Volume III- Issue III- November 2008

LPSP News Letter

Lebanese Inter-hospital Pneumococcal Surveillence Program

Updates on Pneumococcal samples in Lebanon

Since our last shipment in 2007, we had 30 samples that were awaiting shipment in 2008. However, we have encountered some problems regarding the shipment which led to its delay till September 2008. Unfortunately though, some of the collected samples died which led to a decrease in the number of samples to 22.

However, while we were waiting for the shipment to be done, we were collecting pneumococcal samples from various hospitals. The following table demonstrates the hospital contributions. To date, we have sent 131 samples for serotyping and sensitivities, some of which are being worked on at the moment. Our last shipment consisted of 22 samples, out of which 1 was Strep. Viridans and 2 did not grow. Meanwhile, we have the sensitivity and serotype results for these samples and we will share them in this newsletter. We would like to thank all the hospitals that contributed to the success of this study and wish to have more contributions throughout the year with the cooperation of the Ministry of Health to which we owe great thanks. So far, we have 5 new samples awaiting shipment as well as 3 samples that are to be resent again.

HOSPITAL CONTRIBUTION LIST

41	AUBMC	Dr George Araj
6	RIZK HOSPITAL	Dr Jacques Mokhbat
13	MAKASSED GENERAL HOSPITAL	Dr Tamima Jisr
12	HAYKAL HOSPITAL	Dr Ibrahim Nemr
7	RHUH	Dr Rita Feghali
5	SAHEL GENERAL HOSPITAL	Dr Wassim Serhal
9	ST JOSEPH HOSPITAL- DORA	Dr Raymond Rohban
4	CENTRE HOSPITALIER DU NORD	Dr Salam Samad
3	HAMMOUD HOSPITAL	Dr Mohammad Zaatari
6	NINI HOSPITAL	Dr Munzer Hamzeh
3	SACRE COEUR HOSPITAL	Dr Antoine Haddad
3	ST GEORGES HOSPITAL	Dr Ziad Daoud
4	ISLAMIC HOSPITAL	Dr Malak Naboulsi
2	EL-YOUSSEF HOSPITAL- AKKAR	Dr Mohammad Abdallah
2	AL RASOUL AL AZAM	Dr Hosni Yazbek
5	MONLA HOSPITAL	Dr Ricardo Sarraf
1	BAHMAN HOSPITAL	Dr Mohammad Haidar
2	AL HAYAT HOSPITAL	Dr Hadi Al-Amine
1	HOPITAL NOTRE DAME DE SECOURS	Dr Georges Abdel Nour
1	RIYAK HOSPITAL	Dr Talal Araji
2	NOTRE DAME DE LA PAIX	Dr Joseph Freifer
1	TAL CHIHA HOSPITAL -ZAHLE	Dr Naziha Makhlouf
1	ST CHARLES HOSPITAL	Dr. Tony Faddoul
1	CLEMANCEAU MEDIACAL CENTER	Dr Ziad El Baba
1	NAJJAR HOSPITAL	Dr Arwa Mougharbel

