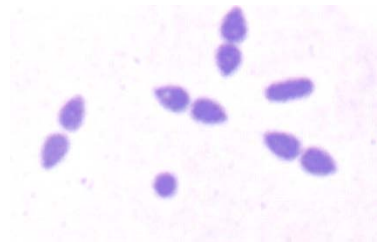


Sorveglianza infezioni invasive da pneumococco

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*Workshop: Sorveglianza delle Malattie Batteriche Invasive
ISS 28-29 Febbraio 2012*



93 Sierotipi

- 1
- 2
- 3
- 4
- 5
- 6A, 6B, 6C, 6D
- 7A, 7B, 7C, 7F
- 8
- 9A, 9L, 9N, 9V
- 10A, 10B, 10C, 10F
- 11A, 11B, 11C, 11D, 11E, 11F
- 12A, 12B, 12F
- 13
- 14
- 15A, 15B, 15C, 15F
- 16A, 16F
- 17A, 17F
- 18A, 18B, 18C, 18F
- 19A, 19B, 19C, 19F
- 20
- 21
- 22A, 22F
- 23A, 23B, 23F
- 24A, 24B, 24F
- 25A, 25F
- 27
- 28A, 28F
- 29
- 31
- 32A, 32F
- 33A, 33B, 33C, 33D, 33F
- 34
- 35A, 35B, 35C, 35F
- 36
- 37
- 38
- 39
- 40
- 41A, 41F
- 42
- 43
- 44
- 45
- 46
- 47A, 47F
- 48

Vaccini pneumococcici

Negli adulti:

Vaccino polisaccaridico (PPV23) (1983)
contenete 23 polisaccaridi purificati
no memoria immunitaria
no effetto booster

Nei bambini:

Vaccini glicoconiugati 7-valente (PCV7)
 10-valente (PCV10)
 13-valente (PCV13)

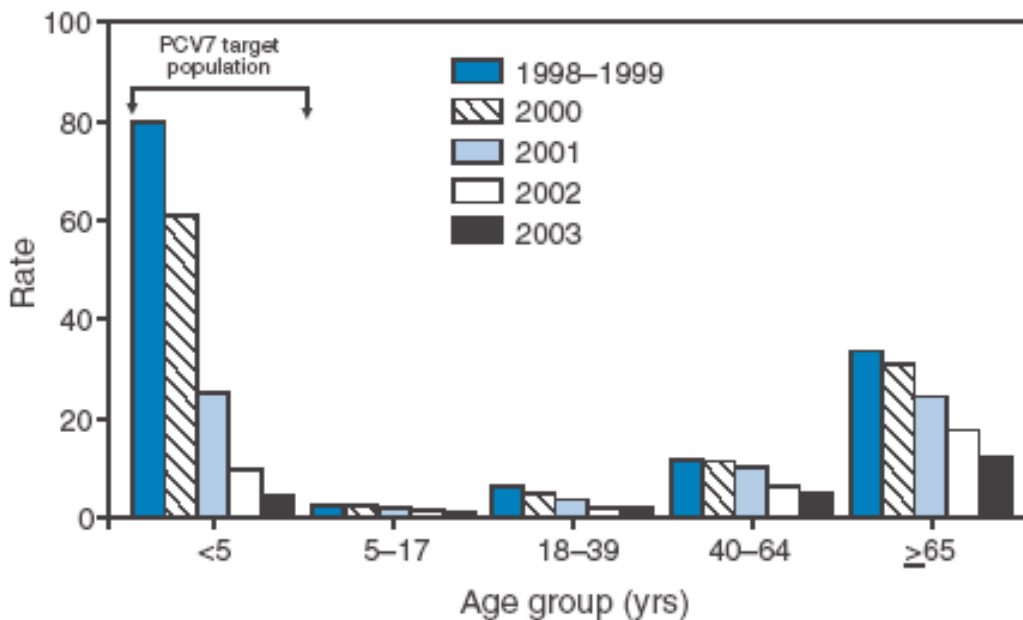
immunogeni nei bambini
memoria immunitaria

Pneumococcal conjugate vaccines

2001	2010	2010
7-valent	10-valent	13-valent
4	4	4
6B	6B	6B
9V	9V	9V
14	14	14
18C	18C	18C
19F	19F	19F
23F	23F	23F
	1	1
	5	5
	7F	7F
		3
		6A
		19A

Diminuzione dell' incidenza delle malattie invasive da pneumococco (USA- sierotipi vaccinali)

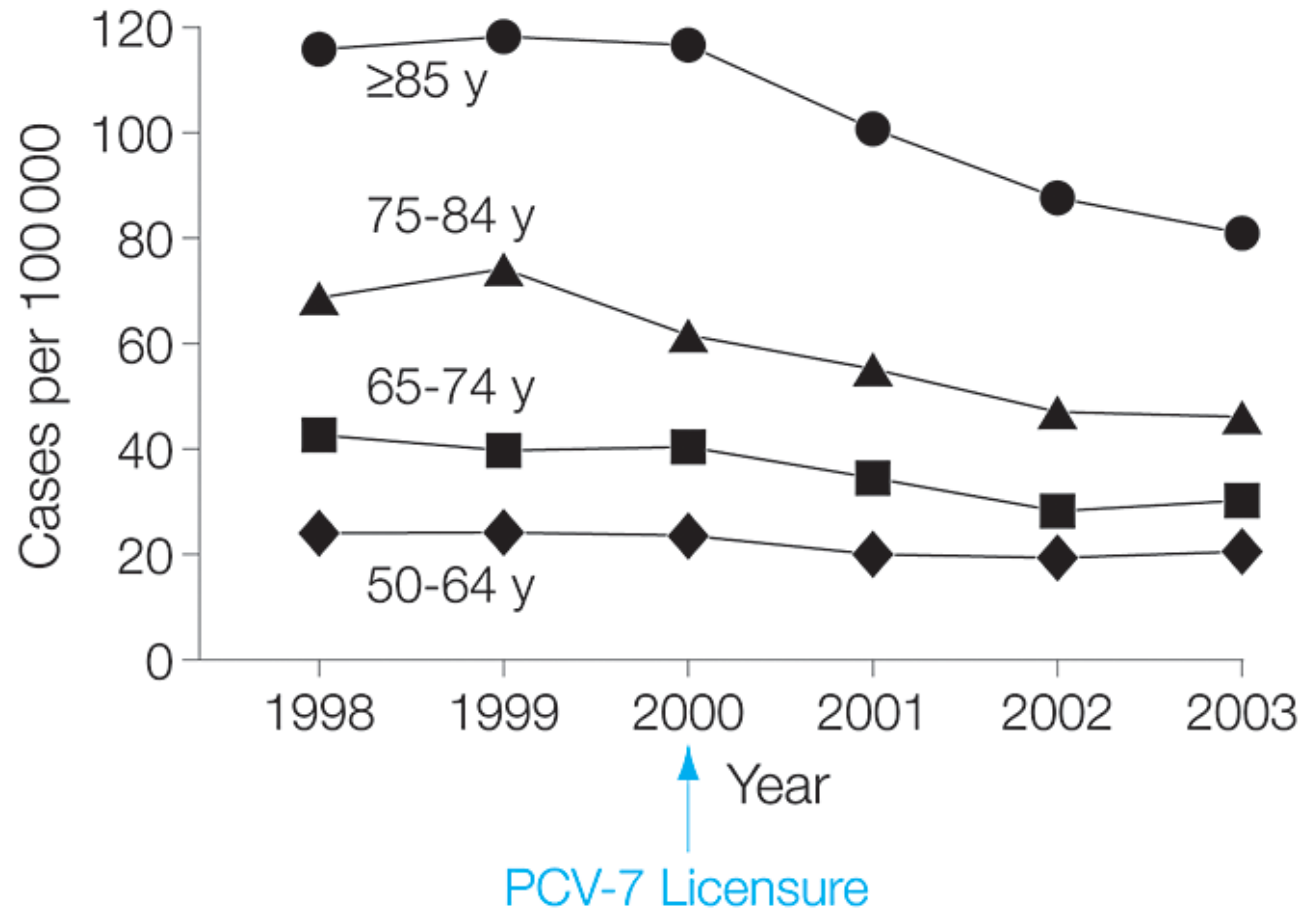
FIGURE 1. Rate* of vaccine-type (VT) invasive pneumococcal disease (IPD) before and after introduction of pneumococcal conjugate vaccine (PCV7), by age group and year — Active Bacterial Core surveillance, United States, 1998–2003



* Per 100,000 population.

† For each age group, the decrease in VT IPD rate for 2003 compared with the 1998–1999 baseline is statistically significant ($p < 0.05$).

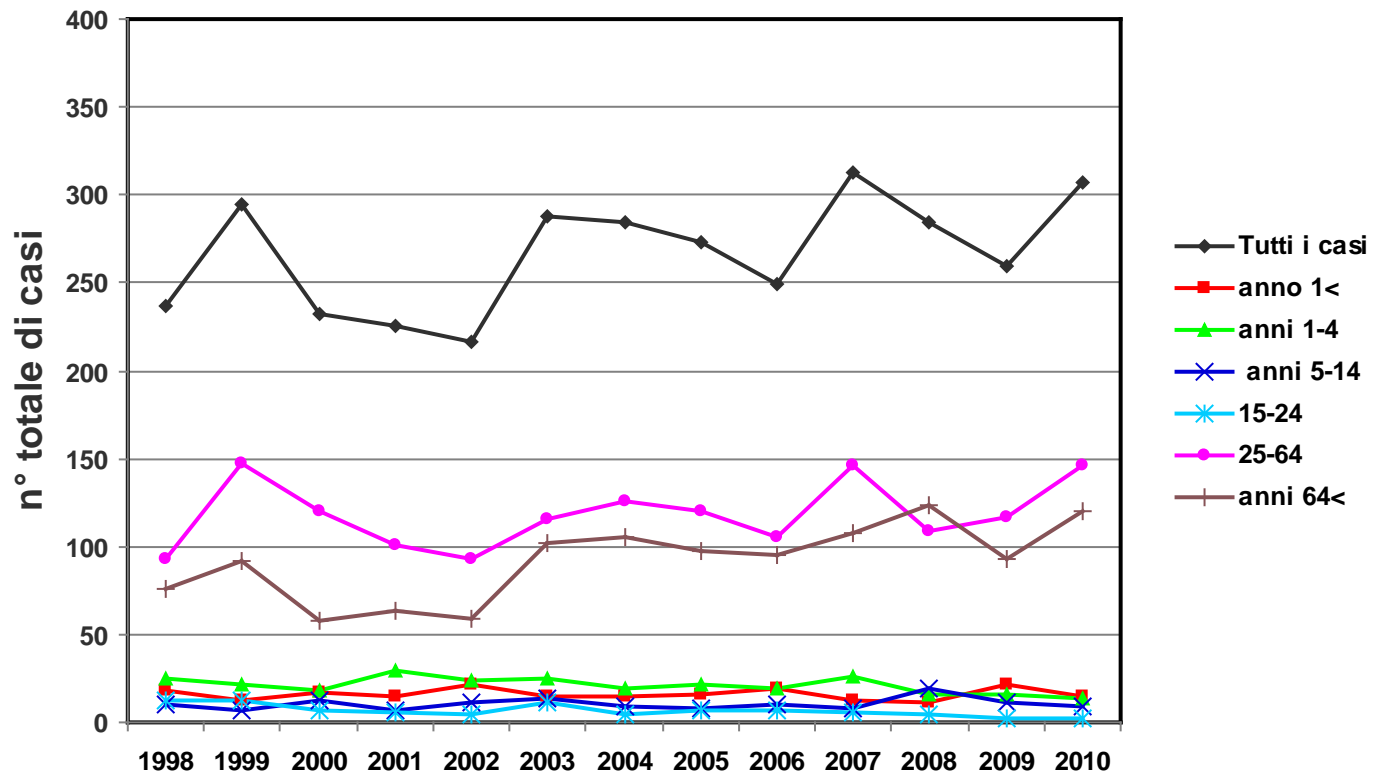
Figure. Annual Incidence of Invasive Pneumococcal Disease by Age Group for Adults ≥ 50 Years—Active Bacterial Core Surveillance, 1998-2003



