Vaccination Considerations in Immune Inflammatory Disorders(IMIDs)

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Pfizer – KPA Virtual Meeting/Webinar

Thursday 14th April 2022

Pfizer

EGERTON UNIVERSITY

KENYA PAEDIATRIC ASSOCIATION

EAST AFRICA CENTRE FOR VACCINES AND IMMUNIZATION

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Background

- Diseases that result from increased activity of the body's defense system are called immune mediated inflammatory disorders (IMIDs).

- Examples include:
  - Juvenile idiopathic arthritis (JIA), Systemic lupus erythematosus (SLE), Juvenile Dermatomyositis and Scleroderma. Diseases that affect the blood vessels include Polyarteritis Nodosa, Henoch Schoenlein Purpura and Kawasaki Disease.

- IMIDs are treated using immunosuppressive agents that include:
  - Steroids such as Prednisone, Methotrexate, Cyclophosphamide, Mycophenolate Mophetil (MMF), Azathioprine and Sulphasalazine. More recently, medicines called Biologics such as Eternacept, Adalizumab, Rituximab and Tocilizumab.

Why is special vaccination important among patients with IMIDS?

IMIDS and Risk of infections

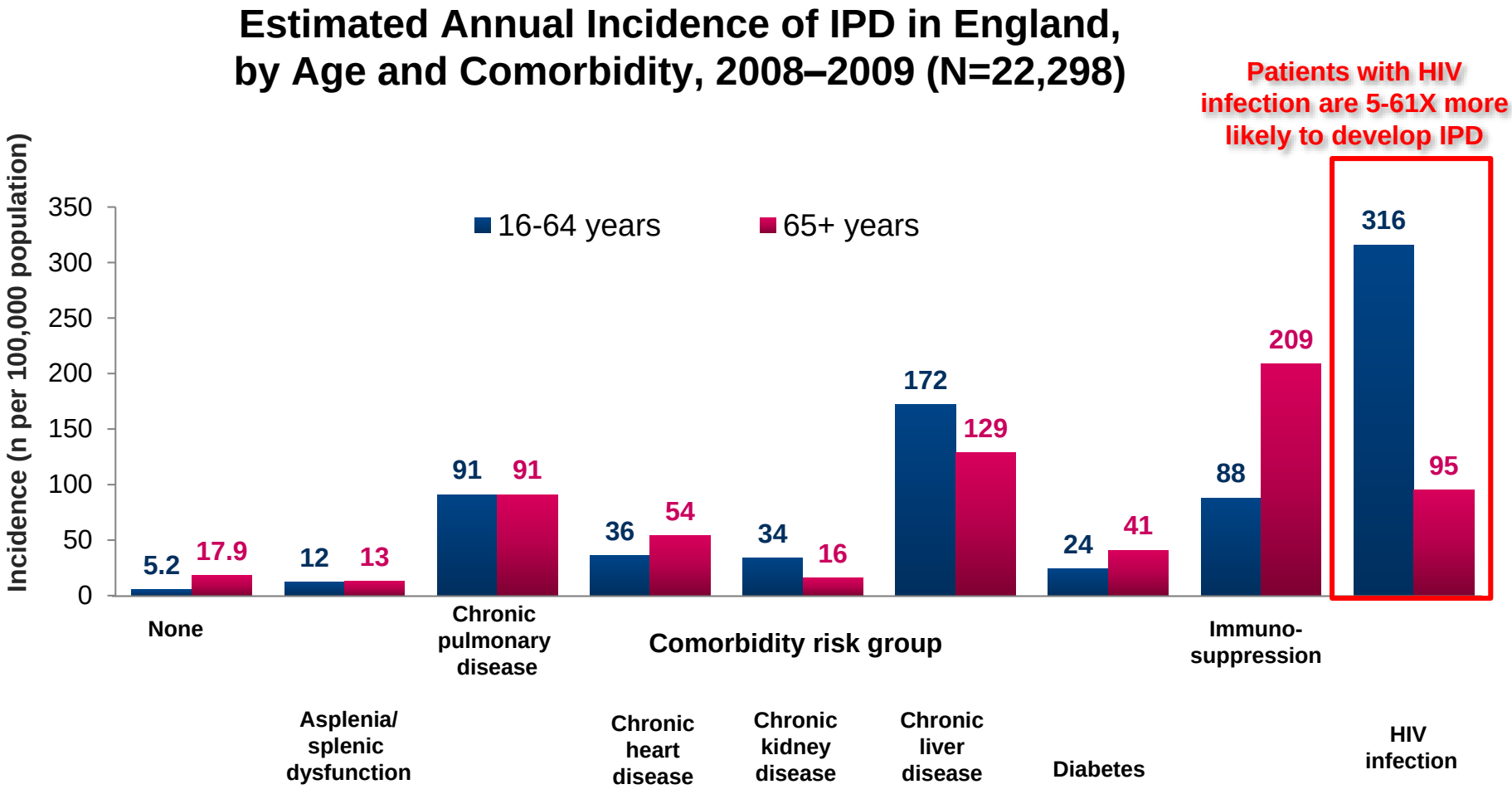
- *Streptococcus pneumoniae* causes invasive and non-invasive pneumococcal disease (common in younger children and older adults)
- WHO – a child dies of Pneumonia disease every minute
- People with IMIDs, are more at risk for infections, (pneumonia, meningitis, blood stream & bone/joint infections) – especially encapsulated bacteria.
- Pneumonia is a leading cause of death in infants and young children with IMIDs.

