

Report to the Boards of Health

Jennifer Morse, MD, MPH, FAAFP, Medical Director

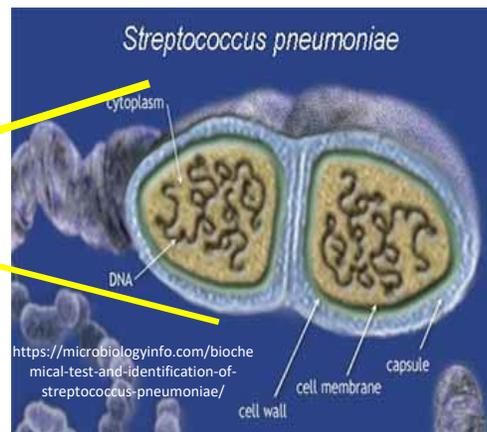
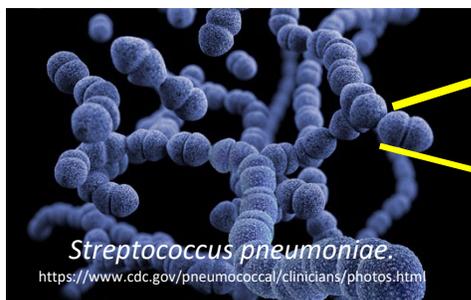
Mid-Michigan District Health Department, Wednesday, December 21, 2022
Central Michigan District Health Department, Wednesday, December 14, 2022
District Health Department 10, Friday, December 16, 2022



New Pneumococcal Vaccinations

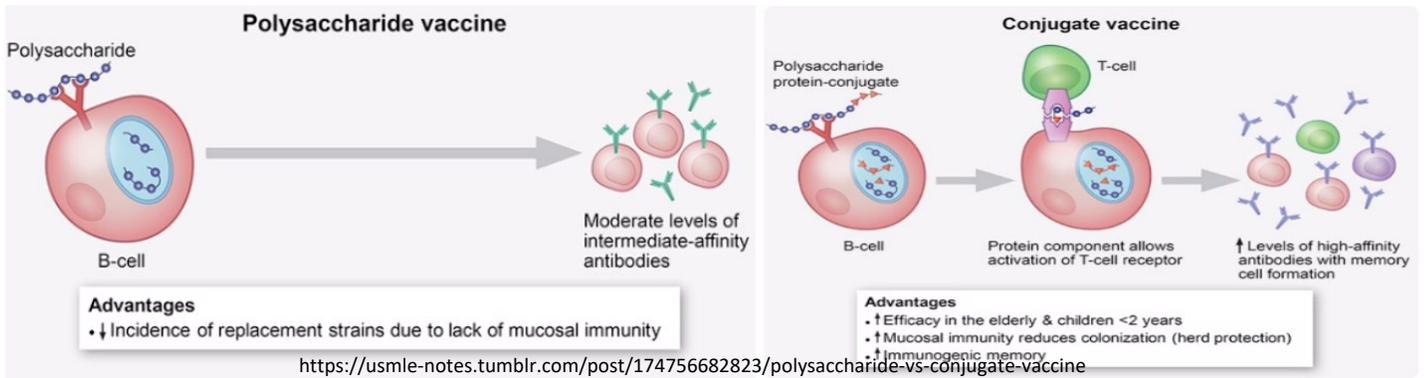
Streptococcus pneumoniae is a cause of bacterial pneumonia. Pneumococcal pneumonia causes about 150,000 hospitalizations a year. *S. pneumoniae* causes other infections, such as ear and sinus infections, bacteremia (infection in the blood), and meningitis. Invasive pneumococcal infections like bacteremia and meningitis kill thousands each year in the United States. Vaccination for *S. pneumoniae* for those at higher risk continues to be the best way to prevent serious infections and death.

There are more than 100 different serotypes of *Streptococcus pneumoniae*. The polysaccharides, or complex sugars, in the capsule of the bacteria determine the serotype, as well as how severe the infections and illness caused by the serotype. Antibodies specific for one serotype will typically only protect against that specific serotype, though some antibodies will cross-react with more than one serotype.