Lexau, C. A. et al. JAMA 2005;294:2043-2051

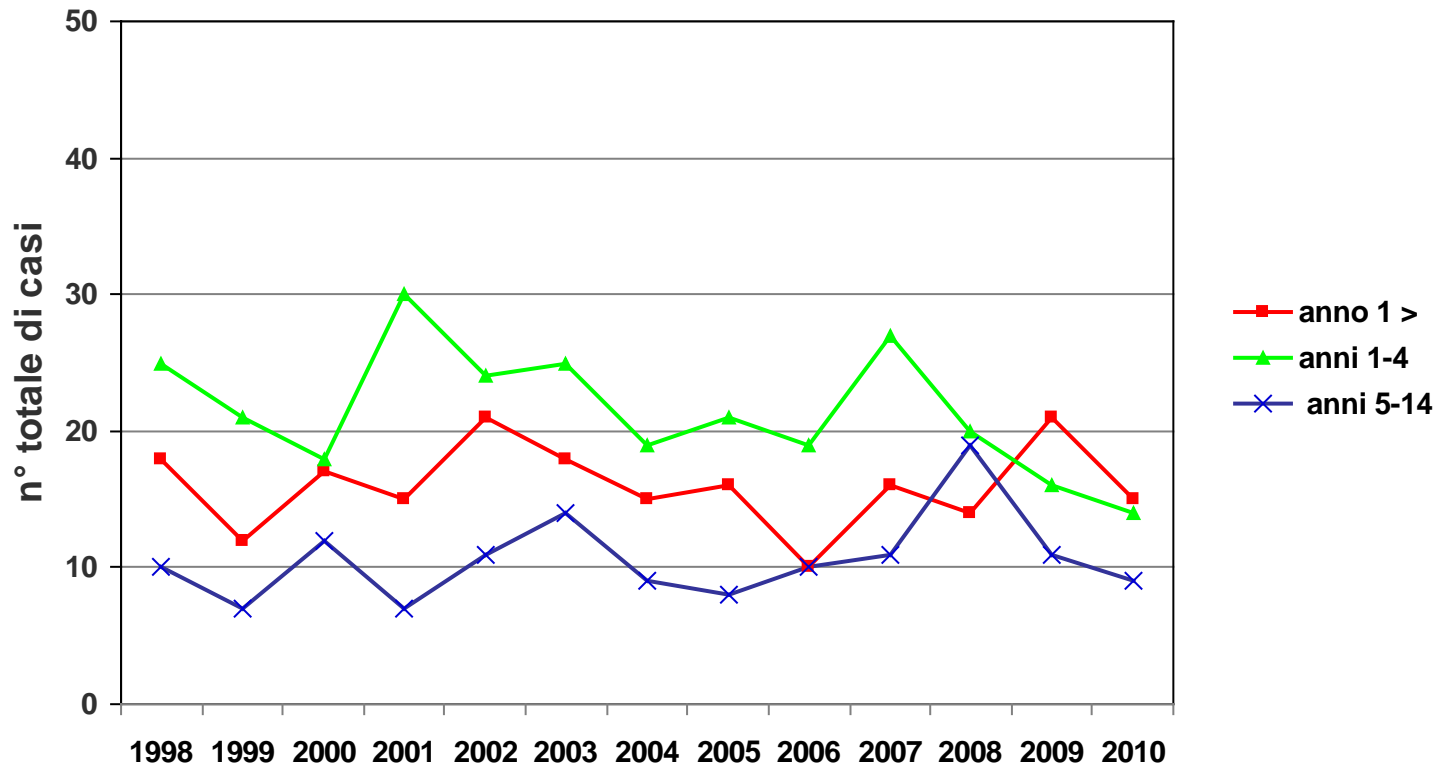
JAMA

Casi annuali di meningite da *S. pneumoniae* per classe di età



dati SIMI

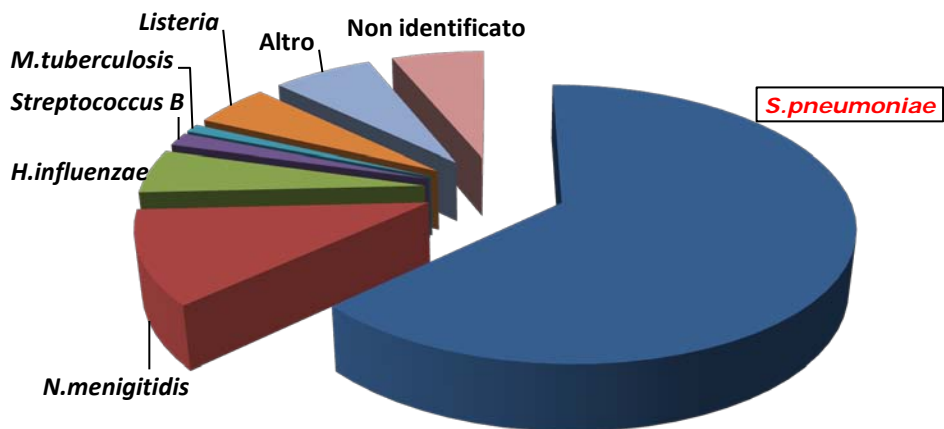
Bambini- casi annuali di meningite da *S. pneumoniae* per classe di età



dati SIMI

Malattie Batteriche Invasive in Italia

2010



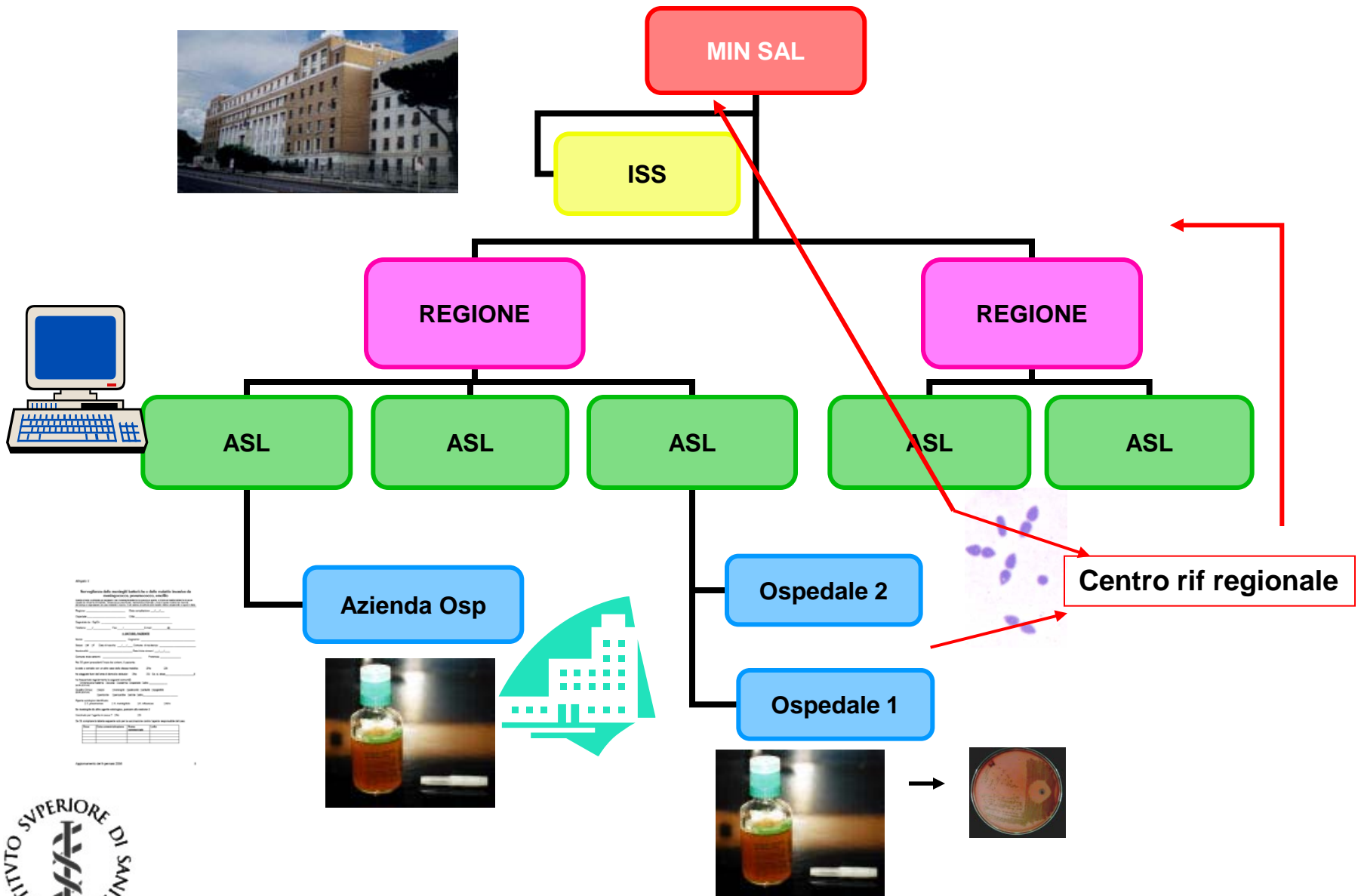
www.simi.iss.it

	Quadro clinico	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 64	> 64	n.i.	TOTALE
2010	Meningite	15	14	3	6	2	146	120	1	307
	Sepsi	14	43	14	5	5	168	293	2	544
	Altro	0	0	0	0	0	0	0	0	0

