LIPSP News Letter
Lebanese Inter-hospital Pneumococcal Surveillence Program

Update on pneumococcal surveillance in Lebanon

Surveillance for invasive pneumococcal disease (IPD) continues 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 2009, we have been collecting new samples and sending them for serotyping in Cairo, Egypt. We have collected 144 *Streptococcus Pneumonia* samples from April 2009 to December 2011. The total samples since the beginning of the study in 2005 till the end of 2011 is 257. The results will be presented in detail in this newsletter. To the right is the hospital contribution list for the 257 samples that were handed in since the beginning of this surveillance program. In 2012, we collected 33 new samples from various hospitals that are ready for susceptibility testing and serotyping.

The following changes were performed since our last issue. New sample identification, using the total sample number and a hospital serial number, was adopted in order to keep the data confidential and to abide to the study protocol.

We would like to thank all the hospitals that are contributing to LIPSP. We would also like to extend our thanks to the Ministry of Health for its cooperation and support.

Demographics

- The age distribution of the 257 collected samples are distributed as follows:

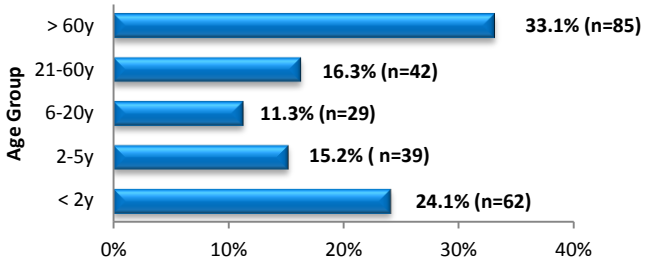


Figure 1: Age Distribution

71	AUBMC	Dr George Araj
32	Makassed	Dr Tamima Jisr
29	RHUH	Dr Rita Feghali
19	Haykal	Dr Gilbert Kara Yacoub
18	Nini	Dr Munzer Hamzeh
13	Monla	Dr Ricardo Sarraf
13	Rizk	Dr Jacques Mokhbat
8	Sacre Coeur	Dr Antoine Haddad
6	St. Joseph Doura	Dr. Raymond Rohban
6	Centre Hospitalier du Nord	Dr. Salam Samad
6	Sahel	Dr. Wassim Serhal
6	Hammoud	Dr Mohammad Zaatari
3	Islamic Tripoli	Dr. Malak Naboulsi
3	Talchiha Zahle	Dr. Naziha Makhlouf
3	St. Georges	Dr. Ziad Daoud
2	Ain w Zein	Dr. Rami Caracalla
2	Arz	Dr. Hiam Matta
2	Riyak	Dr. Salam Monzer
2	St. Charles	Dr. Tony Faddoul
2	St. Louis	Dr. Antoine Abi Nasr
1	Notre Dame de la paix	Dr. Ghaith Makhoul
1	El Hayat	Dr. Antoine Zablit
1	El Youssef Medical Center	Dr. Hadi el Amin
1	Hopital Notre Dame de Secours	Dr. Georges Abdel Nour
1	Najjar	Dr. Nadim Azar
1	Notre Dame du Liban	Dr. Farida Saadeh
1	Rahal	Dr. Mohamed Abdallah
1	Al Rassoul Al Aazam	Dr. Ibrahim Ahmad
1	Rayan	Dr. Mohamad Abdallah
1	Bahman	Dr. Mohammad Haidar
1	Middle East Institute of Health	Dr. Edmond Abboud

Dr Ghassan Dbaibo 03-310645 gdbaibo@aub.edu.lb
Dr. Hiba Chehab 03-942169 hc20@aub.edu.lb
Dr Imane Mahfouz 03-980802 im16@aub.edu.lb
Dr Rima Hanna Wakim 03-267822 rh08@aub.edu.lb
Carelle Tabet RN 70-840312 ct04@aub.edu.lb

- Males constituted 56% of the patients (n=145).
- Mortality was 13.4%: highest in adults above 60 years (25%), followed by children younger than 2 years (11%).
- Out of the 257 samples, 201 (78.2%) were collected from blood, 35 (13.6%) from CSF, 9 (3.5%) from pleural fluid, and 12 (4.7%) from other sources.
- The clinical presentations are summarized in Figure 2.

