Revaccination with PPSV23 in high risk children who have previously received PCV7

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ACIP meeting, October 22, 2008

TABLE 12. Schedule for vaccination using 23-valent polysaccharide vaccine (PPV23) for children aged ≥2 years who have previously received the 7-valent conjugate vaccine (PCV7)

Population	Schedule for PPV23	Revaccination with PPV23*
Healthy children	None†	No
Children with sickle cell disease or anatomic or functional asplenia; immunocompromised;§ or who are infected with human immunodeficiency virus	1 dose of PPV23 administered at age ≥2 yrs and ≥2 mos after last dose of PCV7	Yes¶
Persons with chronic illness§	1 dose of PPV23 administered at age ≥2 yrs and ≥2 mos after last dose of PCV7	Not recommended

* Recommendations for revaccination are adapted from CDC. Prevention of pneumococcal disease: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 1997;46(No. RR-8):12.

† Health-care providers of Alaska Natives and American Indians should consider whether these children would benefit by the additional coverage provided by the expanded serotypes in PPV23 (see recommendations regarding Alaska Natives and American Indians).

§ See Table 8.

¶ Regardless of when administered, a second dose of PPV23 should not be administered <3 years after the previous PPV23 dose. If the patient is aged >10 years, one revaccination should be administered ≥5 years after the previous PPV23 dose. If the patient is aged ≤10 years, one revaccination 3–5 years after previous dose should be considered (**Sources:** CDC. Prevention of pneumococcal disease: recommendations of the Advisory Committee on Immunization Practices [ACIP]. MMWR 1997;46[No. RR-8]:1–24; and American Academy of Pediatrics.

MMWR 2000; 49(RR-09)

Objective

- To propose a clarification to the recommended time interval for PPSV23 revaccination in high risk children aged ≤10 years who have previously received PCV7

Revaccination in high risk children – MMWR 1997;46 (No RR-8)

- *"Revaccination once is recommended for persons aged ≥2 years who are at highest risk for serious pneumococcal infections and those who are likely to have a rapid decline in pneumococcal antibody levels, provided that 5 years have elapsed since receipt of the first dose fo pneumococcal vaccine."*
- *"Revaccination 3 years after the previous dose may be considered for children at highest risk for severe pneumococcal infection who would be aged ≤10 years at the time of revaccination."*
- *These children include those with functional or anatomic asplenia (eg., sickle cell disease or splenectomy) and those with conditions associated with rapid antibody decline after initial vaccination (e.g., nephrotic syndrome, renal failure, or renal transplantation).*

MMWR 1997; 46 (RR-8)

Revaccination in high risk children – MMWR 2000;49 (No RR-9)

- *"Immunocompromised children or children with SCD or functional or anatomic asplenia should be revaccinated with PPV23 as previously recommended"*
- *"If the child is aged ≤10 years, one revaccination should be considered 3-5 years after the previous dose of PPV23"*
- *"Data are limited regarding adverse events related to second dose of PPV23 administered after PCV7. Health care providers should not administer a second dose of PPV23 any earlier than 3 years after the initial dose of PPV23".*

MMWR 2000; 49(RR-09)

