- 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 in other countries. (Rückinger 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. Yargic (2008). "Pneumococcal conjugated vaccines: impact of PCV-7 and new achievements in the post vaccine era." Expert Rev Vaccines **7**(9): 1367-94.

- 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 will be operational in late summer. This facility will offer a number of services including the rapid diagnosis 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

To the generous grants
from PneumoADIP, MSD, and Wyeth
to support LIPSP

This newsletter was prepared by:

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Dr Mariam Reda
Carelle Tabet, RN

Acknowledgment

The LIPSP team would like to thank all the hospitals, doctors and networks that are helping us collect the samples and contribute to the progress of this study.

LIPSP News Letter
Lebanese Inter-hospital Pneumococcal Surveillance Program

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 in order to inform you of the serotypes of the collected samples from your hospitals.

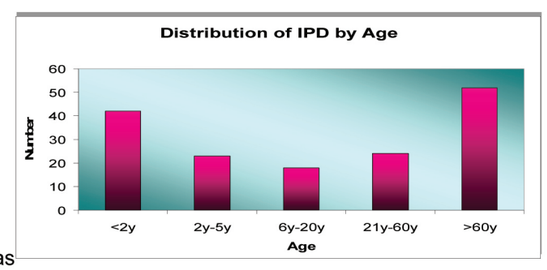
We would like to again thank all the hospitals that are contributing to LIPSP. To the right is the hospital contribution list for the total number of samples that were handed in since the beginning of this surveillance program. We would also like to extend our thanks to the Ministry of Health for its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

48	AUBMC	Dr George Araj
16	MAKASSED GENERAL HOSPITAL	Dr Tamima Jisr
16	RHUH	Dr Rita Feghali
14	HAYKAL HOSPITAL	Dr Ibrahim Nemr/ Dr Gilbert Kara Yacoub
9	RIZK HOSPITAL	Dr Jacques Mokhbat
9	ST JOSEPH HOSPITAL- DORA	Dr Raymond Rohban
9	NINI HOSPITAL	Dr Munzer Hamzeh
8	SAHEL GENERAL HOSPITAL	Dr Wassim Serhal
7	CENTRE HOSPITALIER DU NORD	Dr Salam Samad
6	MONLA HOSPITAL	Dr Ricardo Sarraf
4	HAMMOUD HOSPITAL	Dr Mohammad Zaatari
4	ISLAMIC HOSPITAL	Dr Malak Naboulsi
3	SACRE COEUR HOSPITAL	Dr Antoine Haddad
3	ST GEORGES HOSPITAL	Dr Ziad Daoud
3	AIN WA ZAYN HOSPITAL	Dr Rami Caracalla
2	EL-YOUSSEF HOSPITAL- AKKAR	Dr Mohammad Abdallah
2	AL RASOUL AL AZAM	Dr Hosni Yazbek
2	AL HAYAT HOSPITAL	Dr Hadi Al-Amine
2	RIYAK HOSPITAL	Dr Talal Araji
2	NOTRE DAME DE LA PAIX	Dr Joseph Freifer
2	ST CHARLES HOSPITAL	Dr. Tony Faddoul
2	CLEMENCEAU MEDICAL CENTER	Dr Ziad El Baba
1	BAHMAN HOSPITAL	Dr Mohammad Haidar
1	HOPITAL NOTRE DAME DE SECOURS	Dr Georges Abdel Nour
1	TAL CHIHA HOSPITAL -ZAHLE	Dr Naziha Makhlouf
1	NAJJAR HOSPITAL	Dr Arwa Mougharbel
1	RAYAN HOSPITAL	Dr Mohammad Abdallah
1	EL-ARZ HOSPITAL	Dr Hyam Matta
1	CHEIKH RAGHEB HARB HOSPITAL	Dr Taher Fardoun

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 years 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

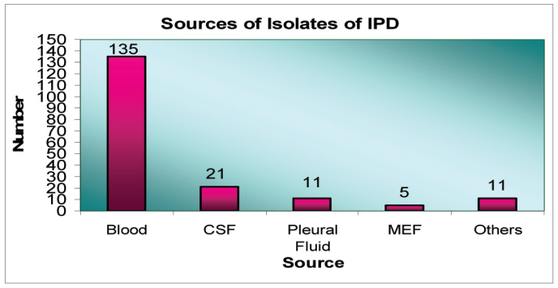


The age distribution of IPD caused by *S. pneumonia* is highest amongst children less than 2 years of age and adults older than 60 as has been reported in other countries.