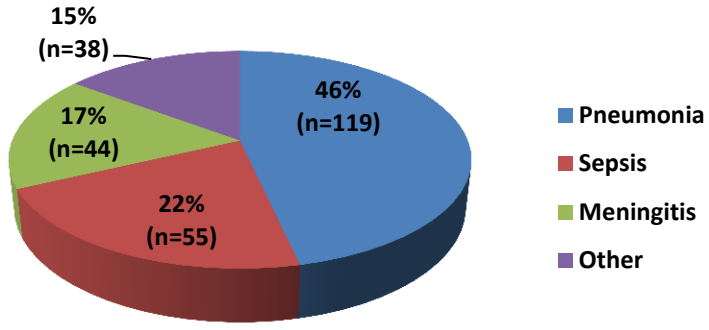


Figure 2: Clinical Presentation

Serotype Distribution and Vaccine Coverage

- The most prevalent serotypes/serogroups were: 19F, 6, 3, 14, and 19A. Serotype distribution is summarized in Figure 3.

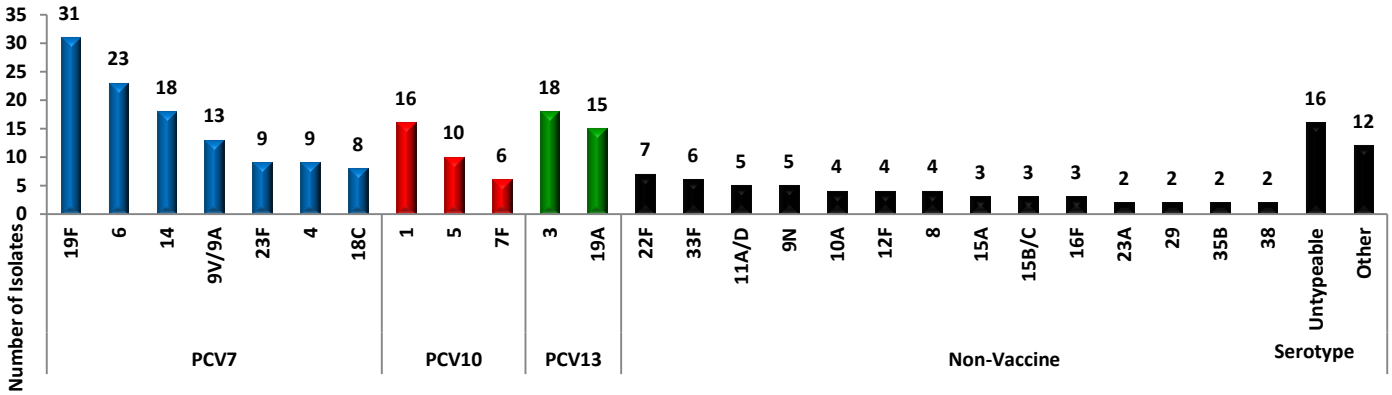
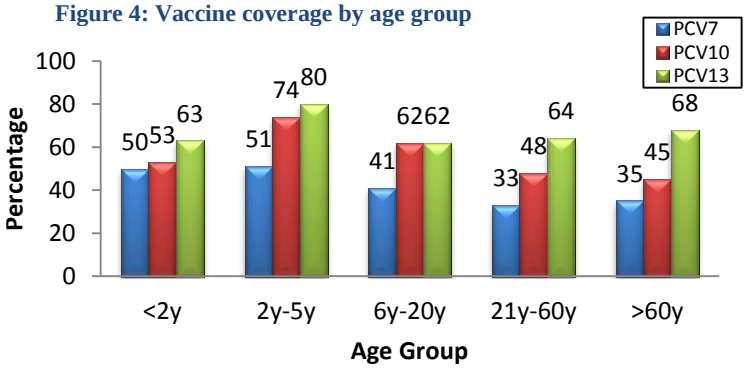


Figure 3: Serotype distribution of IPD cases by vaccine coverage

- When all age-groups were considered together, vaccine coverage was: 41.4% (n=106) for PCV7, 53.9% (n=138) for PCV10 and 67.2% (n=162) for PCV13.
- Vaccine coverage per each age group is represented in *Figure 4.*
- Vaccine coverage for patients 5 years old or younger was: 50.5% for PCV7, 61.4% for PCV10, and 69.3% for PCV13.

Figure 4: Vaccine coverage by age group



Antimicrobial Susceptibilities

Using the latest CLSI breakpoints which differentiate between meningeal and non-meningeal isolates:

- Susceptibility to penicillin G was 82.6% (n=200).
- Susceptibility to ceftriaxone 86.9% (n=218).
- Susceptibility to erythromycin was 70.7% (n=176).
- Susceptibility was 99.5% to levofloxacin and 100% to vancomycin in the tested isolates.

Statistics by Age Group

- The clinical presentation in each age group is summarized in *Figure 5.*

- Susceptibility by age group is described in *Table 1*.