1. **Liu Li, et al, Lancet 2012, 379:2151-2161**
2. **Improving global health by preventing pneumococcal disease APPG report**

IMIDs and Risk of infections

- Greatest danger from encapsulated respiratory bacteria, particularly *Streptococcus pneumoniae*.
  - The mortality rate of such infections is as high as 10-30%
  - Consider joint infections & osteomyelitis in these patients.
  - These patients are often times on immune suppressive medication making them more susceptible to infections.
  - Staphylococcus and Salmonella are an additional threat nisms responsible for osteomyelitis.
- During adult life, infections with gram-negative organisms, especially *Salmonella*, tend to be on the increase.
  - Of special concern is the frequent occurrence of Salmonella osteomyelitis, and related infection in joints, linked to increase use of immunosuppressive.

Comorbidities Can Increase IPD Risk in Adults of All Ages1



1. van Hoek AJ, et al. *J Infect*. 2012;65:17-24.

HIV=human immunodeficiency virus; IPD=invasive pneumococcal disease.

Licensed Pneumococcal Conjugate Vaccines

PCV7	4	6B	9V	14	18C	19F	23F			
	CRM									
PCV10	4	6B	9V	14	18C	19F	23F	1	5	7F
	Protein D				TT	DT	Protein D			
PCV13	4	6B	9V	14	18C	19F	23F	1	5	7F	3	6A	19A
	CRM 197												

1. APPROVED PACKAGE INSERT: PREVENAR® Approved: 07 March 2003
2. APPROVED PACKAGE INSERT: PREVENAR® Approved: 21 June 2013
3. APPROVED PACKAGE INSERT: SYNFLORIX ®

Clinical Relevance of the 6 Additional Serotypes in Prevenar 13

Serotype	Clinical Implications
Serotype 1	Associated with IPD outbreaks in children[1] One of the most common serotypes causing pediatric IPD[2,3] Associated with complicated pneumonia[2]

Serotype 3	• Serotype 3
	  • complicated pneumonia
	  • common cause of AOM

Serotype 5	Associated with IPD outbreaks in children[1]

