The impact of PCV-7 on IPD differs between countries. In a study conducted in Germany which looked at the incidence of invasive pneumococcal disease after the introduction of the PCV-7, a reduction by 224 cases per year was observed (about 50% reduction). The effect was mostly observed among children less than 2 years (incidence reduction from 20/100, 1000 to 11/100,000). While the incidence of all serotypes included in the vaccine was reduced in the age group <2 years, the incidence of non-vaccine serotypes remained stable, as opposed to results from studies vaccine in children. (Rickenberg S, van der Linden M, et al. (2009). “Reduction in the incidence of invasive pneumococcal disease after general vaccination with 7-valent pneumococcal conjugate vaccine in Germany.” Vaccine). Efforts are still ongoing as well to develop alternative more efficacious vaccines against pneumococcal disease especially with the introduction of vaccines based on pneumococcal proteins. (Dinleyici, E. C. and Z. A. Yergic (2008). “Pneumococcal conjugated vaccines: impact of PCV-7 and new achievements in the post vaccine era.” Expert Rev Vaccines 7(9): 1397-94.

A new study published in the NEJM in January 2009 examined the effect of pneumococcal conjugate vaccine on pneumococcal meningitis using a retrospective surveillance of positive CSF cultures from January 1, 1998 until December 31, 2005 from eight Active Bacterial Core surveillance sites in United States. Isolates then underwent serotyping and antimicrobial-susceptibility testing to assess the effect of vaccine serotypes versus non- vaccine serotypes on pneumococcal meningitis. Results showed that with the introduction of the seven valent conjugate pneumococcal vaccine rates of pneumococcal meningitis decreased significantly although there was a substantial increase in the non-vaccine serotypes which raises a new concern. (Hsu, H. E., K. A. Shutt, et al. (2009). “Effect of pneumococcal conjugate vaccine on pneumococcal meningitis.” N Engl J Med 360(3): 244-56.

Q&A #3

Can pregnant women get this pneumococcal polysaccharide vaccine (PPV)?

The safety of PPV for pregnant women has not been studied, although no adverse consequences have been reported among newborns whose mothers were vaccinated with PPV during pregnancy. Women who are at high risk of pneumococcal disease should be vaccinated before becoming pregnant, if possible. Unvaccinated pregnant women who are in a high-risk group should consult with a healthcare professional about getting the vaccination during pregnancy.

Our Future Plans...

One problem we have faced is the loss of samples in the freeze/thaw process or during transportation. We plan to perform PCR on DNA extracted from these “dead” samples using technology that will allow us to identify the serotype without requiring a live bacterial culture. We also plan to extend this technology to CSF samples from patients with partially treated meningitis where no organism can be cultured. Please contact us if you would like to make use of that service.

The Infectious Diseases Research Core Facility at AUB is operational in late summer. This facility will offer a number of services including the rapid diagnoses of multiple respiratory viruses and atypical bacteria from respiratory secretions or multiple central nervous system viral infections from CSF samples by using multiplex PCR technology. Also, there is a lot of interest in the study of multi-resistant organisms. Hopefully we will be able to cooperate with the hospitals in the LIPSP network to work on these investigations.

Thank you

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Update on pneumococcal surveillance in Lebanon

Surveillance for invasive pneumococcal disease (IPD) continues in earnest with the participation of 78 Hospitals all over Lebanon. Thanks to the hard work of all the physicians, microbiologists, and technicians who have made an effort to contribute to LIPSP. Since our last newsletter in 2007, we have been collecting new samples and sending them for serotyping in Cairo, Egypt. We have collected 22 Streptococcus Pneumonia samples that were sent and serotyped. The total of serotyped samples to date is 97. These results will be presented in detail in this newsletter.

At present, we have 32 samples, from various hospitals that are being prepared to go for serotyping. We will be glad to share with you the results as soon as we have them.

As for the upcoming sample collections, the following changes will be performed. New case report forms will be sent without patient identification in order to keep the data confidential and to abide to the study protocol. Each hospital will be handed a log sheet to keep record of the samples collected in order to be able to identify the patients’ serotypes when they are ready. Therefore, each hospital will carry a serial number through which it will be identified. Moreover, letters will be sent regularly after every shipment to inform you of the serotypes of the collected samples from your hospital.

We would like to again thank all the hospitals that are contributing to LIPSP. To the right is the hospital contribution list for the total number of samples that were handed in since the beginning of this surveillance program. We would also like to extend our thanks to the Ministry of Health for its cooperation and support.

