Vaccine Update 2015

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Hawaii Immunization Coalition Workshop
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***Representing the Immunization Action Coalition, Saint Paul, MN**

immunization action coalition
IAC
immunize.org

Disclosures

- **William Atkinson has served as a paid consultant to Merck on human papillomavirus vaccine**
- **The speaker will discuss the use of Tdap vaccine in a manner not approved by the Food and Drug Administration (FDA) but recommended by ACIP**
- **The speaker will not discuss vaccines not licensed by the FDA**

Advisory Committee on Immunization Practices (ACIP)

- **The recommendations to be discussed are primarily those of the ACIP**
  - **composed of 15 experts in clinical medicine and public health who are not government employees**
  - **provides guidance on the use of vaccines and other biologic products to the Department of Health and Human Resources, CDC, and the U.S. Public Health Service**

www.cdc.gov/vaccines/acip/

What's New?

- 2015 schedules
- Influenza vaccines
- Tdap (not so new but important)
- Measles redux
- PCV13 for adults
- Meningococcal serogroup B vaccines
- Human Papillomavirus (HPV) vaccines (also not so new but very important)

Immunization Schedules

- **Revised annually**
- **Intended to reflect and summarize current recommendations, not to create new recommendations**
- **2015 child and adolescent schedules released on January 26, 2015**
- **2015 adult schedule to be released on February 3, 2015**
- **Available on CDC website at**

www.cdc.gov/vaccines/schedules/index.html

Influenza Summary – 2013-14 Season

- Peak during last week of December 2013
- Pandemic H1N1 virus predominated
- 57% of hospitalized persons were 18-64 years old
- 96 laboratory-confirmed pediatric deaths reported from 30 states
  - 44% of deaths among children younger than 23 months

MMWR 2014;63:485-90

Influenza Summary – 2014-15 Season*

- Influenza activity is high in most of the country
- Influenza A H3N2 is predominant
  - 64% of H3N2 isolates are antigenically different (“drifted”) from the vaccine H3N2 strain
- The proportion of deaths attributable to pneumonia and influenza is above the epidemic threshold
- 56 pediatric deaths due to influenza have been reported to date

*as of January 17, 2015. www.cdc.gov/flu

Influenza Vaccine Virus Strains for 2014-15

- **Trivalent vaccines contain:**
  - **an A/California/7/2009 (H1N1)-like virus**
  - **an H3N2 virus antigenically like the cell-propagated prototype virus A/Victoria/361/2011, and**
  - **a B/Massachusetts/2/2012-like virus (Yamagata lineage)**
- **Quadrivalent vaccines also contain:**
  - **a B/Brisbane/60/2008-like virus (Victoria lineage)**

***MMWR* 2014;63:691-7**

Influenza Vaccine Effectiveness for 2014-15

- **During November 10, 2014–January 2, 2015 overall vaccine effectiveness (VE) against laboratory-confirmed influenza associated with medically attended ARI was 23% (95% CI = 8%–36%)**
- **VE for 24% for persons 6 months-17 years, 14% for 50 years and older**
- **Low VE consistent with circulation of drifted influenza A H3N2 strain**
- **Clinicians should have low threshold for use of influenza antiviral drugs**

***MMWR* 2014;63:691-7**

Influenza Antiviral Drugs Background

- **Clinical trials and observational data show that early antiviral treatment can:**
  - **shorten the duration of fever and illness symptoms**
  - **reduce the risk of complications from influenza (e.g., otitis media in young children, pneumonia, and respiratory failure)**
  - **reduce the risk of death among hospitalized patients**
    - **shorten the duration of hospitalization (children)**

http://emergency.cdc.gov/han/han00374.asp

CDC Antiviral Medications: Treatment Recommendations

- **Three FDA-approved influenza antiviral drugs:**
  - **oseltamivir (Tamiflu)**
  - **zanamivir (Relenza)**
  - **peramivir (Rapivab) (≥18 years)**
- **Antiviral treatment is recommended as early as possible for any patient with confirmed or suspected influenza who**
  - **is hospitalized**
  - **has severe, complicated, or progressive illness, or**
  - **is at higher risk for influenza complications**

http://emergency.cdc.gov/han/han00374.asp

CDC Antiviral Medications: Treatment Recommendations (2)