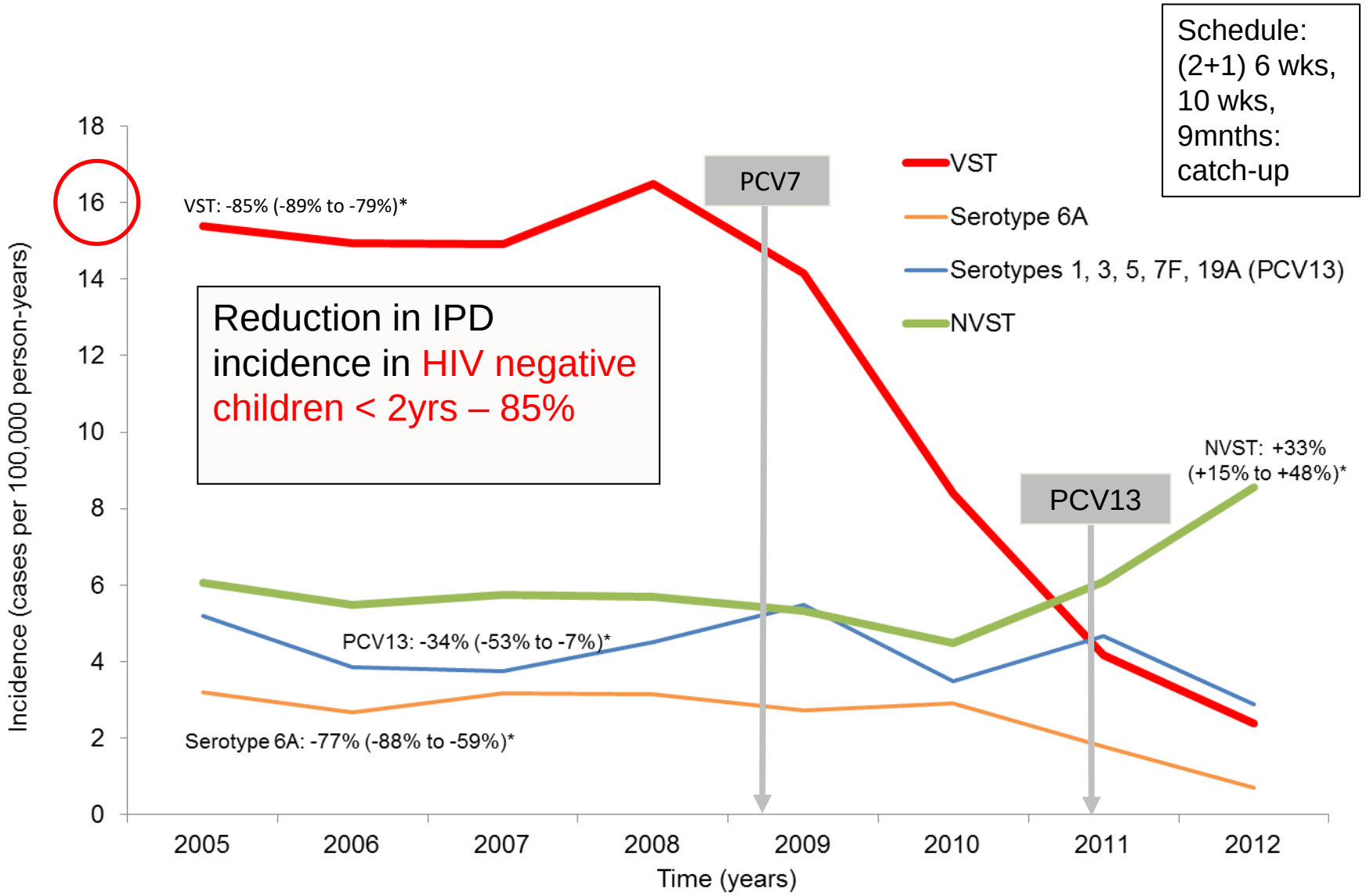
Serotype 6A	• Serotype 6A
	  • Very multidrug resistant
	  • Is common in AOM

Serotype 7F	One of the most common serotypes causing IPD in children[2-4] High case-fatality rate compared with other serotypes[5]

Serotype 19A	• Serotype 19A
	  • Common in NPC
	  • Multidrug resistant
	  • Global cause of IPD and complicated pneumonias

1. Hausdorff WP. *Vaccine.* 2007;25:2406-2412. 2. Weil-Olivier C. *BMC Infect Dis.* 2012;12:207. 3. Kaplan SL. *Pediatrics*. 2010;125(3):429-436. 4. Pilishvili T. *J Infect Dis.* 2010;201:32-41. 5. Ruckinger S, et al. *Pediatr Infect Dis J.* 2009;28:118-122. 6. Rodgers GL, et al. *Vaccine.* 2009;27:3802-3810. 7. Alonso M, et al. *PLoS ONE*. 2013;8(1):e54333. 8. Cho EY. *J Korean Med Sci*. 2012;27:716-722. 9. Chappuy H, et al. *BMC Infect Dis*. 2013 ;13:357. 10. Pichichero ME, Casey JR. *JAMA.* 2007;298:1772-1778. 11. Ma X. *PLoS ONE*. 2013;8(6):e67507. 12. Wroe PC. *Pediatr Infect Dis*. 2012;31(3):249-254.

