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National Surveillance Program of invasive *Streptococcus pneumoniae* (Spn) in Argentina 1994-2007: serotype distribution, antibiotic resistance and coverage of conjugate vaccines

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BACKGROUND

Spn is a prevalent cause of invasive diseases in children. The WHO estimated that in 2005, Spn was responsible for the deaths of 1.6 million children less than 5 years old, most of whom were less than 2 years of age. Differences in the distribution of capsular serotypes in terms of geographic area, patient age, and source of infection justify such continuous surveillance programs like the Regional System for Vaccines (SIREVA) group of the PAHO.

OBJECTIVE

To determine:

1. Serotype distribution of Spn causing invasive disease in children less than 6 years old.

2. Antibiotic resistance profile, and the

3. Coverage of PCV7, PCV10 and PCV13.

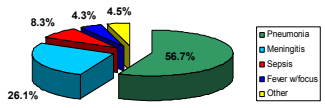
MATERIALS AND METHODS

A total of 2205 Spn were isolated from sterile fluids in 37 hospitals (17 provinces and Bs. As. city) from 1994-2007. 66.8 % were <2 years old. Serotyped was performed by Neufeld-Quellung reaction and susceptibility testing by CLSI agar dilution method, at the National Reference Laboratory (INEI). MIC were interpreted according CLSI 2007 guidelines. External quality assurance was carried out by the Adolfo Lutz Institute (Sao Paulo, Brazil).

Data analysis was done using Epi Info and WHONET 5.4 (WHO). $p < 0.05$ was considered statistically significant.

RESULTS

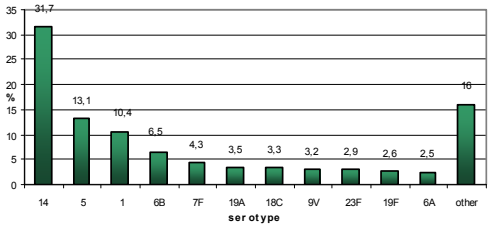
DISTRIBUTION OF ISOLATES BY CLINICAL DIAGNOSIS



	Meningitis (n : 577)	Pneumonia (n : 1251)	Sepsis (n : 183)
1º year of life	62.4%	32.9%	61.6%
≥ 1 years old	37.6%	67.1%	38.4%

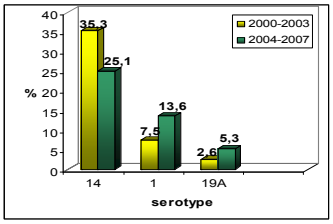
Meningitis and sepsis were prevalent in < 1 year old children while pneumonia in ≥ 1 years old

SEROTYPE DISTRIBUTION



49 serotypes were identified. The 11 more prevalent serotypes represent **84.0 %** of total

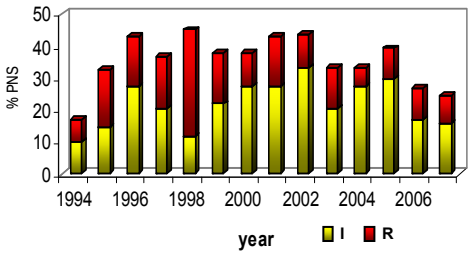
SIGNIFICATIVE CHANGES IN DISTRIBUTION OF SEROTYPES COMPARING TWO PERIODS



During 1994-99 there were not significant changes in serotypes.

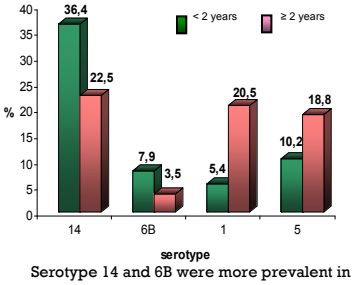
Comparing 2000-03 and 2004-07 changes were observed in serotypes 14 (35.3 % to 25.8 %, p=0.0004), 1 (7.5 % to 13.8 %, p=0.0005) and 19A (2.6 % to 5.3 %, p< 0.01).

