

TRENDS IN PEDIATRIC PNEUMOCOCCAL PLEURAL EMPYEMA FOLLOWING PNEUMOCOCCAL CONJUGATE 13-VALENT VACCINATION: 10 YEARS OF ACTIVE SURVEILLANCE IN A MEXICAN HOSPITAL



*¹ENRIQUE CHACON – CRUZ, MD, ²JORGE ARTURO ALVELAIS - PALACIOS, MD, PhD, ¹ROSA MARIA RIVAS – LANDEROS, PhD, ¹MARIA LUISA VOELKER– SOBERANES, PhD, ^{1,2}ERIKA ZOE LOPATYNSKY - REYES, MD

1. DEPARTMENTS OF PEDIATRICS AND MICROBIOLOGY, GENERAL HOSPITAL OF TIJUANA,

2. UNIVERSIDAD AUTONOMA DE BAJA CALIFORNIA – CAMPUS – CISAUD. MEXICO

* CORRESPONDING AUTHOR echacon88@hotmail.com

Background

- We have previously published the first Mexican study showing a decrease in pneumococcal invasive disease following implementation of the 13-valent pneumococcal conjugate vaccine (PCV13), however, the impact of this vaccine on Pneumococcal Pleural Empyema (PPE), serotypes distribution, and appearance by other non-pneumococcal bacteriae has not been yet published. The Tijuana, Mexico and San Diego, California border is considered the most transited border in the world.

Chacon-Cruz E, et al. TAV 2014; 2(6): 155-8, updated at ISPPD-Glasgow-2016, Poster Number 83.

Methods

- Since October-2005 until September-2015 (10 years), Active Surveillance for pleural empyema (PE) in children < 16 years old was performed in the Tijuana, Mexico, General Hospital (TGH).
- Diagnosis of PE was established by Light criteria of a pleural effusion with a community acquired pneumonia +/- bacterial isolation by standardized cultures. For *Streptococcus pneumoniae* isolates serotype identification was performed using the Quellung reaction (Statens Serum Institute®, Copenhagen, Denmark)
- A descriptive analysis for all PPE was performed using Excel®
- Admission data: Age, gender, days of symptoms, use/not use of antibiotics, pre-disposing conditions, PCV-7 or 13 – status, etc...
- Hospitalization data: Pleural fluid analysis, CBC, antibiotics used, chest tube (yes/no) and duration, pleural decortication (yes/no), hospitalization days, other complications, etc...

Results

- A total of 48 PE were diagnosed.
- Bacterial identification was possible in 35 (73%) cases. Among these, 26 (74.28%) were caused by *S. pneumoniae*.
- Median age for PPE was of 3.91 years (4 months -15 years)
- Median days of symptoms was of 9 (3-21).
- All but one had any PCV vaccination (only PCV7 in 10, PCV7 and PCV13 in 2, only PCV13 in 13)
- One patient had both GCD and IgG deficiency, but this patient had a PE caused by *K. oxytoca*.
- All but 2 received oral antibiotics (amoxicillin mostly).
- All but one required chest tube for a median of 6 days (3-18).
- Pleural decortication was performed in 10 patients (38.5%).
- One patient died.
- Clindamycin and Ceftriaxone/Cefotaxime was given to all patients.
- Hospitalization days median was of 15 (10-28).
- Before PCV13 implementation (a period of 77 months), the total number of PPE were of 21 (3.27 cases per year), with serotypes 3, 19A and 6A/C accounting for 64.3% of all cases (See Figure 1).
- Following PCV13 introduction (43 months period), PPE dropped to 5 cases (1.4 cases per year), with isolation of serotypes 6A/C, 7B, 15, 3 and 24F, (See Figure 1).
- Appearance of non-PPE started to appear since 2010 with two cases, but have increased since implementation of PCV13 (seven cases). Non-pneumococcal isolates have been *Staphylococcus aureus* (3), *Streptococcus pyogenes* (2), as well as *Streptococcus salivarius*, *Group Milleri Streptococcus*, *Klebsiella oxytoca* and *Pseudomonas aeruginosa* (one each), (See Figure 2).

FIGURE 1
PEDIATRIC PNEUMOCOCCAL SEROTYPES ASSOCIATED WITH PLEURAL EMPYEMA (n = 26):
SEROTYPES DISTRIBUTION BASED ON PCV'S INTRODUCTION