DEMOGRAPHICS

The demographic data of the collected samples are distributed as follows:

- Out of 159 samples, 42 were under 2 years of age
- 23 were between 2 and 5 years of age
- 18 were between 6 years and 20 years of age
- 24 were between 21 years and 60 years of age
- 52 were above 60 years of age

The age distribution of IPD caused by S. pneumoniae is highest amongst children less than 2 years of age and adults older than 60 as has been reported in other countries.

Distribution of IPD by Age

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Number of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 years</td>
<td>42</td>
</tr>
<tr>
<td>2-5 years</td>
<td>23</td>
</tr>
<tr>
<td>6-19 years</td>
<td>18</td>
</tr>
<tr>
<td>20-60 years</td>
<td>24</td>
</tr>
<tr>
<td>above 60 years</td>
<td>52</td>
</tr>
</tbody>
</table>

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Out of the 159 samples, 135 were collected from blood, 21 from CSF, 11 from pleural fluid, 5 from MEF, and 11 from other sources including peritoneal fluid and abscesses.

The respective percentages for the presented data are: 86% for blood, 13% for CSF, 7% for pleural fluid, 3% for MEF, and finally 7% for the other sources.

Serotypes Causing IPD

Clinical Syndromes Associated with Streptococcus pneumoniae

- The majority of patients had pneumonia accounting for 45% of the total samples, 21% had sepsis, 14% had meningitis, and the others were distributed between sinusitis, mastoiditis and others.
- Vaccine coverage for all age groups is 44.5% for PCV7 and 57% for PCV10. When only children under 5 are considered, vaccine coverage is 68% for PCV7 and 74% for PCV13.

Sensitivity and Resistance

- 47% of the total number of samples were sensitive to Penicillin G, 13% were resistant and 40% had intermediate resistance.
- 68% showed sensitivity to Ceftriaxone.
- All samples were sensitive to Vancomycin.
- 19% of the samples were resistant to erythromycin.
- 19% of the samples were resistant to tetracycline.
- 26% of the samples were sensitive to Sulfamethoxazole and 40% were resistant to it.

Advances in pneumococcal vaccine

Studies are ongoing to evaluate the impact of conjugate pneumococcal vaccine on the emergence of invasive pneumococcal disease from non-vaccine serotypes. More work is also being done to assess the existence of capsular switching of vaccine serotypes, the effect of vaccine on antibiotic resistance and on how to improve the vaccine quality and efficacy.

A study assessed the effect of introducing a 7-valent PCV in Portugal since June 2001. Significant changes in serotypes were observed among vaccinated as well as unvaccinated children. In a study population of 1238 children, results showed an increase in non-vaccine types (NVT) 1, 6C, 7F, 15A, 19F, 21, 23A, 29, and non-typeable (NT). Rates of penicillin, erythromycin, ceftriaxone, and tetracycline susceptibility remained stable (p<0.05) due to significant increases in intermediate resistance to penicillin and erythromycin among non-vaccine types. (Sil-Leão R, Nunes S, Brito-Ava A, et al. (2009). “Changes in pneumococcal serotypes and antibiotic carry by vaccinated and unvaccinated day-care center attendees in Portugal, a country with widespread use of the seven-valent pneumococcal conjugate vaccine.” Clin Microbiol Infect).

Another study published in September 2008 questioned the effectiveness of the vaccines in the coming years and this is due to the impact of pathogenic pneumococcus that may switch their capsular types and evade vaccine-conferred immunity. Yet, the study showed that the existence of capsular switch by itself, should not impact significantly the effect of the pneumococcal conjugate vaccine on PCP incidence. (Temme, L., P. Y. Boelle, et al. (2008). “Impact of capsular switch on invasive pneumococcal disease incidence in a vaccinated population.” PLoS ONE 3(9): e3244.)


Q&A # 1

If influenza is recommended for healthcare workers to protect high-risk patients from getting influenza, why isn’t pneumococcal vaccine also recommended?

Influenza virus is easily spread from healthcare workers to their patients, and infection usually leads to clinical illness. Pneumococccus is probably not spread from healthcare workers to their patients as easily as is influenza, and infection with pneumococccus does not necessarily lead to clinical illness. Host factors (such as age, underlying illness) are more important in the development of invasive pneumococcal disease than just having the bacteria in one’s nose or throat.

Q&A # 2

How effective is pneumococcal conjugate vaccine (PCV)?

In a large clinical trial, PCV was shown to be 97% effective in preventing invasive disease caused by the pneumococccus contained in the vaccine and 89% effective against all types of S. pneumoniae, including those not found in the vaccine. Children with chronic diseases such as sickle cell disease and HIV infection also seem to respond well to PCV.