- **Can be considered for anyone on the basis of clinical judgment**
- **Antiviral treatment should be started as soon as possible after illness onset, within 48 hours of symptom onset**
- **Antiviral treatment might still be beneficial in patients with severe, complicated or progressive illness and in hospitalized patients when started after 48 hours of illness onset**
- **Treatment of persons with suspected influenza should not wait for laboratory confirmation of influenza**

http://emergency.cdc.gov/han/han00374.asp

Influenza Vaccines Available in 2014-15

- **Quadrivalent live attenuated (LAIV4)**
- **Quadrivalent inactivated (IIV4), standard dose**
- **Trivalent inactivated (IIV3), standard dose**
- **Trivalent inactivated (IIV3), intradermal dose**
- **Trivalent inactivated (IIV3), standard dose, cell culture-based**
- **Trivalent inactivated (IIV3), high dose**
- **Trivalent inactivated, recombinant (RIV3)**

***MMWR* 2014;63:691-7**

Quadrivalent Influenza Vaccines Rationale

- **Two lineages of influenza B viruses: Victoria and Yamagata**
  - **immunization against virus from one lineage provides only limited cross-protection against viruses in the other**
- **Trivalent vaccines contain only one B vaccine virus**
  - **only one B lineage is represented**
- **Predominant lineage is difficult to predict in advance of the season**
- **Quadrivalent vaccines contain one virus from each B lineage**

***MMWR* 2013;62(RR-7)**

Quadrivalent Influenza Vaccines 2014-2015

Vaccine	Age Range
• FluMist (live attenuated influenza vaccine)	2 through 49 years
• Fluarix (GSK)	3 years and older
• FluLaval (IDB/GSK)	3 years and older
• Fluzone (sanofi)	6 months and older

MMWR 2014;63:691-7

Live Attenuated Influenza Vaccine (LAIV) for Children

- **Two randomized studies have been conducted in young children that compare the benefits provided by the LAIV and IIV**
  - **one study was conducted in children 6 to 59 months of age and the other was conducted in children 6 to 71 months of age**
- **Both studies indicated that LAIV provided about 50% better protection than IIV in young children**

***MMWR* 2014;63:691-7**

LAIV Preference, 2014-2015

- **When immediately available, LAIV should be used for healthy children aged 2 through 8 years who have no contraindications or precautions**
- **If LAIV is not immediately available, IIV should be used**
- **Vaccination should not be delayed to procure LAIV**

***MMWR* 2014;63:691-7**

Health Care Personnel and Influenza Vaccination, U.S., 2012

Influenza Vaccination Rates (internet panel, Nov 2012)	
Occupation	**Rate**
Pharmacists	89%
Physicians	84%
Nurses	82%
Other	77%

2020 Healthy People Goal is 90%

Lowest among assistants/ aides (43%) and administrative/non-clinical support staff (55%)

www.cdc.gov/flu/pdf/fluvaxview/hcp-ips-nov2012.pdf

Pertussis in the U.S. – 2013

- **28,639 reported cases (50 in HI)**
- **28,660 provisional in 2014 (36 in HI)**
- **Highest incidence among infants (105/100,000), and adolescents age 7-10 years (30/100,000)**
- **9 deaths reported – all among infants less than 3 months of age)**

***MMWR* 2014;63(No. 32):702-15 and CDC unpublished data**

Tdap Recommendations

- **Routinely recommended at 11 or 12 years of age**
- **Catch up 13 through 18 years who have not been vaccinated with Tdap**
- **Administer Tdap to ALL unvaccinated adults 19 years and older including adults over 65 years of age***

***Off-label recommendation. *MMWR* 2011; 60 (No. 1):13-5**

Tdap and Pregnant Women

- **Administer a dose of Tdap vaccine to during each pregnancy irrespective of the woman's prior history of receiving Tdap***
- **To maximize passive transfer of antibody to the fetus optimum timing of Tdap is between 27 and 36 weeks gestation**
- **Tdap may be administered earlier in pregnancy if necessary (e.g. wound management)**

***Off-label recommendation. *MMWR* 2013:62((No.7): 131-135**

Tdap Revaccination

- **Revaccination with Tdap applies ONLY to pregnant women**
- **Does NOT apply to family members or other contacts**
- **ACIP does not currently recommend Tdap revaccination for HCP**
- **Focus on current Tdap program**
  - **improve adult Tdap coverage, including HCP (31% in 2012)**
  - **vaccination of pregnant women**

***MMWR* 2013:62((No.7): 131-135**

Combination Vaccine Rule

- **Using combination vaccines containing certain antigens not indicated at the time of administration to a patient might be justified when**
  - **the extra antigen is not contraindicated**
  - **products that contain only the needed antigens are not readily available, and**
  - **potential benefits to the patient outweigh the potential risk for adverse events associated with the extra antigens**

