# Adolescent Immunizations: Overview of Vaccines and Tools to Increase Coverage

Rosemary Spence, RN MA
Public Health Nurse Consultant
Colorado Immunization Section

# Presentation Objectives

- Identify immunizations routinely recommended for 11-12 year old adolescents
- Identify resources useful for discussing the Human Papillomavirus (HPV) vaccine with vaccine-hesitant parents of adolescents
- Identify clinical resources available to providers administering vaccines to adolescents

# 2011 National Immunization Survey (NIS)-Teen

# Background

- Collects vaccination information on adolescents 13-17 years in the 50 states and selected local areas
- Uses a random-digit-dialed sample of household telephone numbers
- Guardians identify adolescents' vaccination providers
- Surveys mailed to vaccination providers to obtain vaccination histories
- Measures coverage for Meningococcal Conjugate Vaccine (MCV4); Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccine (Tdap); Human Papillomavirus Vaccine (HPV) and additional vaccines

# 2011: Key Points

- National vaccination rates in adolescents aged 13-17 years have continued to improve for Tdap and MCV4
- National Tdap coverage for adolescents 13-15 years met the 2020 Healthy People objective of 80% for the first time
- For the third year in a row, the increase in coverage for HPV vaccine is half the increases seen for Tdap and MCV4 vaccine coverage
- HPV vaccine coverage is lower for younger girls because girls are not receiving the HPV vaccine series at the recommended ages of 11-12 years

# 2011: Key Points

- Missed opportunities data show that if HPV vaccine was given every time a clinician gave a Tdap or MCV4 dose, HPV vaccine coverage would be over 80%
- Additional information: http://www.cdc.gov/vaccines/who/teens/vaccination-coverage.html

# NIS-Teen Survey Data Collected in 2011

- Tdap vaccine: ≥ 1 dose
  - US coverage: 78.2%
  - Colorado coverage: 84.7%
  - Coverage for 1 dose of Tdap was lower for those living below poverty
- MCV4 vaccine: ≥ 1 dose
  - US coverage: 70.5%
  - Colorado coverage: 64.4%
  - Coverage for 1 dose of MCV4 was higher among Hispanics than whites

# NIS-Teen Survey Data Collected in 2011

- HPV vaccine: Girls
  - US coverage:
    - 53%  of girls received at least 1 dose of HPV vaccine
    - The receipt of 1 or 3 HPV doses  was lower among whites than Hispanics
    - Completion of the 3 dose HPV series among those who had adequate time to complete the series before the interview date was lower for those living below poverty
  - Colorado coverage:
    - 45.9% of girls received at least 1 dose of HPV vaccine

# NIS-Teen Survey Data Collected in 2011

- HPV vaccine: Boys
  - US coverage:
    - 8.3% of boys received at least 1 dose of HPV vaccine
  - Colorado coverage:
    - 13.6% of boys received at least 1 dose of HPV vaccine

# Advisory Committee on Immunization Practices (ACIP) Vaccination Recommendations for Adolescents

# Pertussis Among Adolescents and Adults

- Disease often milder than in infants and children
- Infection may be asymptomatic, or may present as classic pertussis
- Persons with mild disease may transmit the infection
- Older persons often source of infection for infants and children

# Pertussis Among Adolescents and Adults

- Prolonged cough (3 months or longer)
- Post-tussive vomiting
- Multiple medical visits and extensive medical evaluations
- Complications
- Hospitalization
- Medical costs
- Missed school and work
- Impact on public health system

# Adolescent and Adult Pertussis Vaccination

- Primary objective
  - Protect the vaccinated adolescent and adult
- Secondary objective
  - Reduce the reservoir of *Bordetella pertussis*
  - Potentially reduce the incidence of pertussis in other age groups and settings

# Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis (Tdap) Vaccine: Schedule

- Two brands:
  - Boostrix® (GlaxoSmithKline)
    - Approved for persons 10 years of age and older
  - Adacel® (sanofi pasteur)
    - Approved for persons 11-64 years of age
- A single dose of Tdap is recommended for adolescents 11-18 years of age (preferably at 11 or 12 years of age)
- Tdap can be administered regardless of the interval since the last Td-containing vaccine

