC Health

Pneumococcal Vaccines

There are two types of vaccines available to protect against invasive pneumococcal disease:

- Pneumococcal conjugate vaccine: PCV13 (Prevnar®)
  - FDA approved for use in children <18 years (PCV7, 2000; PCV13, 2010, 2013)
  - FDA approved for use in adults 50 years and older (2011)
  - *CDC recommendations (the standard of care for immunization practice) are broader than the information in the package insert*
- Pneumococcal polysaccharide vaccine: PPSV23
  - Licensed for use for persons 2 years and older

NYC Health

PCV13

- A dose of PCV13 is recommended for:
  - Children up to 6 years of age (59 months) who were completely vaccinated with PCV7
  - Children up to 7 years of age (71 months) with high-risk medical conditions
  - Children and teens 6 though 18 years of age who have not received PCV13 and are at high risk for invasive pneumococcal disease because of:
    - Anatomic or functional asplenia (including sickle cell disease)
    - Immunocompromising conditions, including HIV infection
    - Cochlear implants
    - CSF leaks

    should receive a single dose of PCV13 (regardless of any previous history of PCV7 and/or PSV23)

www.cdc.gov/vaccines/pubs/vis/downloads/vis-pcv-hcp-supplmt.pdf accessed 03-06-2013

NYC Health

Underlying Medical Conditions that are Indications for Pneumococcal Conjugate Vaccination Among Children

Immunocompetent persons	Chronic heart disease (particularly cyanotic congenital heart disease and cardiac failure)
	Chronic lung disease (including asthma if treated with high-dose corticosteroids)
	Diabetes mellitus
	Cerebrospinal fluid (CSF) leaks
	Cochlear implants
Functional or anatomic asplenia	Sickle cell disease and other hemoglobinopathies Congenital or acquired asplenia or splenic dysfunction
Immunocompromised persons	HIV infection
	Chronic renal failure and nephrotic syndrome
	Diseases associated with immunosuppressive chemotherapy or radiation therapy including malignant neoplasms, leukemias, lymphomas and Hodgkin disease; solid organ transplant
	Congenital immunodeficiency (B-(humoral) or T-lymphocyte deficiency, complement deficiencies, particularly C1, C2, C3, and C4 deficiency; and phagocytic disorders (excluding chronic granulomatous disease)

www.cdc.gov/vaccines/programs/vfc/downloads/resolutions/0610-pneumo.pdf

NYC Health

PCV13

- Adults 19 and older *who have not received either PCV or PPSV previously* and are at high risk for invasive pneumococcal disease because of
  - Anatomic or functional asplenia (including sickle cell disease)
  - Immunocompromising conditions, including HIV infection
  - Cochlear implants
  - CSF leaks

  should receive a single dose of PCV13.

  This should be followed with a dose of PPSV at least 8 weeks later. (Those with indications for revaccination with PPSV should receive a second dose at least 5 years after the first.)

www.cdc.gov/vaccines/pubs/vis/downloads/vis-pcv-hcp-supplmt.pdf accessed 03-06-2013

NYC Health

PCV13

- Adults 19 and older *who have received one or more doses of PPSV previously* and are at high risk for invasive pneumococcal disease because of
  - Anatomic or functional asplenia (including sickle cell disease)
  - Immunocompromising conditions, including HIV infection
  - Cochlear implants
  - CSF leaks

  should receive a single dose of PCV13 at least one year after the last dose of PPSV23.

www.cdc.gov/vaccines/pubs/vis/downloads/vis-pcv-hcp-supplmt.pdf accessed 03-06-2013

NYC Health

Pneumococcal Polysaccharide Vaccine (PPSV23)

- Select individuals 2 - 64 years
  - Individuals with chronic disease
  - Immunocompromised individuals
- All persons ≥65 years

NYC Health

Overlap of Serotypes

PPSV23 contains 12 of the serotypes included in PCV13, plus 11 additional serotypes

	1	2	3	4	5	6A	6B	7F	8	9N	9V	10A	11A	12F	14	15B	17F	18C	19A	19F	20	22F	23F	33F
PPV 23	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
PCV 13	X		X	X	X	X	X	X			X				X			X	X	X			X	

The immune responses elicited by polysaccharide and conjugate vaccines differ

NYC Health

PPSV23 After PCV13 for Children ≥2 Years of Age with Underlying Medical Conditions

Group	Schedule for PPSV23	Revaccination with PPSV23
Children who are immunocompromised, have sickle cell disease, or functional or anatomic asplenia	1 dose of PPSV23 administered at age >2 yrs and > 8 weeks after last indicated dose of PCV13	1 dose 5 years after the first dose of PPSV23
Immunocompetent children with chronic illness	1 dose of PPSV23 administered at age >2 yrs and > 8 weeks after last indicated dose of PCV13	Not recommended