General Recommendations on Immunization.
***MMWR* 2011:60((No.2): 8.**

Measles – United States, 2014

- 644 cases from 27 states reported to CDC as of December 2014
  - most were importations or spread from imported cases
- Cases among U.S. residents*
  - 7% vaccinated (including 5% with 2 or more doses)
  - 81% unvaccinated
    - 87% personal belief
    - 5% too young

*as of June 20. CDC data presented to ACIP, June 26, 2014

Measles – United States, 2015*

- At least 70 measles cases have been reported from 6 states
  - 59 cases confirmed in California
    - 71% of CA cases linked to a Disney amusement parks
    - at least 5 cases among Disney employees
  - most CA cases were unvaccinated

*as of January 21, 2015. www.cdc.gov/measles/cases-outbreaks.html

MMR Vaccine

- **First dose at 12-15 month, second dose routinely at 4-6 years of age**
- **Minimum interval between doses is 4 weeks**
- **Infants as young as 6 months should receive MMR before international travel**
- **Adults with unknown or undocumented MMR vaccination history should receive 1 or 2 doses**

***MMWR* 2013;62(RR-4)**

Measles
Keep Your Guard Up

- **Train front office staff and post signs urging communication and observations related to presence of respiratory symptoms, rash or suspected exposure to an infectious disease.**
- **Any patient with fever and rash should be assumed to have measles until proven otherwise**
  - **immediate isolation**
- **Be highly suspect of patients with fever and coryza and/or conjunctivitis, particularly if unvaccinated or international travel**
- **Be certain of your measles immunity status**

***MMWR* 2013;62(RR-4)**

Evidence of Measles, Mumps, and Rubella Immunity for Healthcare Personnel (HCP)

- Appropriate vaccination against measles, mumps, and rubella
  - 2 doses of measles and mumps vaccine
  - at least 1 dose of rubella vaccine, or
- Laboratory evidence of immunity, or
- Laboratory confirmation of disease
- Physician-diagnosed disease no longer recommended as evidence of measles or mumps immunity

MMWR 2013;62(RR-4)

Pneumococcal Conjugate Vaccine (PCV13) and Adults

- **FDA approved PCV13 for use among adults 50 years of age and older in December 2011**
- **Immunogenicity of PCV13 was found to be non-inferior to PPSV23**
- **ACIP recommended 1 dose of PCV13 for adults at high risk of invasive pneumococcal disease* in October 2012**

***immunocompromised, functional or anatomic asplenia, cochlear implant, CSF leak**

CAPITA trial

- **Community-Acquired Pneumonia Immunization Trial in Adults**
- **Intended to determine if PCV13 was effective in reducing the risk of a first episode of CAP among persons 65 years and older**
- **Double-blind, placebo controlled**
- **~85,000 persons 65 years or older in the Netherlands**

Pfizer data presented to ACIP, June 25, 2014

CAPITA trial

- **46% efficacy against vaccine-type CAP**
- **75% efficacy against vaccine-type invasive pneumococcal disease**
- **More effective in persons younger than age 75**
- **35% of recipients reported local AE (mostly pain)**

Pfizer data presented to ACIP, June 25, 2014

Pneumococcal Conjugate Vaccine (PCV13) and Adults

- On August 13, 2014 ACIP convened a special remote session to discuss PCV13 recommendations
- ACIP voted to recommend that
  - both PCV13 and PPSV23 should be routinely administered in series to all adults age 65 years and older
  - recommendations for routine PCV13 use among adults age 65 and older years will be reevaluated in 2018 and revised as needed

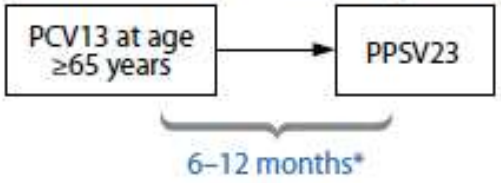
Pneumococcal Vaccines for Persons Age 65 Years and Older

- **One lifetime dose of PCV13 for adults**
- **PCV13 and PPSV23 should NOT be administered at the same visit**
- **Administer PCV13 before PPSV23, whenever possible**
- **PCV13 should be administered to those who have already received PPSV23**

