Active Bacterial Surveillance

April 2021 Newsletter

What we do

In collaboration with the Navajo Nation and White Mountain Apache Tribe, the Center for American Indian Health (CAIH) actively monitors serious diseases caused by the bacteria *Streptococcus pneumoniae, Haemophilus influenzae, Neisseria meningitidis,* and *Staphylococcus aureus* in people living on and around the Navajo and White Mountain Apache Tribal lands. Native Americans have higher rates of disease caused by these bacteria. **In this issue of the newsletter, we provide results from two years of surveillance for pneumococcal community acquired pneumonia (CAP) in hospitalized Native American adults.**

Importance of pneumococcal community acquired pneumonia (CAP)

Pneumonia is a leading cause of hospitalizations and death in the U.S., and Native American communities suffer a disproportionate burden of CAP. The cause of a large proportion of CAP in adults is unknown. When a pathogen is detected, *S. pneumoniae* is detected most frequently. Vaccines have helped to greatly reduce the burden of pneumonia among adults. The 23-valent pneumococcal polysaccharide vaccine (PPSV23) has been recommended for routine use since 1997 in all U.S. adults aged 65 years or older and for Native American adults aged 50-64 years living in areas with an increased risk of invasive pneumococcal disease. Routine use of the pneumococcal conjugate vaccine (PCV13) among children has also had an indirect effect of reducing disease among adults (PCV13 was also recommended for routine use among adults aged 65 years or older from 2014-2019 and can currently be received through shared clinical decision-making with a provider). Understanding the role of *S. pneumoniae* as a cause of CAP is important to make treatment decisions and guide vaccine development and policy.

Overview of the study and procedures

Between March 2016 and March 2018, 689 adults hospitalized with CAP on Navajo and White Mountain Apache Tribal lands were enrolled in the study, along with 411 healthy controls from the surrounding communities. Controls were matched to cases based on age, community, and month of enrollment. A nasopharyngeal / oropharyngeal (NP/OP) swab and urine specimen were collected and tested by PCR and urine antigen detection test, respectively, in study labs. Blood, pleural fluid, and sputum were collected and cultured in the IHS lab. Results from all tests were used to identify pathogens.

Findings

The median age of cases was 66 years; 53% were female and 95% had an underlying health condition, including diabetes (45%) and obesity (30%). A total of 673 cases had a chest x-ray available, of which 82% showed evidence of pneumonia. Most cases 65 years or older had received at least one pneumococcal vaccine (PPV23 [92%] or PCV13 [84%]), in accordance with CDC recommendations.

Photo credit to Kiliii Yuyan

***Figure 1**. Pneumococcal serotypes by age among CAP cases*

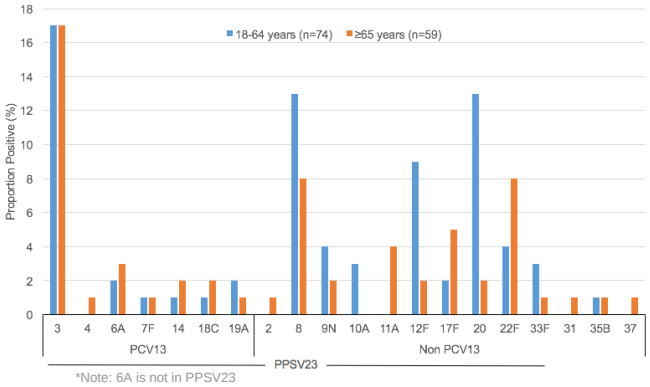
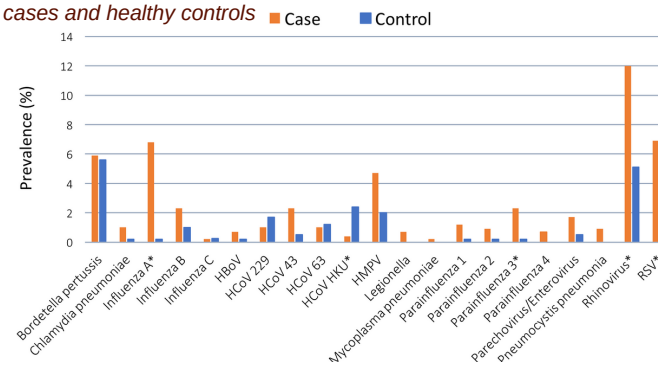