Doses of PCV13 should be completed before PPSV23 is given.

www.cdc.gov/vaccines/programs/vfc/downloads/resolutions/0610-pneumo.pdf

NYC Health

PCV 23 after PCV13

- PPSV23 after PCV13
  - Persons ≥2 years with underlying medical conditions

observe an 8 week interval
between doses of PCV and/or doses of PPSV23

NYC Health

PPSV23 – 2nd dose Recommendations

- Second dose of PPSV23 is recommended 5 years after the first dose for:
  - Persons aged 2-64 years with functional or anatomic asplenia or immunocompromising condition
  - Persons aged 65 years or older, who received a dose prior to age 65

NYC Health

PPSV23 – Persons 65 years and older

- All adults 65 years and older are recommended to receive a dose of PPSV23
  - Persons who received 1 or 2 doses of PPSV23 before age 65 for any indication should receive another dose of PPSV23 at age 65 years or later if at least 5 years have passed since their previous dose.

No more than 3 doses of PPSV23 in a lifetime

www.cdc.gov/vaccines/acip/meetings/downloads/slides-oct-2012/00-Adult-schedule.pdf

NYC Health

Pneumococcal Vaccination Recommendations for Children[1] and Adults by Age and/or Risk Factor

Risk Group	Underlying medical condition or other risk factor	Recommendations for Vaccination with Pneumococcal Conjugate Vaccine (PCV13)			Recommendations for Vaccination with Pneumococcal polysaccharide vaccine (PPSV23)		
		Administer doses needed to complete schedule to children through age 71 months	*Consider* administering 1 dose to PCV13-naïve children age 6–18 years	Administer 1 dose to PCV13-naïve adults age 19 years and older	Administer 1 dose at age 2 through 64 years	Administer second dose 5 years after first dose if age <65 years	Administer 1 dose at age 65 years
Immuno-competent	Healthy adult, non-smoker						X
	Chronic heart disease[2]	X			X		X
	Chronic lung disease[3]	X			X		X
	Diabetes mellitus	X			X		X
	Cerebrospinal fluid leak	X	X	X	X		X
	Cochlear implant	X	X	X	X		X
	Alcoholism				X		X
	Chronic liver disease, cirrhosis				X		X
	Cigarette smoking (≥19 yrs)				X		X
Functional or anatomic asplenia	Sickle cell disease/other hemoglobinopathy	X	X	X	X	X	X
	Congenital or acquired asplenia	X	X	X	X	X	X
Immuno-compromised	Congenital or acquired immunodeficiency[4]	X	X	X	X	X	X
	HIV	X	X	X	X	X	X
	Chronic renal failure	X	X	X	X	X	X
	Nephrotic syndrome	X	X	X	X	X	X
	Leukemia	X	X	X	X	X	X
	Lymphoma	X	X	X	X	X	X
	Hodgkin disease	X	X	X	X	X	X
	Generalized malignancy	X	X	X	X	X	X
	Iatrogenic immunosuppression[5]	X	X	X	X	X	X
	Solid organ transplant	X	X	X	X	X	X
	Multiple myeloma	X	X	X	X	X	X

Technical content reviewed by the Centers for Disease Control and Prevention

IMMUNIZATION ACTION COALITION

1573 Selby Avenue • St. Paul, MN 55104 • 651 647-9009 • www.immunize.org • www.vaccineinformation.org

www.immunize.org/catg.d/p2019.pdf • Item #P2019 (2/13)

1. For PCV13 vaccination of healthy children, see "Recommendations for Pneumococcal Vaccine Use in Children" at www.immunize.org/catg.d/p2016.pdf.
2. Particularly cyanotic congenital heart disease and cardiac failure in children; excluding hypertension in adults.
3. Including asthma in children if treated with high-dose oral corticosteroid therapy; including asthma in adults.
4. Includes B- (humoral) or T-lymphocyte deficiency, complement deficiencies (particularly C1, C2, C3, and C4 deficiencies), and phagocytic disorders (excluding chronic granulomatous disease).
5. Diseases requiring treatment with immunosuppressive drugs, including long-term systemic corticosteroids and radiation therapy.

www.immunize.org/catg.d/p2019.pdf accessed 03-07-13

NYC Health

The Tetanus-Containing Vaccines

For children <7 years

- DTaP
- DTP (not in US market)
- DT (uncommon use)

For persons 7 years or older

- Td
- Tdap

Different vaccines are licensed for use at different ages

Pay attention to how the vaccine is written

An upper case letter describes a larger amount of antigen;
a lower case letter a smaller amount

NYC Health

Routine DTaP / Tdap Vaccination Schedule

Dose	Recommended Age	Minimum Interval
Primary #1	2 months	---
Primary #2	4 months	4 weeks
Primary #3	6 months	4 weeks
Primary #4	15-18 months	6 months
Final DTaP dose	4-6 years	6 months
Tdap	[10]*-11-12 years	---
Booster	every 10 years	

