Pneumococcal Vaccines

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Pneumococcal Vaccines Work Group Members

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  - Kathy Neuzil (IDSA)
  - Arthur Reingold (U of California, Berkeley)
  - Keipp Talbot (Vanderbilt University)

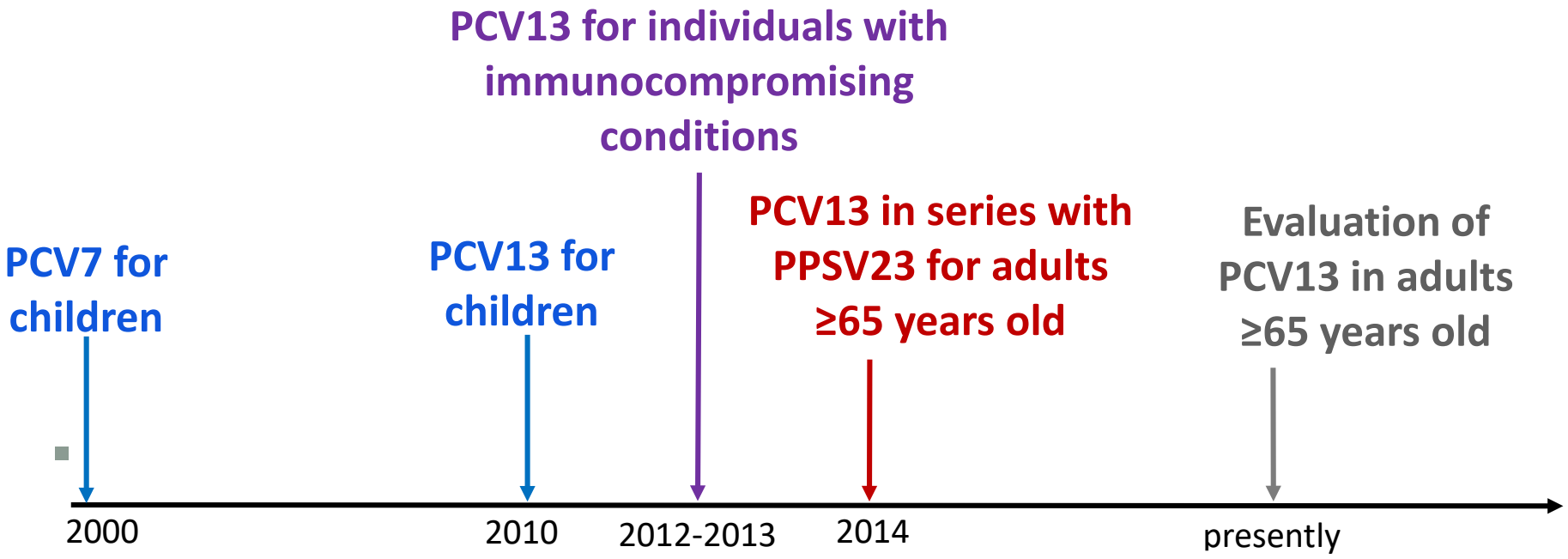
Terms of Reference

- Review current data on efficacy, effectiveness, immunogenicity, and cost-effectiveness of pneumococcal vaccines

- Review current recommendations considering up-to-date evidence, including epidemiological studies, and assess strength of the evidence

- Revise or update recommendations for pneumococcal vaccine use, as needed

Pneumococcal Conjugate Vaccine Recommendations



2014 ACIP Age Based Recommendation

- In 2014 when ACIP recommended PCV13 in series with PPSV23 for adults ≥65 years old the thinking was:
  - Short-term, the recommendation was warranted because while indirect effects had decreased vaccine-type IPD, there was still a significant burden of pneumonia, especially among older adults
  - Long-term public health benefits expected to be limited because of anticipated continued indirect effects from pediatric PCV13 program
- Therefore, the recommendation was made with a commitment to re-evaluate this policy 4 years later and revise as needed

Re-evaluation of PCV13 for adults ≥65 years

- Monitor pneumococcal disease including both invasive disease and non-invasive pneumonia among adults ≥65 years
- Evaluate impact of direct and indirect effects on pneumococcal disease among adults ≥65 years
- Continue to monitor vaccine safety

Table 1. Medical conditions or other indications for administration of PCV13 and PPSV23 for adults