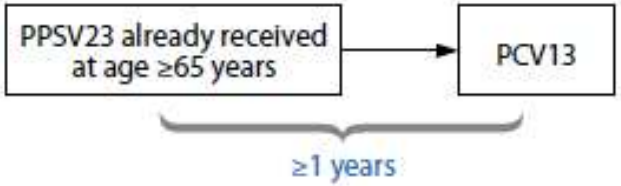
***MMWR* 2014;63(No. 37):822-5**

BOX. Sequential administration and recommended intervals for PCV13 and PPSV23 for adults aged ≥65 years — Advisory Committee on Immunization Practices, United States

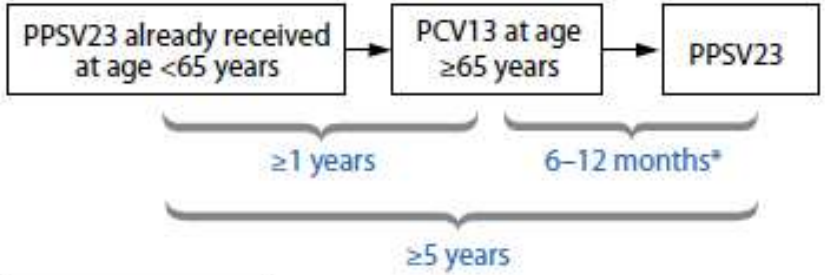
Pneumococcal vaccine-naïve persons aged ≥65 years



Persons who previously received PPSV23 at age ≥65 years



Persons who previously received PPSV23 before age 65 years who are now aged ≥65 years



Abbreviations: PCV13 = 13-valent pneumococcal conjugate vaccine; PPSV23 = 23-valent pneumococcal polysaccharide vaccine.

* Minimum interval between sequential administration of PCV13 and PPSV23 is 8 weeks; PPSV23 can be given later than 6–12 months after PCV13 if this window is missed.

Recommendations for PCV13 and PPSV23 in Pneumococcal Vaccine-Naïve Adults

- For high-risk adults (asplenia, immunocompromised, etc)
  - single dose of PCV13
  - dose of PPSV23 at least 8 weeks later
- For persons 65 years or older who are not at high risk
  - single dose of PCV13
  - dose of PPSV23 6 to 12 months later
- Minimum interval for all groups is 8 weeks

PPSV23 at 65 Years or Age

- **Recommendations for PPSV23 have not changed**
- **All adults are eligible for a dose of PPSV23 at 65 years of age regardless of previous pneumococcal vaccination**
- **Maximum of 3 lifetime doses of PPSV23**
- **Adults vaccinated with PPSV23 at/after age 65 require no further doses of PPSV23**

Pneumococcal Vaccines and Medicare

- **Previously Medicare (Part B) would reimburse for only 1 dose of pneumococcal vaccine**
- **In December 2014 the Centers for Medicare and Medicaid Services (CMS) updated the Medicare coverage requirements to align with the updated ACIP recommendations**

Pneumococcal Vaccines and Medicare

- **Effective September 19, 2014 Medicare will cover**
  - **an initial pneumococcal vaccine to all Medicare beneficiaries who have never received the vaccine under Medicare Part B; and**
  - **a different, second pneumococcal vaccine one year after the first vaccine was administered (that is, 11 full months have passed following the month in which the last pneumococcal vaccine was administered)**

www.cms.gov

Neisseria meningitidis Epidemiology

- **Incidence falling since 2000 (before licensure of MCV4)**
- **Incidence of all serogroups falling, including serogroup B which is not in MCV4**
- **556 cases reported in 2013**
- **Of cases with known serogroup (n=258)**
  - **55% ACWY (n=142), 38% B (n=99)**
- **Highest incidence among infants (2.1/100,000), more than half is serogroup B**

CDC unpublished data

Groups at Increased Risk for Meningococcal B Disease

- **High-risk medical conditions:**
  - **persistent complement component deficiencies**
  - **functional or anatomic asplenia**
- **Certain microbiologists**
- **Populations at risk during an outbreak**
- **NOT at increased risk: international travelers, first year college students**

CDC unpublished data

Outbreaks of Meningococcal Disease

- **Meningococcal outbreaks are rare, historically causing ~2-3% of US cases**
- **Five serogroup B meningococcal disease clusters/outbreaks on college campuses**
  - **Princeton: 1,400 fold increased risk; 5,800 recommended vaccine**
  - **UCSB: 200 fold increased risk; 20,000 recommended vaccine**

National Notifiable Diseases Surveillance System

Meningococcus Serogroup B (MenB)