Totale segnalazioni= 851

Meningite 36 %
Sepsi 64 %

FLUSSO DI DATI E CEPPI NEL SISTEMA DI SORVEGLIANZA



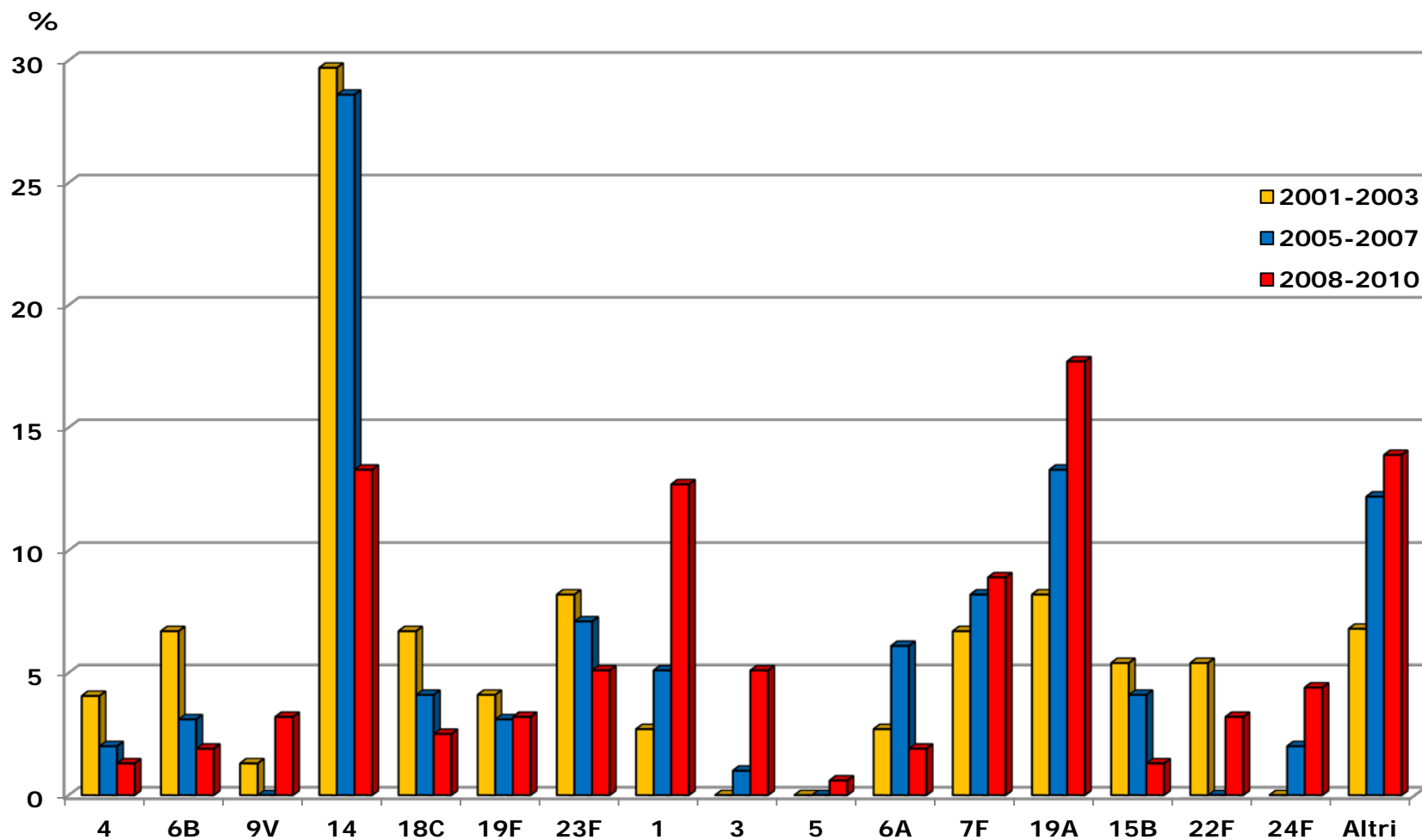
Casi segnalati/ceppi sierotipizzati per regione

Regione	2005-2007		2008-2010	
	n° casi	n° sierotipizzati	n° casi	n° sierotipizzati
<i>Piemonte</i>	135	6	559	75
<i>Valle d'Aosta</i>	1	0	2	0
<i>Lombardia</i>	256	59	668	446
<i>Trentino Alto Adige</i>	20	2	112	43
<i>Veneto</i>	172	2	386	1
<i>Friuli Venezia Giulia</i>	37	2	58	33
<i>Liguria</i>	42	4	70	8
<i>Emilia Romagna</i>	181	0	270	35
<i>Toscana</i>	66	0	50	5
<i>Umbria</i>	1	2	4	2
<i>Marche</i>	6	0	14	7
<i>Lazio</i>	56	0	120	28
<i>Abruzzo</i>	7	2	9	4
<i>Molise</i>	1	1	1	0
<i>Campania</i>	64	6	42	11
<i>Puglia</i>	16	0	11	1
<i>Basilicata</i>	1	0	0	0
<i>Calabria</i>	6	0	12	1
<i>Sicilia</i>	17	2	27	6
<i>Sardegna</i>	10	0	13	3

Evoluzione dei sierotipi confronto tra 3 periodi

- ❑ Periodo precedente PCV7 o basso uso PCV7
(2001-2003)
- ❑ Implementazione vaccinazione
(2005-2007)
- ❑ Uso PCV7 >50% su scala nazionale
(2008-2010)

Bambini <5 anni

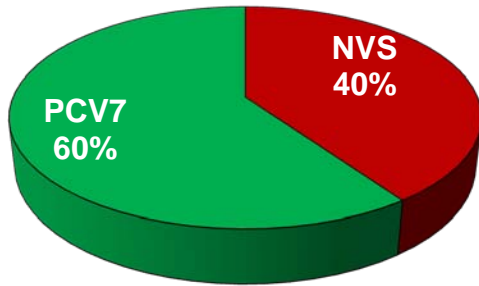


PCV7

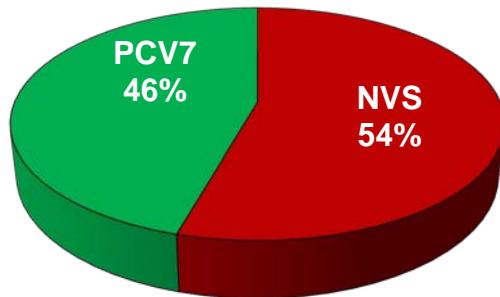
PCV13

Bambini ≤ 5 anni

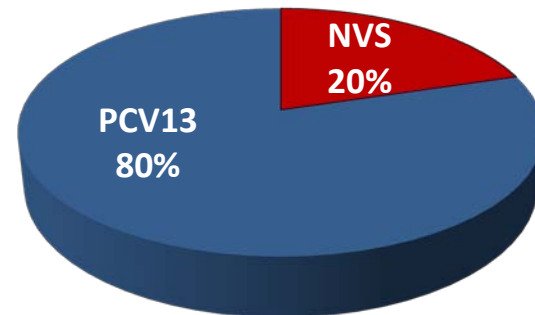
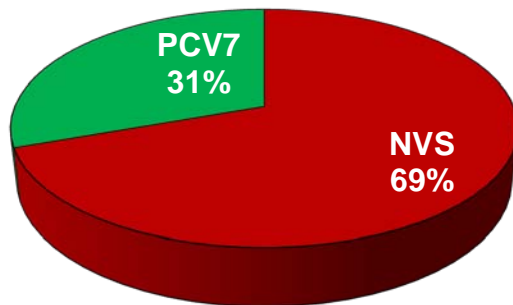
2001-2003



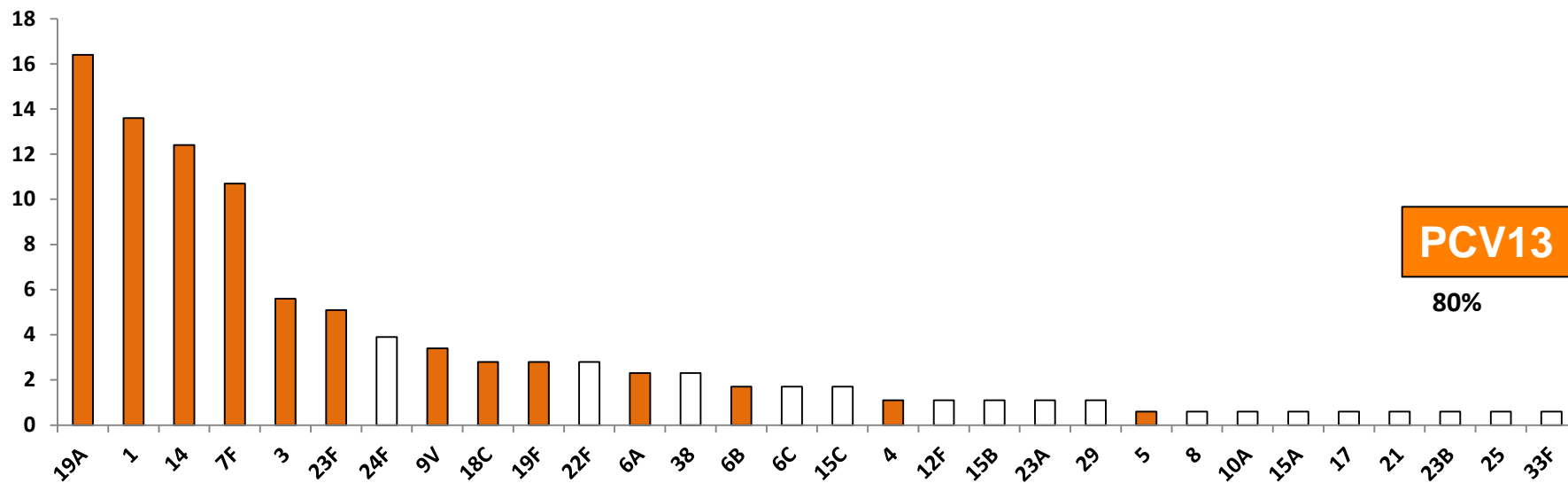
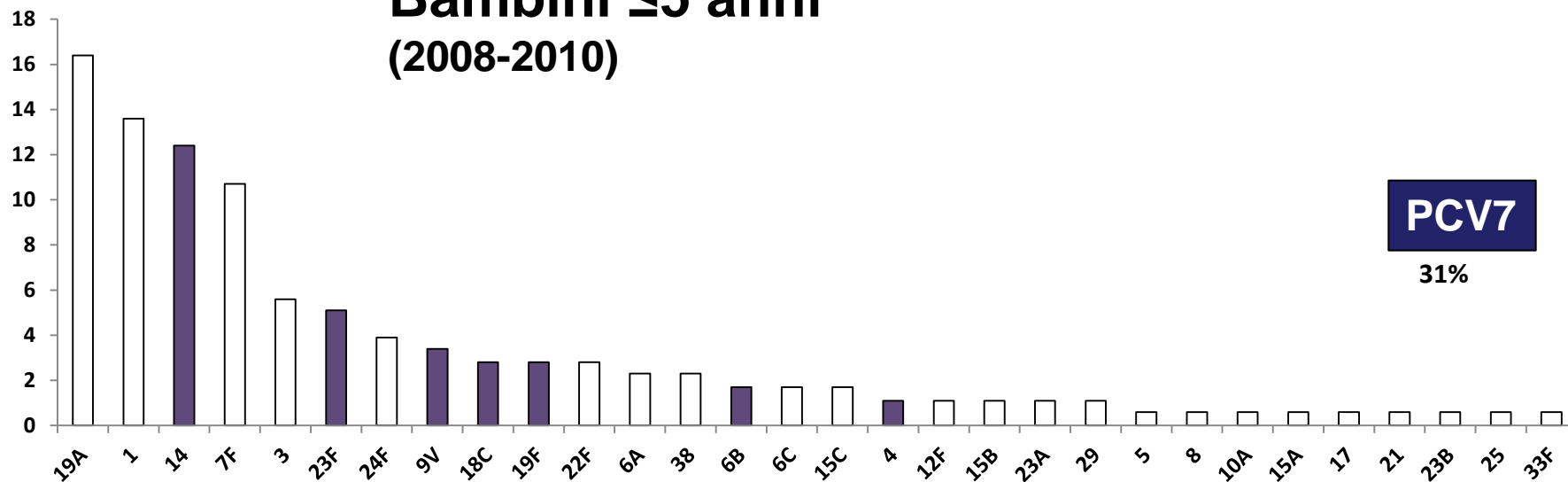
2005-2007



