PARENTS PACK

MONTHLY UPDATES ABOUT VACCINES ACROSS THE LIFESPAN

PNEUMOCOCCAL VACCINES FOR ADULTS (PART 2): THE LATEST NEWS

August 2023

In the July 2023 *Parents PACK* issue, we featured information about pneumococcal vaccine and kids. This month, in part 2 of our series on pneumococcal vaccines, we are focusing on adults. Often adults don't realize they need vaccines, but pneumococcal vaccine is one that large groups of adults need. Most often, those over 65 years of age realize they need the so-called "pneumonia vaccine," but other younger adults may also benefit from this vaccine and not realize it. Keep reading to find out more.

Pneumococcal disease in adults

When adults are infected with one of the approximately 90 types of *Streptococcus pneumoniae*, they can experience a sinus infection, pneumonia, or something more severe, such as bloodstream infections and meningitis. Unfortunately, infection with one type of pneumococcus does not provide protection against multiple pneumococcal infections throughout a person's life.

One of the most important realities related to these bacteria is that they take advantage of any condition that weakens the immune system or injures the lining of the nose, throat and airways. Normally, viruses and bacteria that are on these surfaces cannot get into our bloodstream to circulate throughout the body. However, when these surfaces are compromised, pneumococcal bacteria seize on the opportunity to invade and cause disease, particularly among elderly adults because the immune system weakens with age. Other conditions put individuals younger than 65 at increased risk as well, including alcoholism; chronic heart, lung, kidney or liver disease; diabetes; smoking; and some immune-compromising conditions. Additionally, a viral infection, such an influenza, can break down our normal immune defenses and predispose recently infected individuals to pneumococcal pneumonia. This is one of the many reasons influenza vaccine is recommended for all age groups each year.

Antibiotics: A delay for vaccine efforts

The extent of disease caused by pneumococcus drove scientists to work toward development of a pneumococcal vaccine in the early 1900s. However, by the 1940s, antibiotics, such as penicillin, were shown to be effective against this infection. As a result, vaccine research slowed. One scientist, however, Robert Austrian, continued to work on vaccine development. Over time, it became clear that antibiotics alone were not the answer. First, for some with severe disease, antibiotic treatment was not sufficient. Second, the bacteria quickly developed resistance, meaning the bacteria changed so that some strains were no longer killed by penicillin. Ultimately, the first pneumococcal vaccine was introduced in 1977.

Polysaccharide pneumococcal vaccine: The first prevention

The first pneumococcal vaccine was a polysaccharide vaccine that protected against 14 types of the bacteria. The vaccine introduced the immune system to the polysaccharide, or sugar, coating of the types in the vaccine. It was known as PPSV14, and it had its most significant impact in reducing "invasive" disease — that is, infections that resulted when the bacteria found their way into the bloodstream or organs and tissues. The result was a decrease in sepsis (bloodstream infections), meningitis (infections of the lining of the brain and spinal cord), pneumonia (infection of the lungs) with bloodstream infection, and bone or joint infections.

However, the polysaccharide vaccine had two important limitations. First, it did not eliminate bacteria that lived on the lining of the nasal passages and throat. This meant that it did not effectively reduce spread of the bacteria between people. Second, it wasn't effective in children because their immune systems do not make good responses to polysaccharides.

Conjugate pneumococcal vaccines: Increased effectiveness

In 2000, these limitations were solved with a different type of pneumococcal vaccine — a conjugate vaccine. Conjugate vaccines were made by linking a harmless protein to the polysaccharide. When a child's immune system makes an immune response to the harmless protein, it also makes a response to the polysaccharide. In addition to improving immune responses, the conjugate vaccines are also effective in reducing the amount of virus in the nasal passage of recipients, thereby decreasing spread of the bacteria. In fact, just by vaccinating children, the incidence of disease dropped across all age groups as children were less likely to pass the bacteria to their caretakers and grandparents. The first conjugate vaccine protected against seven types of pneumococcus, so it was called PCV7.

Over time, both polysaccharide and conjugate pneumococcal vaccines evolved to protect against more types of pneumococcus, and vaccine recommendations evolved to include conjugate vaccines for adults. The current polysaccharide vaccine protects against 23 types of pneumococcus (PPSV23), and the conjugate vaccines have progressed from PCV13 (2010) to PCV15 and PCV20, both of which were introduced most recently (2022 and 2023).

In sum: Adults who have already received PPSV23 vaccine should check with their healthcare providers to determine if they need a dose of a conjugate vaccine. For adults not previously vaccinated against pneumococcus, but who are recommended to get this vaccine, they should get either the two doses (one of PCV15 followed by a dose of PPSV23 one year later) or one dose of PCV20 vaccine alone. All adults should talk with their healthcare provider to ensure they are protected against pneumococcus and up to date on all recommended vaccines.

Bonus feature! Check out this month's "Dr. Handy's Corner" video to find out more about pneumococcal disease in adults.

For links to resources in the Feature Article, please visit *bit.ly/Aug2023FA*.

continued >

TRIVIA CORNER

What vaccine-preventable disease can be particularly deadly for the elderly?

A. Pneumococcal disease
B. Shingles
C. Measles
D. Rotavirus

DR. HANDY'S CORNER – PNEUMOCOCCAL VACCINE AND ADULTS

Do you know if you are among the adults considered to be at higher risk for severe pneumococcal infection? Listen to Dr. Handy as she describes why pneumococcus can be a problem for some adults and find out more about the vaccines, including recent changes to pneumococcal vaccine recommendations for adults.

Watch the video: *bit.ly/pneumo-vaccine-adults*.

NEWS & NOTES

New STEM careers booklet describes variety of opportunities

The Vaccine Makers Project, the classroom program of the Vaccine Education Center, recently released a new booklet for teens considering career paths. Often, common misconceptions about STEM careers, such as that they require a lot of years of schooling or that the choices are limited, leave students crossing off this large area of options. In addition to describing the array of opportunities available, the booklet, "STEM Careers: It's not rocket science ... but it could be," features the different types of labs at the Children's Hospital of Philadelphia.

Check out the booklet or share it with the teens you know today!

The history of public health & why chronic underfunding threatens us all

The Vaccine Education Center's newsletter for healthcare providers, Vaccine Update, recently featured an article about the evolution of public health authority in the U.S. The article, "Public Health Funding: It's Not Just About Vaccines," also reviewed the findings of a recent survey of the funding levels and discussed two tangible ways to improve the current situation. However, the article also makes the point that this can only happen with societal support.

Check out the article and related resources.

Bonus! Extra Dr. Handy video this month discusses RSV

The homepage of the Vaccine Education Center website features a new video in which Dr. Handy describes respiratory syncytial virus (RSV) and exciting developments in the fight to protect the most vulnerable from this winter virus.

This and other videos featuring Dr. Handy can also be found here:

- "Healthy at Home with Dr. Handy" playlist
- "Dr. Handy's Corner" on the Parents PACK website

For links, please visit News & Notes online, *bit.ly/Aug2023NN*.

TRIVIA ANSWER

The correct answer is A. Pneumococcal disease is known as an opportunistic infection because it usually attacks when a person's immune system is already weakened by another infection. Pneumococcus is particularly deadly in elderly people when it causes pneumonia during recovery from an influenza infection.

Go to vaccine.chop.edu/trivia to play Just the Vax, the Vaccine Education Center's trivia game, where you can find this question and others like it.

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Contact us: contactPACK@chop.edu

Learn more: vaccine.chop.edu/parents

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