Preventing Pneumococcal and HPV Infections:
Update on recent progress and research in Alaska

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Disclosure

- Dr. Singleton has received funding for a clinical trial from Pfizer, Inc
- CDC Arctic Investigations Program received an unconditional gift from Pfizer (ne. Wyeth Vaccines) in 1998-2011
- We will discuss a non-licensed use of a vaccine – PCV13
- We will mention a non-licensed vaccine

Disclosure

- *This presentation represents the views of the authors and do not necessarily represent the official position of the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and the Indian Health Service*.

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- … We could be rogue scientists.

What we will cover….

- Pneumococcal disease in children
  - Vaccine uptake
  - Disease rates
  - Nasal colonization
  - Recent disease in young children
  - What's new?
- Human papillomavirus (HPV)
  - Vaccine uptake
  - Research studies
    - Immunogenicity study
    - Preventable cervical cancers
    - Colposcopy clinic study
  - What's next?

Has the Federal Government Shutdown Affected Essential Services at CDC's Arctic Investigations Program?

Valet Parking in Alaska-

Is it really needed?

Pneumococcus (*Streptococcus pneumoniae*)

- Main cause of
  - Bacterial meningitis
  - Blood infections
  - Pneumonia
  - Otitis media
- Reportable disease in Alaska
  - Non-sterile site
  - Invasive pneumo disease
    - "IPD"
- Lab-based surveillance since 1986
  - CDC Arctic Investigations Program