***Figure 2**. Pathogens detected by PCR from NP/OP swabs among CAP cases and healthy controls*



HBoV= Human bocavirus; HCoV= Human coronavirus; HMPV=Human metapneumovirus; RSV=respiratory syncytial virus; * denotes a pathogen statistically significantly associated with case status at p<0.05

Integrating all testing methods, *S. pneumoniae* was the most commonly identified pathogen, detected in 26% of CAP cases. Among pneumococcal CAP cases, 21% had serotypes covered by PPSV23 and 10% had serotypes covered by PCV13 (Figure 1). NP/OP swabs were also analyzed to identify pathogens associated with case status, comparing cases and controls. Four pathogens were more commonly found in cases than controls (Figure 2), suggesting a possible etiology for the pneumonia: influenza A (7% of cases), respiratory syncytial virus (RSV; 7%), rhinovirus (12%), and parainfluenza 3 (2.3%). In addition, many pathogens were found to be circulating in the community among both cases and controls. This included four coronaviruses, all unrelated to the current COVID-19 pandemic: HCoV 43, HCoV 63, HCoV 229, and HCoV HKU (Figure 2).

Conclusions

S. pneumoniae, including vaccine types, remains a major cause of CAP in Native American adults. Respiratory viruses, including influenza, also contribute substantially to the burden of CAP. Increasing uptake of currently available vaccines against pneumococcus and influenza could help to reduce the burden of CAP. Other prevention strategies, including new vaccines and reduction of risk factors, are also needed.

What does this mean in your community?

Understanding the burden can help:

- **The public health community** bring attention to this problem and plan interventions (e.g. community & provider education)
- **Healthcare administration** plan resources
- **Healthcare providers** manage patients by promoting earlier detection and proper treatment

How can you protect yourself and your family from community-acquired pneumonia?

- Know the signs of pneumonia and contact your healthcare provider if you think you have an infection
- Get vaccinated: Talk to a doctor or nurse to see if you are eligible to receive a vaccine to protect against pneumonia
- Encourage good hygiene such as cleaning hands regularly

Expanded surveillance activities

In addition to Active Bacterial Surveillance (ABS), our team has introduced Surveillance in Native Americans (SuNA) systems for COVID-19 and RSV. Through ABS, RSV SuNA and COVID SuNA, we'll monitor and identify the common causes of respiratory illnesses among Navajo and White Mountain Apache adults and children. This information will inform public health interventions and research that aim to reduce the high burden of pneumonia in Native American communities.

Thanks to our many community partners!

Navajo Nation

- Represented by 20+ laboratories
- Navajo Epidemiology Center
- Navajo Area Indian Health Service
- Navajo Nation Human Research Review Board

White Mountain Apache

- Represented by 3 laboratories
- White Mountain Apache Tribal Council
- Phoenix Area Indian Health Service

What bacterial isolates do we look for?

- *Streptococcus pneumoniae*
- *Haemophilus influenzae*
- *Neisseria meningitidis*
- *Staphylococcus aureus*
- Group A *Streptococcus* (WMA only)

Isolate from sterile body sites:

- Blood
- Bone
- Cerebrospinal fluid
- Pericardial fluid
- Peritoneal fluid
- Pleural fluid
- Synovial fluid (joint fluid)
- Middle ear (*S. pneumo* only)

We request ONE slant of the *S. pneumoniae, H. influenzae, N. meningitidis, S. aureus*, or Group A *Streptococcus* isolate. CAIH will provide the chocolate agar slants upon request. Isolates are sent to our reference labs for additional testing. Please maintain the isolate in your lab until you receive confirmation from us that the isolate was viable.

If you have any questions about Active Bacterial Surveillance, please contact us:

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The mission of the Johns Hopkins Center for American Indian Health:

We work in partnership with American Indian and Alaska Native communities to improve the health status, self-sufficiency, and health leadership of Native people. *This mission is accomplished through three core activities:*

Research **Training/Education** **Service**