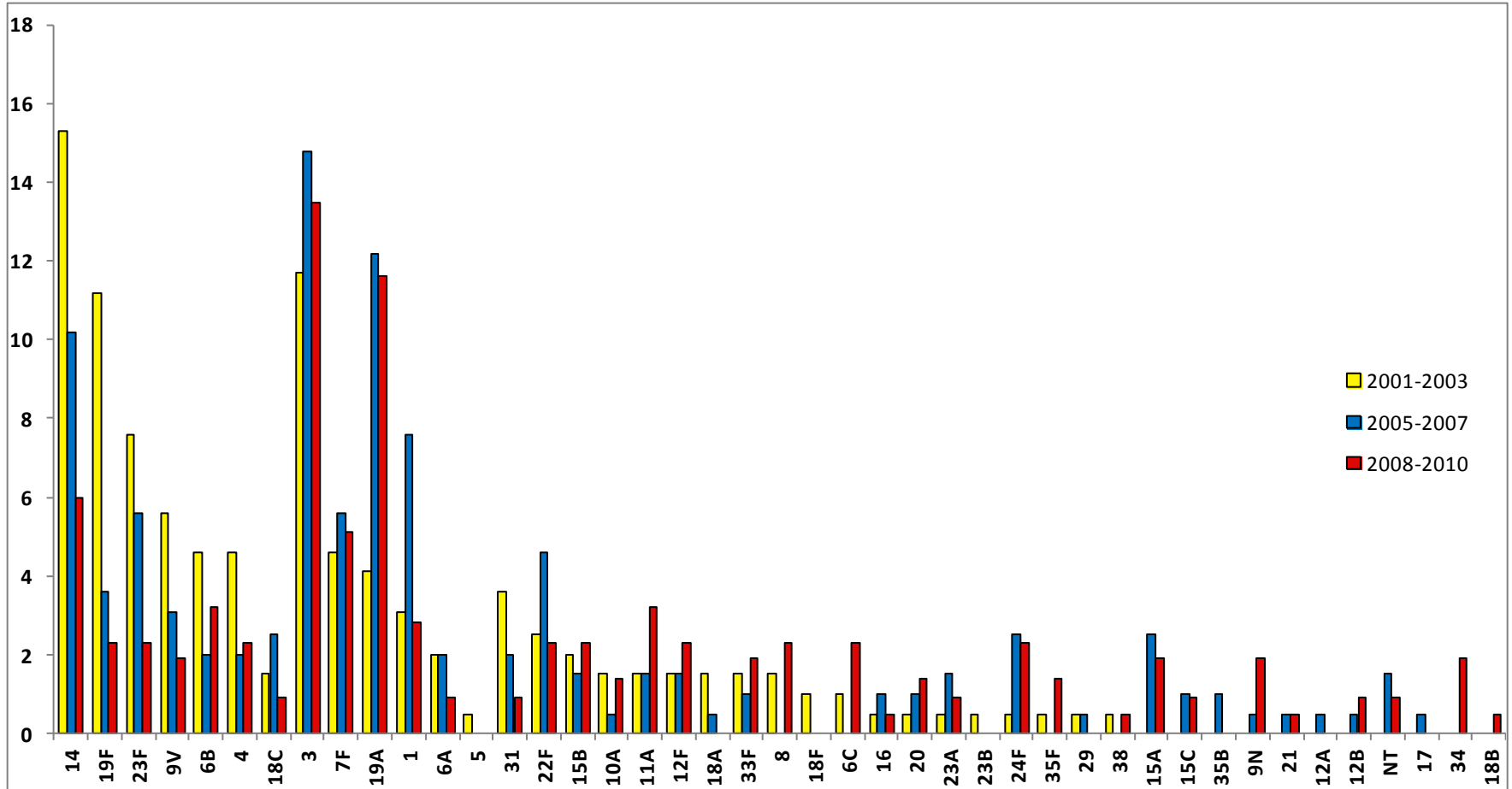
2008-2010



Bambini ≤5 anni (2008-2010)



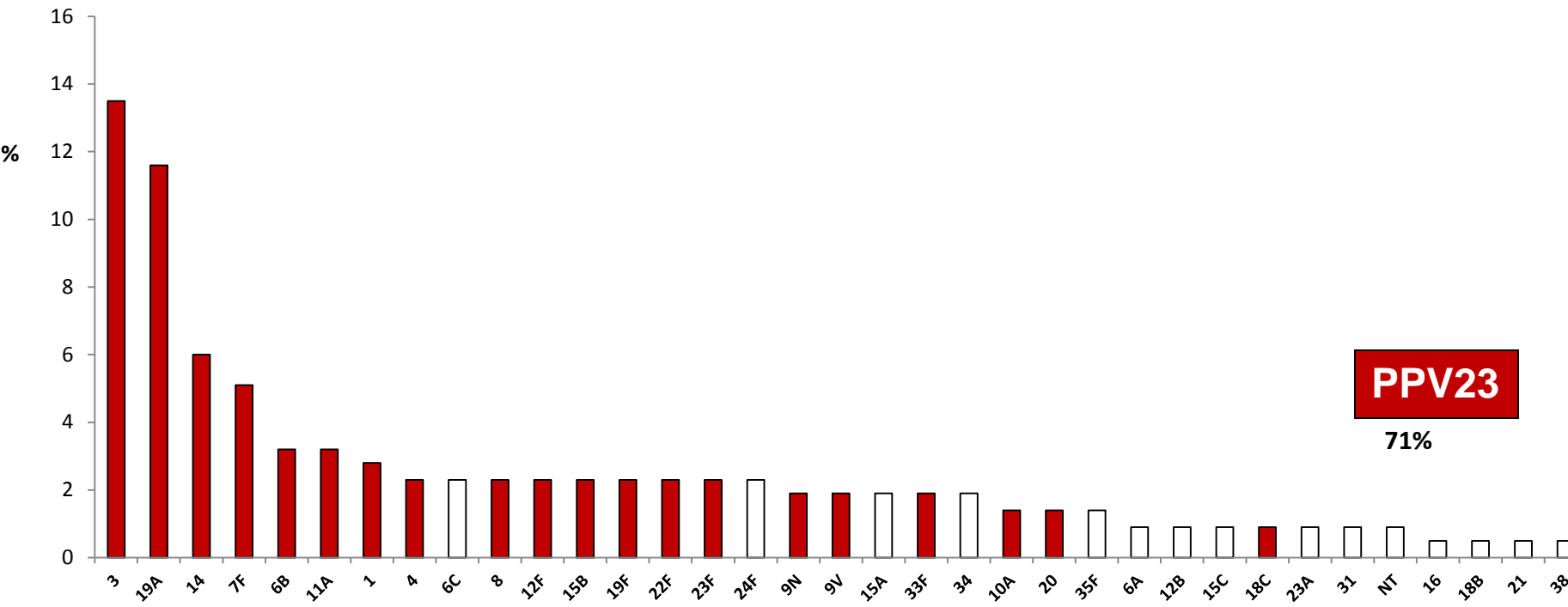
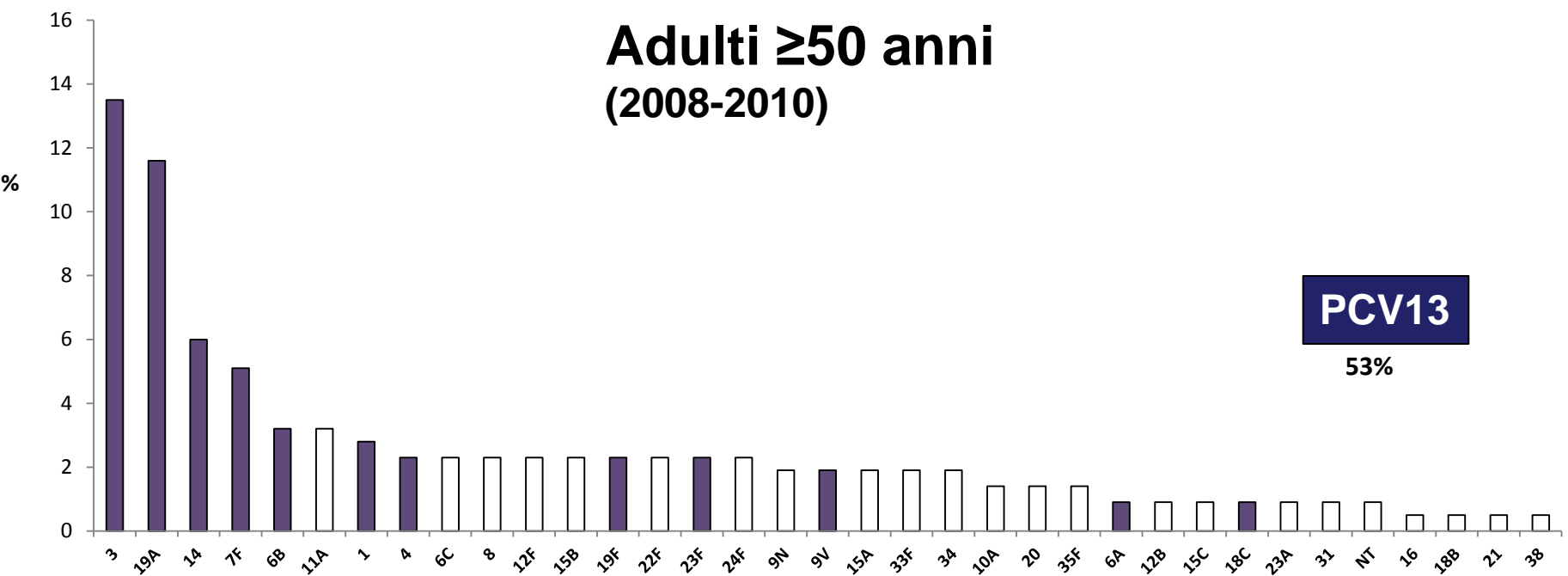
Adulti ≥50 anni



PCV7

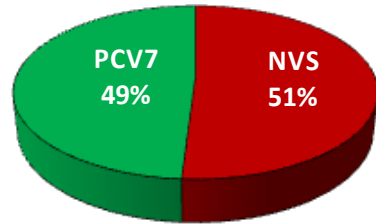
PCV13

Adulti ≥50 anni (2008-2010)