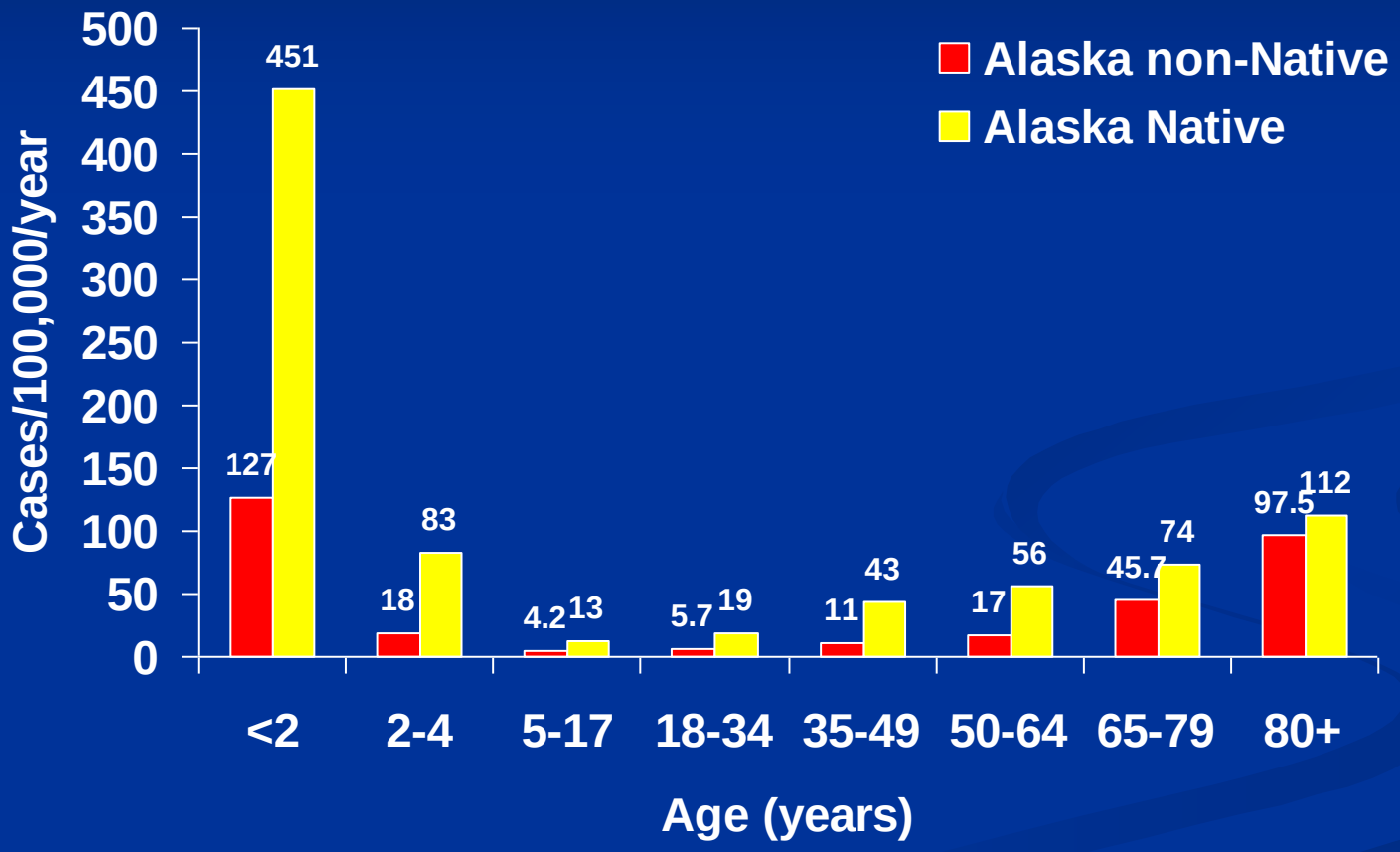
Pneumonia

Brain: meningitis

Ear infection

Pneumococcal bacteria

Pneumococcal Invasive Disease Rates, 1996 - 2000

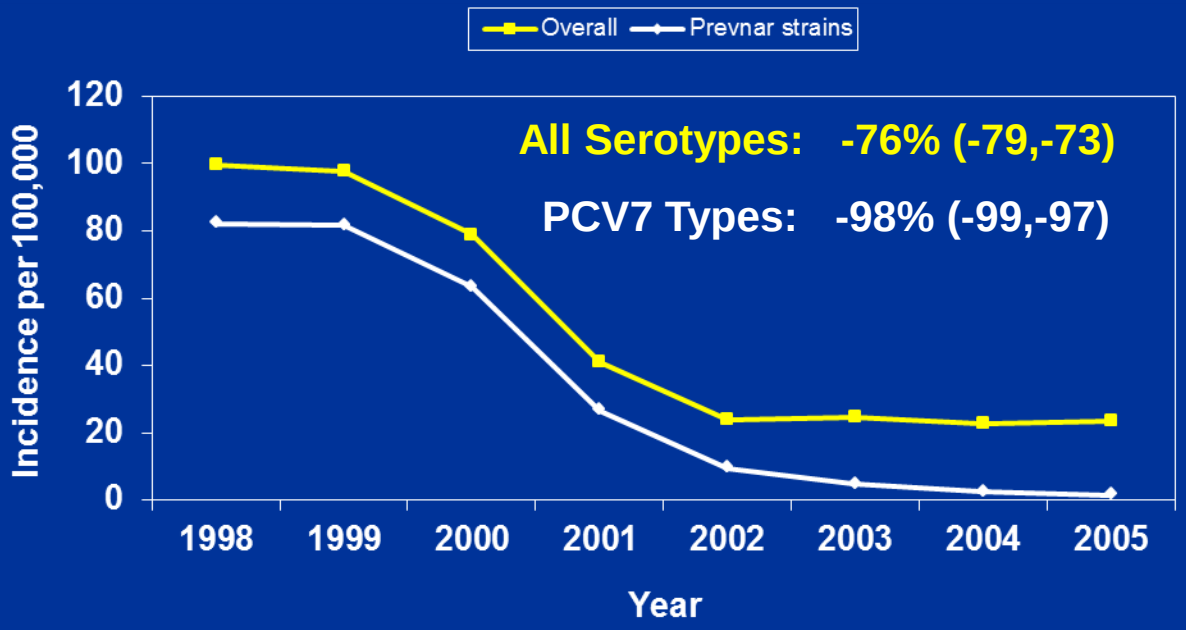


Two Pneumococcal Vaccines

- **Pneumococcal polysaccharide vaccine (PPSV23)**
  - 23 polysaccharide antigens
  - 88% adult disease
  - No immune memory
  - No effect on carriage
  - Not effective <2 yrs
  - 60-70% effective against invasive disease
- **Pneumococcal conjugate vaccine (PCV)**
  - Polysaccharide conjugated to protein
  - 7 serotypes: 80% child illness
  - Boosting/ memory
  - Decreases carriage
  - Immunogenic in children
  - >90% effective against invasive disease