*NYS school requirements for 6th grade

NYC Health

Tdap Products

- GSK - Boostrix®
- sanofi pastuer - ADACEL®
- Either product
  - May be used beginning at 7 years of age with no upper age limit for administration

For guidance about the use of vaccines, go to www.cdc.gov/vaccines

Do *not* rely on the package insert

NYC Health

ACIP Recommendations

- Children 7-10 years who did not complete a primary series of pertussis-containing vaccine (DTaP) should receive a single dose of Tdap
  - Fewer than 4 doses of DTaP, *or*
  - The last dose of DTaP was before 4 years of age

CDC recommendations are the standard of care

NYC Health

Recommendations for Tdap

- Incomplete/unknown vaccination history:
  - Children 7 years and older with an incomplete primary series of tetanus-containing vaccine should receive or complete a primary series (3 vaccinations)
    - Single dose of Tdap
    - Td ≥ 28 days later
    - The final dose of Td 6-12 months later

Tdap may substitute for any one of the three doses in the series
This dose of Tdap will be accepted as the required dose

NYC Health

Tdap Recommendations

- *All adults* should receive a one-time dose of Tdap, unless it is already documented.

NYC Health

ACIP Recommendation

- Pregnant women should be immunized with Tdap *during each pregnancy* to protect their newborns.
  - Optimal timing for Tdap administration is between 27 and 36 weeks gestation to maximize maternal antibody reponse and passive transfer to the infant.
  - If vaccine is not administered, it should be given in the immediate post-partum period

Tdap Recommendations

- Tdap should be given to parents, caretakers, and close contacts of infants <12 months of age ideally at least two weeks before beginning such close contact.

- Includes: parents, grandparents, relatives, nannies, babysitters, child care workers, extended family, health care workers, etc.

CDC recommendations are the standard of care

NYC Health

Tdap in Health Care Workers

- Health care personnel, regardless of age, should receive a single dose of Tdap as soon as feasible if they have not previously received Tdap *and* regardless of the time since the last Td.

CDC recommendations are the standard of care

NYC Health

Minimum Interval Between Td and Tdap

There is no minimum interval that must be observed

- Tdap can be administered regardless of interval since the last tetanus- or diphtheria-containing vaccine.

CDC recommendations are the standard of care

NYC Health

History of Pertussis

- Persons with a history of pertussis should receive Tdap according to routine recommendations
  - There is no long lasting immunity from pertussis (whooping cough) disease

NYC Health

Tdap Adverse Reactions

Local reactions (pain, redness, swelling)	21%-66%
Temp of 104°F or higher	1.4%

Adverse reactions occur at approximately the same rate as with Td (without the acellular pertussis component)

Second dose adverse reactions are similar

CDC. Epidemiology and Prevention of Vaccine Preventable Diseases (Pink Book), 12th ed., 2nd printing. 2012
ACIP meeting Feb 2013

NYC Health

Contraindications to Tdap

- Anaphylactic reaction to a previous dose or to any component of the vaccine
- Encephalopathy not attributable to an identifiable cause within 7 days of pertussis-containing vaccine

- - - - - - - - - -

- If there was a previous Arthus reaction to a tetanus toxoid or diphtheria toxoid-containing vaccine, a 10 year interval between doses is recommended
- Febrile reactions or seizures after DTP/DTaP are not a contraindication to Tdap

Type III hypersensitivity reaction – immune complex mediated with deposits of Ag/AB complexes in vascular walls; local vasculitis characterized by severe pain, swelling, edema, hemorrhage and occasionally necrosis.

NYC Health

New York State Public Health Law §2805-h

- Effective November 25, 2009 - annually, between 9/1 and 4/1 requires hospitals with NICUs to offer flu vaccine to parents and family members of newborns in the NICU
- Effective January 14, 2013 - Requires all hospitals having a newborn nursery or providing obstetric services to offer and provide Tdap vaccination to every parent, person in parental relation or caregiver.
- The hospital need not offer vaccine to parents who have already received the vaccine or for whom it is medically contraindicated
- Parent may refuse vaccination after being fully informed of the benefits and risks of vaccination

NYC Health

Quadrivalent Meningococcal Vaccines A/C/Y/W-135

- Conjugated vaccines
  - Menactra™ MCV4-D (sanofi pasteur)
    - For use ages 9 months through 55 years
  - Menveo® MCV4-CRM (Novartis)
    - For use ages 2 through 55 years
- Polysaccharide vaccine
  - Menomune® (sanofi pasteur)
    - Approved by the FDA for use ages 2 and older
    - Only approved product for persons >55 years
    - ACIP: Use of MPSV4 should be limited to persons >55 years or when MCV4 is not available

NYC Health

Menveo® MCV4-CRM (Novartis)

Lyophilized serogroup A
reconstituted with liquid serogroups C, Y and W-135

ALWAYS USE THE TWO VIALS TOGETHER !

