

Pneumococcal Pneumonia and Pandemic H1N1

[Announcer] This program is presented by the Centers for Disease Control and Prevention.

[Mike Miller] Hi, I'm Dr. Mike Miller and today I'm speaking with Dr. George Nelson, a public health doctor specializing in respiratory disease at CDC. Our conversation is based on his study about Pneumococcal Pneumonia and Pandemic H1N1, which appears in CDC's journal, *Emerging Infectious Diseases*. Welcome, Dr. Nelson.

[George Nelson] Thank you so much for having me on, Mike.

[Mike Miller] Dr. Nelson, let me start by asking, what is pneumonia and what is pneumococcal pneumonia?

[George Nelson] Well, at its simplest level, pneumonia is an infection of the lungs. The air sacs in the lungs, known as alveoli, become filled with fluid and pus and reduce the ability of the lungs to their job. The primary function of the lungs, of course, is to move oxygen from the air to the blood when we breathe in and to move carbon dioxide from the blood to the air when we breathe out. Pneumococcal pneumonia is a specific type of pneumonia caused by a type of bacteria called "pneumococcus." The specific name for pneumococcus is *Streptococcus pneumoniae*.

[Mike Miller] Are there other causes of pneumonia?

[George Nelson] Absolutely. Pneumonia can be caused by bacteria, viruses, fungi, and parasites. Among the bacteria, pneumococcus is the most common cause but others, such as *Staph*, are also important. Viruses like flu can also cause pneumonia. And finally, when people contract tuberculosis, it most commonly appears as pneumonia.

[Mike Miller] So how do people get pneumonia?

[George Nelson] Almost all causes of pneumonia are spread person-to-person by coughing out tiny droplets. Some of these causes, such as pneumococcus, can live in the nose and throat without causing any problems. But when they are inhaled into the lungs, they can cause pneumonia. Although many people are exposed to pneumococcus, it is usually people with some types of medical problems that actually develop pneumonia.

[Mike Miller] What sorts of medical problems would put someone at higher risk for pneumonia?

[George Nelson] The most common problems are heart disease, lung disease, and diabetes. Smoking dramatically increases the risk of developing pneumonia. So people can protect themselves from pneumonia by choosing lifestyles that reduce their risk of those conditions. And people who already have those conditions can talk to their doctors about how to manage them in a way that will reduce their risk.

[Mike Miller] Well, you talk about invasive pneumococcal disease in your investigation. What is 'invasive pneumococcal disease' and what makes it so dangerous?

[George Nelson] Invasive pneumococcal disease is when pneumococcus gets into a part of the body that's normally completely free of bacteria. For example, when pneumococcus gets into the blood, we call it bacteremia and when it gets into spinal fluid, we call it meningitis. People with bacteremia or meningitis can become extremely sick, they can become disabled, and, in about 10 to 15 percent of adult cases, they can die.

[Mike Miller] Okay, so pneumonia is an infection of the lungs and pneumococcus is a common cause of pneumonia. Well, when pneumococcus gets into places where it's not supposed to be, that can be very dangerous. What does that have to do with the 2009 flu pandemic?

[George Nelson] During previous flu pandemics, up to one in every three cases developed pneumonia and many of those cases were caused by pneumococcus. So, before the 2009 flu pandemic, many experts were worried that pneumococcal pneumonia would be a big problem during the next pandemic. CDC's own pandemic flu planning included many strategies for reducing not only the impact of pandemic flu virus itself, but also complications like pneumococcal pneumonia.

[Mike Miller] During your investigation, did you find an association between pandemic H1N1 infection and pneumococcal pneumonia?

[George Nelson] We did. We found more than three times the number of cases of invasive pneumococcal disease than we would have expected during the month that the pandemic peaked in Denver, suggesting a link. Seventeen percent of those with invasive pneumococcal disease had evidence of pandemic H1N1 infection and up to 62 percent of cases of pneumococcal pneumonia may have been associated with pandemic H1N1, based on their presenting symptoms.

[Mike Miller] Was bacterial pneumonia associated with previous flu pandemics at the same level it was associated with the 2009 H1N1 flu pandemic?

[George Nelson] It's difficult to compare our findings with prior flu pandemics, in part because the tests that doctors use to diagnose flu and pneumococcus today are somewhat different than during other pandemics. For example, during the 1918 pandemic, the flu virus had not even been discovered yet. And during the 2009 pandemic, CDC developed a very advanced method for not only identifying flu, but confirming that the virus was, in fact, the pandemic virus.

[Mike Miller] Well, you found an increase in invasive pneumococcal disease in Denver. What do you think caused this increase?

[George Nelson] Well we'll never know for sure but, based on the data available to us today, the pandemic clearly played a major role. The timing of the increase in invasive pneumococcal disease was identical to that of the peak in pandemic flu hospitalizations and we identified pandemic flu infection in many of the pneumococcal cases.

[Mike Miller] We know that there's an annual flu vaccine that everyone should get. Are there vaccines for pneumonia?

[George Nelson] In the US, there are several vaccines that can prevent pneumonia. In addition to the two pneumococcal vaccines, there are also vaccines against *Haemophilus influenzae* type b, or Hib; pertussis, which is also known as whooping cough; varicella, or chickenpox; measles; and, as you mentioned, flu vaccine. All of these can protect people from pneumonia. While almost everyone should receive a flu vaccine every year, people should talk to their doctors about which of the other vaccines are appropriate for them. Vaccines are one of the strongest tools we have to prevent many types of pneumonia. Ask your doctor what vaccines are right for you. Adults may be surprised to find out they need vaccines or boosters, even if they had them as a child.

[Mike Miller] Are there any conclusions from your investigation that could impact public health strategies?

[George Nelson] Definitely. There are several areas that we can act on. The first is awareness. Letting patients and healthcare providers know about the relationship between flu and pneumococcal pneumonia will alert them to look for complications of bacterial pneumonia after flu infection. The second is really to advocate for vaccination, especially with flu and pneumococcal vaccines.

[Mike Miller] Well, thanks, Dr. Nelson. I've been talking with Dr. George Nelson about his study, *Invasive Pneumococcal Disease and Pandemic (H1N1) 2009, Denver, Colorado, USA*, which appears in the February 2012 issue of CDC's journal, *Emerging Infectious Diseases*. You can see the entire article online at www.cdc.gov/eid.

If you'd like to comment on this podcast, send an email to eideditor@cdc.gov. I'm Mike Miller, for *Emerging Infectious Diseases*.

[Announcer] For the most accurate health information, visit www.cdc.gov or call 1-800-CDC-INFO.