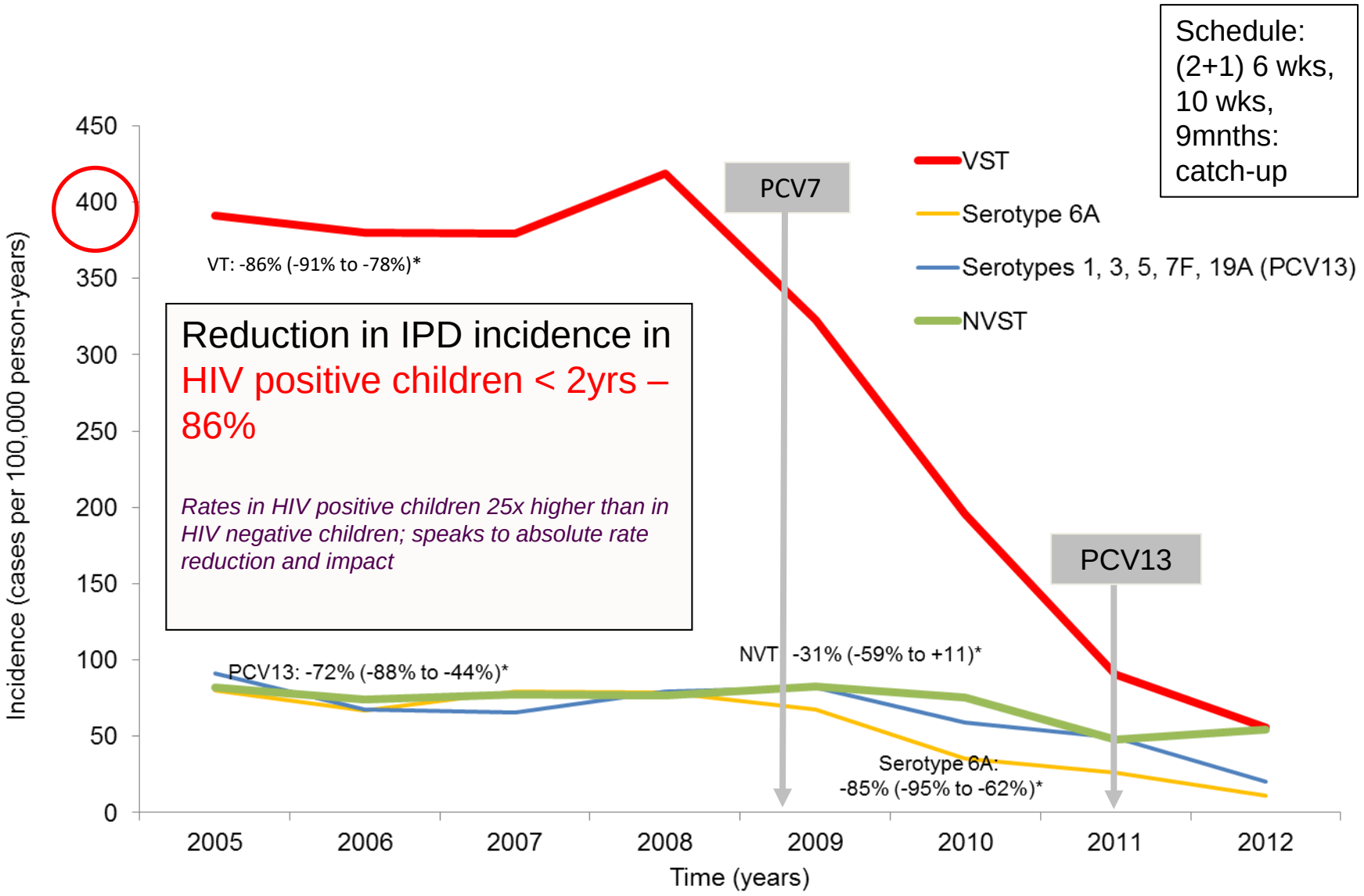
South Africa: Incidence of IPD Among HIV-uninfected children <2 Years of Age by Year and Serotype in (2005–2012)



*% change in IPD incidence: post-vaccine (2012) *vs.* pre-vaccine (2005-2008) years

1. Von Gottberg, et al. NEJM 2014

South Africa: Incidence of IPD Among HIV-infected children <2 Years of Age by Year and Serotype in South Africa (2005–2012)