# Tdap Vaccine: Schedule

- Children aged 7 through 10 years who are not fully vaccinated against pertussis and for whom no contraindication to pertussis vaccine exists should receive a single dose of Tdap to provide protection against pertussis
- Pregnant adolescents:
  - Health-care personnel should administer a dose of Tdap during each pregnancy, irrespective of the patient's prior history of receiving Tdap
  - To maximize the maternal antibody response and passive antibody transfer to the infant, optimal timing for Tdap administration is between 27 and 36 weeks gestation although Tdap may be given at any time during pregnancy
  - For women not previously vaccinated with Tdap, if Tdap is not administered during pregnancy, Tdap should be administered immediately postpartum

# Tdap Vaccine: Contraindications

- Severe allergic reaction to vaccine component or following a prior dose
- Encephalopathy not due to another identifiable cause occurring within 7 days after vaccination with a pertussis-containing vaccine

# Tdap Vaccine: Precautions

- History of a severe local reaction (Arthus reaction) following a prior dose of a tetanus and/or diphtheria toxoid-containing vaccine
- Progressive neurologic disorder until the condition has stabilized
- History of Guillain-Barré syndrome within 6 weeks after a prior dose of tetanus toxoid-containing vaccine
- Moderate or severe acute illness

# NOT Precautions for Tdap

- Following a dose of DTaP/DTP:
  - Temperature 105°F (40.5°C) or higher
  - Collapse or shock-like state
  - Persistent crying lasting 3 hours or longer
  - Convulsions with or without fever
  - History of an extensive limb swelling reaction
- Stable neurologic disorder
- Pregnancy
- Breastfeeding
- Immunosuppression including
  - Human Immunodeficiency Virus (HIV) infection
  - Concurrent minor illness
  - Antimicrobial use

# Tdap Adverse Reactions

- Local reactions (pain, redness, swelling): 21%-75%
- Temperature of 100.4°F or higher: 3%-5%
- Adverse reactions occur at approximately the same rate as Td alone (without acellular pertussis vaccine)

# Tdap Vaccine: Storage and Handling

- Stored between 35°F and 46°F (between 2° and 8°C) at all times
- Must never be frozen
- Vaccine exposed to freezing temperature must not be administered and should be discarded
- Do not use after the expiration date printed on the box or label

# Tdap and Diphtheria and Tetanus Toxoids and Acellular Pertussis (DTaP) Vaccines: Administration Errors

- Tdap and DTaP are NOT the same vaccines
- Tdap contains lower amounts of diphtheria toxoid and lower amounts of some pertussis antigens compared with DTaP
- Studies of the immune responses to Tdap among infants have not been conducted
- The increased diphtheria toxoid content in DTaP is associated with higher rates of adverse reactions in older people

# Tdap and DTaP: Vaccine Administration Errors

- Clinical guidance for addressing inadvertent administration of Tdap or DTaP is available in: "Preventing Tetanus, Diphtheria, and Pertussis Among Adolescents: Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP)." MMWR March 24, 2006; 55 (No.RR-3): 1-34 available at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5503a1.htm
- Vaccine administration errors should be reported to the Institute for Safe Medication Practices at http://www.ismp.org/
- Adverse events following the administration of a vaccine should be reported to the Vaccine Adverse Event Reporting System (VAERS) at http://vaers.hhs.gov/index or 1-800-822-7967

# Tdap and DTaP: Resource to Help Reduce Administration Errors

- "Check Your Vials" poster showing images of DTaP/Tdap/Td vials and packaging
- Developed by the California Immunization Branch and available at http://eziz.org/assets/docs/IMM-508.pdf

# Meningococcal Disease Among Adolescents and Young Adults, United States, 1998-1999

- 18-23 years old: 1.4 / 100,000
- 18-23 years old not college student: 1.4 / 100,000
- Freshmen: 1.9 / 100,000
- Freshmen in dorm: 5.1 / 100,000