NYC Health

HibMenCY

- MenHibrix® [Meningococcal C and Y and Hib Conjugate Vaccine] (GSK) is recommended to be used at 2, 4, 6, and 12-15 months *only* for those infants at greatest risk for invasive meningococcal disease
  - Persistent complement pathway deficiencies
  - Anatomic or functional asplenia, including sickle cell disease
  - In communities with serogroup C or Y disease outbreaks
- If HibMenCY is used for protection against meningococcal serogroups C and Y, HibMenCY should be used for all 4 doses of the Hib vaccine.

Non-US Meningococcal Vaccines

- Meningococcal vaccines are used in many countries outside of the US. They are specific to the meningococcal strains circulating in those communities
  - Monovalent (C or A) vaccines [Monovalent B in Cuba]
  - Bivalent (A and C) vaccines
  - Given at a very different schedule (infancy)
- All may be recorded as “mening”. Be cautious as you document these vaccines; teens still need the quadrivalent vaccine ACYW-135

NYC Health

Meningococcal Conjugate Vaccine (MCV4) Recommendations

- Routine use in adolescents 11-18 years of age
  - Age 11-12 years with a booster dose at 16 years of age. Catch-up those up to 18 years of age who do have not been vaccinated.
    - If the first dose is administered at age 13-15 years, a booster dose should be administered at 16-18 years with a minimum interval of at least 8 weeks from the preceding dose.
    - If the first dose is administered at 16 years or older, a booster dose is not needed.
  - HIV+ adolescents aged 11-18 years should receive a 2-dose primary series of MCV4 with doses at least 8 weeks apart

NYC Health

MCV4 Vaccination Recommendations
High-Risk <2 years of age

- For children younger than 19 months of age with anatomic or functional asplenia (including sickle cell disease), give an infant series of HibMenCY (MenHibrix) at 2, 4, 6, and 12-15 months.
- For children aged 2 through 18 months with persistent complement component deficiency,
  - administer either an infant series of HibMenCY at 2, 4, 6, and 12 through 15 months *or*
  - a 2-dose primary series of MCV4D (Menactra) starting at 9 months, with at least 8 weeks between doses.
- For children aged 19 through 23 months with persistent complement component deficiency who have not received a complete series of HibMenCY or MCV4D (Menactra), administer 2 primary doses of MCV4D at least 8 weeks apart.

MCV4 Vaccine Recommendations High-Risk 24 months and older

- For children 24 months and older
  - with persistent complement component deficiency who have not previously been vaccinated, *or*
  - with anatomic/functional asplenia (including sickle cell disease)

who have not received a complete series of Hib-MenCY or MCV4-D

  - administer 2 primary doses of either brand of MCV4 at least 8 weeks apart, and 1 dose every 5 years thereafter

*For children with anatomical/functional asplenia, if MCV4D is used, administer at a minimum age of 2 years and at least 4 weeks after completion of all PCV13 doses

MCV4 For Travel

Indicated if traveling to endemic or hyper-endemic region such as sub-Saharan Africa of for the Hajj

- For children 9 months to 23 months of age
  - 2 doses of MCVD separated by at least 8 weeks

  (note- if travel is completed and only one dose was administered, no second dose is indicated unless the child will be returning to the endemic community)
- For persons 2 years and older
  - 1 dose of either brand of MCV4 vaccine (use MPSV4 for persons >55 years of age)
- * Prior receipt of HibMenCY is not sufficient for children traveling to the meningitis belt or to the Hajj

See www.cdc.gov/travel for details

The African Meningitis Belt

wwwnc.cdc.gov/travel/yellowbook/2012/chapter-3-infectious-diseases-related-to-travel/meningococcal-disease.htm

NYC Health

Meningococcal Vaccination Recommendations by Age and/or Risk Factor

This table summarizes the recommendations of CDC's Advisory Committee on Immunization Practices for the use of meningococcal vaccine.

MCV4 = Menactra (sanofi) and Menveo (Novartis) MCV4-D = Menactra
MPSV = Menomune (sanofi) Hib-MenCY = MenHibrix (GlaxoSmithKline)