- MenB capsular polysaccharide is poorly immunogenic and structurally similar to certain proteins in human tissue
  - concern (unproven) about auto-immunity created by using MenB capsular polysaccharide in a vaccine
- Vaccine research has focused on surface proteins
- However, MenB strains are highly diverse with more than 8,000 genetically different B strains identified

Meningococcal Serogroup B Vaccines

- **rLP2086 (Trumenba, Pfizer)**
  - **2 fHbp (factor H-binding protein) subvariants (B/v1 and A/v2-3)**

- **4CMenB (Bexsero, Novartis)**
  - **Single subvariant of fHbp (B/v1)**
  - **NadA (Neisserial adhesin A)**
  - **NhbA (Neisserial heparin binding antigen)**
  - **Outer membrane vesicles of the New Zealand epidemic strain (OMV - NZ)**

rLP2086 (Trumenba, Pfizer)

- **Licensed by FDA on October 29, 2014**
- **Licensure based on serologic response to vaccination**
- **Approved for 10 through 25 years of age**
- **3 dose series (0, 2, 6 months)**
- **Intramuscular**

www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/

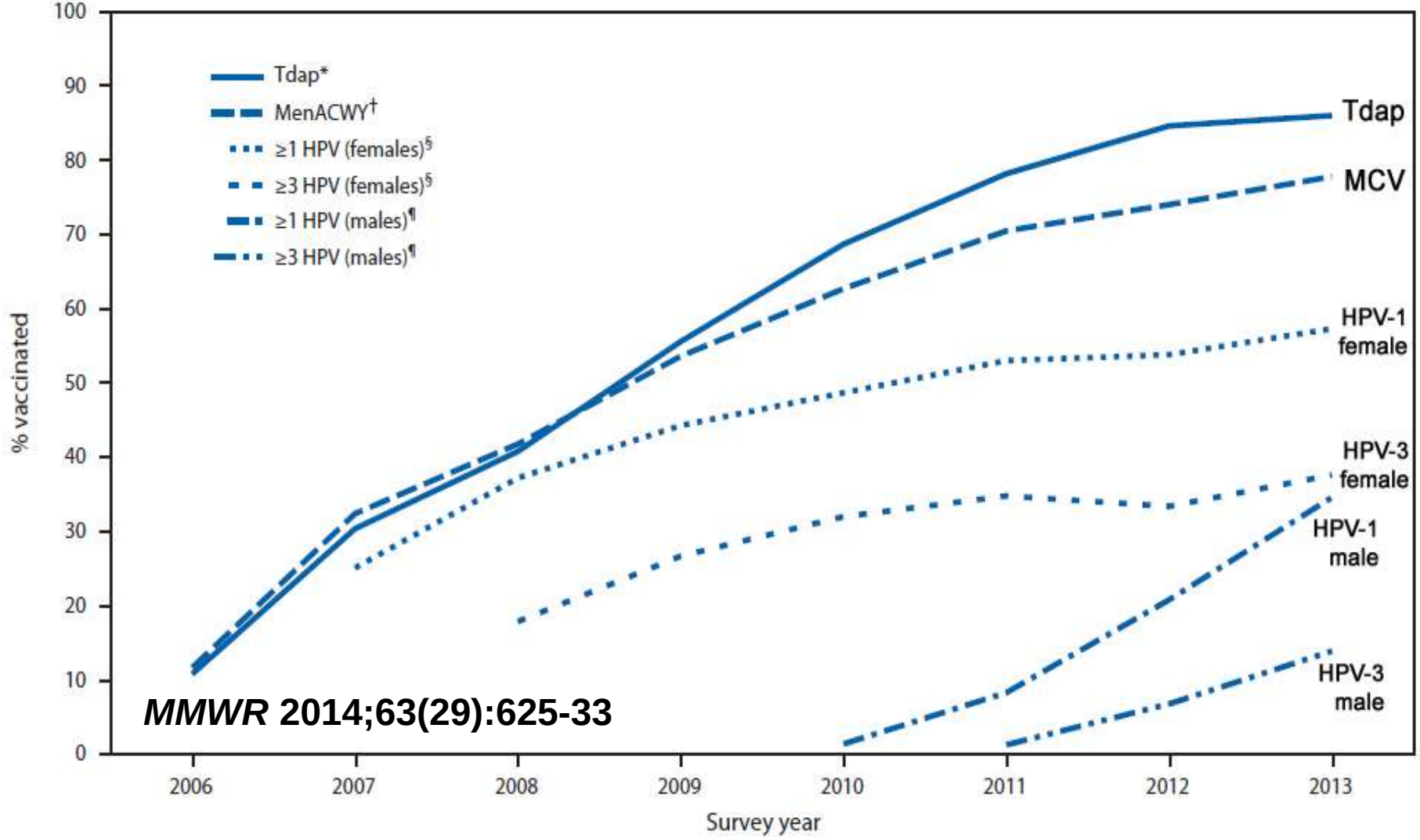
4CMenB (Bexsero, Novartis)

