

# First National Study of Prevalence for Nasopharyngeal Carriage (NPC) of *Streptococcus pneumoniae* (Spn) among non Vaccinated Children Attending Daycare Centers in Argentina

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**Background:** Spn usually colonizes the nasopharynx and carriage is related to the development of invasive disease. The aims of this study were: 1) to assess the rate of Spn NPC in healthy, non vaccinated, <3 years children, attending 7 daycare centers from 7 cities, during 2007 winter season 2) to determine serotype distribution and antimicrobial susceptibility of Spn isolates.

**Methods:** Samples were obtained from 381 children. Two isolates from each sample were serotyped by Quellung. If both isolates presented the same serotype, antimicrobial susceptibility of only one was tested. MIC was performed by agar dilution method (CLSI), and macrolide phenotypes (MLSb and M) by disk diffusion.

**Results:** 211/381 (55.4%) children carried Spn and 37/211 (17.5%) Spn showed two different serotypes. From 211 samples 411 Spn isolates were serotyped: 6B 10.2%, 19F 9.5%, 15B 9.5%, 14 9.0%, 6A 8.5%, 23F 8.3%, 15C 5.4%, 19A 4.4% and 9V 4.4%.

Susceptibility of 242 isolates was evaluated (MIC mg/L): 43.3% penicillin (PEN)  $\geq 0.12$  (38.8% 0.12-1; 4.5%  $\geq 2$ ); 6.6% cefotaxime MIC  $\geq 1$  (5.8% 1, 0.8%  $\geq 2$ ) and 7.8% meropenem MIC  $\geq 0.5$  (7% 0.5, 0.8%  $\geq 1$ ). Non susceptibility, according to nonmeningeal breakpoint was: PEN G 1.2%, amoxicillin 1.6% and cefotaxime 0.8%. Among the 9 most frequent serotypes, 47.6% presented PEN MIC  $\geq 0.12$ : 19A (73%); 6B, 14, 6A and 15C (52-67%); 19F and 9V (41-44%); 15B and 23F (17-28%). Percentage of resistance was: 20.7 for erythromycin (54% M and 46% MLSb phenotype), 34.7 for trimethoprim-sulfamethoxazole and 0 for vancomycin and ofloxacin.

**Conclusions:** 1) Spn NPC was >50%, 2) The serotype distribution and antibiotic resistance highlights the importance of epidemiological surveillance before implementation of Spn vaccination program. 3) 73% of 19A Spn showed PEN MIC 0.12 – 2 mg/L



## OBJECTIVES

☉ TO ASSESS THE RATE OF SPN NPC IN HEALTHY, NON VACCINATED, <3 YEARS CHILDREN, ATTENDING 7 DAYCARE CENTERS FROM 7 CITIES, DURING 2007 WINTER SEASON .

☉ TO DETERMINE SEROTYPE DISTRIBUTION AND ANTIMICROBIAL SUSCEPTIBILITY OF SPN ISOLATES.

## MATERIALS AND METHODS

☉ Nasopharyngeal samples were obtained from 381 children. Two isolates from each positive sample were serotyped by Quellung (211 samples/411 spn). If both isolates presented the same serotype, antimicrobial susceptibility of only one was tested. MIC was performed to 242 Spn by agar dilution (CLSI) to penicillin (PEN), amoxicillin (AMX), cefotaxime (CTX), meropenem (MER), erythromycin (ERY), trimethoprim-sulfamethoxazole (SXT), vancomycin (VAN) and ofloxacin (OFL). Macrolide phenotypes (MLSb and M) were done by disk diffusion only to erythromycin non susceptible isolates (50 Spn)

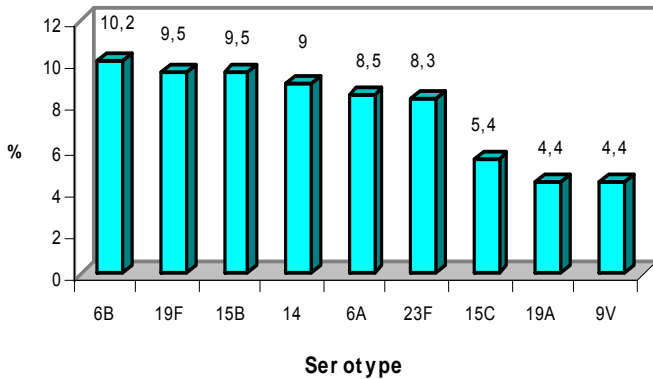
## RESULTS

### No. Spn Isolates studied by Day-Care Center

Code	City	N° of children	N° of positive samples	Spn NPC	N° of Spn Serotyped	N° of Spn Antimicrobial Susceptibility
GUT	Capital Federal	70	38	54.3%	72	38
BUE	Buenos Aires	39	26	66.7%	49	29
SAL	Salta	50	20	40%	40	24
COR	Corrientes	60	24	40%	48	28
CAT	Catamarca	55	22	40%	43	31
TLW	Trelew	51	36	70.6%	69	40
ROS	Rosario	56	45	80.4%	90	52
	<b>Total</b>	<b>381</b>	<b>211</b>	<b>55.4%</b>	<b>411</b>	<b>242</b>