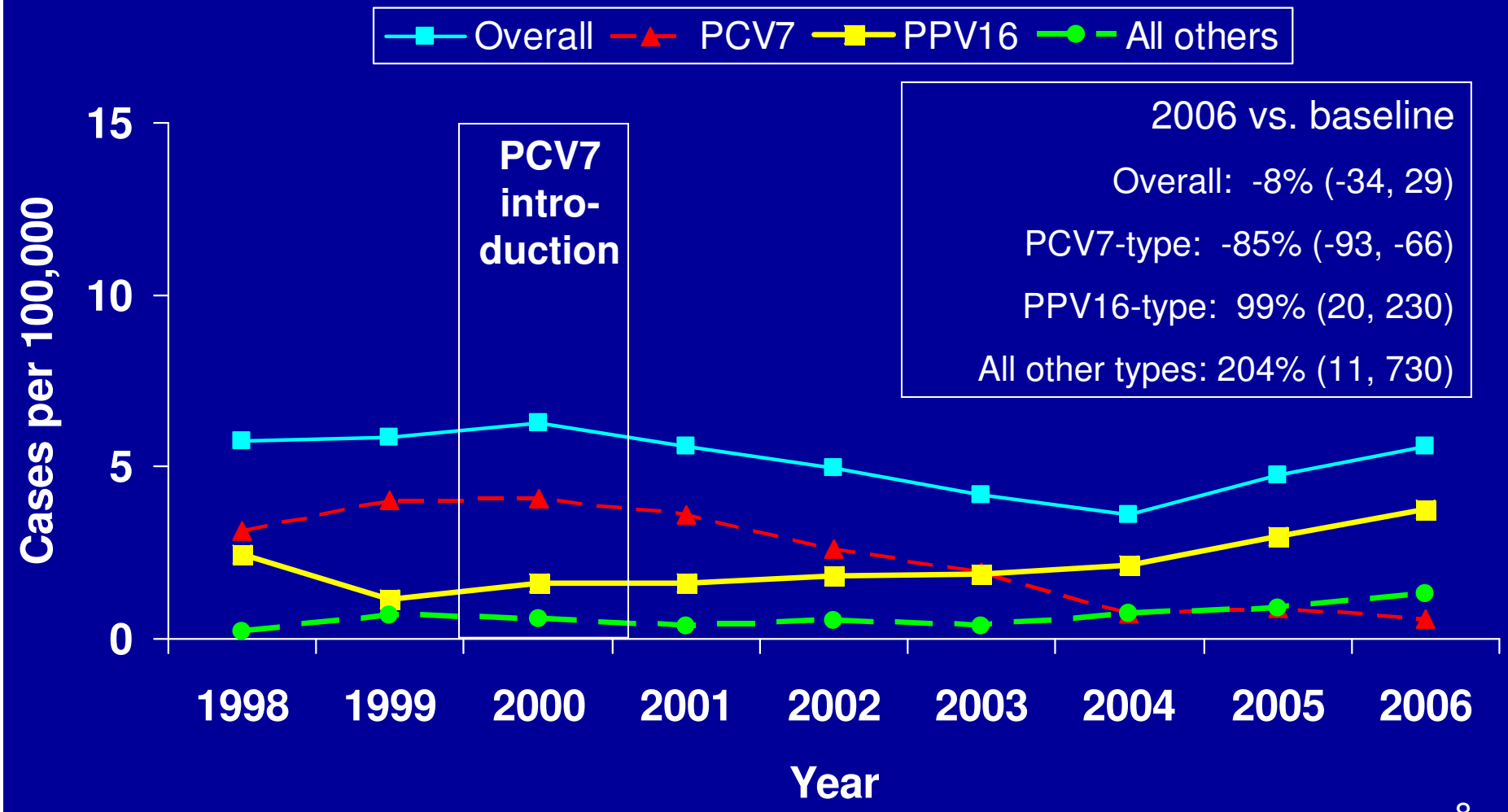
Rationale for use of PPSV23 in high risk children who have received PCV7

- *"Although data regarding safety of PPSV23 administered after PCV7 are limited, the opportunity to provide additional serotype coverage among these children at very high risk justifies use of the vaccines sequentially[1]"*
- PPSV23 provides excellent booster response in healthy children to the 7 serotypes in both PCV7 and PPSV23[2]
- The intent of recommendation is to target the 16 serotypes only in PPSV23 but the effectiveness of this approach is unknown

1. MMWR 2000; 49(RR-09); 2. O'Brien Lancet Inf Dis, 2007

Current rates and serotypes causing IPD in children aged 5-9 years

Rates of invasive pneumococcal disease among children aged 5-9 years, by serotype,1998/99-2006



Data source: CDC, Active Bacterial Core surveillance, unpublished

Proportion of IPD cases among children aged 5-9 years who had underlying medical conditions* 1998-2006