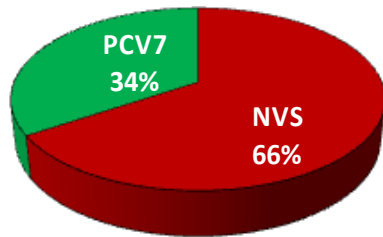


Adulti ≥50 anni

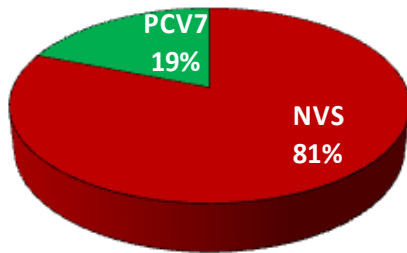
2001-2003



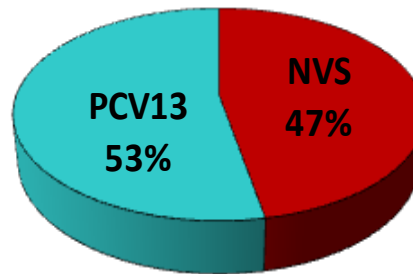
2005-2007



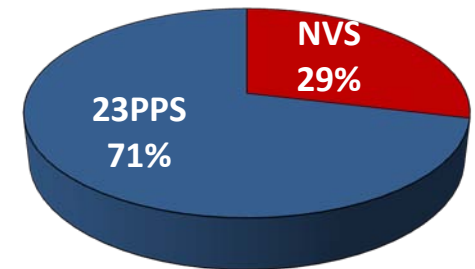
2008-2010



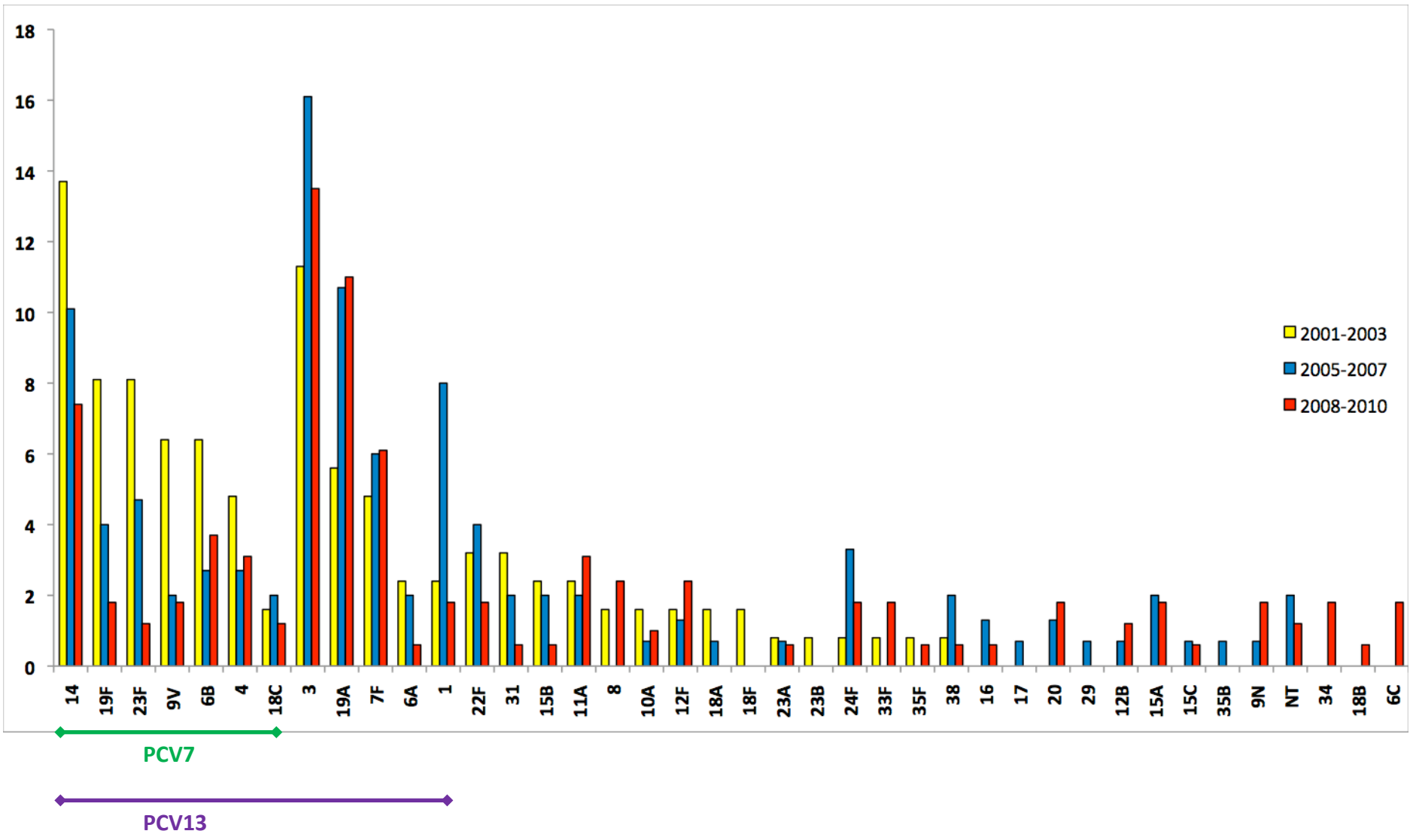
2008-2010



2008-2010

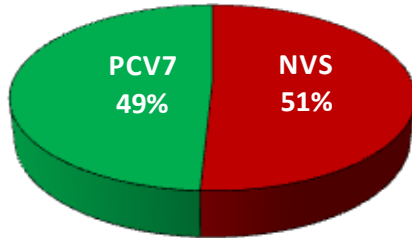


Adulti ≥65 anni

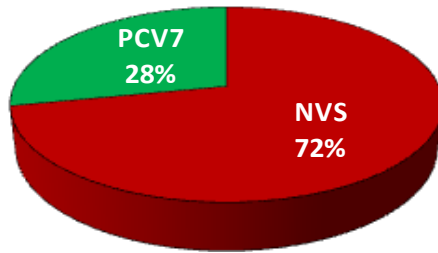


Adulti ≥65 anni

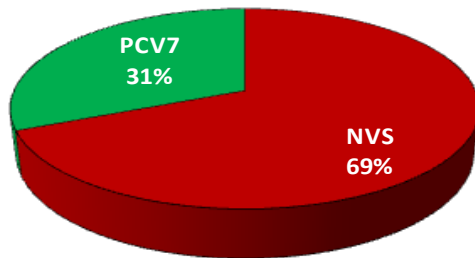
2001-2003



2005-2007



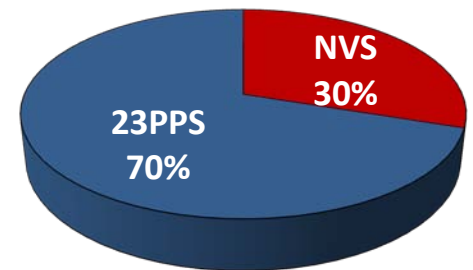
2008-2010



2008-2010



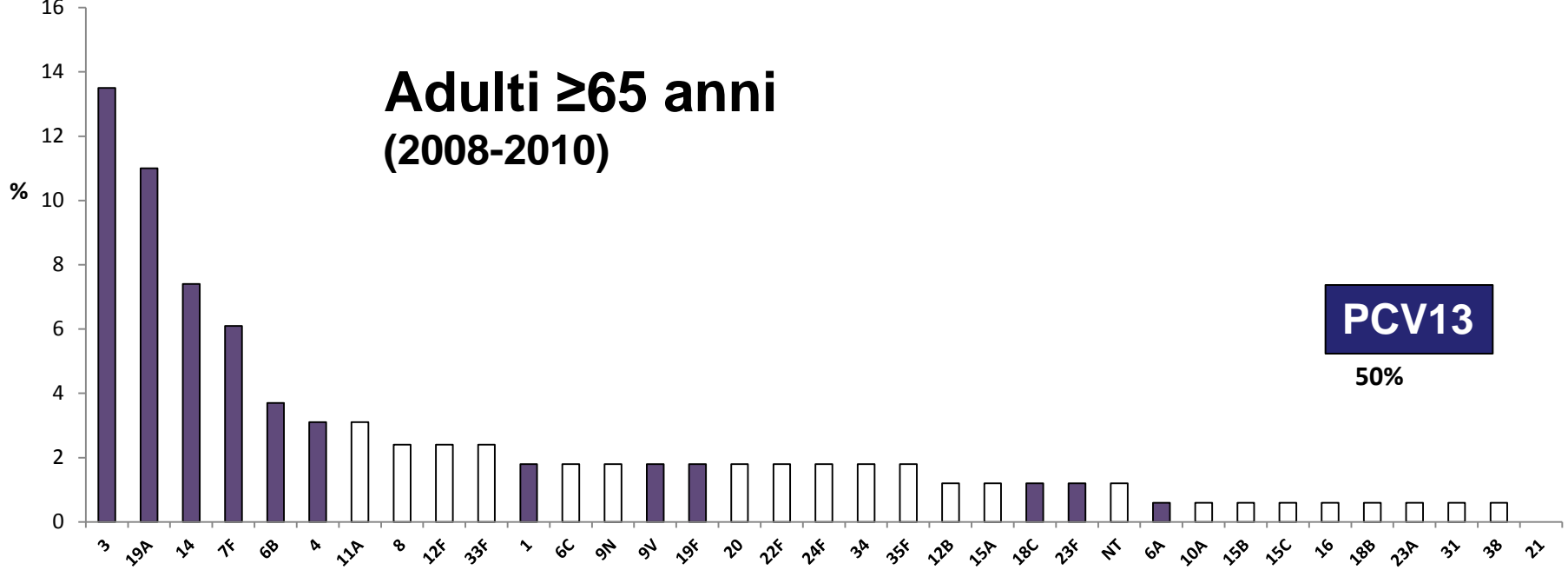
2008-2010



Adulti ≥65 anni (2008-2010)