# Meningococcal Outbreaks in the United States

- Outbreaks account for less than 5% of reported cases
- Frequency of localized outbreaks has increased since 1991
- Most recent outbreaks caused by serogroup C
- Since 1997 outbreaks caused by serogroups Y and B organisms have also been reported

# Meningococcal Polysaccharide Vaccine (MPSV4)

- Menomune® (sanofi pasteur)
- Quadrivalent polysaccharide vaccine (A, C,Y,W-135)
- Use of Menomune® should be limited to persons older than 55 years of age, or when Menactra® or Menveo® are not available
- Administered by subcutaneous injection
- 10-dose vial contains thimerosal as a preservative

# Meningococcal Conjugate Vaccine, Quadrivalent (MCV4): Schedule

- Two brands:
  - Menactra® (sanofi pasteur)
    - Approved for persons 9 months through 55 years of age
    - Protects against serogroups A, C, Y and W-135
  - Menveo® (Novartis)
    - Approved for persons 2 years through 55 years of age
    - Protects against serogroups A, C, Y and W-135
- Administer MCV4 at age 11 or 12 years with a booster dose at 16 years of age
- Administer 1 dose at age 13 through 15 years if not previously vaccinated

# Meningococcal Conjugate Vaccine, Quadrivalent (MCV4): Schedule

- For persons vaccinated at age 13 through 15 years, administer a 1-time booster dose, preferably at 16 through 18 years of age
- Healthy persons who receive their first routine dose of meningococcal conjugate vaccine at or after 16 years of age do not need a booster dose

# Meningococcal Vaccines: Contraindications and Precautions

- Severe allergic reaction to vaccine component or following prior dose of vaccine
- Moderate or severe acute illness
- A history of Guillain-Barré syndrome is no longer considered to be a precaution to MCV4 vaccination

# Meningococcal Vaccines: Adverse Reactions

| | MPSV4 (Menomune®) | MCV4 (Menactra®; Menveo®) |
|---|---|---|
| Local reactions for 1-2 days | 4%-48% | 11%-59% |
| Fever >100°F | 3% | 5% |
| Systemic reactions (headache, malaise fatigue) | 3%-60% | 4%-62% |

# Meningococcal Vaccines: Storage and Handling

- Vaccines should be stored at refrigerator temperature (35°-46°F, 2°-8°C)
- The vaccines must not be exposed to freezing temperature, and any vaccine exposed to freezing temperature should not be used
- Single dose vials of Menomune® must be used within 30 minutes of reconstitution
- The MenA (lyophilized) component of Menveo®can only be reconstituted using the liquid C-Y-W135 component of Menveo®

# Human Papilloma Virus (HPV)Disease Burden in the United States

- Anogenital HPV is the most common sexually transmitted infection in the US
  - Estimated 20 million currently infected
  - 6.2 million new infections/year
- Common among adolescents and young adults
- Estimated 80% of sexually active women will have been infected by age 50
- Infection also common in men

# Cervical Cancer Disease Burden in the United States

- The American Cancer Society estimates that in 2012 there will be:
  - 12,170 new cervical cancer cases
  - 4,220 cervical cancer deaths
- Almost 100% of these cervical cancer cases will be caused by one of the 40 HPV types that infect the mucosa

# Human Papillomavirus Vaccine (HPV)

- Two brands:
  - HPV4 (Gardasil®; Merck)
    - Protects against types 16 and 18 (high risk) and types 6 and 11 (low risk)
    - Approved for females and males 9 through 26 years of age
  - HPV2 (Cervarix®; GlaxoSmithKline)
    - Protects against types 16 and 18 (high risk)
    - Approved for females 9 through 25 years of age

# Human Papillomavirus Vaccine (HPV): Females

- ACIP recommends routine vaccination of females 11 or 12 years of age
- The vaccination series can be started as young as 9 years of age at the clinician's discretion
- "Catch-up" vaccination recommended for females 13 through 26 years of age

# Human Papillomavirus Vaccine (HPV): Males

- ACIP recommends routine vaccination of males 11 or 12 years of age
- The vaccination series can be started as young as 9 years of age
- "Catch-up" vaccination recommended for males 13 through 21 years of age
- Males aged 22 through 26 years may be vaccinated
- All immunocompromised males (including those with HIV infection) and men who have sex with men should be vaccinated through 26 years of age
- **Gardasil® is the only HPV vaccine licensed for use in males**