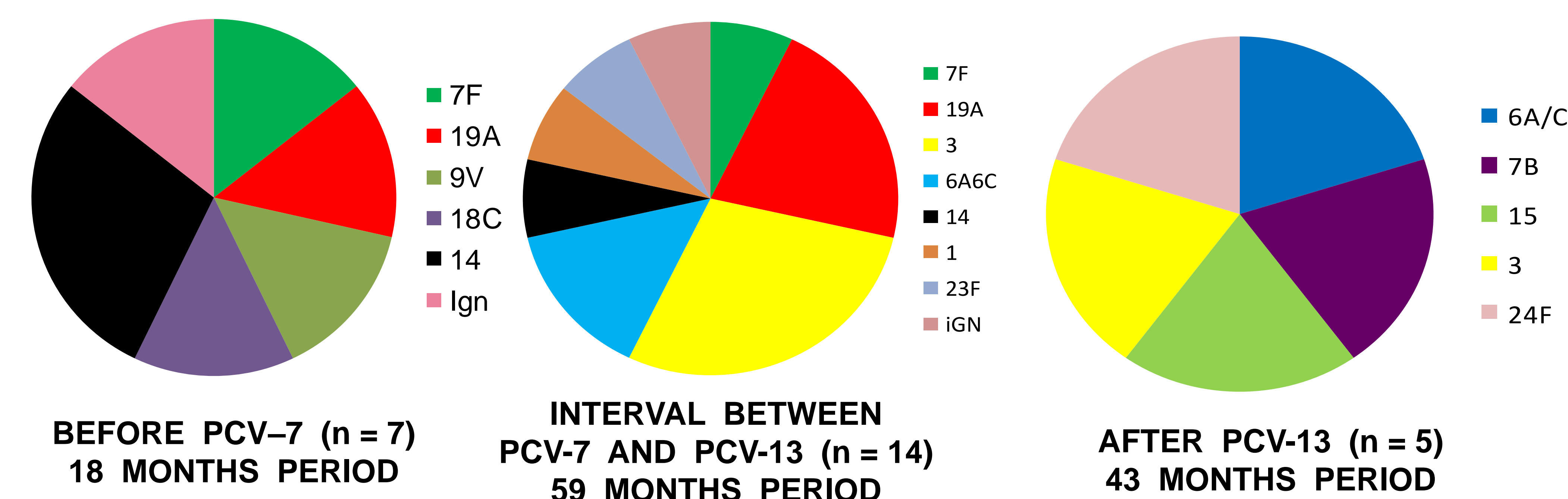
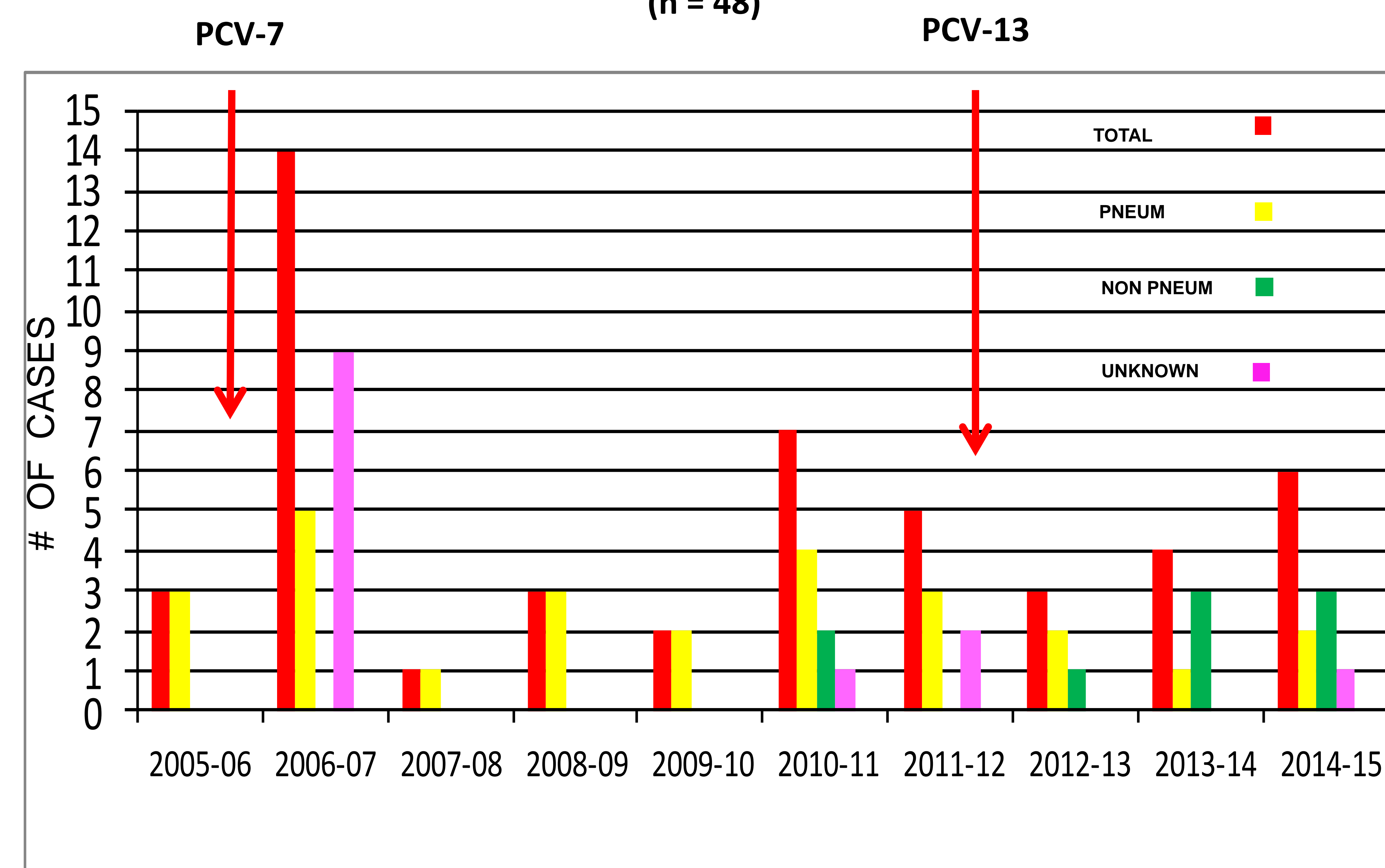


FIGURE 2
PEDIATRIC PLEURAL EMPYEMAS
OCT-2005 - SEP-2015
(n = 48)



Conclusions

- Following PCV13 universal vaccination, all PPE cases have decreased, with a trend on decrease on serotypes 6A/C, 3 and 19A.
- This study shows an impact of PCV13 on PPE, however, early appearance (replacement?) of other pneumococcal serotypes, and non-pneumococcal bacteriae causing PE is present. PE still is a considerable infectious diseases in Tijuana, Mexico, with significant impact on morbidity.
- Continuous active surveillance for PE is mandatory.