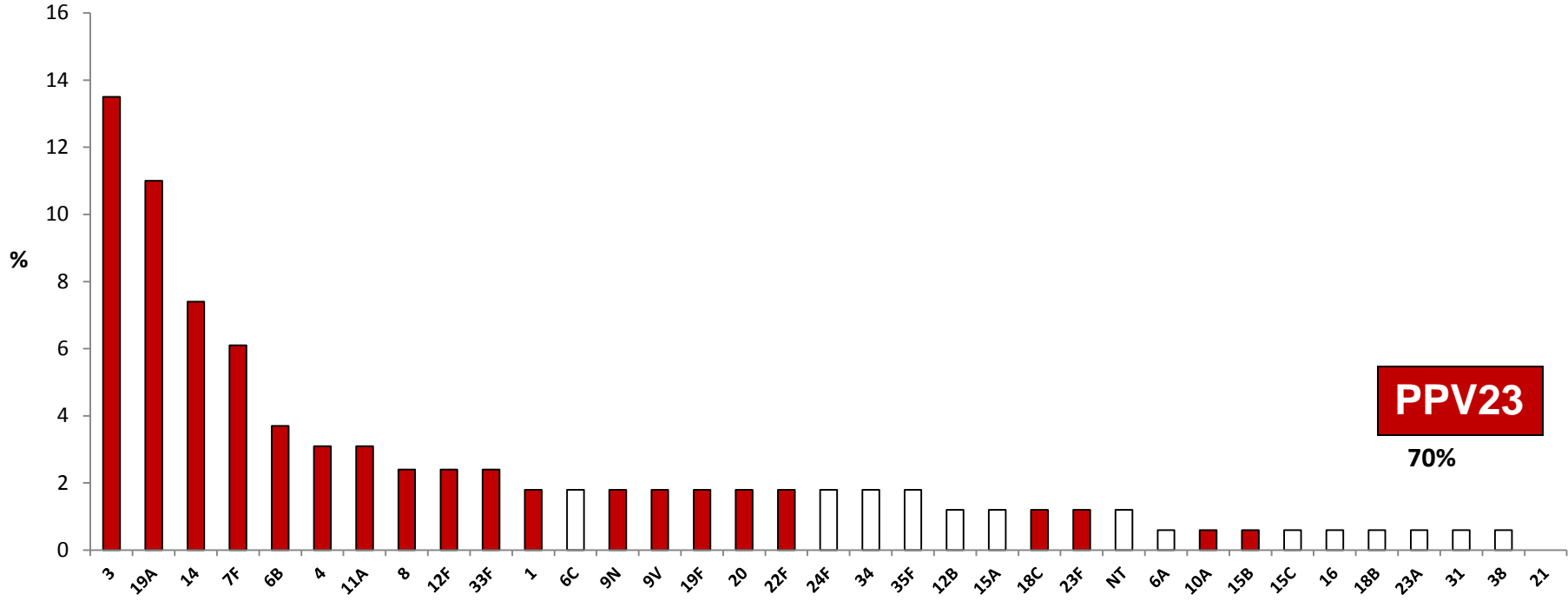
PCV13

50%



PPV23

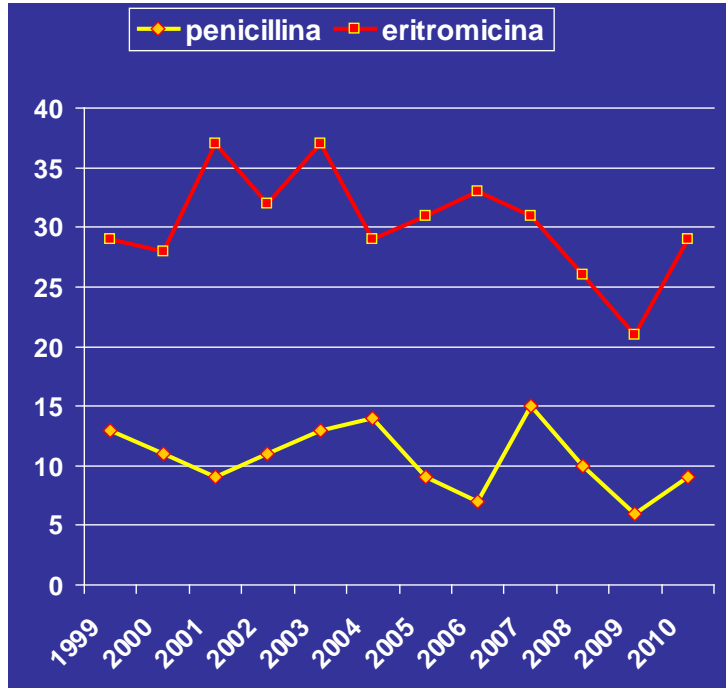
70%



Resistenza agli antibiotici in ceppi invasivi di *S. pneumoniae*

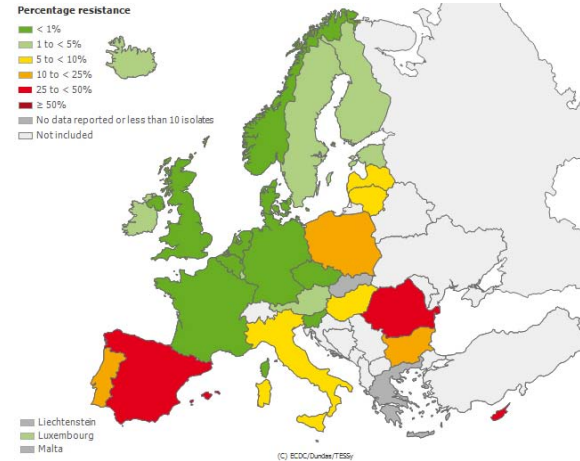
EARS-NET

Resistenza in Italia



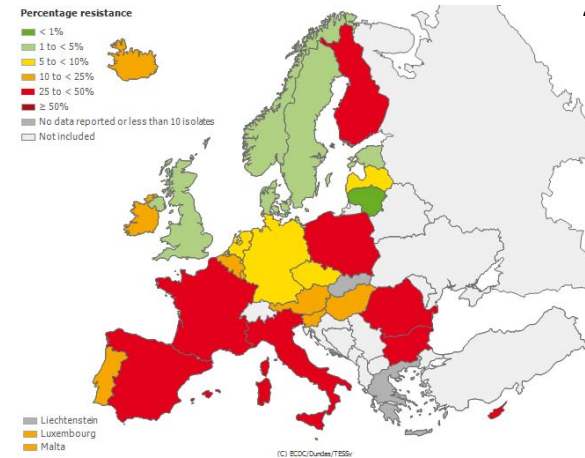
Resistenza - Penicillina

2010

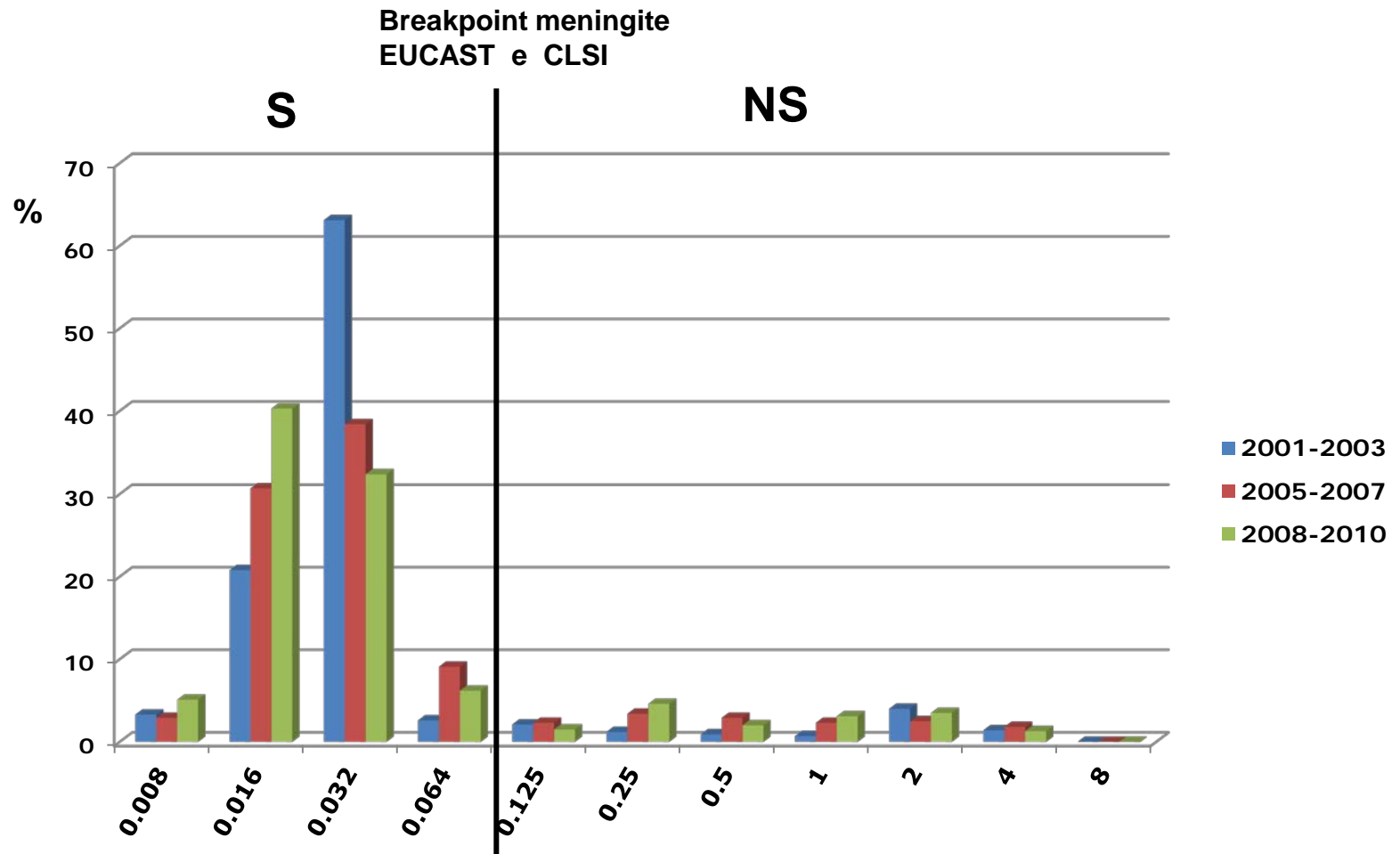


Resistenza - Eritromicina

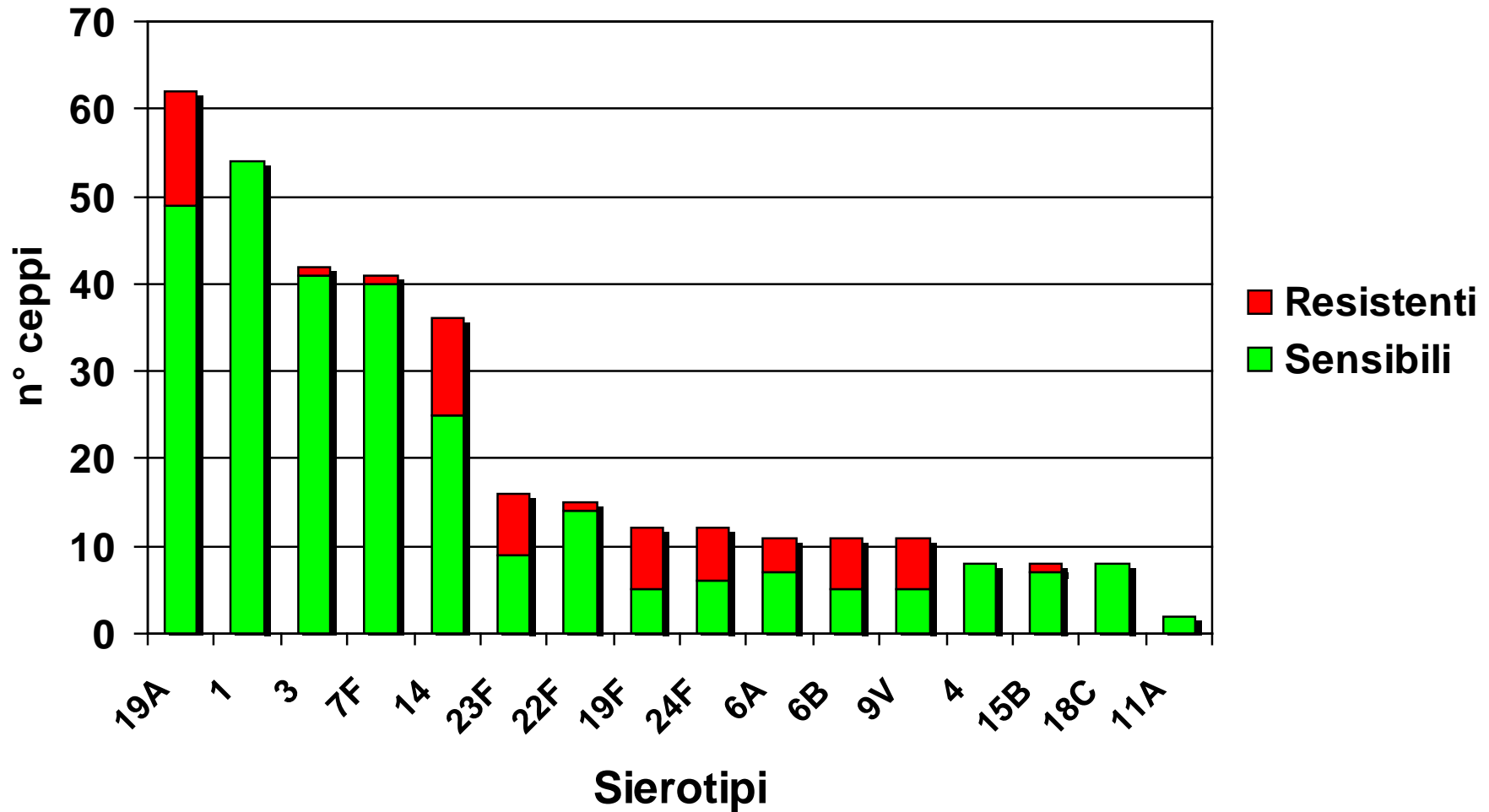
2010



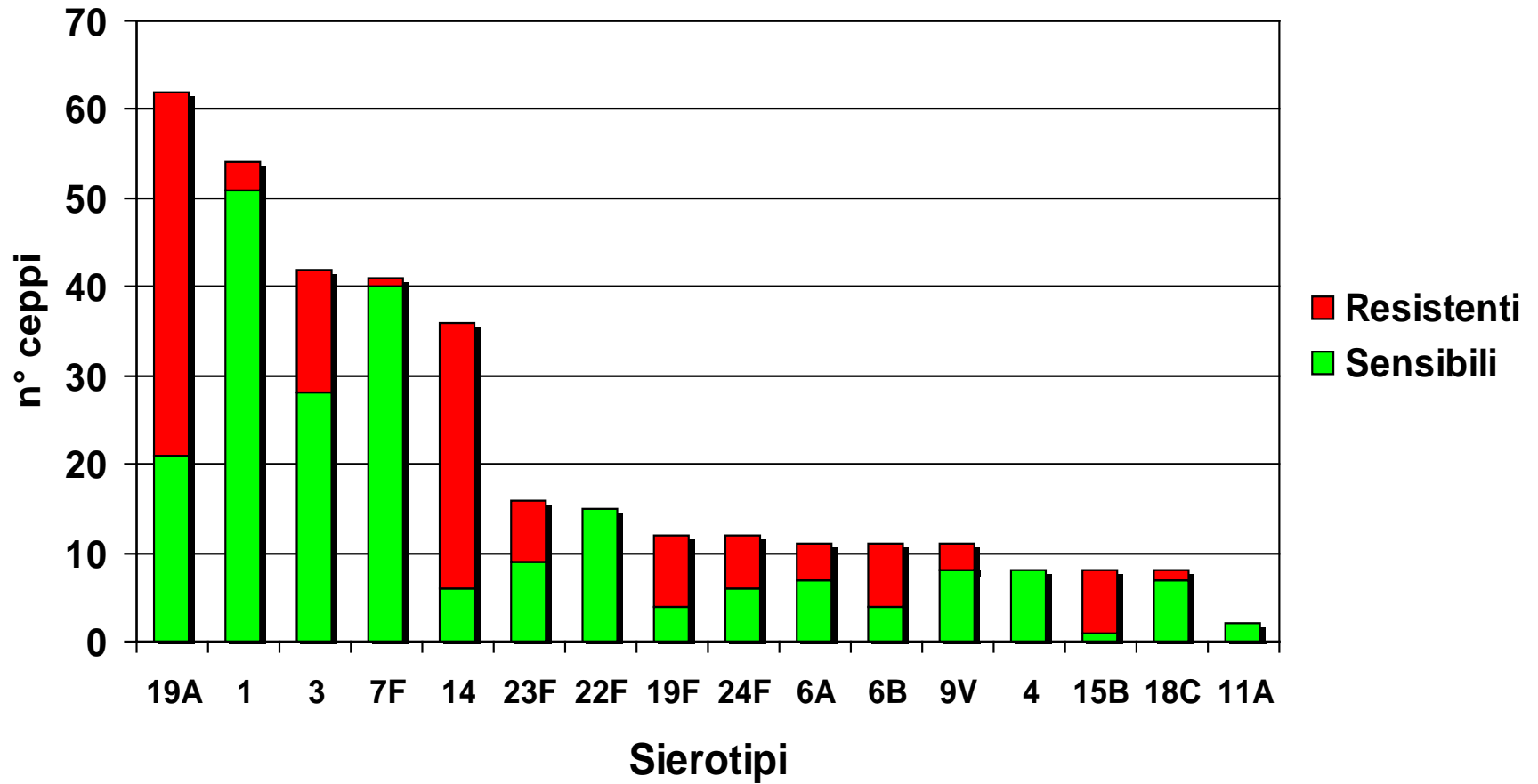
Distribuzione delle MIC per la penicillina



Sierotipi e resistenza alla penicillina