A vaccine targeted against the polysaccharides in the capsule (also referred to as the antigen) was first created in 1977 and contained capsular polysaccharide antigen from 14 different serotypes of pneumococci. In 1983, the vaccine Pneumovax 23 (PPSV23), which contained antigen from 23 different serotypes of pneumococci, became the standard vaccine. Polysaccharide vaccines cause good antibody production, but don't work in children under the age of 2. They also do not trigger our T cells to respond. T cells are needed to help our immune system keep a memory of our immunity. This allows our immune system to respond better if we are exposed to pneumococcus again in the future. T cells also seems to allow us to produce more antibodies in our mucus membranes, which can keep us from getting colonized with pneumococcus. The antibody protection from PPSV23 can start to drop as soon as 2 years after vaccination.

To improve the immune response from vaccination, the polysaccharide antigens were conjugated (attached) to a protein to create the pneumococcal conjugate vaccine. The protein used is a genetically detoxified diphtheria toxin. That first conjugated pneumococcal vaccine, Prevnar 7 (PCV7), was introduced in 2000 and included antigens to 7 serotypes. In 2010, it was replaced by Prevnar 13 (PCV13), which contained 6 additional serotypes. Recently, two additional pneumococcal conjugate vaccines have been approved for use. One is Vaxneuvance (PCV15) and the other is Prevnar 20 (PCV20). Each contains the same serotypes as PCV13, but PCV15 had 2 additional types and PCV20 had 7 additional types.



Infants and young children are recommended to get a 4-shot series of PCV vaccine. Initially the PCV 7 vaccine was utilized, and this was replaced by PCV13, and has now been replaced by PCV15. Adult pneumococcal vaccination recommendations have been more complicated over the years and are as follow:

1997: Give 1 dose of the PPSV23 to adults at average risk age 65 and older.

2012: Give both the PCV13 and PPSV23 to adults with risk factors for invasive pneumococcal disease.

2014: Expanded indications for PCV13: give it, along with PPSV23, to all adults aged 65 and older.

2019: Another layer of complexity: use a process of shared clinical decision-making between the healthcare provider and the patient to determine who should get PCV13 in addition to the PPSV23 vaccine.

2022: New recommendations made to incorporate newer and potentially better vaccine options and to try to simplify recommendations. For those that have already received a PCV13, PPSV23, or both vaccines, the recommendations are still a bit confusing. The current recommendations are in the table below. The CDC has an app called the ***PneumoRecs VaxAdvisor*** (<https://www.cdc.gov/vaccines/vpd/pneumo/hcp/pneumoapp.html>) to help vaccine providers quickly and easily determine which pneumococcal vaccines a patient needs and when.

Population	Prior pneumococcal vaccine history	Vaccine(s) recommended to complete pneumococcal vaccine series
Adults aged 65 years and older	None	PCV20 OR PCV15, then one year later, get PPSV23
	1 dose of PCV13	PCV20 OR PPSV23 at least 1 year after the PCV13
	1 dose PPSV23	PCV20 or PCV15 at least 1 year after their last PPSV23 dose
	PCV13 and PPSV23	PCV20 <i>may</i> be given at least 5 years after the most recent pneumococcal vaccine dose (<i>shared clinical decision-making</i>) *
Adults 19-64 with a risk factor [#]	None	PCV20 OR PCV15 then at least 8 weeks later, get PPSV23
	PCV13 only	<i>Option A: PCV20</i> at least 8 weeks after previous PCV13 dose <i>Option B: PPSV23</i> least 8 weeks after previous PCV13 dose
	PPSV23 only	PCV20 or PCV15 least 8 weeks after previous PPSV dose
	PCV13 and one or more PPSV23 doses (before age 65), but have not completed all previously recommended doses of PPSV23	<i>Option A: PCV20</i> at least 5 years after the most recent pneumococcal vaccine dose <i>Option B: PPSV23</i> as previously recommended (5 years after most recent PPSV23) *