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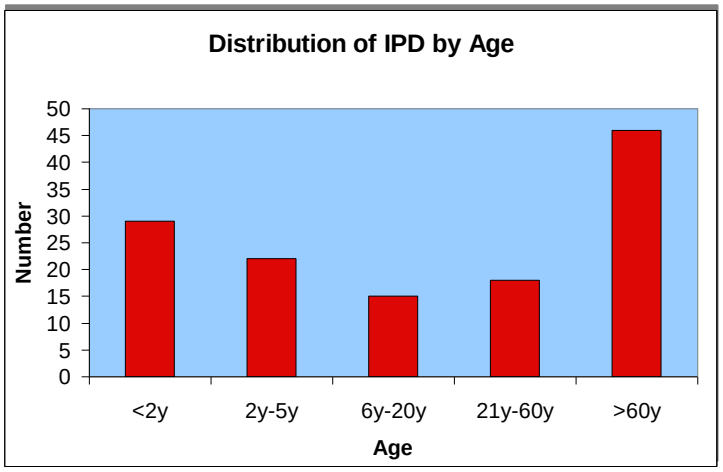
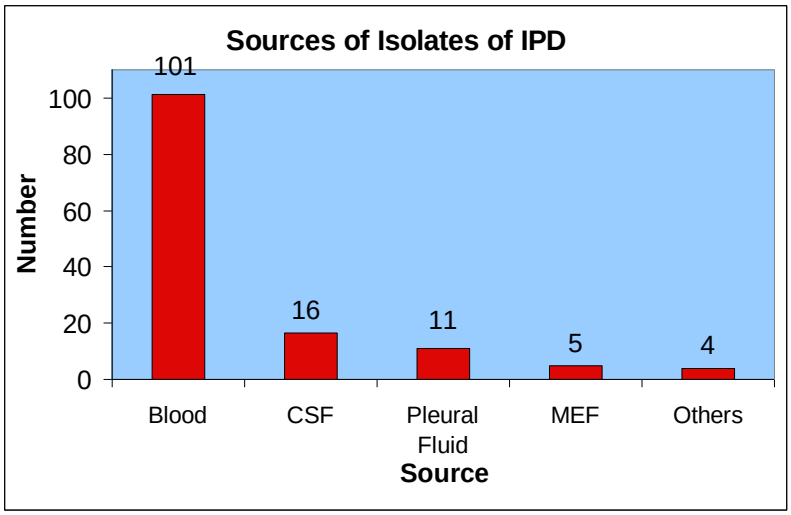
DEMOGRAPHICS

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

- Out of 129 samples, 29 were under 2 years of age
- 22 were between 2 years and 5 years of age
- 15 were between 6 years and 20 years of age
- 18 were between 21 years and 60 years of age
- 46 were above 60 years of age

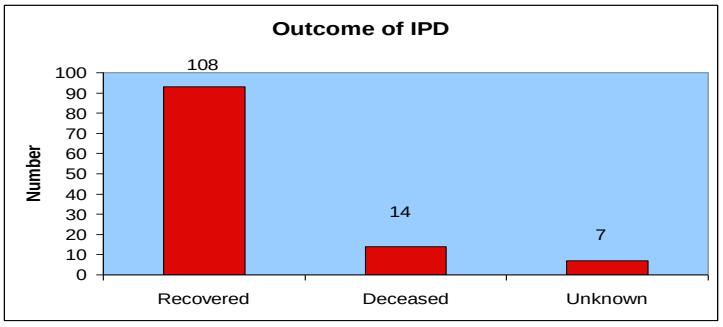
As it is revealed in studies over the world, the prevalence of strep. Pneumonia is highest in children less than 2 years of age and adults above 60 years.

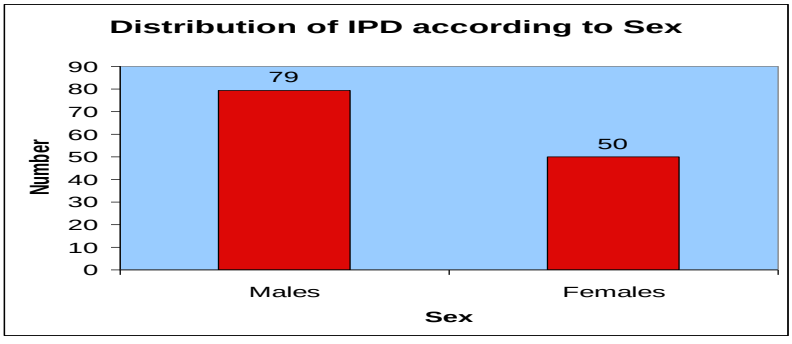




- 101 samples out of the 129 were collected from blood, 16 from CSF, 11 from pleural fluid, 5 from MEF, and 4 from other sources including peritoneal fluid and pus.
- The respective percentages for the presented data are: 73% for blood, 11.6% for CSF, 8% for pleural fluid, 3.6% for MEF, and finally 2.9% for he other sources.
- Some of the patients had the pathogen present in more than one source.

