



Update on Immunization Practices
For Younger & Older Adults
Focus on
Pneumococcal Disease and HPV

Supported by an educational grant from Merck & Co., Inc.   Jointly provided by Center for Independent Healthcare Education and Venco Medical

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Activity Description

Target Audience
 This activity is designed as a comprehensive approach to address the practice needs of primary care providers, including primary care physicians, doctors of osteopathy, physician assistants, nurse practitioners, and allied healthcare professionals, who are at the forefront of caring for adult patients eligible for immunizations and/or at risk for vaccine-preventable diseases.

Learning Objectives
 At the conclusion of the educational activity, the learner should be able to:

- Evaluate the latest clinical research on the impact of HPV vaccination in the prevention of various types of cancer in men and women
- Identify strategies to adhere to ACIP HPV vaccination recommendations and overcome barriers by both healthcare providers and patients to vaccinate younger adults
- Describe the clinical consequences of pneumococcal disease and its associated complications among older adults
- State the latest ACIP recommendations for pneumococcal vaccination among older adults

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Faculty and Disclosure

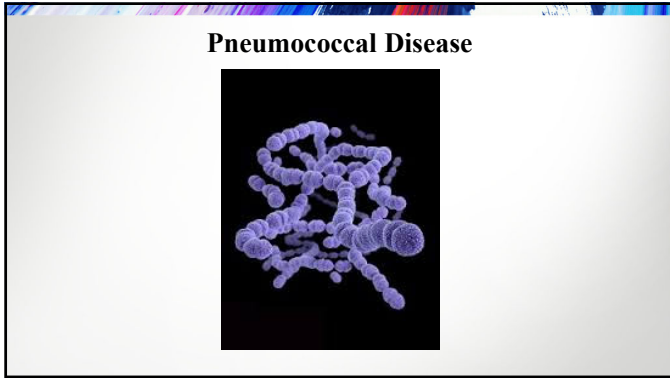
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Dr. Rachel Caskey does not have any relevant financial relationships to disclose.
Dr. Caskey does not intend to discuss off-label uses of products.

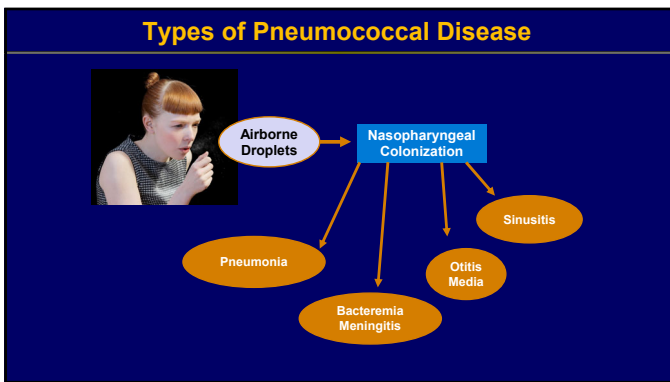
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Content review confirmed that the content was developed in a fair, balanced manner free from commercial bias. Disclosure of a relationship is not intended to suggest or condone commercial bias in any presentation, but it is made to provide participants with information that might be of potential importance to their evaluation of a presentation.

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Pneumococcal Disease: Scope of the Problem

PNEUMOCOCCAL DISEASE

- Sinusitis
- Otitis media
- Pneumonia
- IPD

Cases USA

- 4,000,000 cases/year
- 445,000 hospital admissions/year
- 22,000 deaths/year

IPD, invasive pneumococcal disease
Centers for Disease Control and Prevention. Manual for the surveillance of vaccine-preventable diseases.
<http://www.cdc.gov/vaccines/pubs/surv-manual/chpt11-pneumo.html#11>. Accessed July 24, 2019.

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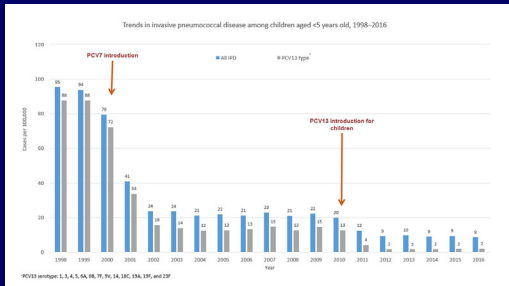
INVASIVE PNEUMOCOCCAL DISEASE

- Bacteremia
- Meningitis
- Sepsis
- Cases USA
 - 12.9 cases/100K
 - ~10% case-fatality rate
 - More frequent in seniors, persons with chronic medical conditions
 - >2000 deaths/year in 65+

IPD, invasive pneumococcal disease.
Centers for Disease Control and Prevention. Manual for the surveillance of vaccine-preventable diseases.
<http://www.cdc.gov/vaccines/pubs/surv-manual/chpt11-pneumo.html#t1>. Accessed July 24, 2019.