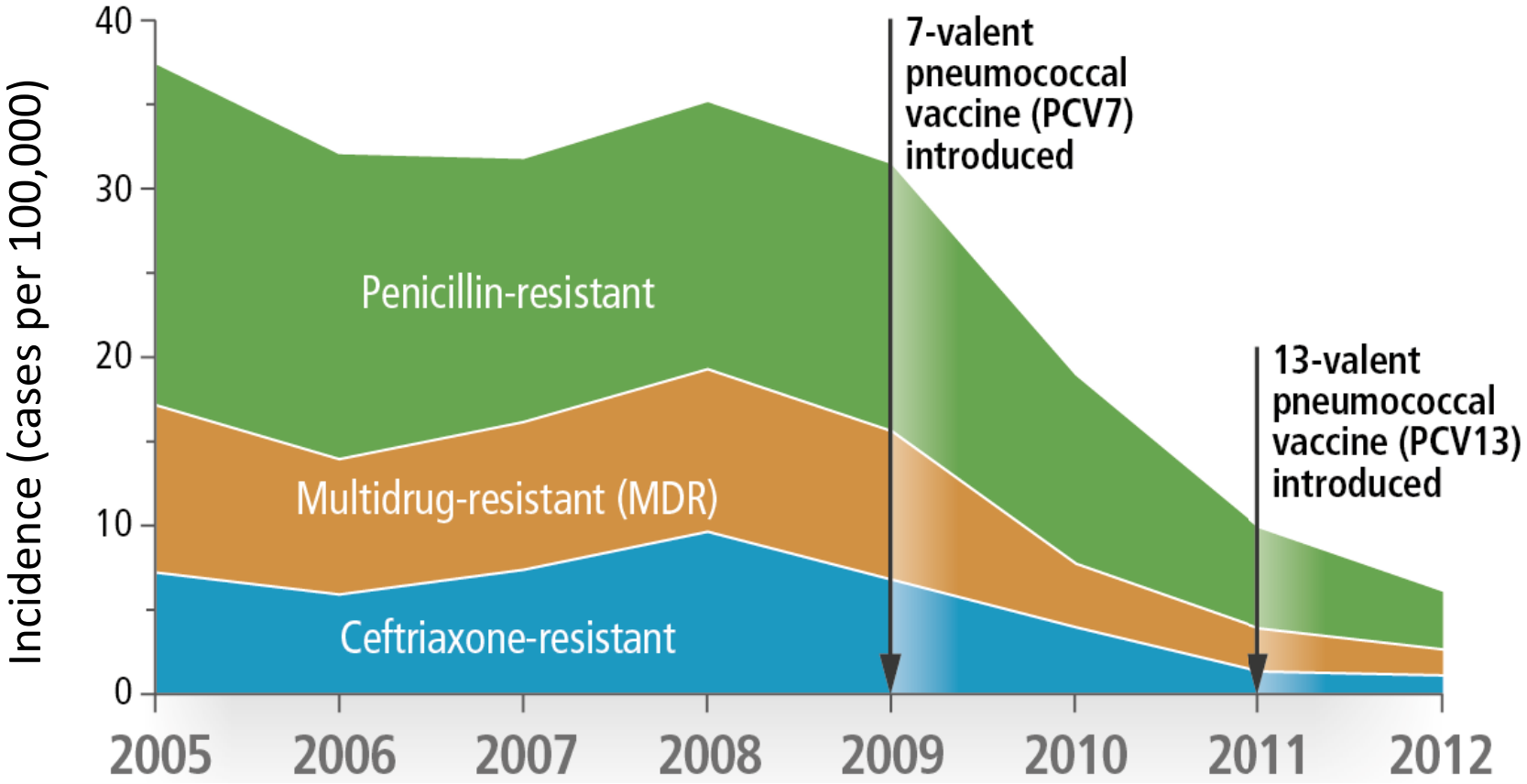


*% change in IPD incidence: post-vaccine (2012) *vs.* pre-vaccine (2005-2008) years

1. Von Gottberg, et al. NEJM 2014.

Vaccines reduce antibiotic resistance

Incidence of antibiotic-resistant invasive pneumococcal disease in children < 2 years, South Africa (cases per 100,000 person-years)



Source: A von Gottberg et al, for GERMS-SA. NEJM 2014;371:1889-99.

Vaccines for IMID patients

- Vaccines are a great way to prevent many serious infections.
- Children and adults with IMIDs should get **all recommended vaccinations,** including a **flu vaccination**.
- People with IMIDs are considered **"high risk"** for certain infections and should follow a special vaccination schedule for the following vaccines:
  - *Haemophilus influenzae type b (Hib)*
  - *Pneumococcal vaccines*
  - *Meningococcal vaccines*
  - *Salmonella and influenza virus vaccines as indicated*

Recommended immunization schedule for sickle cell disease

Age category	Pneumococcus	*Meningococcus* and *Haemophilus influenzae* type b	Influenza
Under 2 years	Routine	Routine	Age 6 & 7 months
Age 2–5 years (fully immunized)	Next Slide	Booster dose given as the Hib/ACYW135 vaccine	Annual
Age 2–5 years (unvaccinated or partially vaccinated)	Next Slide	Two doses of the Hib/ACYW135 vaccine given 2 months apart	Annual
Age >5 years (fully vaccinated)	Next Slide	Two doses of the Hib/ACYW135 given 2 months apart	Annual
Age >5 years (unvaccinated)	Next Slide	Two doses of the Hib/ACYW135 vaccine given 2 months apart	Annual
Reinforcing immunization	Next Slide	ACYW135 vaccine every 5 years, Hib vaccine not currently recommended	Annual

N/B – Typhoid vaccine should be given as indicated

Current ACIP Recommendations for Pneumococcal Vaccination in Infants & Children

Age and/or risk group	Previous vaccination	Recommended vaccination
6 weeks – 6 months	No previous doses	• PCV13, 3 + 1
7 – 11 months	No previous doses	• PC13, 2+1
12 – 23 months	No previous doses	• PCV13: 2 doses
14 – 59 months	Full schedule PCV7	• PCV13: 1 dose
24 – 59 months	Incomplete schedule of doses or <3 doses of PCV7	• 2 doses of PCV13 • 1 dose of PPV23 at least 8 weeks following
24 – 59 months (Healthy)		• PCV13: 1 dose
2 – 5 years (Risk Groups)	Incomplete schedule of PCV13 or PCV7	• 1 doses of PCV13 • 1 dose of PPV23 at least 8 weeks following
	<3 doses of PCV13 or PCV7	• 1 doses of PCV13 • 1 dose of PPV23 at least 8 weeks following
	Full Schedule of PCV7	• 1 dose of PCV13

MMWR. 2015.