Pneumococcal Vaccines for Children

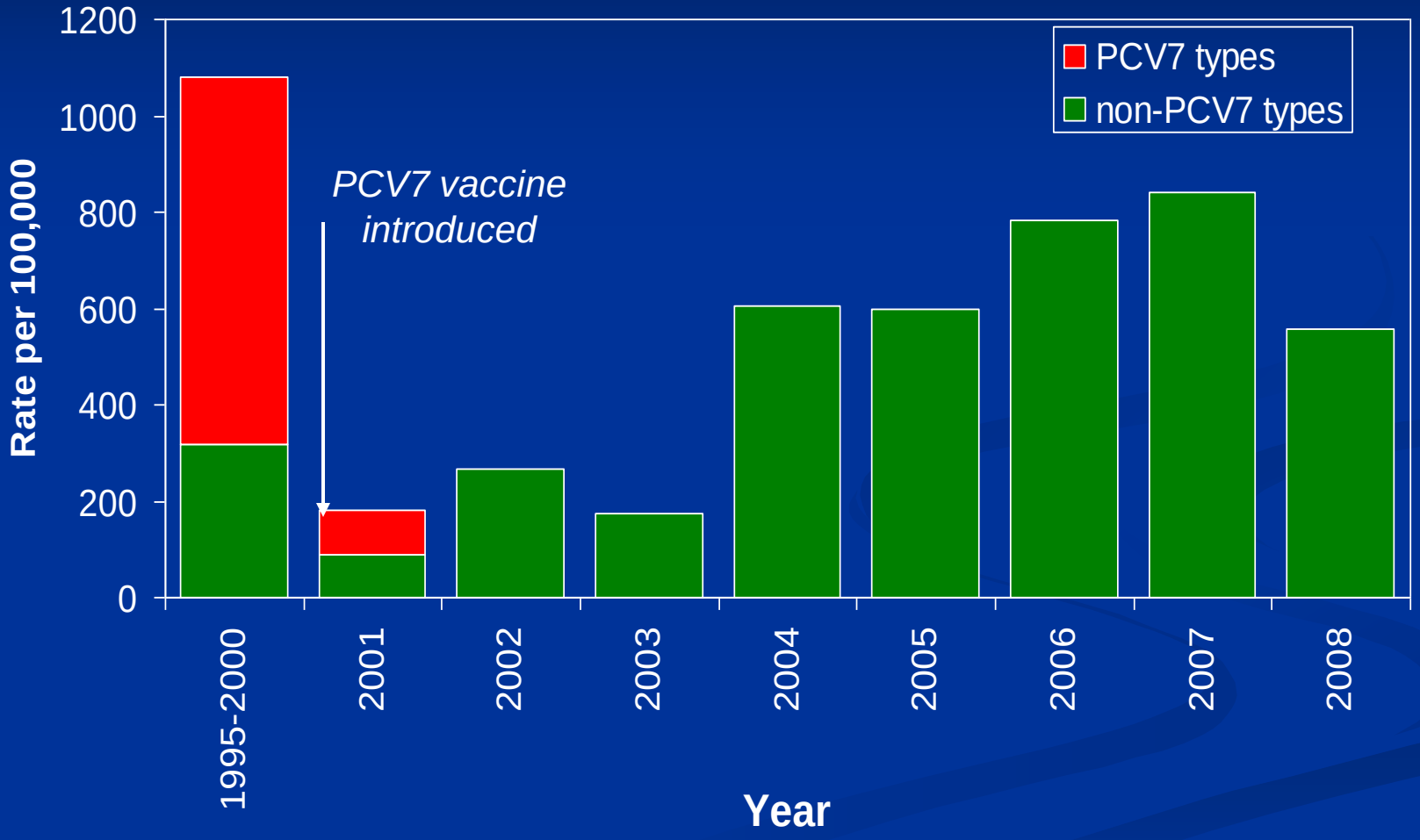
- PCV7 (pneumococcal conjugate vaccine)
  - Introduced in 2000
  - 7 serotypes caused 76% of IPD in < 5 year olds
  - Given at 2,4,6, 12 months
  - Essentially eliminated the 7 vaccine serotypes



- In 2010, PCV13 replaced PCV7
  - Covers ~ 70% of the remaining invasive pneumococcal disease