# HPV Vaccination Schedule

- Routine schedule is 0, 2, 6 months
- Third dose should follow the first dose by at least 24 weeks
- An accelerated schedule using minimum intervals is not recommended
- Series does not need to be restarted if the schedule is interrupted

# HPV Vaccine: Contraindications and Precautions

- Contraindication
  - Severe allergic reaction to a vaccine component or following a prior dose
- Precaution
  - Moderate or severe acute illnesses (defer until symptoms improve)

# HPV Vaccination During Pregnancy

- Initiation of the vaccine series should be delayed until after completion of pregnancy
- If a woman is found to be pregnant after initiating the vaccination series, remaining doses should be delayed until after the pregnancy
- If a vaccine dose has been administered during pregnancy, there is no indication for intervention

# HPV Vaccine Adverse Reactions

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

# HPV Vaccine Storage and Handling

- Store at 36°F -46°F (2°C -8°C)
- Protect from light
- Do not expose to freezing temperature
- Remove from refrigeration immediately before administration

# Tips for Talking about HPV Vaccine with Vaccine-Hesitant Parents

- **Studies show that a strong recommendation from you is the single best predictor of vaccination**
- Recommend the HPV vaccine series the same way you recommend the other adolescent vaccines
- Parents may be interested in vaccinating, yet still have questions
- Taking the time to listen to parents' questions helps you save time and give an effective response

# Tips for Talking about HPV Vaccine with Vaccine-Hesitant Parents

- CDC research shows the "HPV vaccine is cancer prevention" message resonates strongly with parents
  - Try saying: *HPV vaccine is very important because it prevents cancer. I want your child to be protected from cancer, and I know you want that too. That's why I'm recommending that your daughter/son receive the first dose of HPV vaccine today.*
- CDC research shows disease prevalence is not understood, and parents are unclear about what the vaccine actually protects against.
  - Try saying: *HPV can cause cancers of the cervix, vagina, and vulva in women, cancer of the penis in men, and cancers of the anus and the mouth or throat in both women and men. There are about 36,000 of these cancers each year—and most could be prevented with HPV vaccine*.

# Tips for Talking about HPV Vaccine with Vaccine-Hesitant Parents

- CDC research shows that parents may be concerned that vaccinating may be perceived by the adolescent as permission to have sex.
  - Try saying: *Research has shown that getting the HPV vaccine dose not make kids more likely to be sexually active or start having sex at a younger age.*
- CDC research shows that parents might believe their child won't be exposed to HPV because they aren't sexually active or may not be for a long time.
  - Try saying: *HPV is so common that almost everyone will be infected at some point. Even if your son/daughter waits until marriage to have sex, or only has one partner in the future, he/she could still be exposed.*

# Tips for Talking about HPV Vaccine with Vaccine-Hesitant Parents

- CDC research shows that emphasizing your personal belief in the importance of HPV vaccine helps parents feel secure in their decision.
  - Try saying: I strongly believe in the importance of this cancer-preventing vaccine, and I have given HPV vaccine to my son/daughter/grandchild, etc. Experts (like the American Academy of Pediatrics, cancer doctors, and the CDC) also agree that this vaccine is very important for your child.
- CDC research shows that many parents do not know that the full vaccine series requires 3 shots. Your reminder will help them complete the series.

# Tips for Talking about HPV Vaccine with Vaccine-Hesitant Parents

- CDC research shows that parents may be concerned about the vaccine's safety and side effects.
  - Try saying: *HPV vaccine has been carefully studied by scientific experts. This is not a new vaccine, and for years HPV vaccine has been shown to be very effective and very safe. Like other shots, side effects can happen, but most are mild, primarily pain or redness in the arm. This should go away quickly, and HPV vaccine has not been associated with any long-term side effects.*