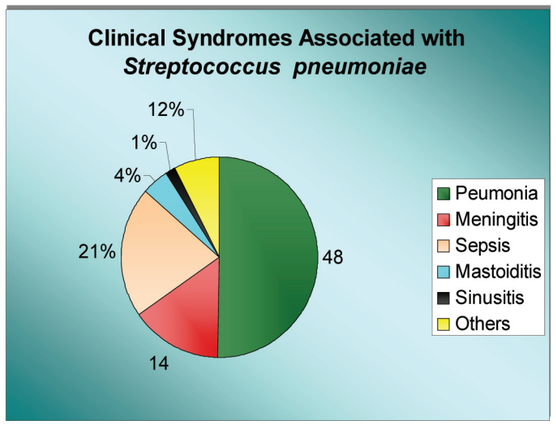
Dr Ghassan Dbaibo	Dr. Fadi Kayale	Dr Zahraa Abdel Sater	Dr Rima Hanna Wakim	Carelle Tabet RN
03-310645	70-199775	03-862018	03-267822	03-860129
gdbaibo@aub.edu.lb	fak04@aub.edu.lb	za35@aub.edu.lb	rh08@aub.edu.lb	cnt03@aub.edu.lb

- 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 abscess.

- The respective percentages for the presented data are: 85% for blood, 13% for CSF, 7% for pleural fluid, 3% for MEF, and finally 7% for the other sources.



Serotypes Causing IPD

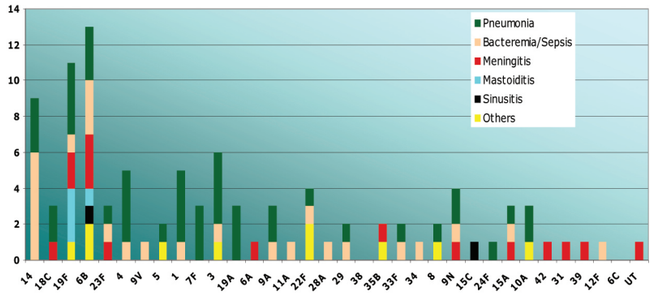


- The majority of patients had pneumonia accounting for 48% of the total samples, 21% had sepsis, 14% had meningitis, and the others were distributed between sinusitis, mastoiditis and others.

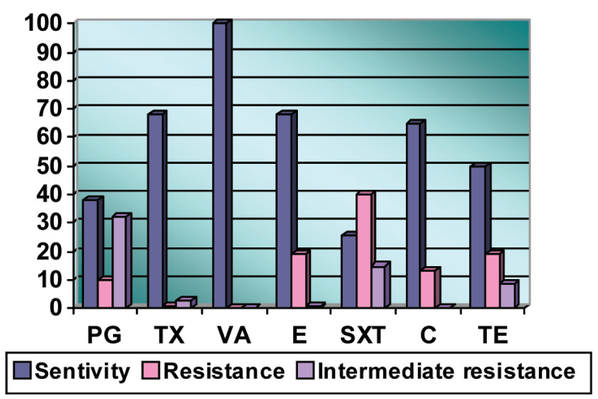
- Vaccine coverage for all age groups is 44.5% for PCV7 and 57% for PCV10. When only children under 5 are considered, vaccine coverage is 69% for PCV7 and 74% for PCV13.

- As it is evident in the adjacent chart, pneumonia, bacteremia/sepsis, and meningitis are caused by several serotypes some of which are not covered by the vaccine available.

- Although the numbers are small, we found that sinusitis was mainly caused by serotypes 6B and 15C, whereas mastoiditis was mostly caused by serotypes 19F, 16B, and 3.



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, on the effect of vaccine on antibiotic resistance and on how to improve the vaccine quality and efficacy.

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. Pneumococcus is probably not spread from healthcare workers to their patients as easily as is influenza, and infection with pneumococcus 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.

- A study assessed the effect of introducing the 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 1288 children, results showed an increase in non-vaccine types (NVT) 1, 6C, 7F, 15A, 16F, 21, 23A, 29, and non-typeable (NT). Rates of penicillin, erythromycin, clindamycin, and tetracycline susceptibility remained stable ($p<0.05$) due to significant increases in intermediate resistance to penicillin and erythromycin among non-vaccine types. (Sá-Leão R, Nunes S, Brito-Avô A, et al. (2009). “Changes in pneumococcal serotypes and antibiotypes carried 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 efficacy of the pneumococcal conjugate vaccine on IPD incidence. (Temime, 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.).

- In December 2008 a study was published about the epidemiology of resistance of streptococcus pneumonia. The study compared serotypes, antimicrobial resistance profiles and genetic relatedness of isolates from patients with IPD between 1999-2000 and 2004-2005. Results showed lower rates of high level penicillin resistance and higher level of erythromycin resistance in vaccine serotypes after the introduction of Prevnar in 2000. However there was an increase in the prevalence of penicillin-resistance in non vaccine serotypes especially 19A and 35B. (Richter, S. S., K. P. Heilmann, et al. (2009). "Changing epidemiology of antimicrobial-resistant Streptococcus pneumoniae in the United States, 2004-2005." Clin Infect Dis **48**(3): e23-33).

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 pneumococcus 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.