



**fimp**

Federazione Italiana Medici *Pediatr*i  
Sezione di Caserta

## SIPPS & FIMPAGGIORNA 2014

### OBIETTIVO PEDIATRIA:

La centralità del bambino tra territorio, ospedale ed università



Il Corso rientra nel programma di Educazione Continua in Medicina del Ministero della Salute

#### Sede del Corso

PLAZA HOTEL, Via Lamberti - Caserta

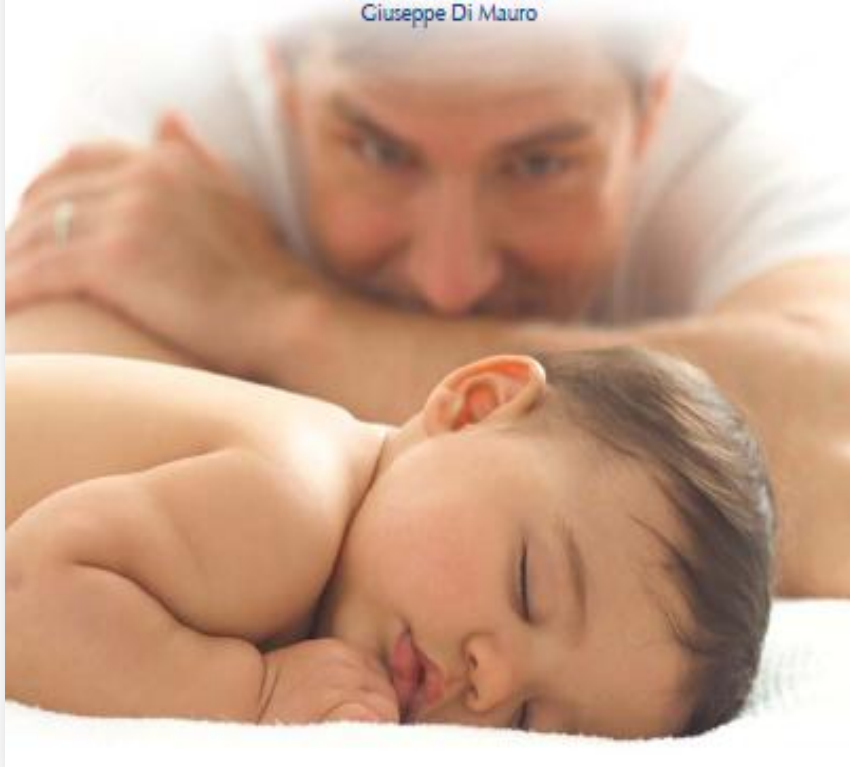
#### Coordinatore Scientifico

Giuseppe Di Mauro

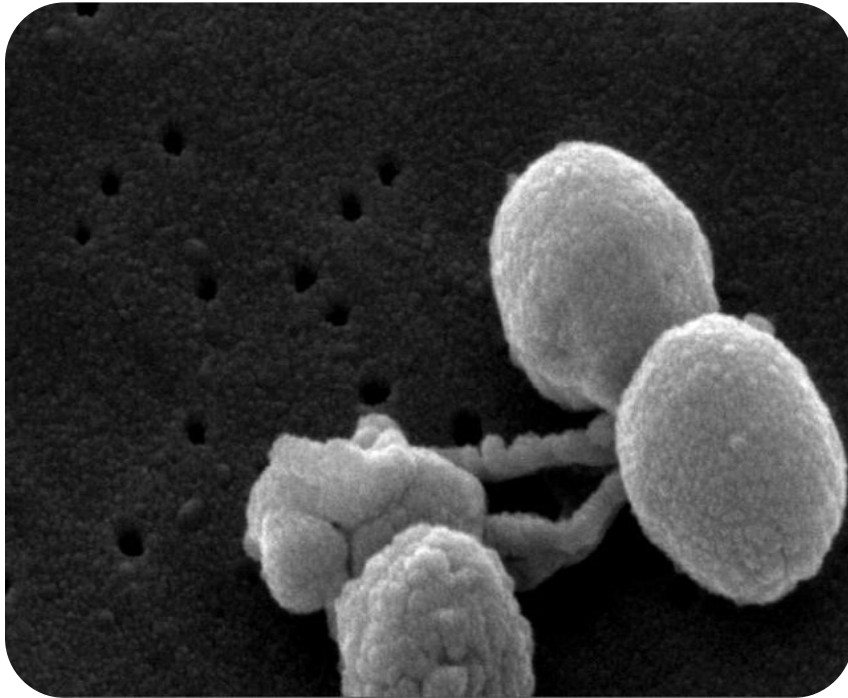
# Update della vaccinazione pneumococcica in pediatria