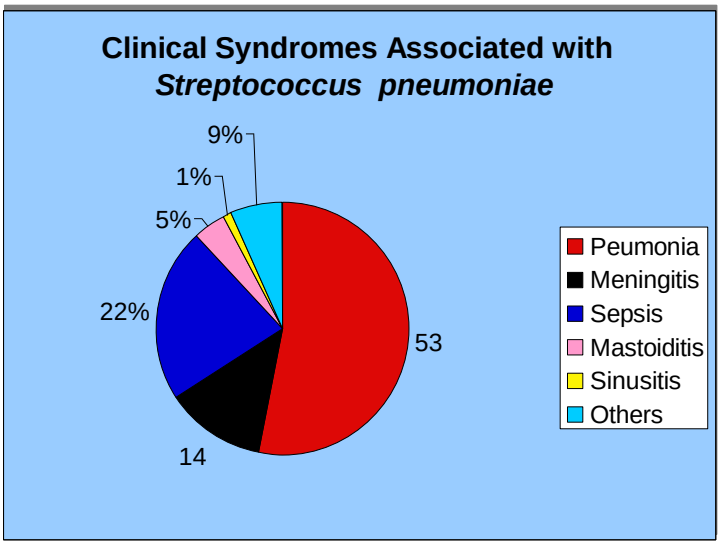
- 108 patients recovered, 14 were deceased, while 7 patients had unknown outcomes.



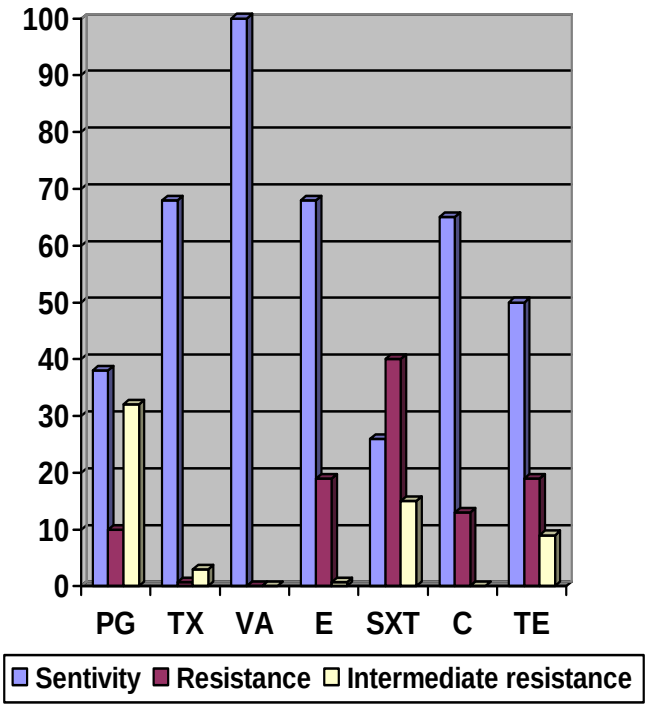


- Out of the 129 patients, 79 were males and 50 were females.

- The majority of patients had pneumonia accounting for 53% of the total samples, 22% had sepsis, 14% had meningitis, and the others were distributed between sinusitis, mastoiditis and others.
- S. Pneumonia accounted for 7 million cases of otitis yearly in addition to 3000 cases of meningitis and 500 thousand cases of pneumonia in the United States before the introduction of conjugate vaccination in 2000. (Temime et al., 2008)