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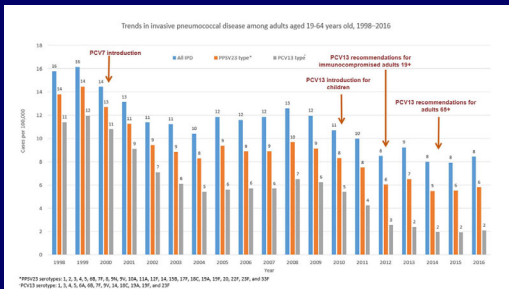
Childhood PCV and IPD: Children



Centers for Disease Control and Prevention. Surveillance and reporting. <https://www.cdc.gov/pneumococcal/surveillance.html>. Accessed July 24, 2019.

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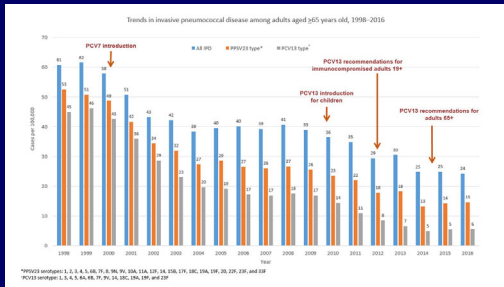
Childhood PCV and IPD: Adults



Centers for Disease Control and Prevention. Surveillance and reporting. <https://www.cdc.gov/pneumococcal/surveillance.html>. Accessed July 24, 2019.

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Childhood PCV and IPD: Adults 65+ years

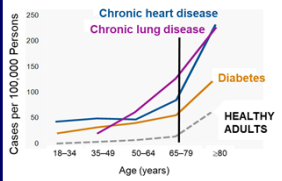


Centers for Disease Control and Prevention. Surveillance and reporting. <https://www.cdc.gov/pneumococcal/surveillance.html>. Accessed July 24, 2019.

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Incidence of Pneumococcal Disease Increases With Age and Certain Chronic Conditions

Incidence Rate of IPD — United States, 1999–2000



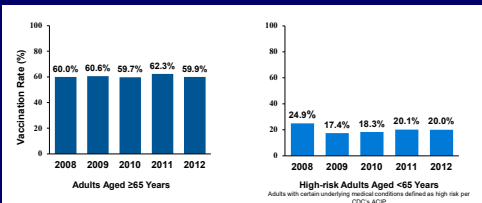
- Diabetes mellitus**
3X the risk of IPD compared with that in healthy adults
- Chronic heart disease**
6X the risk of IPD compared with that in healthy adults
- Chronic lung disease**
6X the risk of IPD compared with that in healthy adults

Adapted from Kyaw MH, et al; Active Bacterial Core Surveillance Program of the Emerging Infections Program Network. *J Infect Dis.* 2005;192(3):377-386.

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Adult Pneumococcal Vaccination Rates Are Low

Pneumococcal Vaccination Rates — United States, 2008–2012



Centers for Disease Control and Prevention (CDC). *MMWR Morb Mortal Wkly Rep.* 2013;62(4):66-72; National Center for Health Statistics. Health, United States, 2012: With Special Feature on Emergency Care. Hyattsville, MD, 2013. www.cdc.gov/nchs/data/healthus12.pdf. Accessed July 24, 2019; Williams WW, et al; Centers for Disease Control and Prevention (CDC). *MMWR Morb Mortal Wkly Rep.* 2014;63(5):95-102.

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Adult Pneumococcal Immunization

HIGHEST Risk Immune compromise, 'Anatomic Risk'	PCV13 + PPSV23
INCREASED Risk Smokers, Chronic Conditions (liver, pulmonary, kidney) Immunocompetent Adults 65+	PPSV23 ONLY
AVERAGE Risk Young (< 65), No Chronic Medical Conditions	NO PNEUMOCOCCAL VACCINE

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Pneumococcal Immunization for Increased Risk

PPSV23 alone for those at INCREASED RISK

All cigarette smokers and alcoholics 19 to 64 years old!