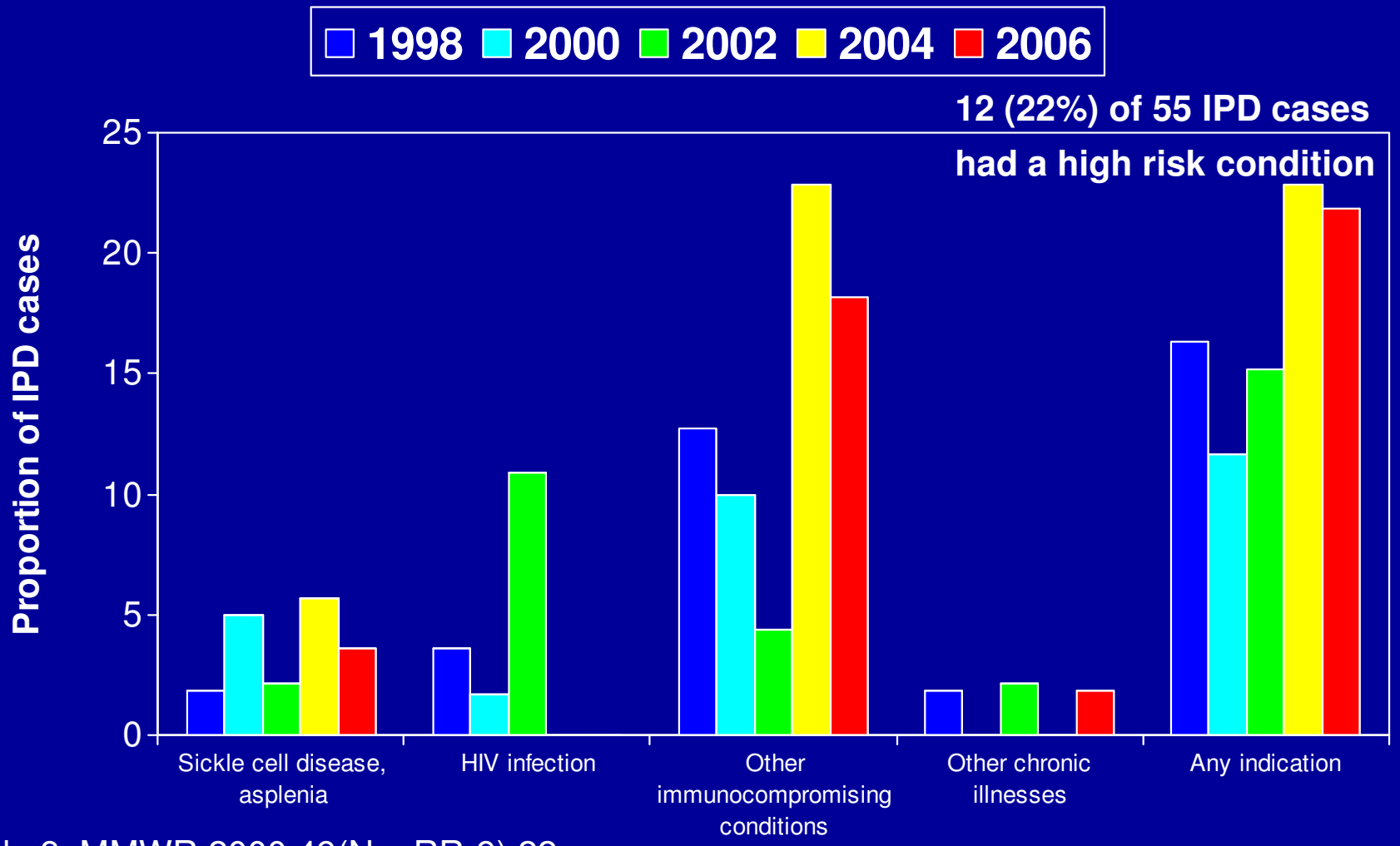
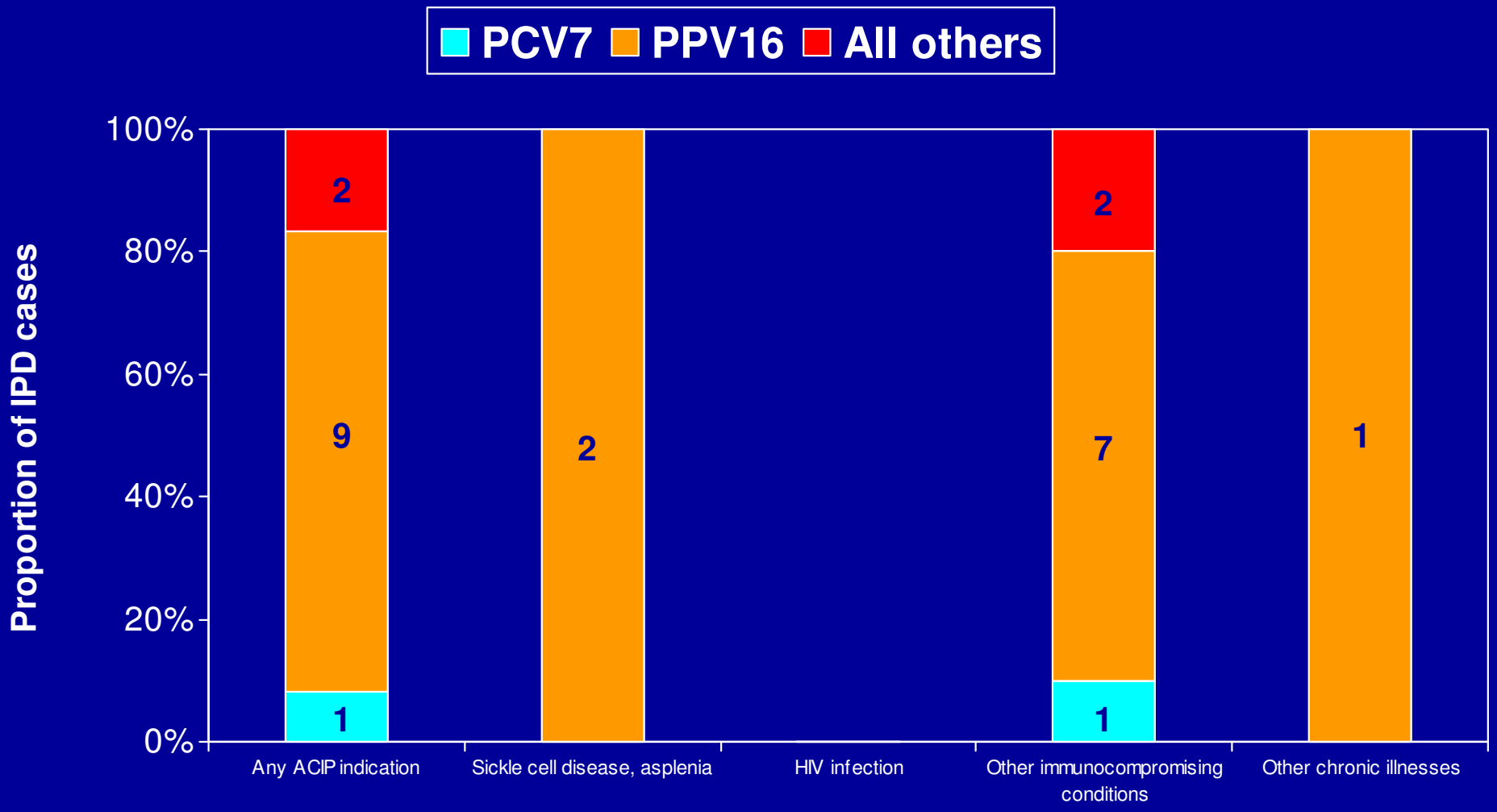