TARGETED GROUP BY AGE AND/OR RISK FACTOR	PRIMARY DOSE(S)	BOOSTER DOSE(S)
People ages 11 through 18 years	Give 1 dose of MCV4, preferably at age 11 or 12 years[1]	Give booster at age 16 years if primary dose given at age 12 years or younger
		Give booster at age 16 through 18 years if primary dose given at age 13 through 15 years[2]
People ages 19 through 21 years who are are first-year college students and living in residence halls	Give 1 dose of MCV4[1]	Give booster if previous dose given at age younger than 16 years
Certain travelers,[3] people present during outbreaks caused by a vaccine serogroup,[4] and other people with prolonged increased risk for exposure (e.g., travelers to or residents of countries where meningococcal disease is hyperendemic or epidemic and microbiologists routinely working with *Neisseria meningitidis*)		
▪ for age 9 through 23 months	Give 2 doses of MCV4-D, 3 months apart[5]	If risk continues, give initial booster after 3 years, followed by boosters every 5 years
▪ for age 2 through 55 years	Give 1 dose of MCV4[1]	Boost every 5 years with MCV4[6, 7]
▪ for age 56 years and older	Give 1 dose of MPSV	Boost every 5 years with MPSV[7]
People with persistent complement component deficiencies,[8] or functional or anatomic asplenia, including sickle cell disease		
▪ for age 2 through 18 months[9]	Give Hib-MenCY at ages 2, 4, 6 and 12–15 months	Give MCV4 booster after 3 years followed by MCV4 boosters every 5 years thereafter
▪ for age 9 through 23 months with persistent complement component deficiencies only *(does **not** include children with functional or anatomic asplenia)*	Give 2 doses of MCV4-D, 3 months apart	
▪ for ages 2 through 55 years	Give 2 doses of MCV4, 2 months apart[10]	Boost every 5 years with MCV4[6, 11]
▪ for age 56 years and older	Give 1 dose of MPSV	Boost every 5 years with MPSV[11]

FOOTNOTES

1. If the person is HIV-positive, give 2 doses, 2 months apart.
2. The minimum interval between doses of MCV4 is 8 weeks.
3. Prior receipt of Hib-MenCY is not sufficient for children traveling to the Hajj or meningitis belt as it doesn't provide protection against serogroups A or W-135.
4. Seek advice of local public health authority to determine if vaccination is recommended.
5. If a child age 9 through 23 months will enter an endemic area in less than 3 months, give doses as close as 2 months apart.
6. If primary dose(s) given when younger than age 7 years, give initial booster after 3 years, followed by boosters every 5 years.
7. Boosters are recommended if the person remains at increased risk.
8. Persistent complement component deficiencies include C3, C5-C9, properdin, factor H, and factor D.
9. Children ages 2 through 18 months who are present during outbreaks caused by serogroups C or Y may be given an age-appropriate series of Hib-MenCY.
10. Children with functional or anatomic asplenia should complete a PCV13 vaccine series before vaccination with MCV4; if MCV4-D is to be given, vaccinate at least 4 weeks following last dose of PCV13.
11. If the person received a 1-dose primary series, give booster at the earliest opportunity, then boost every 5 years.

Technical content reviewed by the Centers for Disease Control and Prevention

IMMUNIZATION ACTION COALITION 1573 Selby Avenue • St. Paul, MN 55104 • 651-647-9009 • www.immunize.org • www.vaccineinformation.org

www.immunize.org/catg.d/p2018.pdf • Item #P2018 (12/12)

www.immunize.org/catg.d/p2018.pdf accessed 03-07-13

NYC Health

NYC / NYS Recommendations Meningococcal Vaccination for MSM 03-06-2013

There is an ongoing outbreak of invasive meningococcal disease (IMD) among MSM in NYC: 22 cases and 7 deaths since 2010. The incidence of IMD in the MSM population is >60 times that of non-MSM males in NYC.

- Meningococcal vaccine should be offered to:
  - All HIV-infected MSM
  - MSM, regardless of HIV status, who regularly have close or intimate contact with men met through online websites, digital applications ("app") or at a bar or party

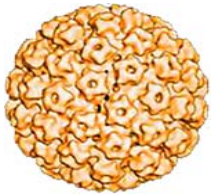
One dose of MCV4
for HIV+ MSM, 2 doses separated by at least 8 weeks

NYC Health

Meningococcal Polysaccharide Vaccine MPSV4 A/C/Y/W-135

- Menomune® (sanofi pasteur)
- Originally licensed in 1974
  - Approved by the FDA for use ages 2 and older
    - Only approved product for persons >55 years
  - ACIP: Use of MPSV4 should be limited to persons >55 years or when MCV4 is not available
  - Single dose with revaccination 5 or more years later if risk factors remain