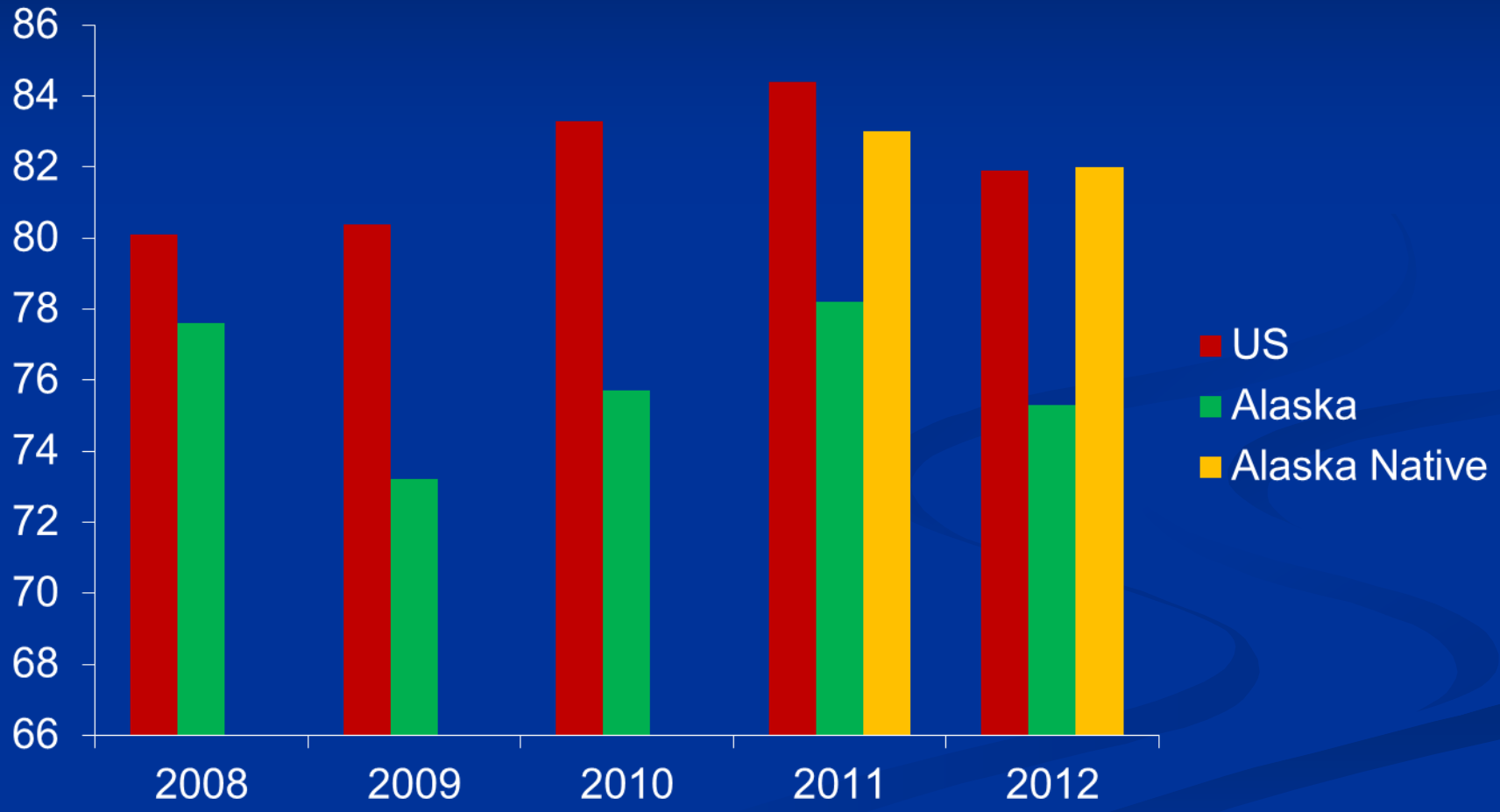
Invasive Pneumococcal Disease

Western Alaska Children < 2 yrs old



PCV uptake in U.S. and Alaska

National Immunization Survey, 2008-2012 with tribal reports for 2011 and 2012



Alaska Native rate for 6/30/2013 was 89%

Alaska Adult Pneumococcal Vaccine Recommendations

- 19-64 year old– 1 dose PPV23 for High Risk
  - Underlying medical conditions
    - CHF, CLD, chronic liver disease, diabetes, alcoholism, asthma smokers, cochlear implant, renal failure, immunocompromise, asplenia, CSF leak
  - Cigarette smokers
- 50-64 year olds - 1 dose PPV23 for unimmunized Alaska Natives
- 65+ year olds – 1 booster dose for all
  - 5+ years from any previous dose

http://www.epi.alaska.gov/bulletins/docs/b2012_24.pdf

PCV13 for Immunocompromised Adults

- **ACIP recommends PCV13 for:** *"Adults 19 years & older with immunocompromising conditions, asplenia, CSF leaks, or cochlear implants"*

Recommendations:

- Pneumovax (PPV23)-naïve (preferred)
  - Give one dose PCV13 first and PPV23 at least 8 weeks after PCV13
- PPV23-immunized adults
  - Give one dose PCV13 at least 1 year after the last PPV23 dose