# Resources for Talking about HPV Vaccine with Vaccine-Hesitant Parents

- "Tips and Time-savers for Talking with Parents about HPV Vaccine" available at http://www.cdc.gov/vaccines/who/teens/for-hcp-tipsheet-hpv.pdf
- "Key Messages to Share with Families" and "Addressing Common Concerns" available at http://www2.aap.org/immunization/pediatricians/adolescents.html

# Influenza Vaccine (Seasonal)

- Annual influenza vaccination is recommended for everyone 6 months of age and older

# General Information

- Remember to administer vaccines (for example, varicella, MMR, etc.) adolescents may have missed during childhood
- Syncope following vaccination:
  - An increase in the number of reports of syncope has been detected by the Vaccine Adverse Event Reporting System (VAERS)
  - 11-18 year old females have contributed most of the increase
  - Serious injuries have resulted
  - Providers should strongly consider observing patients for 15 minutes after they are vaccinated

# Resources Available to Providers Administering Vaccines to Adolescents

# Clinical Resources

- Centers for Disease Control and Prevention (CDC): http://www.cdc.gov/vaccines/
  - Birth to 18 Years and Catch-up Immunization Schedules: http://www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html
  - **Epidemiology and Prevention of Vaccine-Preventable Diseases**, 12th edition, 2nd printing (May 2012): http://www.cdc.gov/vaccines/pubs/pinkbook/index.html
  - "Information for Health Care Professionals about Adolescent Vaccines": http://www.cdc.gov/vaccines/who/teens/downloads/hcp-factsheet.pdf

# Clinical Resources

- Centers for Disease Control and Prevention (CDC): http://www.cdc.gov/vaccines/
  - ACIP recommendations: http://www.cdc.gov/vaccines/pubs/ACIP-list.htm
  - Webcasts and self-study courses about vaccinations: http://www.cdc.gov/vaccines/ed/courses.htm
  - "Recommended and Minimum Ages and Intervals Between Doses": http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/A/age-interval-table.pdf
  - "Vaccine Excipient and Media Summary": http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/B/excipient-table-2.pdf
  - "Latex in Vaccine Packaging": http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/B/latex-table.pdf

# Clinical Resources

- Immunization Action Coalition (IAC): www.immunize.org
  - Vaccine Information Statements (VISs): http://www.immunize.org/vis/
  - "Meningococcal Vaccination Recommendations by Age and/or Risk Factor": http://www.immunize.org/catg.d/p2018.pdf
  - "Administering Vaccines: Dose, Route, Site, and Needle Size": http://www.immunize.org/catg.d/p3085.pdf
  - "Guide to Contraindications and Precautions to Commonly Used Vaccines": http://www.immunize.org/catg.d/p3072a.pdf
  - "Vaccines with Diluents: How to Use Them": http://www.immunize.org/catg.d/p3040.pdf
  - Vaccine Package Inserts: http://www.immunize.org/packageinserts/

# Clinical Resources

- Colorado Immunization Section (CIS) http://www.colorado.gov/cs/Satellite/CDPHE-DCEED/CBON/1251609961007:
  - CIS on-call public health nurse consultant: available to answer clinical questions by calling 303/692/2700 Monday through Friday 8:30am-5pm
- Colorado Children's Immunization Coalition: http://www.childrensimmunization.org/

# Resources for Parents and Adolescents

- National Foundation for Infectious Diseases (NFID): http://www.adolescentvaccination.org/
- Vaccine Education Center/The Children's Hospital of Philadelphia: http://www.chop.edu/service/vaccine-education-center/home.html
- Colorado Children's Immunization Coalition (CCIC): http://www.childrensimmunization.org/
- Centers for Disease Control and Prevention (CDC): http://www.cdc.gov/vaccines/who/teens/index.html
- National Meningitis Association: http://www.nmaus.org/
- Parents of Kids with Infectious Diseases (PKIDS) Vaccine Initiative: GetVaxed: http://getvaxed.org/

# What Can You Do to Increase Coverage?

- Strongly recommend vaccines
- Implement patient reminder-recall
- Provider prompts or standing orders
- Include all recommended vaccines at every visit
- Educate adolescents and their parents
- Address costs
- Hold vaccine clinics at hours that are convenient for families

Questions? Rosemary.spence@state.co.us or 303/692/2798