NYC Health

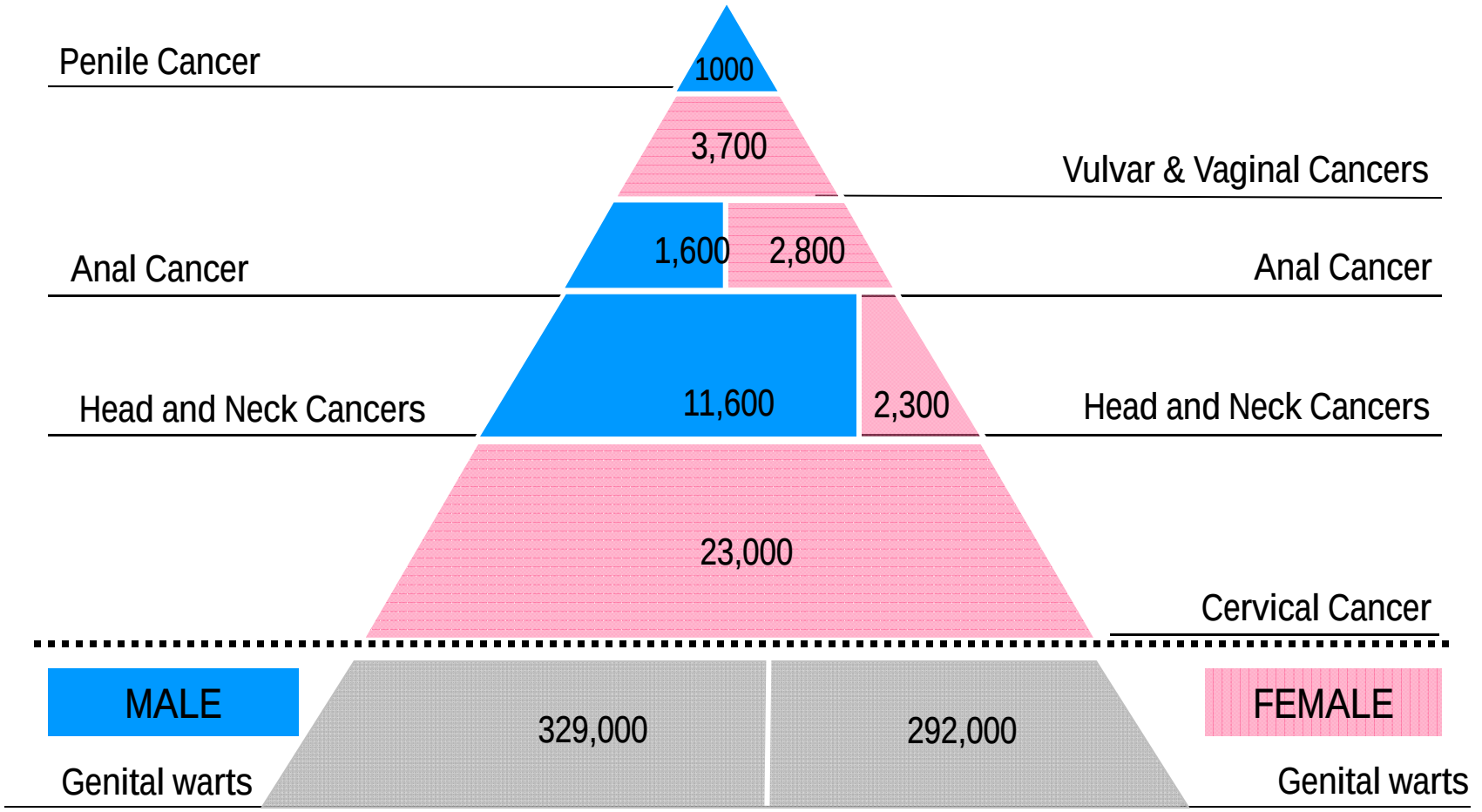


HPV Disease Burden in the U.S.

- Human only disease; >130 types identified
- 30-40 anogenital types of HPV (alpha human papillomavirus)
  - High-risk, oncogenic types
  - Low-risk, non-oncogenic types
- Anogenital HPV is the most common STD in the US
  - Estimated 20 million currently infected
  - 6.2 million new infections/year
- Common among adolescents and young adults
- Men appear to have a higher prevalence of HPV infections as compared to women

NYC Health

HPV and Cancers



Annual new cancers and genital warts cases related to HPV 6,11,16 and/or 18 in Males and Females in Europe

Annual number of new cancer cases calculated based on crude incidence rates from IARC database (1998-2002) and population estimate Eurostat 2008; estimate Globocan 2008 for cervical cancer; published HPV prevalence rates were applied (for Europe, when available) Genital warts estimates based on incidence rates in UK, HPA 2007

Thanks to Gale Burstine MD and Anna Guiliano MD

NYC Health

HPV Vaccine Recommendations

- All females 9 through 26 years (HPV4 or HPV2)
- All males 9 through 21 years (HPV4)
  - Routine at 11-12 yrs; may be given as early as 9 yrs
  - Catch-up begun through age 21 (males) or 26 (females)
- Males 22 through 26 years who are:
  - HIV+ *or* MSM *or* immunocompromised should be vaccinated
  - All other males 22 through 26 years *may* receive HPV4

NYC Health

HPV Vaccine Recommendations

- Pre-vaccination assessments are not recommended at any age (sexual activity, Pap, HPV, pregnancy tests)
- HPV vaccines may be given to immunosuppressed persons (they are not live virus vaccines)
- HPV vaccine may be given to women who are breastfeeding (breastfeeding is not a contraindication to any vaccine)
- There are no therapeutic effects of HPV vaccine
- HPV vaccine may be administered simultaneously with any other indicated vaccines.