Sierotipi e resistenza alla eritromicina



Fallimenti vaccinali

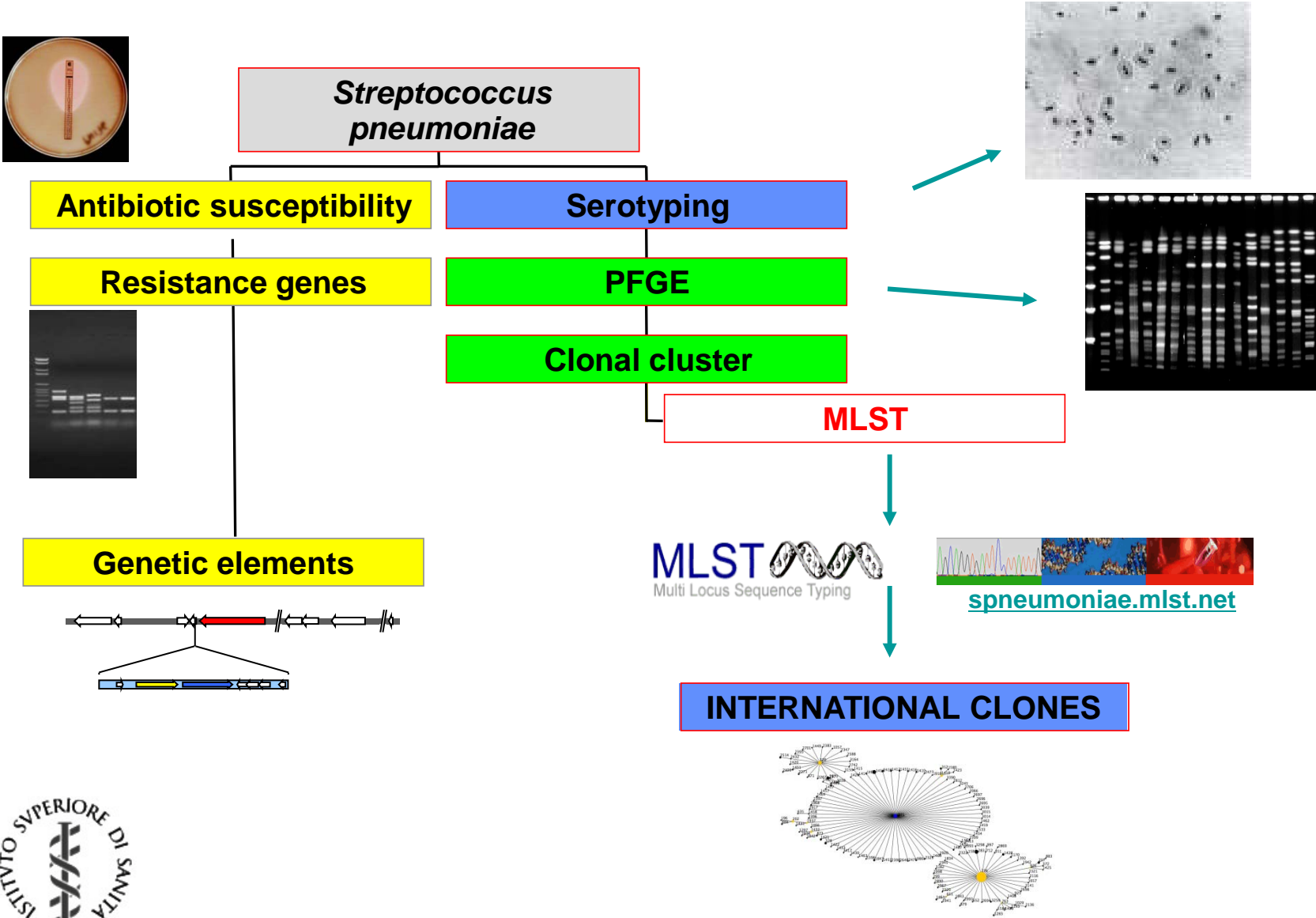
- **2011:** *Regione:* PIEMONTE
sexso: F
età: 1 anno
diagnosi: SEPSI
POLMONITE
vaccino: PREVENAR
n° dosi: 3
sierotipo: **19F**

- **2010:** *Regione:* EMILIA
ROMAGNA
sexso: M
età: 1 anno
diagnosi: SEPSI
vaccino: PREVENAR
n° dosi: 3
sierotipo: **19F**

- **2009:** *Regione:* FRIULI VENEZIA
GIULIA
sexso: M
età: 2 anni
diagnosi: POLMONITE
vaccino: PREVENAR
n° dosi: 3
sierotipo: **23F**

- **2008:** *Regione :* LOMBARDIA
sexso: M
età: 4 mesi
diagnosi: SEPSI
vaccino: PREVENAR
n° dosi: 1
sierotipo: **23F**