- Licensed by FDA on January 23, 2015
- Licensure based on serologic response to vaccination
- Approved for 10 through 25 years of age
- 2 dose series (0, 1 months)
- Intramuscular

ACIP Recommendations for Meningococcal B Vaccine

- Pending (vote expected at Feb 2015 meeting)
- Recommendations will probably include persons with
  - persistent complement component deficiencies
  - anatomic or functional asplenia
  - risk in a serogroup B meningococcal disease outbreak
  - certain microbiologists
- A recommendation to vaccinate the general population is unlikely

National Immunization Survey – Teen, 2006-2013



MMWR 2014;63(29):625-33

HPV Vaccine Coverage Among 13-17 Year-Olds, 2013

	US	HI
• **Females**		
– one or more doses	57%	53%
– full series	38%	34%
• **Males**		
– one or more doses	35%	40%
– full series	4%	15%

MMWR 2014;63(29):625-33

HPV Vaccine Coverage Among 13-17 Year-Olds, 2013

- **If HPV vaccine was administered at the same visit where at least one other vaccine was administered, coverage for one or more doses would increase from 57% to 91% by age 13 years for adolescent girls born in 2000**

***MMWR* 2014;63(29):625-33**

Why HPV Vaccine Coverage Is Important

- **Currently there are 26 million girls 12 years of age and younger in the United States**
- **If none are vaccinated,168,400 will develop cervical cancer and 54,100 will die from it over the course of their lives**
- **Continuing 30% coverage of 12 year old girls would prevent 45,500 of these cases and 14,600 deaths**
- **Vaccinating 80% would prevent 98,800 cases and 31,700 deaths**

***Vaccine* 2011;29:8443-50**

Why HPV Vaccine Coverage Is Important

- **For each year coverage remains at 30% instead of achieving 80%, 4,400 future cervical cancer cases and 1,400 cervical cancer deaths will occur**

***Vaccine* 2011;29:8443-50**

Top 5 Reasons for Not Receiving HPV Vaccine – NIS-Teen, 2013

Parents of girls		
Reason	%	(95% CI)
Lack of knowledge	15.5	(13.0–18.5)
Not needed or necessary	14.7	(12.5–17.3)
Safety concern/Side effects	14.2	(11.8–16.8)
Not recommended	13.0	(10.8–15.5)
Not sexually active	11.3	(9.1–13.9)

Parents of boys		
Reason	%	(95% CI)
Not recommended	22.8	(20.6–25.0)
Not needed or necessary	17.9	(15.9–20.1)
Lack of knowledge	15.5	(13.7–17.6)
Not sexually active	7.7	(6.4–9.2)
Safety concern/Side effects	6.9	(5.6–8.5)

***MMWR* 2014;63(29):625-33**

Practical Approaches to Improve HPV Vaccination Rates In Your Practice

- **Provide an unequivocal recommendation for the vaccine!**
- **Remind parents that the full series is 3 doses over 6 months**
- **Check vaccination status of all patients at every visit and vaccinate at every opportunity**
- **Incorporate patient reminder systems such as telephone calls, texts, postcards, or letters**
- **Many practice resources at www.cdc.gov/vaccines/who/teens/for-hcp/hpv-resources.html**

9-Valent HPV Vaccine

- **HPV9 licensed by FDA on December 10, 2014**
- **Approved for females 9 through 26 years and males 9 through 15 years**
- **Same schedule as HPV4**
- **Both HPV4 and HPV9 will be available for up to 24 months after licensure**

HPV9 ACIP Recommendations

- **Pending (vote expected at Feb 2015 meeting)**
- **Will likely be the same as the current recommendations for HPV4 (female 9 through 26, male 9 through 21 [off-label], permissive through 26)**
- **Guidance on “mixed” schedules and revaccination?**

Resources

- **CDC Vaccines and Immunization Website**
  - **www.cdc.gov/vaccines/**
- **Immunization Action Coalition**
  - **www.immunize.org**
- **Vaccine Education Center at the Children's Hospital of Philadelphia**
  - **www.chop.edu/service/vaccine-education-center/home.html**