BOLD added to note the authors recommendation

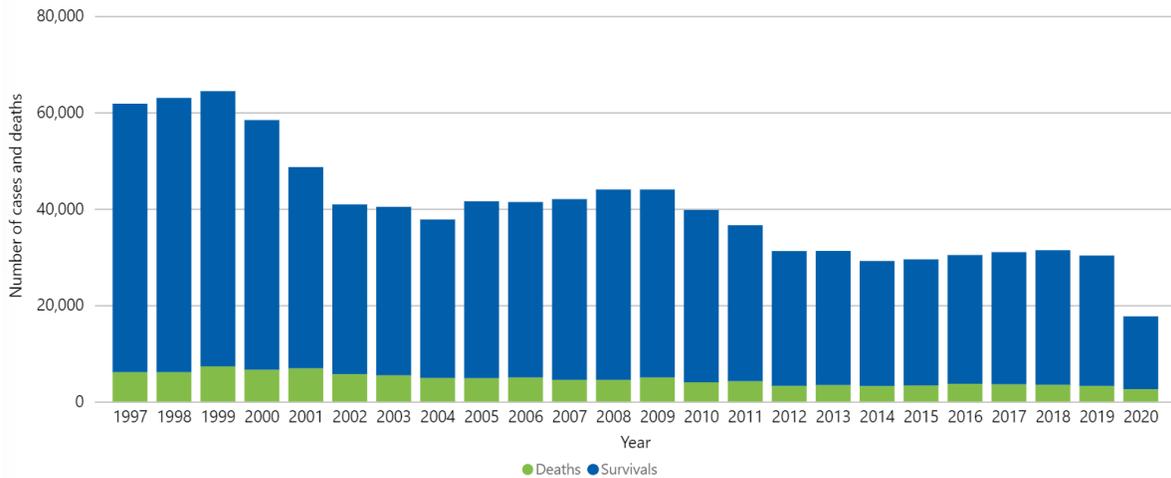
*These [are recommendations of the ACIP](#) and yet to be formally published

#Risk Factors for 19-64 Include:

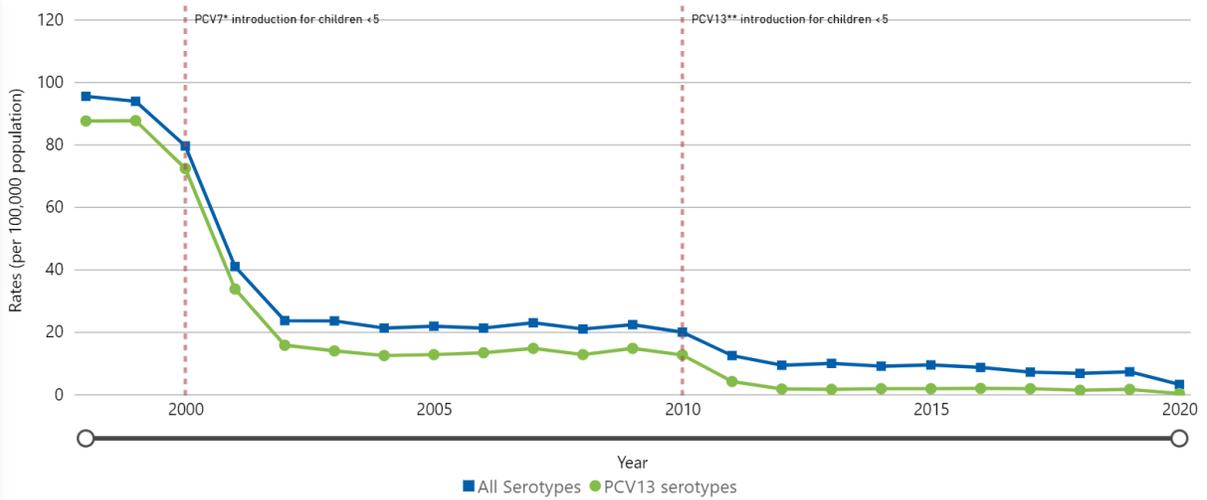
- Alcoholism
- Cerebrospinal fluid leak
- Chronic heart disease, including congestive heart failure and cardiomyopathies
- Chronic liver disease
- Chronic lung disease, including chronic obstructive pulmonary disease, emphysema, and asthma
- Chronic renal failure
- Cigarette smoking
- Cochlear implant
- Congenital or acquired asplenia
- Congenital or acquired immunodeficiency
- Diabetes mellitus
- Generalized malignancy
- HIV infection
- Hodgkin disease
- Iatrogenic immunosuppression, including long-term systemic corticosteroids and radiation therapy
- Leukemia
- Lymphoma
- Multiple myeloma
- Nephrotic syndrome
- Sickle cell disease or other hemoglobinopathies
- Solid organ transplant

Since pneumococcal vaccination started in the United States, there has been a decrease in the number of illnesses caused by *S. pneumoniae* as well as deaths, and a decrease in invasive infections caused by the serogroups covered by vaccination.