Chronic conditions in adults 19–64 years old:

- Diabetes
- Lung disease: Asthma, COPD, Others
- Cardiovascular disease (except isolated HTN)
- Liver disease (include chronic hepatitis)
- Kidney disease (Stages 1–3)

Centers for Disease Control and Prevention, *MMWR Morb Mortal Wkly Rep.* 2010;59(34):1102-1106. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5934a3.htm>. Accessed July 24, 2019.
Centers for Disease Control and Prevention, *MMWR Morb Mortal Wkly Rep.* 2012;61(40):816-819. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6140a4.htm>. Accessed July 24, 2019.

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Pneumococcal Immunization for High Risk

SEQUENTIAL PCV13 + PPSV23: HIGHEST RISK

Immunocompromised:

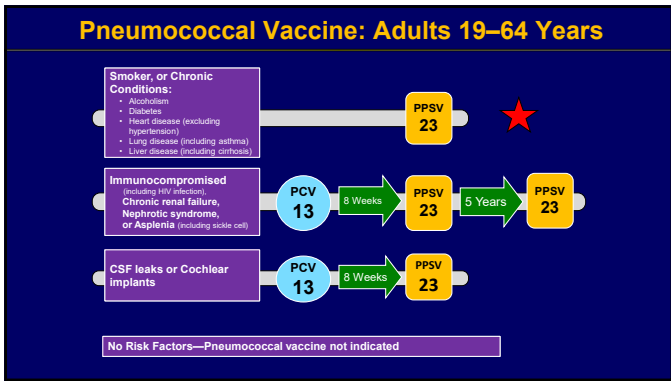
1. Disease:
 - Cancer: solid tumors, hematologic malignancies, myeloma, etc
 - HIV
 - INHERITED and OTHER immune deficiency (CVID, etc)
 - End-stage kidney disease, nephrotic syndrome
2. Iatrogenic:
 - MEDS: Steroids (20+ mg/d), biologic immunomodulators, cancer treatment, others
 - TRANSPLANTS: solid organ, bone marrow, stem cell
3. Asplenia:
 - ANATOMIC: Splenectomy (Best Practice: immunize prior to splenectomy)
 - FUNCTIONAL: Hemoglobinopathy, sickle cell, other

Anatomic:

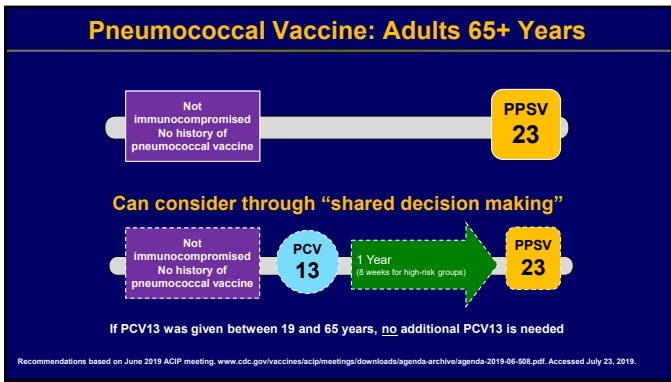
- CSF leak, Cochlear implant

Centers for Disease Control and Prevention, *MMWR Morb Mortal Wkly Rep.* 2012;61(40):816-819. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6140a4.htm>. Accessed July 24, 2019.
Tomczyk S et al. Centers for Disease Control and Prevention (CDC). *MMWR Morb Mortal Wkly Rep.* 2014;63(37):822-825. <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6337a4.htm>. Accessed July 24, 2019.