NYC Health

HPV Vaccine Schedule

- Recommended schedule
  - 0, 1-2, 6 months
- Minimum intervals
  - 4 weeks (1 month) between the first and second doses
  - 12 weeks (3 months) between second and third doses
  - 24 weeks (6 months) between first and third doses

Vaccine may be given with any and all other vaccines

NYC Health

HPV Vaccine: Adverse Reactions

- Local reactions 20%-90%
  (pain, swelling)
- Fever 10%-13%
- No serious reactions reported

NYC Health

Countries with HPV Vaccine in their National Immunization Schedule, 2010

- Target group – young adolescent girls
- Catch-up age groups variable

Source: WHO/IVB database, 193 WHO Member States. Data as of April 2011

Date of slide: 03 August 2011

No *(156 countries or 81%)*

Yes *(33 countries or 17%)*

Yes (Part of the country) *(4 countries or 2%)*

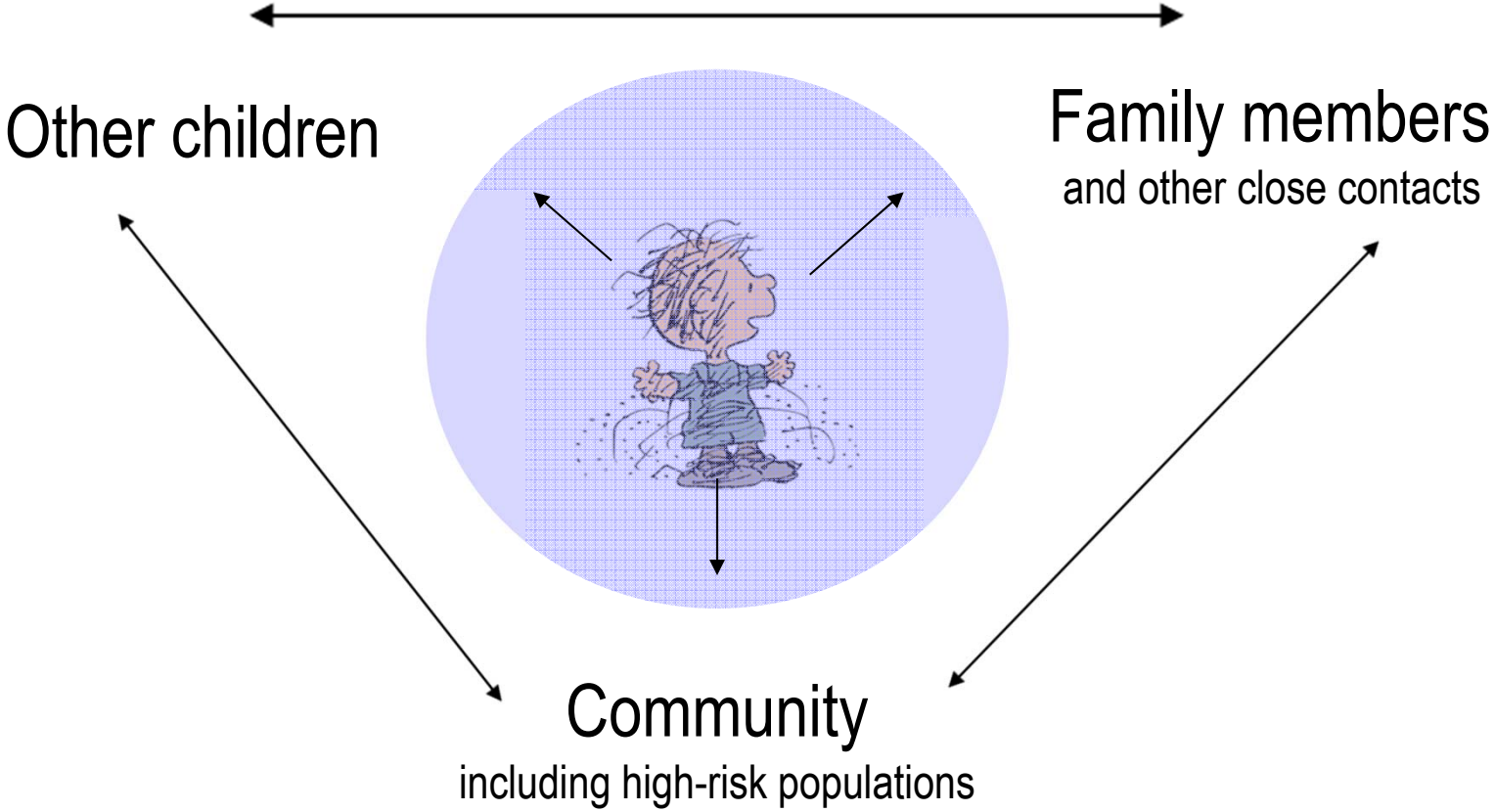
2012-2013 Influenza Recommendations

- All persons 6 months and older are recommended to receive annual influenza vaccine unless they have a valid medical contraindication