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6140a4.htm

Pneumococcal Vaccines for Immunocompromised Children

- ACIP recommends PCV13 for:
  - "children aged 6–18 years with immunocompromising conditions, functional or anatomic asplenia, cerebrospinal fluid (CSF) leaks, or cochlear implants who have not previously received PCV13"
- ACIP recommends PPSV23
  - Children ≥ 2 years with increased disease risk
- Give PCV13 first, PPSV23 8 weeks later
- Previous PPSV23: One dose of PCV13
  - Booster does of PPSV23 after 5 years

PCV13 Impact on Invasive Pneumococcal Disease and Nasal Colonization

Michael Bruce MD, MPH

Alaska Immunization Conference

October 9th 2013

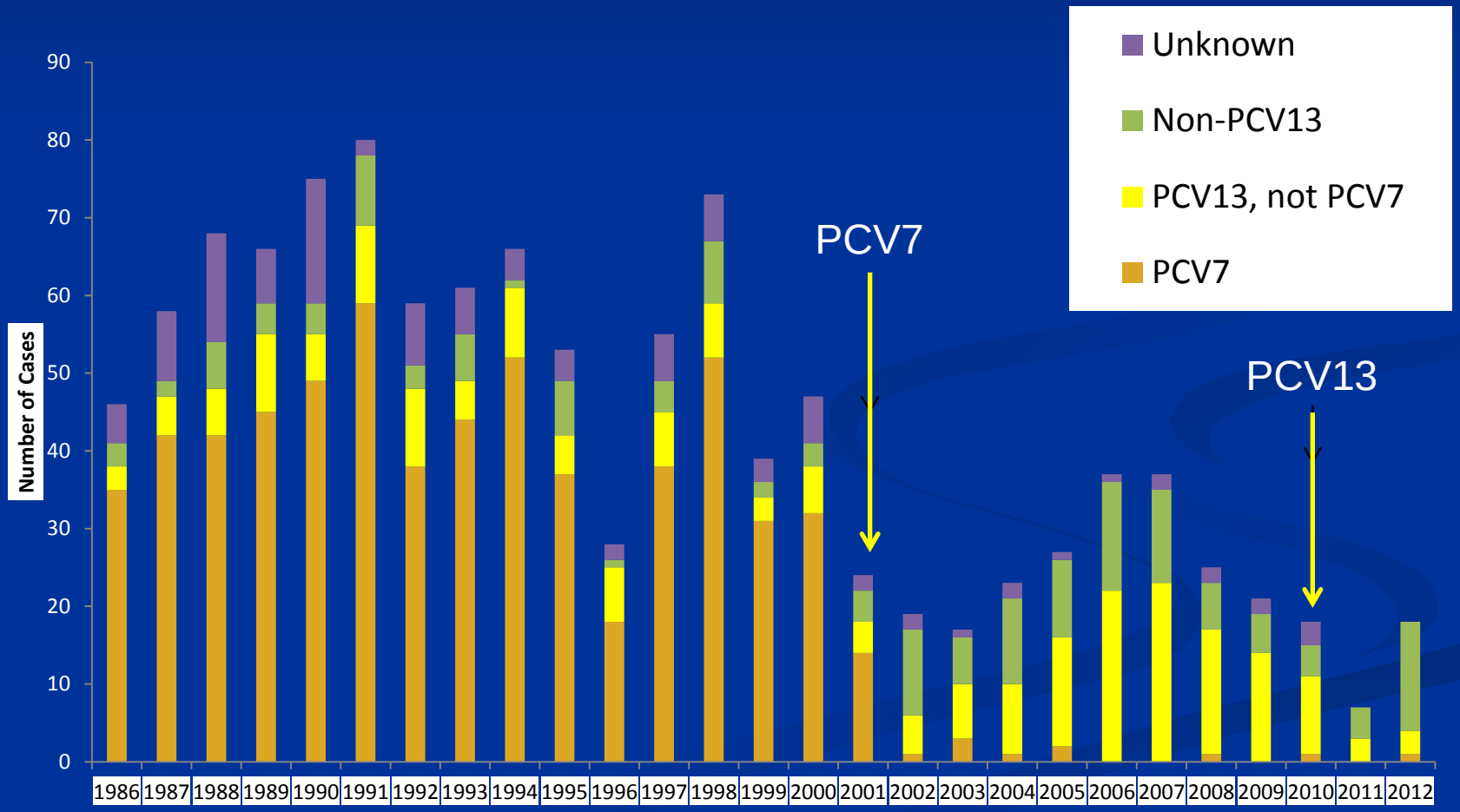
Objective

- Evaluate the impact of PCV13 on IPD in the state of Alaska

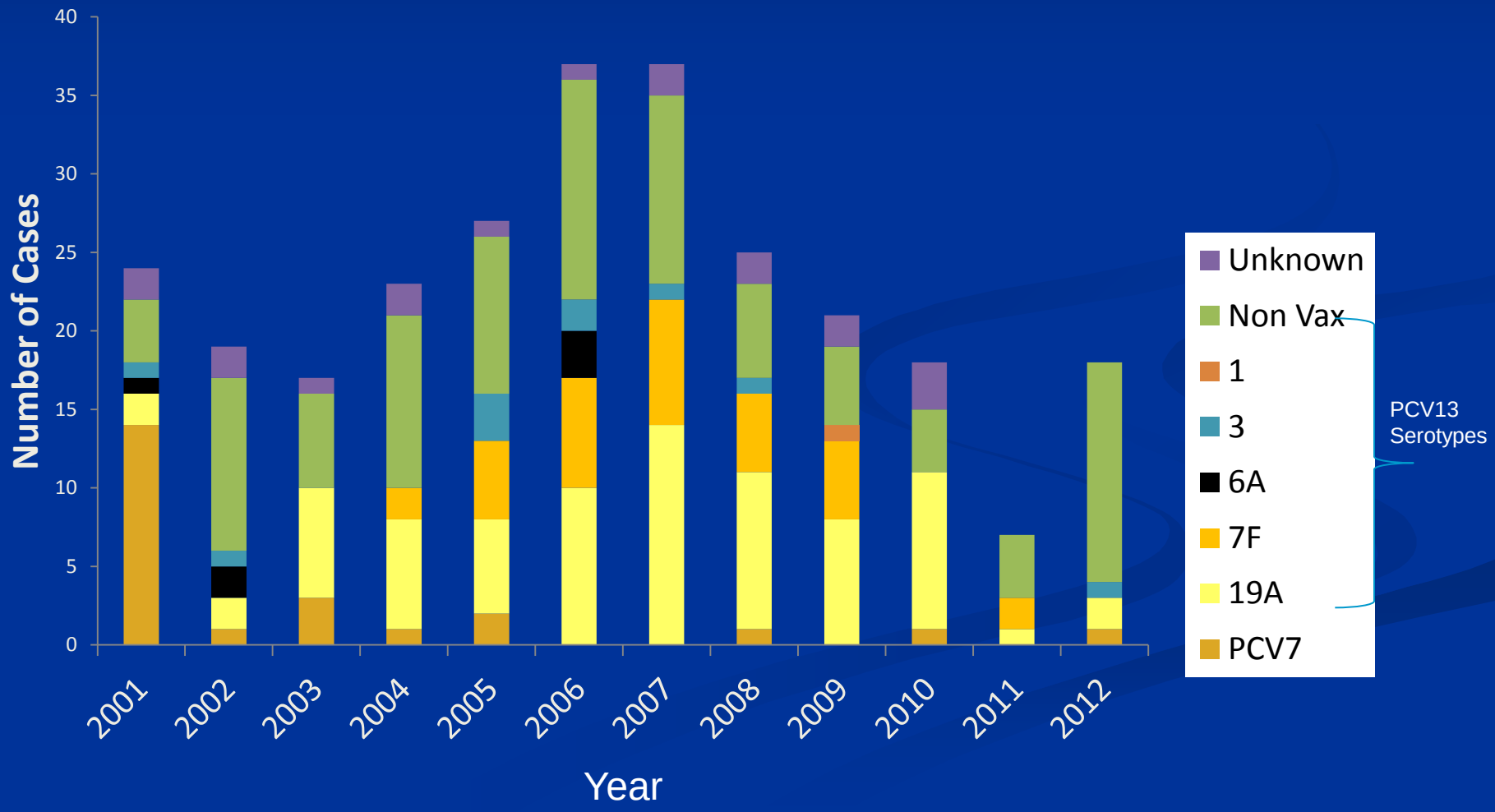
Methods

- Pre-vaccine period:
  - April 2005-March 2008
- Post-vaccine period:
  - April 2010-December 2012