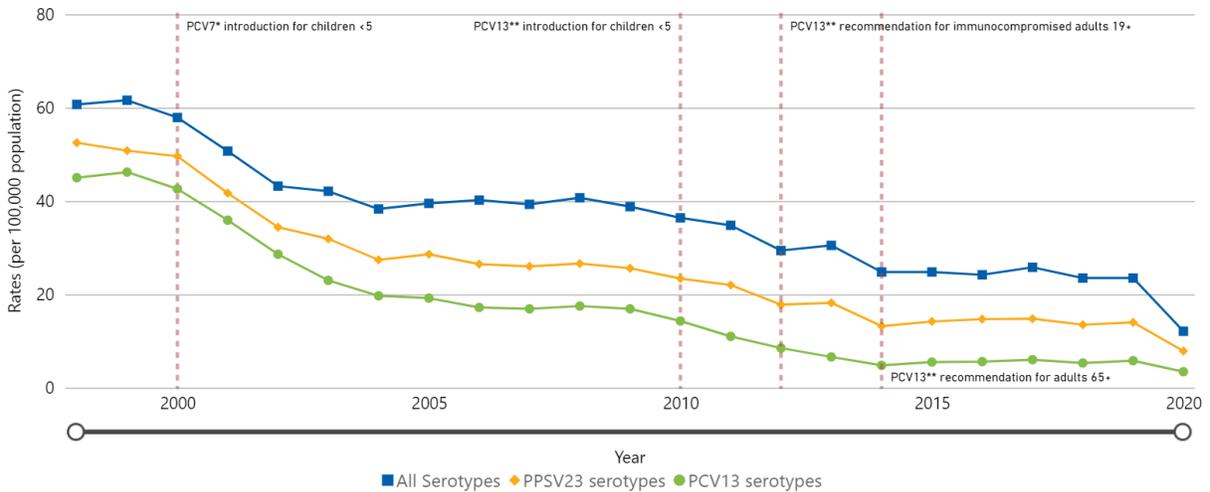
Estimated number of cases and deaths of invasive SPN infections in the US*



Rates of invasive SPN infection among children <5 years old, by serotype, in ABCs areas



Rates of invasive SPN infection among adults ≥65 years old, by serotype, in ABCs areas



Recommendations:

1. Talk to your healthcare provider or health department to ensure your pneumococcal vaccinations are up to date. Getting too many vaccines is not recommended.
2. Pneumococcal illness can be very serious and deadly, especially if you have risks. Do all you can to improve any risks you may have.

Sources

- Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases. Hall E., Wodi A.P., Hamborsky J., et al., eds. 14th ed. Washington, D.C. Public Health Foundation, 2021.
- Centers for Disease Control and Prevention. Pneumococcal Disease. <https://www.cdc.gov/pneumococcal/index.html>
- Kobayashi M, Farrar JL, Gierke R, et al. Use of 15-Valent Pneumococcal Conjugate Vaccine and 20-Valent Pneumococcal Conjugate Vaccine Among U.S. Adults: Updated Recommendations of the Advisory Committee on Immunization Practices — United States, 2022. *MMWR Morb Mortal Wkly Rep* 2022;71:109–117. DOI: <http://dx.doi.org/10.15585/mmwr.mm7104a1>
- IZ Express. Issue1,659: October 26, 2022. *Immunize.org summarizes ACIP's October 19–20 meeting allowing PCV20 vaccination for previously vaccinated adults, adding COVID-19 vaccines to the VFC program, and more.* <https://www.immunize.org/express/issue1659.asp#IZX1>
- Nielsen, Craig D., Joel A. Kammeyer, and Michael J. Tan. "Update on pneumococcal vaccination in adults: Simpler is better." *Cleveland Clinic Journal of Medicine* 89.11 (2022): 640-642.
- Centers for Disease Control and Prevention. Active Bacterial Core surveillance (ABCs). <https://www.cdc.gov/abcs/bact-facts-interactive-dashboard.html>