Medical indication	Underlying medical condition	PCV13 for ≥ 19 years	PPSV23* for 19 through 64 years		PCV13 at ≥ 65 years	PPSV23 at ≥ 65 years
		Recommended	Recommended	Revaccination	Recommended	Recommended
None	None of the below				✓	✓ ≥ 1 year after PCV13
Immunocompetent persons	Alcoholism		✓		✓	✓ ≥ 1 year after PCV13 ≥ 5 years after any PPSV23 at < 65 years
	Chronic heart disease†					
	Chronic liver disease					
	Chronic lung disease§					
	Cigarette smoking					
	Diabetes mellitus					
	Cochlear implants	✓	✓ ≥ 8 weeks after PCV13		✓ If no previous PCV13 vaccination	✓ ≥ 8 weeks after PCV13 ≥ 5 years after any PPSV23 at < 65 years
	CSF leaks					
Persons with functional or anatomic asplenia	Congenital or acquired asplenia	✓	✓ ≥ 8 weeks after PCV13	✓ ≥ 5 years after first dose PPSV23	✓ If no previous PCV13 vaccination	✓ ≥ 8 weeks after PCV13 ≥ 5 years after any PPSV23 at < 65 years
	Sickle cell disease/other hemoglobinopathies					
Immunocompromised persons	Chronic renal failure	✓	✓ ≥ 8 weeks after PCV13	✓ ≥ 5 years after first dose PPSV23	✓ If no previous PCV13 vaccination	✓ ≥ 8 weeks after PCV13 ≥ 5 years after any PPSV23 at < 65 years
	Congenital or acquired immunodeficiencies¶					
	Generalized malignancy					
	HIV infection					
	Hodgkin disease					
	Iatrogenic immunosuppression‡					
	Leukemia					
	Lymphoma					
	Multiple myeloma					
	Nephrotic syndrome					
	Solid organ transplant					

*This PPSV23 column only refers to adults 19 through 64 years of age. All adults 65 years of age or older should receive one dose of PPSV23 5 or more years after any prior dose of PPSV23, regardless of previous history of vaccination with pneumococcal vaccine. No additional doses of PPSV23 should be administered following the dose administered at 65 years of age or older.

†Including congestive heart failure and cardiomyopathies

§Including chronic obstructive pulmonary disease, emphysema, and asthma

¶Includes B- (humoral) or T-lymphocyte deficiency, complement deficiencies (particularly C1, C2, C3, and C4 deficiencies), and phagocytic disorders (excluding chronic granulomatous disease)

‡Diseases requiring treatment with immunosuppressive drugs, including long-term systemic corticosteroids and radiation therapy

Evidence Presented to ACIP since 2014: Nasopharyngeal Carriage

- Nasopharyngeal carriage before and after PCV13 introduction in adults ≥65 to identifying serotypes circulating in the community
  - Children <5 years:
    - PCV13-serotype carriage declined from 8% in 2011 to <1% in 2017
    - Total *S. pneumoniae* carriage remained the same (~30%)
  - Adults ≥65 years:
    - PCV13-serotype carriage 0.2% in 2015-16
    - Total *S. pneumoniae* carriage also low (1.8%)

Thomas, ACIP meeting Oct 2017; Lessa, ACIP meeting Oct 2017

Evidence Presented to ACIP since 2014: PCV13 Coverage in Adults

- Adults ≥65 years old:
  - Coverage increased to ~40% through 2017
- 19–64 years old with PCV13 indications:
  - Coverage is lower, and varies by indication

Pilishvili, ACIP meeting Oct 2017; Black, MMWR 2017

Evidence Presented to ACIP since 2014: Burden of IPD in Adults ≥65 Years Old Since 2014

- PCV13-type IPD declined in all age groups (2007-16)
- Overall and PCV13-type IPD incidence in adults ≥65 years old declined by 40% and 68%, respectively, and then plateaued from 2014 to 2016
- Combined direct and indirect effects since 2014
  - Mathematical model to estimate contribution of direct vs indirect PCV13 effects on observed trends in IPD among adults ≥65 years old
  - Model estimated that ~580 IPD cases were prevented since 2014 among adults ≥65 years old in the U.S., with benefits decreasing over time

Matanock, ACIP meeting Oct 2017; Pillishvili, ACIP meeting Feb 2018

Evidence Presented to ACIP since 2014: PCV13 Effectiveness in Adults ≥65 Years Old

- PCV13 effectiveness against PCV13-type **IPD** 47% (95%CI 4–71%) to 65% (95%CI 19–85%) demonstrated in 2 case-control studies
  - Confidence intervals overlap with the pre-2014 CAPiTA PCV13 efficacy estimates of 75% (95%CI 41–91%) against PCV13-type IPD
- PCV13 effectiveness against PCV13-type **pneumonia** 73% (95% CI 13–92) demonstrated in a test negative case-control study design
  - Confidence intervals overlap with the pre-2014 CAPiTA PCV13 efficacy estimates of 45% (95%CI 14–65%) against PCV13-type pneumonia

Pillishvili, ACIP meeting Feb 2018; McLaughlin, ACIP Feb 2018

Today's Pneumococcal Vaccines Session Outline

- Safety of PCV13 in adults aged ≥65 years old—Dr. Tom Shimabukuro (CDC/NCEZID)
- Pneumococcal pneumonia burden and PCV13 impact among adults aged ≥65 years old in Louisville, KY—Dr. David Swerdlow (Pfizer)
- Pneumococcal carriage, invasive disease, and hospitalizations following community acquired pneumonia (CAP) among Native American populations—Dr. Laura Hammitt (Infectious Disease Prevention Program, Center for American Indian Health)
- Racial disparities in invasive pneumococcal disease and PCV13 impact and Overview of the Evidence to Recommendations Framework for the ongoing review of the PCV13 recommendation for adults ≥65 years old—Dr. Almea Matanock (CDC/NCIRD)

Discussion Question for Today's Pneumococcal Vaccines Session

- What additional evidence would be helpful for decision-making with regard to continued use of PCV13 in immunocompetent adults ≥65 years?