Allergy to egg is no longer a contraindication to influenza vaccine

NYC Health

Children as Vectors



Influenza Vaccines

- There are three types of influenza vaccine:
  - Injectable or inactivated vaccine (TIV)
    - Available from many manufacturers
    - Earliest age at which any brand is licensed for use: 6 months
    - High-dose formulation for persons ≥65 years is available
    - Dose: 0.25 mL IM for 6 months -35 months; 0.5mL ≥3 years IM
  - Live attenuated intranasal vaccine (LAIV)
    - Only one manufacturer
    - Licensed for use ages 2 though 49 years
    - Dose: 0.2mL divided between nostrils
  - Intradermal inactivated vaccine
    - Only one manufacturer
    - Licensed for use ages 19 through 64 years
    - Dose: 0.1mL intradermally administered

NYC Health

Newly Licensed Influenza Vaccines

- FluMist® Quadrivalent (MedImmune) 02/29/2012
  - Contains two influenza A strains (H1N1; H3N2) and two influenza B (Victoria and Yamagata) strains
  - For use in persons 2-49 years of age
- Fluarix® Quadrivalent (GlaxoSmithKline) 12/18/2012
  - Contains two influenza A strains (H1N1; H3N2) and two influenza B (Victoria and Yamagata) strains
  - For use in persons 3 years of age and older
- Flucelvax® (Novartis) 11/20/2012
  - Trivalent vaccine manufactured using cell culture technique
  - For use in persons 18 years and older
- FluBlok ® (Protein Sciences Corp) 1/16/2013
  - Trivalent vaccine manufactured using recombinant DNA technology
  - For use in persons 18 through 49

NYC Health

You

cannot

get the flu

from the flu vaccine !

NYC Health

Influenza Vaccination of Persons with Egg Allergy

- If the person can eat cooked eggs without a reaction ⇒ vaccinate (TIV) without special precautions
- If after eating egg or egg-containing food the person has hives only ⇒ vaccinate (TIV) and observe for at least 30 minutes
- If the person has hives and other symptoms (e.g. wheezing, nausea) then refer the person to a physician with expertise in management of allergy
- LAIV should not be administered to persons with egg allergy

NYC Health

Latex in Vaccine Packaging

- If a person reports a severe (anaphylactic) allergy to latex, vaccines supplied in vials or syringes that contain natural rubber should not be administered
- For latex allergies other than anaphylactic allergies (e.g., a history of contact allergy to latex gloves) vaccines supplied in vials or syringes that contain dry natural rubber or rubber latex can be administered

www.latexallergyresources.org

NYC Health

New York State Public Health Law §2805-h

- Effective November 25, 2009 - annually, between 9/1 and 4/1 requires hospitals with NICUs to offer flu vaccine to parents and family members of newborns in the NICU
- Effective January 14, 2013 - Requires all hospitals having a newborn nursery or providing obstetric services to offer and provide Tdap vaccination to every parent, person in parental relation or caregiver.
- The hospital need not offer vaccine to parents who have already received the vaccine or for whom it is medically contraindicated
- Parent may refuse vaccination after being fully informed of the benefits and risks of vaccination

NYC Health

The Citywide Immunization Registry (CIR)

- The NYC DOHMH's electronic database of immunization records
  - Effective January 1, 1997 and extended August 18, 2005
- Mandated reporting of all immunization data for NYC children <19 years
  - Vaccines administered *and* historical information
- Voluntary reporting for NYC adults ≥19 years (consent in their medical record)

347-396-2400

www.nyc.gov/health/cir

NYC Health Code sections 11.04 and (d)11.07

New York State Immunization Information System (NYSIIS)

- NYS DOH's web database of immunization records
  - Effective January 1, 2008
- Mandated reporting for all immunization data for children in NYS (other than NYC) <19 years

518-473-2839
nysiis@health.state.ny.us

NYS PHL 2168, Article 21, Title 6

VPD Surveillance

Report *suspected* cases of
vaccine preventable diseases
to
your local health department

In NYC

212-676-2288

after hours: 212-POISONS

NYC Health

Vaccine Adverse Events

Report all *suspected* vaccine adverse events

800-822-7967
or
www.vaers.hhs.gov

or, in NYC,

on-line through the CIR
www.nyc.gov/health/cir

NYC Health

thank you

questions?

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