Caratterizzazione di *S. pneumoniae*



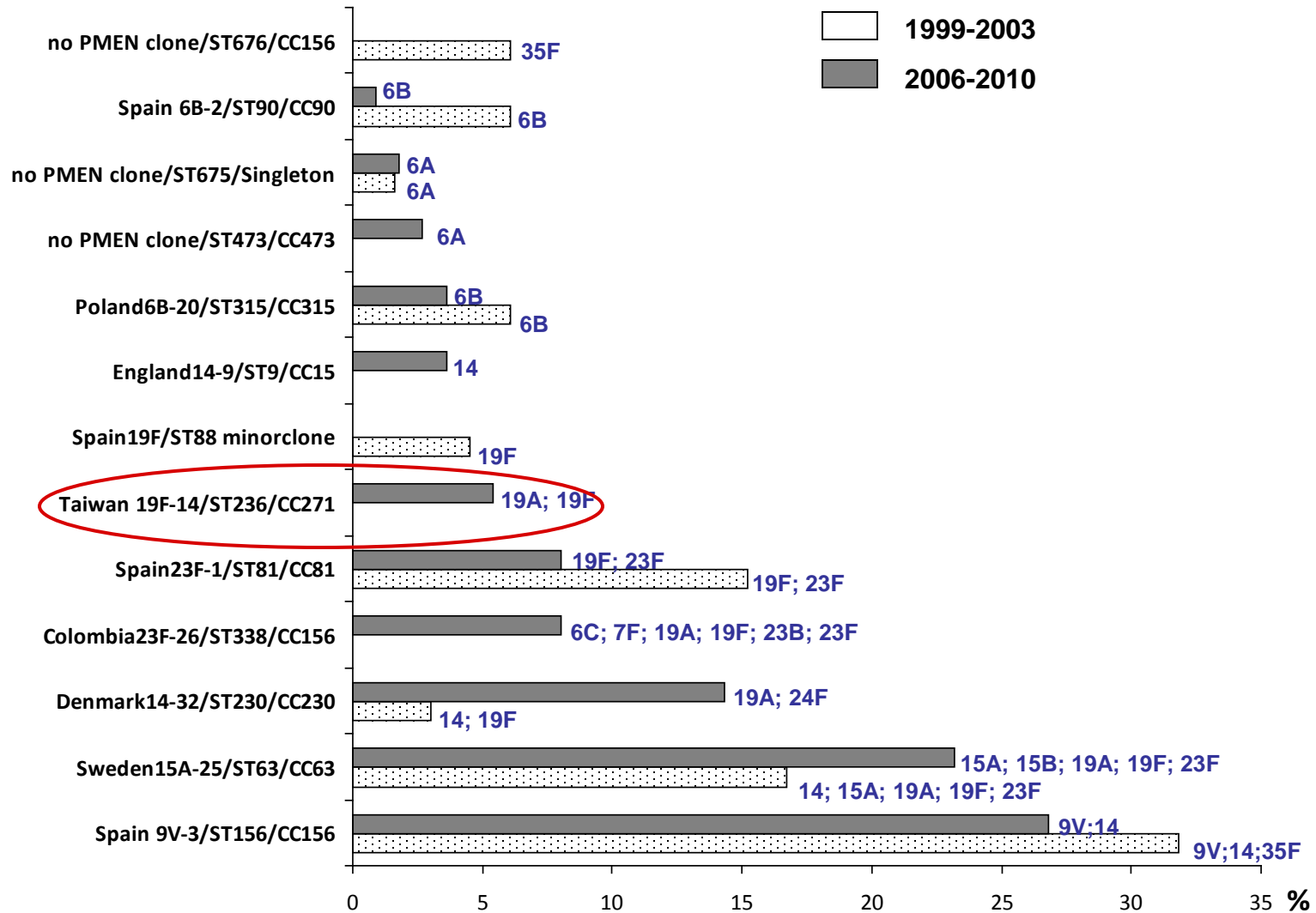
Studi sui ceppi

Nuovi sierotipi:

- ❑ Tipizzazione del sierotipo 6C e 6D e conferma tramite PCR
- ❑ Analisi dei ceppi con sierotipo 11A, per distinguere in questo gruppo il nuovo sierotipo 11E
- ❑ Caratterizzazione dei ceppi non tipizzabili e conferma identificazione
- ❑ Identificazione dei cloni prevalenti circolanti in Italia
- ❑ Evoluzione dei cloni nel tempo
- ❑ Associazione con la resistenza agli antibiotici

Pneumococco resistente alla penicillina

Evoluzione dei cloni

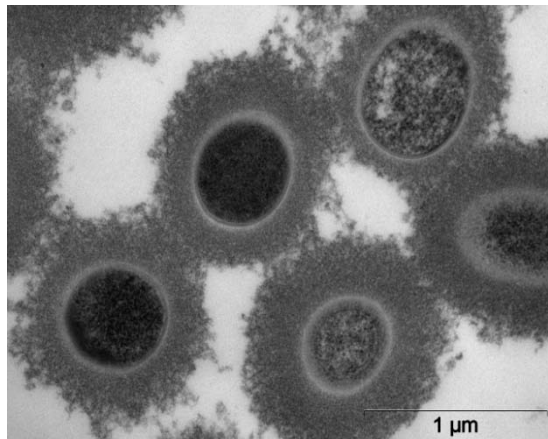


NON-TYPEABLE PNEUMOCOCCI

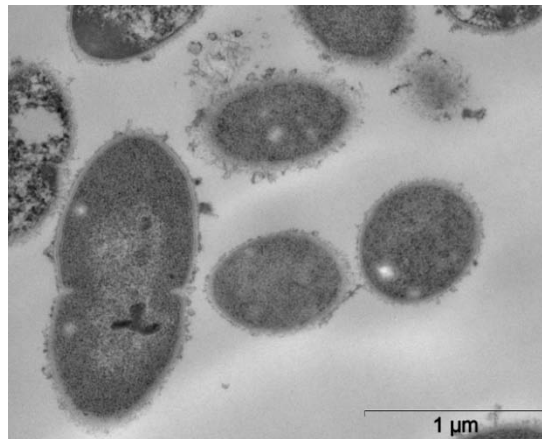
2,000 ceppi da infezioni invasive :
1 ceppo *S. pseudopneumoniae*
5 pneumococchi non tipizzabili

AP422 e AP426 isolati da due casi di polmonite batteriemia nel 2006

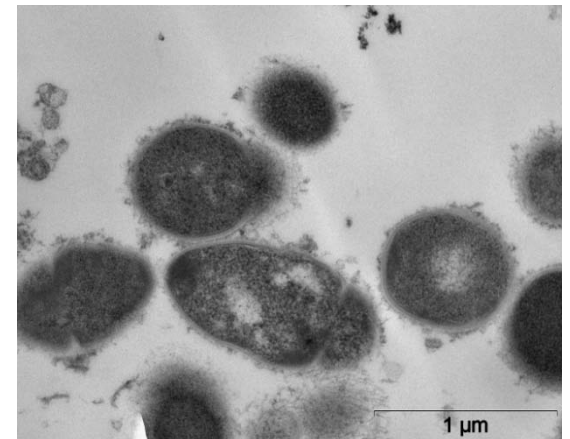
AP425 sierotipo 7F



AP422 NT



AP426 NT



Sequencing of the capsular locus (*cps*)



7F *cps* in both strains, but distinct single point mutations in *wchA*, coding for a glucose phosphate transferase

AP422 (deletion of A910)

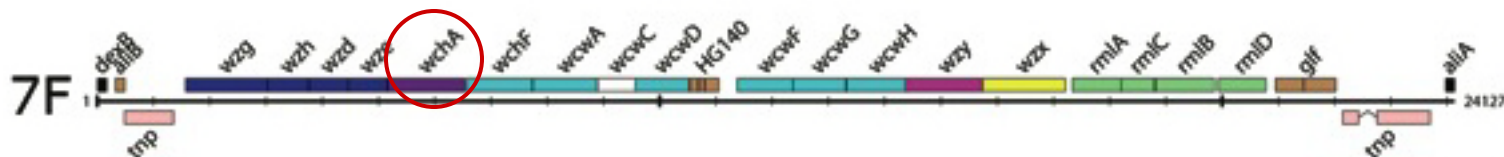
WchA wt

```
MDEKGLKIFLAVLQSIIVILLVYFLSFVREAELEERSMIVLYLLHFFVYFSSYGNFFK
RGYLVEFNSTIRYIFFFAIAISVLNFFIAERFISRRGMVYFLTLEGISLYLLNFLVKKY
WKHVFFNLKNSKKILLTIVTKNMEKVLDKLLESDELSWKLVAVSVLDKSDFQHDKIPVIE
KEKII EFATHEVVDEVFVNLPGESYDIGEII SRFETMGIDVTVNLKAFDKNLGRNKQIYE
MVGLNVVTFSTNFYKTSHVVISKRILDICGATIGLILFAIASLVLVPLIRKDGGAIFAQT
RIGKNGRHFTFYKFRSMRSDAEAIKEQLMDQNTMQGGMFKIDNDPRVTKIGRFIRKTSLD
ELPQFWNVFIGDMSLVGTRPPTVDEYVQYTPQKRRLSFKPGITGLWQVSGRSKITDFDD
VVKLDVAYIDNWTIWKDIEILLKTVKVVMREGAK-
```

```
MDEKGLKIFLAVLQSIIVILLVYFLSFVREAELEERSMIVLYLLHFFVYFSSYGNFFK
RGYLVEFNSTIRYIFFFAIAISVLNFFIAERFISRRGMVYFLTLEGISLYLLNFLVKKY
WKHVFFNLKNSKKILLTIVTKNMEKVLDKLLESDELSWKLVAVSVLDKSDFQHDKIPVIE
KEKII EFATHEVVDEVFVNLPGESYDIGEII SRFETMGIDVTVNLKAFDKNLGRNKQIYE
MVGLNVVTFSTNFYKTSHVVISKRILDICGATIGLILFAIASLVLVPLIRKDGGAIFAQT
RIGKNGRHFTFYKFRSMRSDAEAIKEQLMDQNTMQGGMFKIDNDPRVTKIGRFIRKTSLD
RIGKMGVDILPFINSVRCGAMLLKLSKNS-
```

```
MDEKGLKIFLAVLQSIIVILLVYFLSFVREAELEERSMIVLYLLHFFVYFSSYGNFFK
RGYLVEFNSTIRYIFFFAIAISVLNFFIAERFISRRGMVYFLTLEGISLYLLNFLVKKY
WKHVFFNLKNSKKILLTIVTKNMEKVLDKLLESDELSWKLVAVSVLDKSDFQHDKIPVIE
KEKII EFATHEVVDEVFVNLPGESYDIGEII SRFETMGIDVTVNLKAFDKNLGRNKQIYE
MVGLNVVTFSTNFYKTSHVVISKRILDICGATIGLILFAIASLVLVPLIRKDGGAIFAQT
RIGKNGRHFTFYKFRSMRSDAEAIKEQLMDQNTMQGGMFKIDNDPRVTKIGRFIRKTSLD
RIGKMGVDILPFINSVRCGAMLLKLSKNS-
```

AP426 (G1081T transversion)



ISS



MIPI

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