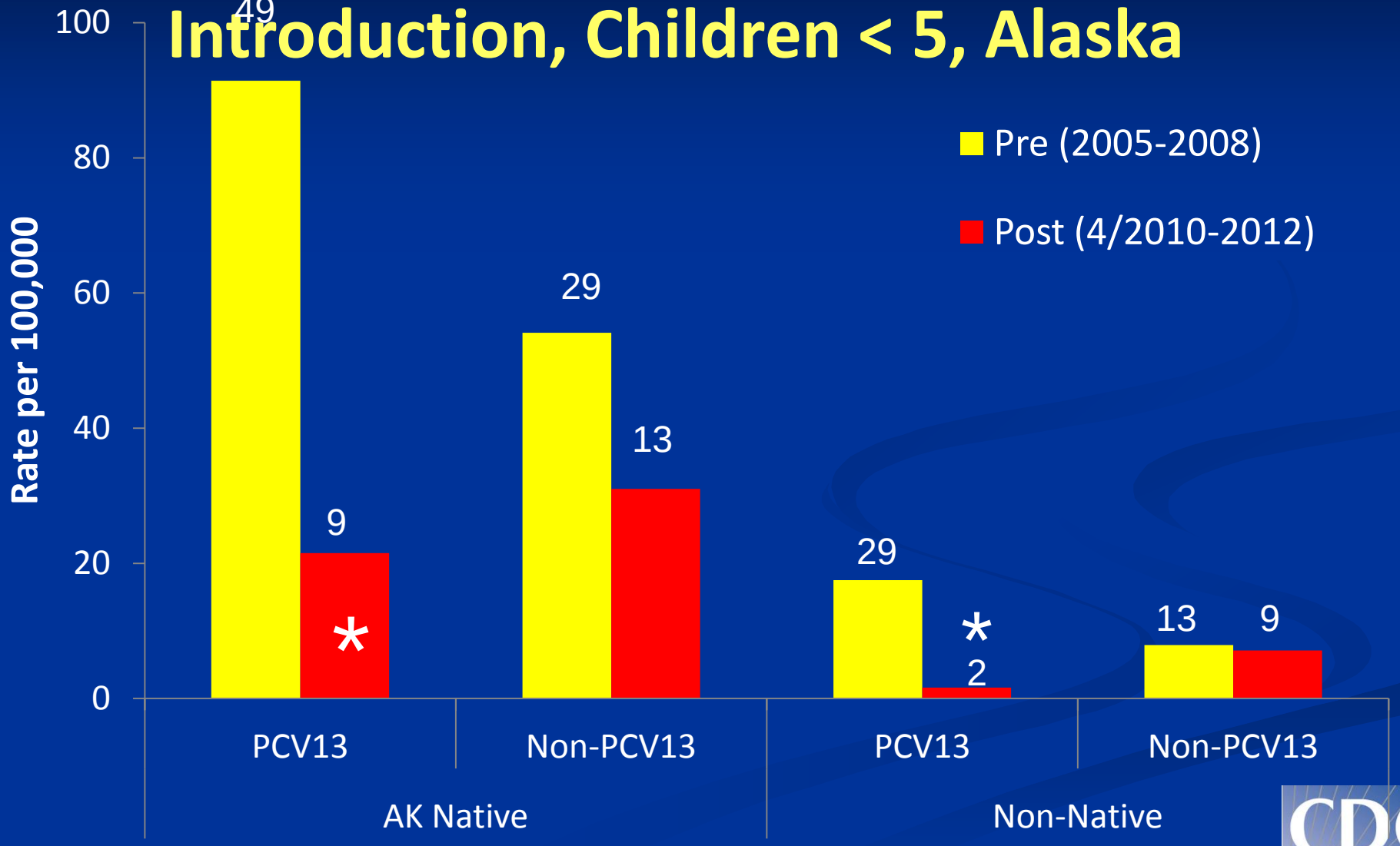
IPD by Vaccine Serotype in Children < 5 Years, Alaska, 1986-2012