*Table 8, MMWR 2000;49(No. RR-9):22

Data source: CDC, Active Bacterial Core surveillance, unpublished

Proportion of invasive pneumococcal disease cases caused by indicated serotypes among children 5-9 years-old with ACIP indications for PPV23* (N=12), 2006



•Table 2, MMWR 1997;46(No. RR-8):12

•Data source: CDC, Active Bacterial Core surveillance, unpublished

Pediatric studies of multiple PPSV23 doses

- 6 studies from the 1970s and 1980s*
  - Different vaccine formulations (PPSV8, PPSV12, PPSV14, PPSV23)
- Most used radioimmunoassay (RIA)
  - predate development of sensitive and specific assays
  - lacks specificity for serotype specific antibody
- 5 of 6 studies observed lower antibody concentrations for some serotypes with a second PPSV dose

*Reviewed in: O'Brien Lancet Infect Dis 2007;7:597-606

Workgroup's considerations (1)

- Few studies have evaluated the immunogenicity of multiple doses of PPSV23 in children
- The clinical effectiveness of PPSV23 following PCV7 in children is unknown
- No data are available on the effectiveness of revaccination with PPSV23 in this age group compared with only a single dose of PPSV23
- The statement to consider revaccination in high risk children 3 years after the first dose was based on immunologic data from the 1980s indicating rapid antibody decline after PPSV23 vaccination in certain children at high risk[1]

1. MMWR 1997; 46 (RR-8)

Workgroup's considerations (2)

- However, those studies predated development of sensitive and specific antibody assays. Therefore, the interpretation of data is hampered by the non-specificity of the assays used to measure the immune response
- No data are available to determine the relative benefit of 3 vs. 5 year revaccination interval but immunologic responses to PPSV23 may be better in older children[1,2]
- There is concern about potential immunologic hyporesponsiveness to subsequent exposure to pneumococcal antigens after PPSV23
  - the clinical relevance of this observation is unknown
- A longer interval between PPSV23 doses may reduce the immunologic hyporesponsiveness

1.2. Vernacchio J Infect Dis 2000; Rao J Pediatr 1995

Proposed recommendation

- Immunocompromised persons or persons with sickle cell disease or functional or anatomic asplenia are at highest risk for serious pneumoccoccal infection and may have a rapid decline in pneumococcal antibody levels after PPSV23
- The WG recommends a single revaccination interval for these persons in all age groups:
- *A second dose of PPSV23 is recommended 5 years after the first dose of PPSV23 for persons aged ≥2 years who are immunocompromised, have sickle cell disease, or functional or anatomic asplenia."*

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