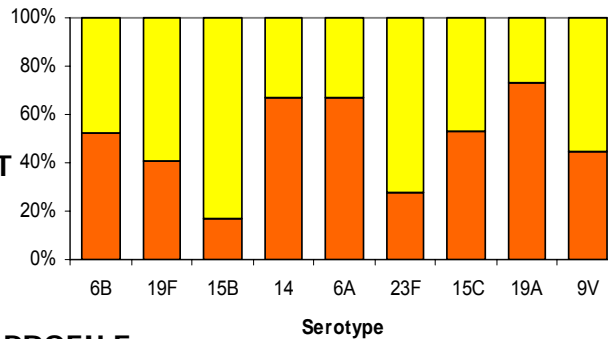
THE GLOBAL RATE OF NPC WAS 55.4% (211 / 381)

## DISTRIBUTION OF SEROTYPES



- 39 serotypes were identified.
- 17.5% of carriers showed Spn isolates with different serotypes.
- The 9 more frequent serotypes represented 69.2% of Spn isolates.

## PENICILLIN SUSCEPTIBILITY AMONG THE 9 MOST FREQUENT SEROTYPES

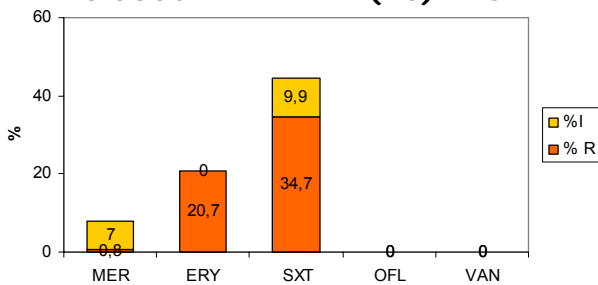


- The global penicillin (PEN) resistance (MIC  $\geq 0.12$  mg/L) was 43.3%.
- The global CTX no susceptibility (MIC  $\geq 1$  mg/L) was 6.6%.

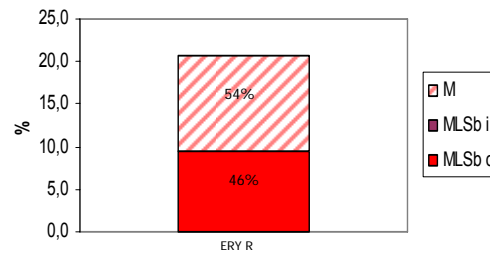
Among the 9 most frequent serotypes, 47.6% presented penicillin MICs  $\geq 0.12$  mg/L:

- Serotype 19A : 73%
- Serotype 6B, 14, 6A ,15C: 52-67%
- Serotypes 19F and 9V : 41-44%
- Serotypes 15B and 23F: 17-28%

## NO SUSCEPTIBILITY (NS) PROFILE



## ERYTHROMYCIN RESISTANT PHENOTYPES



Percentage of resistance was 20.7 for ERY (54% M and 46% MLSb phenotype)

## CONCLUDING REMARKS

- ✘ The global rate of NPC was 55.4%.
- ✘ Serotype 1 and 5 (both frequently found in invasive disease in Argentina) were not frequent in NPC.
- ✘ The global penicillin (PEN) resistance (MIC  $\geq 0.12$  mg/L) was 43.3%. PEN resistance was associated with 15.2% CTX MIC  $\geq 1$ mg/L, 29.5% ERY NS and 69.5% trimethoprim-sulfamethoxazole (SXT) NS.
- ✘ Percentage of resistance was: 20.7 for erythromycin (54% M and 46% MLSb phenotype), 34.7 for trimethoprim-sulfamethoxazole and 0 for vancomycin and ofloxacin.
- ✘ Serotype 19A presented: 73% PEN MIC 0.12–2mg/L, 9.1% CTX MIC  $\geq 1$ mg/L, 18.2% ERY NS and 37.5% SXT NS.
- ✘ Serotype 19A with PEN  $\geq 0.12$  mg/L was present in NPC despite pneumococcal conjugate vaccine is not include in national vaccination schedule in Argentina.

✘ The serotype distribution and antibiotic resistance highlights the importance of epidemiological surveillance before implementation of Spn vaccination program.