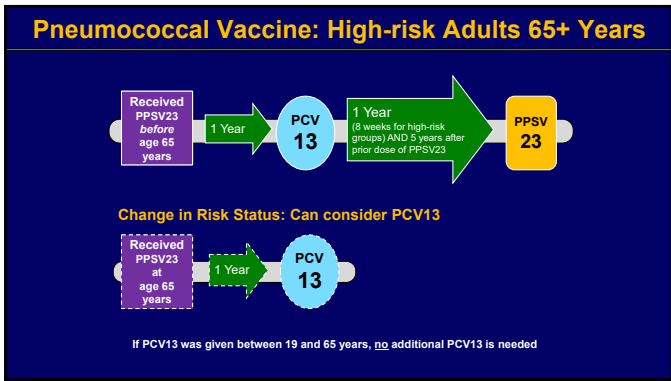
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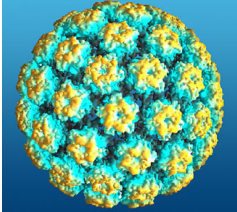
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HPV Vaccine

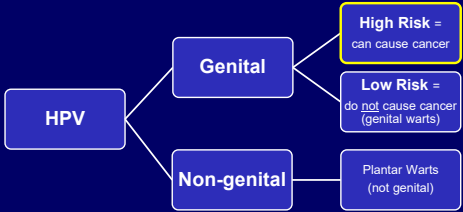
Cancer Prevention



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Human Papillomavirus (HPV) in the United States

Over 120 types of HPV



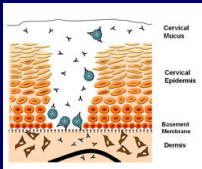
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graph LR
    HPV[HPV] --> Genital[Genital]
    HPV --> Non-genital[Non-genital]
    Genital --> HighRisk[High Risk = can cause cancer]
    Genital --> LowRisk[Low Risk = do not cause cancer (genital warts)]
    Non-genital --> PlantarWarts[Plantar Warts (not genital)]
  
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HPV Durability

- Induce persistent infection without early serious complications to host
 - HPV infects where normal cell layers of epidermis are disrupted
 - Able to evade acute immune system response
 - Minimal inflammation, no blood viremic phase, infection exclusively epithelial (poor access to immune responses)
- Shed virions for transmission
- Despite this, ~90% of infections are cleared by innate immune system



National Cancer Institute, <http://www.cancer.gov/ncicancerbulletin/053111/page5>

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HPV in the United States

HPV is the most common sexually transmitted infection in the U.S.

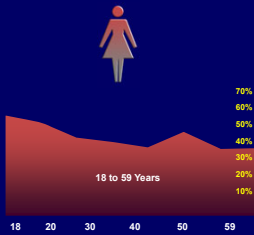
- Over 6.2 million new infections every year
- Nearly three-fourths new infections in 15-24 yo



Dunne EF, et al. JAMA, 2007;297:813-819.

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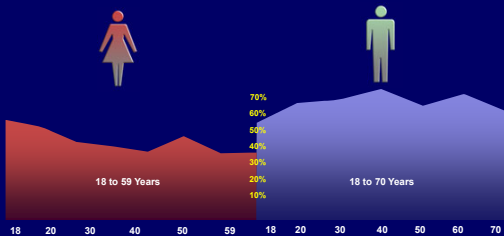
Genital HPV Prevalence Is Higher in Males Than in Females and Does Not Decrease With Age



Shi R et al. BMC Res Notes. 2014;7:544; Giuliano AR et al. Cancer Epidemiol Biomarkers Prev. 2008;17(8):2036-2043.

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Genital HPV Prevalence Is Higher in Males Than in Females and Does Not Decrease With Age

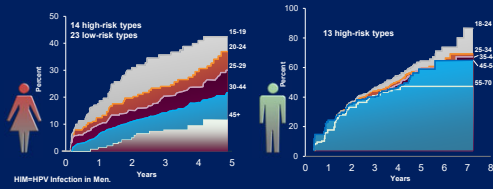


Shi R et al. BMC Res Notes. 2014;7:544; Giuliano AR et al. Cancer Epidemiol Biomarkers Prev. 2008;17(8):2036-2043.

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Risk for Acquiring New Genital HPV Infection

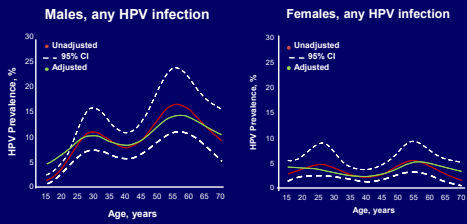
Cumulative Risk for New HPV Infections by Age at Baseline



Muñoz N, et al; Instituto Nacional de Cancerología HPV Study Group. *J Infect Dis*. 2004;190:2077-2087, by permission of Oxford University Press; Adapted from Giuliano AR, et al. *Lancet*. 2011;377(9769):932-940.