Current ACIP Recommendations Pneumococcal Vaccination in Children 6 – 18 years

Age and/or risk group	Previous vaccination	Recommended vaccination
6-18 years of age with • Anatomic or functional asplenia • SCD or other hemoglobinopathies • Cochlear implant; CSF leak • **Immunocompromising conditions as HIV, IMID** • Chronic renal failure • Nephrotic syndrom • Diseases treated with immunosuppressive drugs, or radiation therapy • Congenital or acquired immunodeficiency • Malignant neoplasms, as leukemia, lymphoma, Hodgkin's disease, generalized malignancy or multiple myeloma • Solid organ transplantation	No PCV13	• 1 dose of PCV13 • 1 dose of PPV23 at least 8 weeks following
6-18 years of age with • Chronic heart disease • Chronic lung disease, including asthma if treated with high-dose corticosteroids • Chronic liver disease • DM • Alcoholism	If not received PPV23 or received PCV13	• PPV23 1 dose

MMWR. 2015.

ACIP Recommends 13-Valent Pneumococcal Conjugate Vaccine for Immunocompromised Adults Aged ≥19 Years[1]

- ACIP defines immunocompromised persons as those with the following underlying medical conditions or other indications:

- Congenital or acquired immunodeficiency
- HIV infection
- Chronic renal failure
- Nephrotic syndrome
- Leukemia
- Lymphoma
- Hodgkin disease
- Generalized malignancy
- **Diseases requiring treatment with immunosuppressive drugs, IMID including long-term systemic corticosteroids or** radiation therapy
- Solid organ transplantation
- Multiple myeloma

- **Persons with functional or anatomic asplenia, cerebrospinal fluid leaks, or cochlear implants are also included in the ACIP recommendation for vaccination with 13-valent pneumococcal vaccine**

ACIP=Advisory Committee on Immunization Practices; HIV=human immunodeficiency virus.

1. Centers for Disease Control and Prevention (CDC). *MMWR Morb Mortal Wkly Rep.* 2012;61:816-819.

ACIP Recommendations for Use of PCV 13 in Adults 19-64 Years

ACIP Voted to Recommend the Use of PCV 13 for Adults 19 Years of Age and Older with Immunocompromising Conditions

- Recommendation for PPSV23-naïve adults:
  - We recommend adults 19 years of age or older **with immunocompromising conditions*, functional or anatomic asplenia,** CSF leaks or cochlear implants, and who have not previously received PCV 13 or PPSV23 receive a single dose of PCV 13 followed by a dose of PPSV23 at least 8 weeks later
- Recommendation for adults previously vaccinated with PPSV23:
  - We recommend adults 19 years of age or older **with immunocompromising conditions*, functional or anatomic asplenia,** CSF leaks or cochlear implants, and who have previously received one or more doses of PPSV23, receive a dose of PCV 13 1 or more years after the last PPSV23 dose was received
  - For those that require additional doses of PPSV23, the first such dose should be given no sooner than 8 weeks after PCV 13 and at least 5 years since the most recent dose of PPSV23

• ACIP defines immunocompromising conditions as: congenital or acquired immunodeficiencies; HIV infection; chronic renal failure or nephrotic syndrome; leukemias, lymphomas, Hodgkins disease; generalized malignancy; diseases requiring treatment with immunosuppressive drugs, including long-term systemic corticosteroids or radiation therapy; solid organ transplantation; and multiple myeloma. ACIP, Advisory Committee on Immunization Practices; PPSV, pneumococcal polysaccharide vaccine; CSF, cerebrospinal fluid; HIV, human immunodeficiency virus.

1. Centers for Disease Control and Prevention. Recommended Adult Immunization Schedule—United States – 2020. http://www.cdc.gov/vaccines/schedules/downloads/adult/adult-schedule.pdf. Accessed September 15th 2020.

ACIP Recommendations for Use of PCV 13 Adults +65

Recommendation for PPSV23-naïve adults:

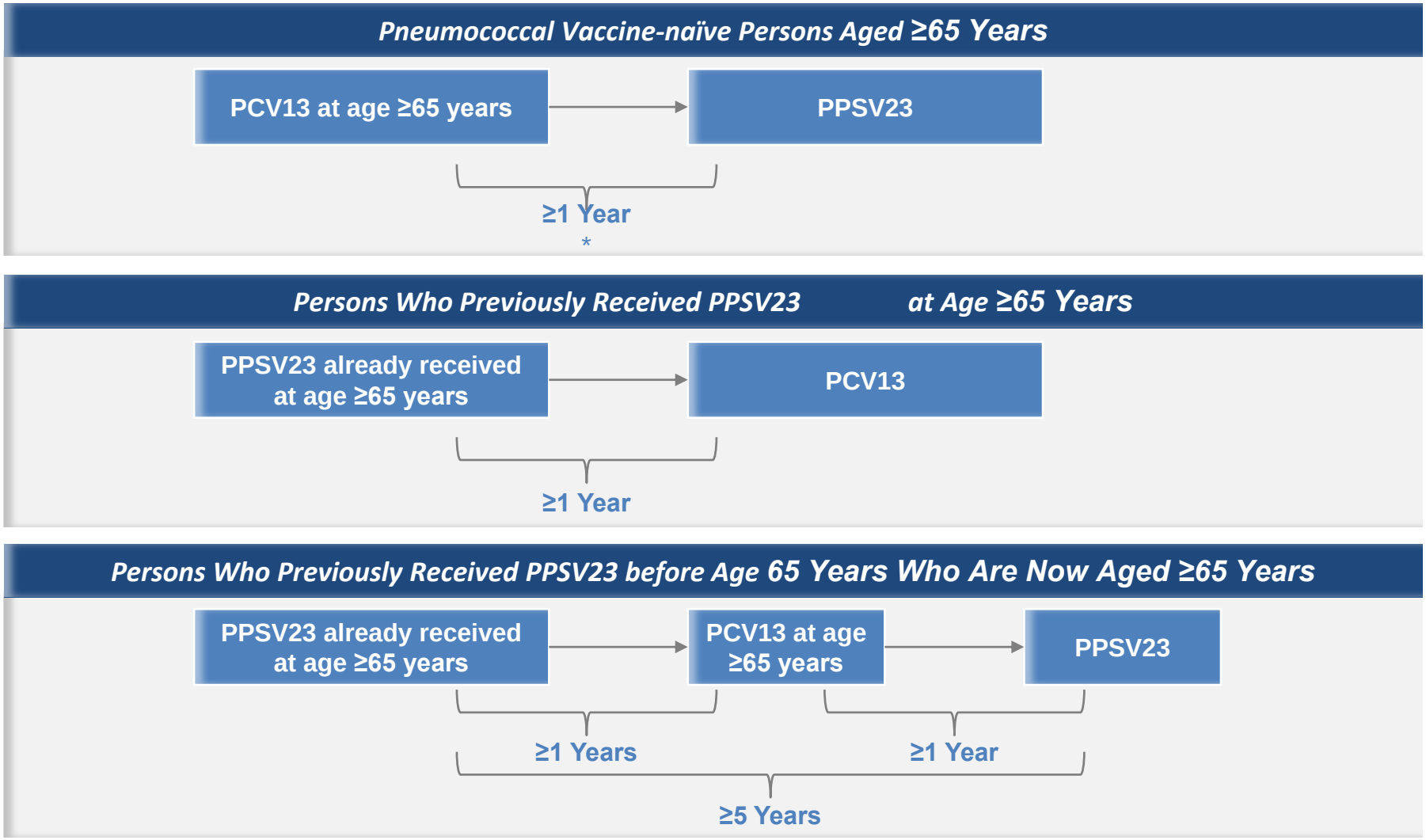
- Adults 65 years of age or older who have not previously received pneumococcal vaccine or whose previous vaccination history is unknown should receive a dose of PCV13 first, followed by a dose of PPSV23 (6-12 months)

Recommendation for adults previously vaccinated with PPSV23:

- Adults 65 years of age or older who have not previously received PCV13 and who have previously received one or more doses of PPSV23 should receive a dose of PCV13

ACIP guidance on sequencing of PCV13 and PPSV13 within the MMWR (Morbidity and Mortality Weekly Report), Vol. 36, September 19, 2014

Sequence and Spacing in adults > 65 years (New Recommendation Sept. 2015)



•**Important Safety Information:** Indications: Pneumococcal 13-valent conjugate vaccine is indicated for the prevention of invasive disease, pneumonia, and otitis media caused by Streptococcus pneumoniae serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F and 23F in infants, children and adolescents. For adults aged 18years and older, Pneumococcal 13-valent conjugate vaccine is indicated for the prevention of pneumococcal disease (including pneumonia and invasive disease) caused by Streptococcus pneumoniae serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F and 23F.