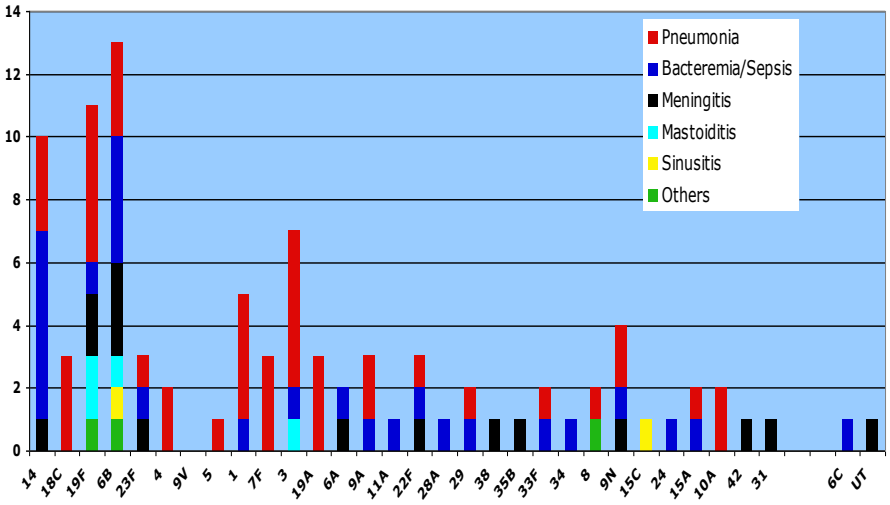
Sensitivity and Resistance



- 38% of the total number of samples were sensitive to Penicillin G, 10% were resistant and 32% had intermediate resistance.
- 68% showed sensitivity to Ceftriaxone.
- All samples were sensitive to Vancomycin.
- The samples had the same resistance to Erythromycin and Teicoplanin 19%.
- 26% of the samples were sensitive to Sulfamethoxazole and 40% were resisnatnt to it.
- 65% of the samples were sensitive to Chloramphenicol, whereas 13% showed resistance to it.

Distribution of IPD according to serotypes

- 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 vaccines available.
- Sinusitis was mainly caused by serotypes 6B and 15C, whereas mastoisitis accounted for serotypes 19F, 16B, and 3.



Antibiotic Resistance...

As of 2007, isolates of drug-resistant S *pneumoniae* have become increasingly common worldwide. In 2004, 21.4% of all isolates obtained showed intermediate or resistant susceptibility patterns to penicillin (up from 20% in 2003).The prevalence of resistance varies greatly among countries, states, counties, and within populations in particular cities and may be as high as 30-40% in some locations. Resistance rates are generally higher in most European countries, as well as in Hong Kong and Thailand.

Unlike many common bacterial organisms, the method of resistance of pneumococcus to penicillin and cephalosporins is through alteration in the cell wall penicillin-binding proteins (PBPs). By altering these sites (where the antibiotics bind), the antibiotic affinity is decreased, subsequently decreasing the susceptibilities. This type of resistance can be overcome if the serum or site levels of the antibiotic exceed the minimum inhibitory concentration (MIC) of the organism for 40-50% of the dosing interval.

Penicillin-resistant pneumococci are often also resistant to multiple other classes of antibiotics, including other penicillins, cephalosporins, sulfonamides, trimethoprim-sulfamethoxazole (through amino acid changes), macrolides (through methylation or via an efflux pump), quinolones (through decreased permeability, efflux pumps, and alteration of enzymes), and chloramphenicol (through inactivating enzymes). Resistance is obtained as part of a cassette of genetic information, or transposon, that encodes resistance to multiple antibiotics.

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 pneumococci 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.

New Advances in Pneumococcal Vaccine

Since last year new studies are ongoing to further evaluate the impact of conjugate pneumococcal vaccine on the emergence of invasive pneumococcal disease from non-vaccine serotypes. More work is also being done on assessing the existence of capsular switching of vaccine serotypes and on the effect of vaccine on antibiotics resistance.

In a study published in November, 2007 and conducted in France and Germany to evaluate the immunogenicity, safety and reactogenicity of the seven valent conjugate vaccine (PCV7), results showed that the latter was highly immunogenic, well tolerated and safe when coadministered with DTPa-IPV-HBV-Hib vaccine at 2, 3, 4 months of age with a booster dose at 12-15 months. However, PCV7 did not show any relevant influence on the immunogecity and safety of the concurrently administered DTPa-IPV-HBV-Hib vaccine. (Olivier C, Belohradsky BH, Stojanov S, Bonnet E, Petersen G, Liese JG.)

Moreover, 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 pneumococci 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, Boelle PY, Opatowski L, Guillemot D.)

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 rate 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. (Sandra S. Richter, Kristopher P. Heilmann, Cassie L. Dohrn, Fathollah Riahi, Susan E. Beekmann, and Gary V. Doern).

The latest breakthrough in pneumococcal vaccine was with the introduction of the 11 valent pneumococcal conjugate vaccine (Pn-Pd) which was proven to be immunogenic and safe by “GSK” and the 13 valent pneumococcal conjugate vaccine on which a randomized trial (CAPITA) is being conducted on patient with community acquired pneumonia above the age of 65 years old to assess its efficacy in preventing pneumococcal disease “netherland journal of medicine”. Efforts are still ongoing as well the develop alternative more efficacious vaccine against pneumococcal disease especially in the introduction of vaccine based on pneumococcal proteins. (Abstract)

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.