IPD Serotypes, Children <5, Alaska, 2001-2012

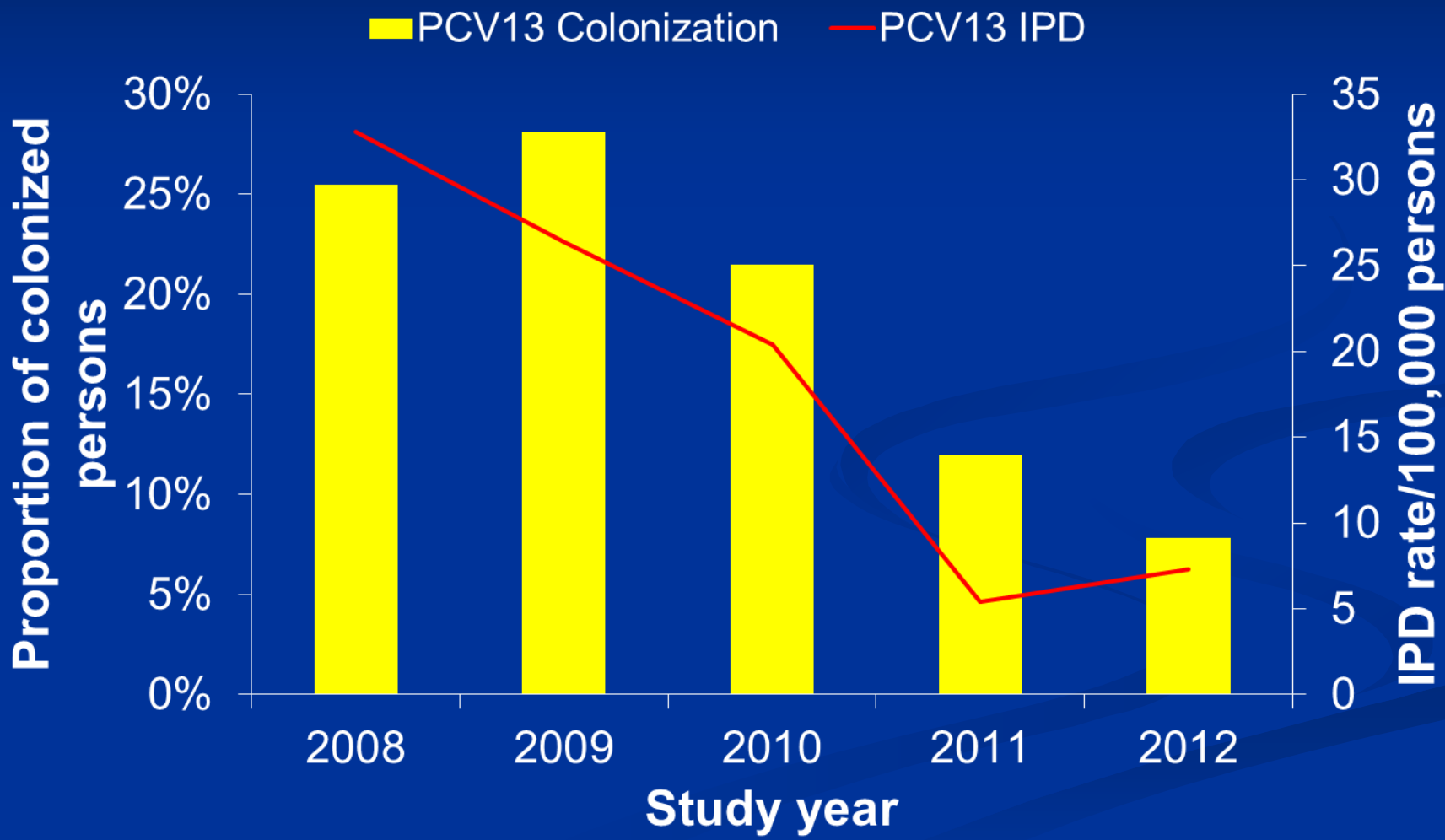


IPD Rates Pre- and Post-PCV13 Introduction, Children < 5, Alaska



CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Pneumococcal Colonization and IPD Caused by PCV13 Serotypes in Children <5 years — Alaska, 2008–2012



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  - Studies of nasal colonization
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    - Immunogenicity study
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    - Colposcopy clinic study
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HPV and Cervical Cancer

- HPV genotypes
  - > 100 types
  - 30 types cause genital infections
- HPV a necessary cause of cervical cancer
- Genital HPV infection is common:
  - ~50% of sexually active adults get HPV
  - Most HPV genital infections clear on their own
  - Persistent infection with "high-risk" types can lead to cervical cancer.

HPV Vaccines in the U.S.

- HPV4, “Gardasil” ®
  - Includes genotypes 16, 18, 6, 11
    - 70% of cervical cancer, 90% genital warts
  - 3-shot series over 6 months
- HPV2, “Cervarix” ®
  - Genotypes 16, 18
  - 3-shot series over 6 months
- Cost
  - Cost/Dose: Quadrivalent: $106 CDC contract, $130 private
- Target population
  - Approved for 9 -26 year olds: Recommended for 9-26 year old females and 9-21 year old males
  - Routine use in 11-12 year olds

HPV Vaccine Use

ACIP recommends:

- HPV vaccine in females & males 11-12 years, through 21 years for males and 26 years for females.

- HPV-4 (Gardasil) is licensed for females & males 9 through 26 yrs.

  http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6050a3.htm

State of Alaska is only providing HPV vaccine to 9-18 year old VFC-eligible males and females (Medicaid eligible, Alaska Native, Uninsured, Underinsured)

- Other options for non-VFC eligible:
  - Many insurance companies reimburse HPV vaccine
  - Merck Patient Assist. Program – uninsured low-income 19-26 yrs.
  - Medicaid reimburse for eligible 19-20 year old women