• Contraindications: Hypersensitivity to any component of the vaccine, including diphtheria toxoid.1 Undesirable effects: Adverse reactions from clinical trials with Prevenar 13. Infants and children aged 6 weeks to 5 years: Very common and common adverse reactions include decreased appetite, irritability, drowsiness/ increased sleep, restless sleep/decreased sleep, fever, any vaccination-site erythema, induration/swelling, pain/tenderness, diarrhea, vomiting, rash. These data are from clinical trials in which Prevenar 13 was administered simultaneously with other routine childhood vaccines. Children and adolescents aged 5-17 years: the most common adverse reactions were decreased appetite, irritability, drowsiness/increased sleep, restless sleep/decreased sleep, any vaccination-site erythema, induration/swelling, pain/tenderness (including impaired movement), headache, diarrhea, vomiting, rash, urticaria or urticaria-like rash, fever. Adults aged 18 years and older: Very common and common adverse reactions include decreased appetite, headache, diarrhea, vomiting, rash, generalized new/aggravated joint pain, generalized new/aggravated muscle pain, chills, fatigue, vaccination-site induration/swelling, vaccination site pain/tenderness, limitation of arm movement, fever.

•Reference: Prevenar 13 CDS, NEAR, July 2019, version 6

•Prevenar 13 Abridged Prescribing Information Prevenar 13® suspension for injection Pneumococcal polysaccharide conjugate vaccine (13-valent, adsorbed) Presentation: Each 0.5ml (1 dose) of Prevenar 13 contains 2.2 µg of each of the following pneumococcal polysaccharide serotypes: 1, 3, 4, 5, 6A, 7F, 9V, 14, 18C, 19A, 19F, 23F and 4.4 µg of polysaccharide serotype 6B, all conjugated to the CRM197, carrier protein and adsorbed on aluminum phosphate (0.125 mg aluminum), supplied as a ready-to-use suspension for intramuscular injection in a pre-filled syringe. Indications Pneumococcal 13-valent conjugate vaccine is indicated for the prevention of invasive disease, pneumonia, and otitis media caused by Streptococcus pneumoniae serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F and 23F in infants, children and adolescents. For adults aged 18years and older, Pneumococcal 13-valent conjugate vaccine is indicated for the prevention of pneumococcal disease (including pneumonia and invasive disease) caused by Streptococcus pneumoniae serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F and 23F. Dosage and Administration: For intramuscular use only. 0.5ml is given intramuscularly with care to avoid injection into or near nerves and blood vessels. The vaccine should not be injected in the gluteal area. For infants and children aged 6 weeks to 17 years (prior to the 18th birthday): it is recommended that infants who receive a first dose of Prevenar 13 complete the vaccination course with Prevenar 13. The recommended immunization series consists of 3 doses of 0.5mL each at approximately 2-month intervals, followed by a fourth dose of 0.5mL at 12-15 months of age. The customary age for the first dose is 2 months of age but it can be given as young as 6 weeks of age. Alternatively, when PREVENAR 13 is given as part of a routine infant immunization program, a 3-dose schedule may be considered. The first dose may be given from the age of 2 months, with a second dose 2 months later, and a third (booster) dose is recommended between 11-15 months of age. For Adults aged 18 years and older: Prevenar 13 is to be administered as a single dose including those previously vaccinated with a pneumococcal polysaccharide vaccine. (Please refer to full prescribing information for more details on the vaccination schedules for different age groups, special populations and method of administration) Contraindications: Hypersensitivity to any component of the vaccine, including diphtheria toxoid. Special Warnings and precautions for use As with all injectable vaccines, appropriate medical treatment and supervision must always be readily available in case of a rare anaphylactic event following the administration of the vaccine. The administration of Prevenar 13 should be postponed in subjects suffering from acute severe febrile illness (Please refer to full prescribing information for more details on special warnings and precautions for use). Undesirable effects: Adverse reactions from clinical trials with Prevenar 13. Infants and children aged 6 weeks to 5 years: Very common and common adverse reactions include decreased appetite, irritability, drowsiness/ increased sleep, restless sleep/decreased sleep, fever, any vaccination-site erythema, induration/swelling, pain/tenderness, diarrhea, vomiting, rash. These data are from clinical trials in which Prevenar 13 was administered simultaneously with other routine childhood vaccines. Children and adolescents aged 5-17 years: the most common adverse reactions were decreased appetite, irritability, drowsiness/increased sleep, restless sleep/decreased sleep, any vaccination-site erythema, induration/swelling, pain/tenderness (including impaired movement), headache, diarrhea, vomiting, rash, urticaria or urticaria-like rash, fever. Adults aged 18 years and older: Very common and common adverse reactions include decreased appetite, headache, diarrhea, vomiting, rash, generalized new/aggravated joint pain, generalized new/aggravated muscle pain, chills, fatigue, vaccination-site induration/swelling, vaccination site pain/tenderness, limitation of arm movement, fever. (Please refer to the full prescribing information for complete details on undesirable effects including adverse reactions in special populations and post-marketing experience). Full prescribing information is available on request, please contact near_reception@pfizer.com Reference: Prevenar 13 CDS, NEAR, July 2019, version 6.


Thank you