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Oral HPV Prevalence Is Significantly Higher in Males Than Females



Adapted from Gillison M, et al. *JAMA*. 2012;307(7):693-703.

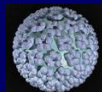
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Transmission of HPV

Surface-to-surface contact!

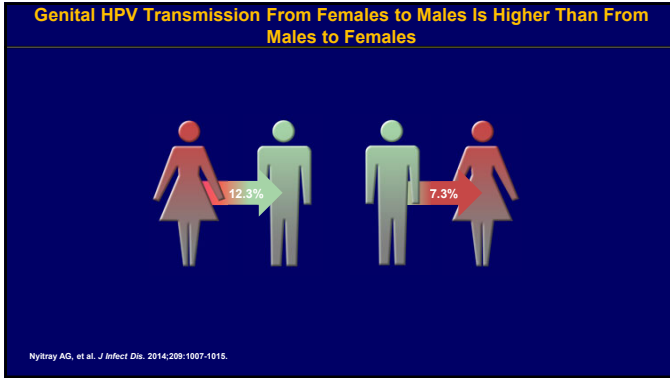
HPV can spread through anogenital region

- Condoms only partially effective in prevention
- Some adolescents found to test positive for vaginal HPV prior to first vaginal sexual intercourse

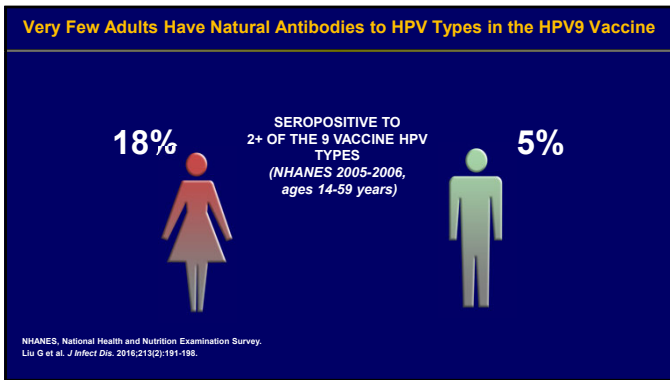


Shew ML, et al. *J Infect Dis*. 2013;207:1012-6.

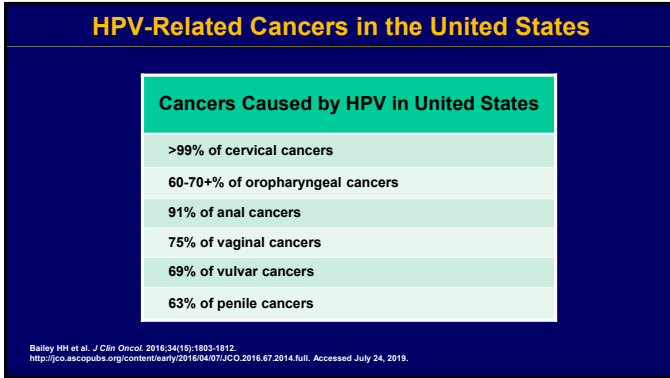
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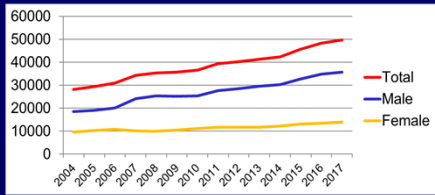


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Incidence of Oral Pharyngeal Cancers



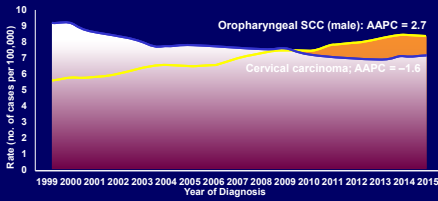
Incidence of HPV-related oral pharyngeal carcinomas are **increasing**

- Particularly among males (2x more common)
- 70+% positive for HPV 16

American Cancer Society, Cancer Facts & Figures, 2004-2017, www.cancer.org

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The incidence of cervical cancer is declining but the incidence of HPV-related oropharyngeal squamous cell carcinomas (SCCs) in males is increasing



AAPC, average annual percent change; SCC, squamous cell carcinoma.

CDC's National Program of Cancer Registries; National Cancer Institute's Surveillance, Epidemiology, and End Results program, as cited in Van Dyne EA, et al. *MMWR Morb Mortal Wkly Rep*. 2018;67(33):918-924.