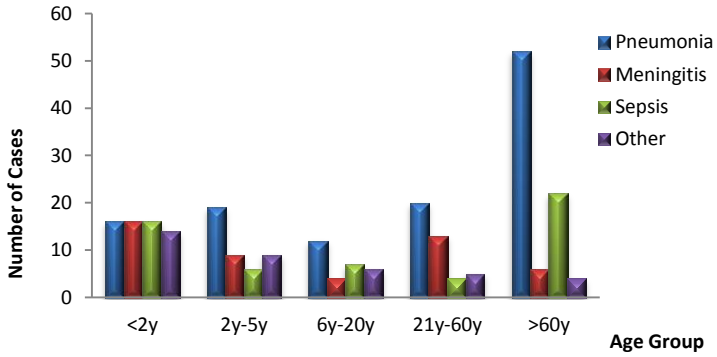


Figure 5: Clinical Presentation by Age Group

Table 1: Susceptibilities by Age Group

Age Group	Penicillin Non-Susceptibility	Ceftriaxone Non-Susceptibility	Erythromycin Resistance
< 2 years	29.1% (16)	18.3% (11)	40.7% (24)
2-5 years	13.2% (5)	12.8% (5)	30.8% (12)
6-20 years	3.4% (1)	3.4% (1)	24.1% (7)
21-60 years	23.7% (9)	12.8% (5)	21.1% (8)
> 60 years	13.4% (11)	13.1% (11)	26.2% (22)

The most common serotypes in each age group were:

- < 2 years: serotypes 14 (n=12), 19F (n=9), and 6 (n=7)
- 2-5 years: serotypes 5 (n=6), 14 (n=5), 6 (n=4), and 19F (n=4)
- 6-20 years: serotypes 1 (n=4), 19F (n=4), and 6 (n=3)
- 21-60 years: serotypes 19F (n=7), 1 (n=4), 6 (n=4), and19A (n=4)
- > 60 years: serotypes 3 (n=13), 9V/A (n=9), 19F (n=7), and 19A (n=6)

Conclusions

- Pneumococcal disease continues to be major cause of morbidity and mortality for both children and adults worldwide. The WHO estimated that, worldwide, 1.6 million deaths are attributed to pneumococcal disease annually [1].

- The development of pneumococcal conjugate vaccines has significantly impacted the burden of disease in countries in which they were introduced [2]. However, none of these vaccines is currently part of Extended Program of Immunization (EPI) schedule in Lebanon.

- Data about invasive pneumococcal disease in Lebanon is largely lacking. Thus was the aim of this surveillance study: to provide data about the epidemiologic characteristics, serotypes, and antibiotic susceptibilities of S. pneumoniae isolates causing invasive pneumococcal disease (IPD) in Lebanon.

- This data will be useful in helping health authorities make decisions about the importance of vaccination and changes in antibiotic treatment regimens in order to decrease the disease burden at the national level.

- The most prevalent invasive serotypes in our study are those found in the commercially available conjugated pneumococcal vaccines. This may be a consequence of the low number of vaccinated children in Lebanon, which in turn emphasizes the importance of implementing the conjugated pneumococcal vaccines in the routine immunization schedule on the national level.

- The higher rates of antimicrobial resistance described in our study, in comparison to developed countries, are probably due to the unrestricted over-the-counter use of antibiotics in Lebanon, necessitating more control over antibiotic intake.

- Continuing the current surveillance study would help assess the on-going changes in epidemiology of IPD, serotype prevalence, and antibiotic resistance in Lebanon.

References

1. WHO. International travel and health; Pneumococcal Disease. World Health Organization 2012; Available from: http://www.who.int/ith/diseases/pneumococcal/en/

2. Albrich WC, Baughman W, Schmotzer B, Farley MM. Changing characteristics of invasive p neumococcal disease in Metropolitan Atlanta, Georgia, after introduction of a 7-valent pneumococcal conjugate vaccine (1997-2004). Clin Infect Dis 2007; 44:1569.

Our Future Plans

- *Streptococcus pneumoniae* is the most prevalent cause of community-acquired pneumonia (CAP) leading to hospitalization.

- The use of conventional blood cultures for diagnosis may give false negative results (low sensitivity) attributable to the low prevalence of bacteremia in pneumococcal CAP, and to the prior use of antibiotics.

- We are starting a research protocol using Real Time-Polymerase Chain Reaction molecular diagnostic approach on blood samples taken from patients with symptoms and clinical workup suggestive of community-acquired pneumonia to prospectively assess the sensitivity of Real Time- PCR in detecting CAP and to determine by Multiplex PCR Serotype Deduction the pneumococcal serotypes that are responsible for pneumococcal CAP and are circulating in Lebanon.

- Data generated from this study will allow us to improve our molecular diagnostic testing and provide in the future a more rapid identification of bacteremic pneumonia, thus enhancing the diagnosis and optimizing the antimicrobial choice.

Thank you

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