PENICILLIN NO SUSCEPTIBILITY (MIC≥0.12 mg/L) (PNS)



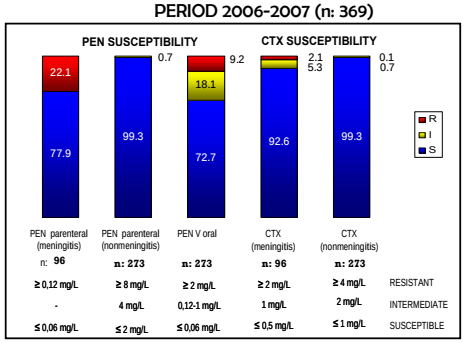
The global PNS was 33.2%. PNS increased from 17.0 % in 1994 to 43.2 % in 1996, remaining constant for years and declining to 25.6 % in 2006-07.

SIGNIFICATIVE DIFERENCES IN DISTRIBUTION OF SEROTYPES BETWEEN AGE GROUPS

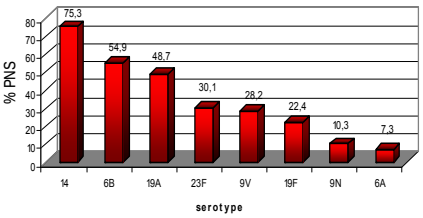


Serotype 14 and 6B were more prevalent in children < 2 years old and serotypes 1 and 5 were significantly less prevalent in this age group (p<0.0001)

PEN AND CTX SUSCEPTIBILITY: PERIOD 2006-2007 (n: 369)

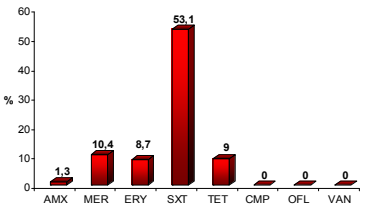


SEROTYPE DISTRIBUTION OF PNS ISOLATES



Main serotypes associated with PNS were: serotype 14, 6B, 19A, 23F, 9V, 19F, 9N and 6A.

RESISTANCE TO ANTIBIOTICS



ERY resistance was 8.7 %, increasing from 0 % in 1994 to 13.8 % in 2007.

SXT resistance was 53.1 %, decreasing from 58.7 % in 1994-99 to 54.6 % in 2000-03, and 47.1 % in 2004-07.

SEROTYPE COVERAGE (%) OF CONJUGATE VACCINES

	VACCINES	1994-99	2000-03	2004-07
<6 years old	7-V	52.7	57.6	44.6
	10-V	80.2	81.2	75.4
	13-V	86.1	87.2	85.9
<2 years old	7-V	59.3	65.0	51.7
	10-V	79.6	82.8	72.4
	13-V	85.6	88.5	84.5
<2 years old with neumonia	7-V	68.7	76.7	49.8
	10-V	83.9	88.1	74.2
	13-V	88.5	93.8	87.6
<2 years old with meningitis	7-V	42.9	51.5	53.3
	10-V	72.9	77.7	74.3
	13-V	80.8	83.5	80.2

PCV7: serotypes 4, 6B, 9V, 14, 18C, 19F and 23F

PCV10: PCV7 + serotypes 1, 5 and 7F

PCV13: PCV10 + serotypes 3, 6A and 19A

CONCLUDING REMARKS

- **Reduction of penicillin and SXT no-susceptibility was observed during last years.**
- **There was an alarming increase of ERY resistance during the last period.**
- **PEN and AMX remain the best treatment options for nonmeningeal isolates.**
- **Cefotaxime/ceftriaxone are the recommended drugs for meningitis.**
- **Changes in the serotype distribution were observed during 2004-2007: decrease of 14 and increase of 1 and 19A serotypes. This changes reduced the coverage of PCV7.**
- **Serotype 19A presented: 48.7 % PNS, 1.3 % CTX MIC ≥ 1 mg/L, 7.6 % ERY resistance and 21.6 % SXT resistance. This PNS serotype was present, even though the National Vaccination Schedule in Argentina does not include PCV7.**
- **The new PCV10 and PCV13 currently under study include other serotypes that greatly improve the coverage in Argentina.**