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HPV Vaccine and Sexual Behaviors

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HPV Prevention: Vaccination

- HPV2 — Cervarix (GSK)
- HPV4 — Gardasil (Merck)
- HPV9 — Gardasil 9 (Merck)

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9-Valent HPV Vaccine Composition

Gardasil®

AAHS

6

11

16

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Gardasil®9

AAHS

6

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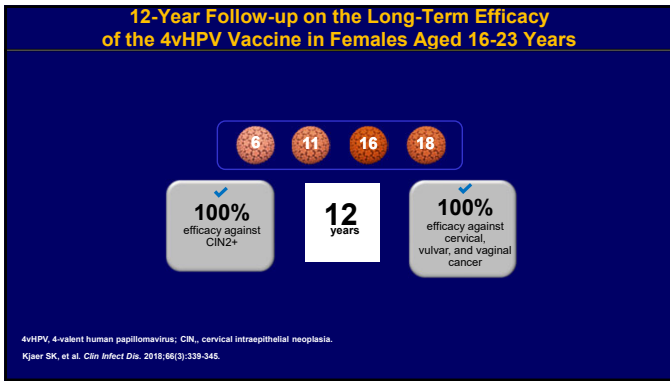
“Original types”

“New types”

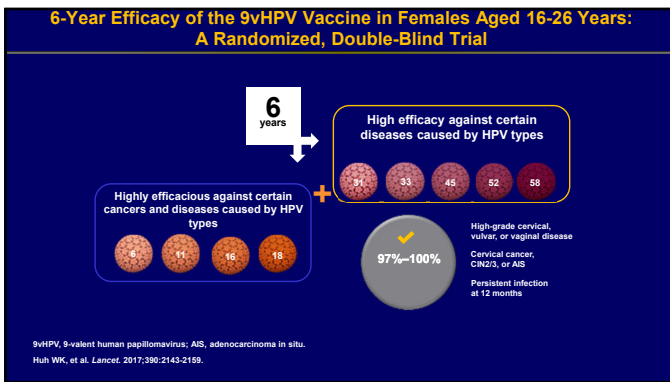
AAHS – amorphous aluminum hydroxyphosphate sulfate

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HPV Vaccine Safety

- >129 million doses of HPV vaccine distributed in the United States since 2006
- Most common adverse events are mild: Sore arm, myalgias
- Among serious adverse events: **No** patterns to suggest any events related to the HPV vaccine
- Findings similar to the safety of all other adolescent vaccines

Stade BA et al. *JAMA*. 2009;302(7):750-757; Centers for Disease Control and Prevention. FAQs about HPV safety. <https://www.cdc.gov/vaccinesafety/vaccines/hpv/hpv-safety-faqs.html>. Last Reviewed November 2, 2015. Accessed July 24, 2019.

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HPV Vaccine Recommendations: ACIP Update

- HPV vaccination recommended for both males and females through age 26 years
 - Start at age 11-12
 - Can start as early as age 9
 - If <15 years of age: **2 doses**
 - If >15 years of age: **3 doses**
- For ages 27 to 45 years: decision to vaccinate based on *shared decision-making*

Recommendations based on June 2019 ACIP meeting. www.cdc.gov/vaccines/acip/meetings/downloads/agenda-archive/agenda-2019-06-508.pdf. Accessed July 23, 2019.

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<https://www.who.int/emergencies/ten-threats-to-global-health-in-2019>

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WHO: 10 Threats to Global Health in 2019

1. Air pollution and climate change
2. Noncommunicable chronic disease
3. Global influenza pandemic
4. Fragile and vulnerable settings
5. Antimicrobial resistance
6. Ebola and other high-threat pathogens
7. Weak primary health care
8. **Vaccine hesitancy**
9. Dengue
10. HIV

<https://www.who.int/emergencies/ten-threats-to-global-health-in-2019>

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Strategies to Improve Vaccination

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For the Majority of Patients

A strong, consistent *presumptive* recommendation

“Today, you are due for two vaccines, HPV and pneumococcal, someone will be right in to administer those vaccines.”

Rather than the *participatory approach*

“Do you want to get the HPV and pneumococcal vaccines today?”

Opel DJ, et al., 2013. *Pediatrics*. 2013;132:1037-46.

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Thank You!

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