**Rocco Russo**  
*Pediatra*

*Unità Operative Materno Infantili  
AA.SS.LL. Benevento e Napoli 1*

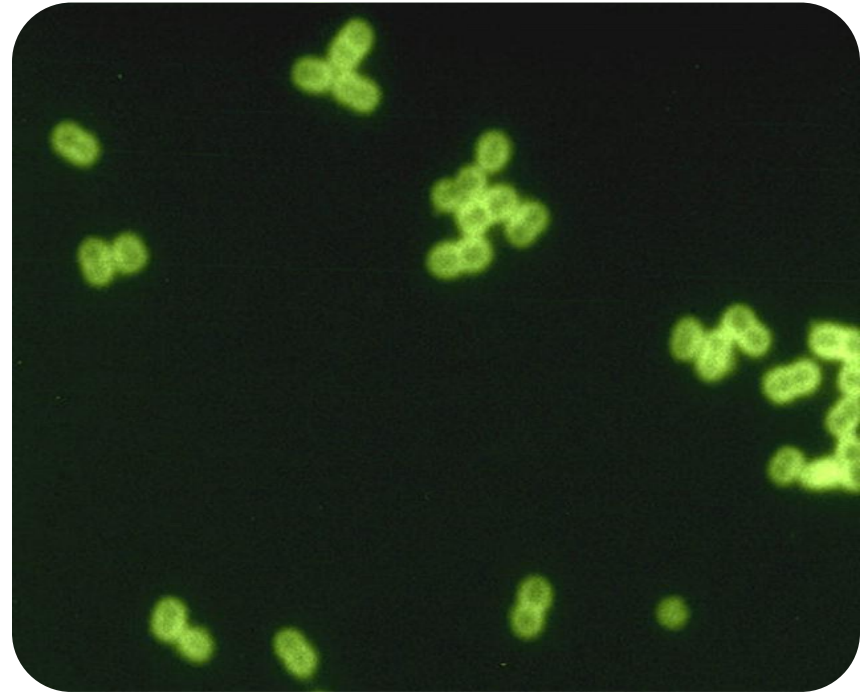


**Pneumococcal Infections Scanning Electron  
Micrograph of Streptococcus pneumoniae**



Red Book Online Visual Library, 2009. Image 102\_42. Available at:  
<http://aapredbook.aappublications.org/visual>.

**Pneumococcal Infections Streptococcus  
pneumoniae in spinal fluid**

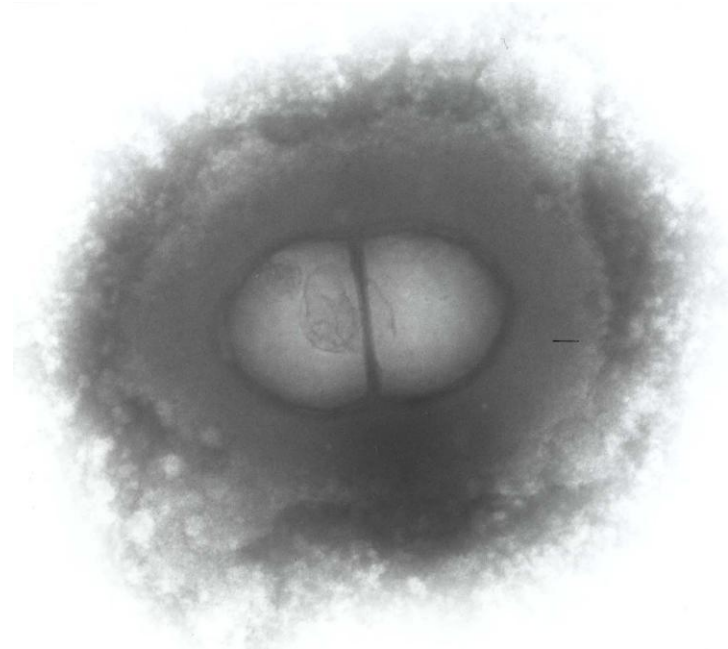


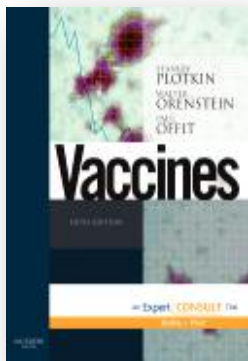
Red Book Online Visual Library, 2009. Image 102\_41. Available at:  
<http://aapredbook.aappublications.org/visual>.



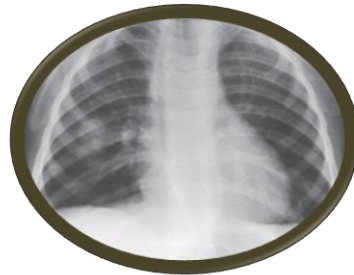
## *Streptococcus pneumoniae* (pneumococco): caratteristiche

- ✓ *Diplococco Gram-positivo lanceolato*
- ✓ *ubiquitario; molti soggetti ne sono colonizzati al livello delle alte vie respiratorie*
- ✓ *viene trasmesso da persona a persona, preferibilmente per contatto tramite goccioline respiratorie*
- ✓ *il periodo di incubazione varia a seconda del tipo di infezione e può anche durare 1-3 giorni*
- ✓ *infezioni prevalenti in inverno*
- ✓ *ne sono stati identificati almeno 90 sierotipi diversi in base al polisaccaride capsulare*
- ✓ *alcuni sierotipi (6A, 6B, 9V, 14, 19A, 19F, 23F) sono più frequentemente associati a resistenza alla penicillina*
- ✓ *il 19A, è la causa più frequente di malattia invasiva nel bambino vaccinato con PCV7*





# Clinical pneumococcal infections



*Streptococcus pneumoniae* is a leading bacterial cause of **meningitis**, **bacteremia**, **pneumonia** and **otitis media** in the United States.

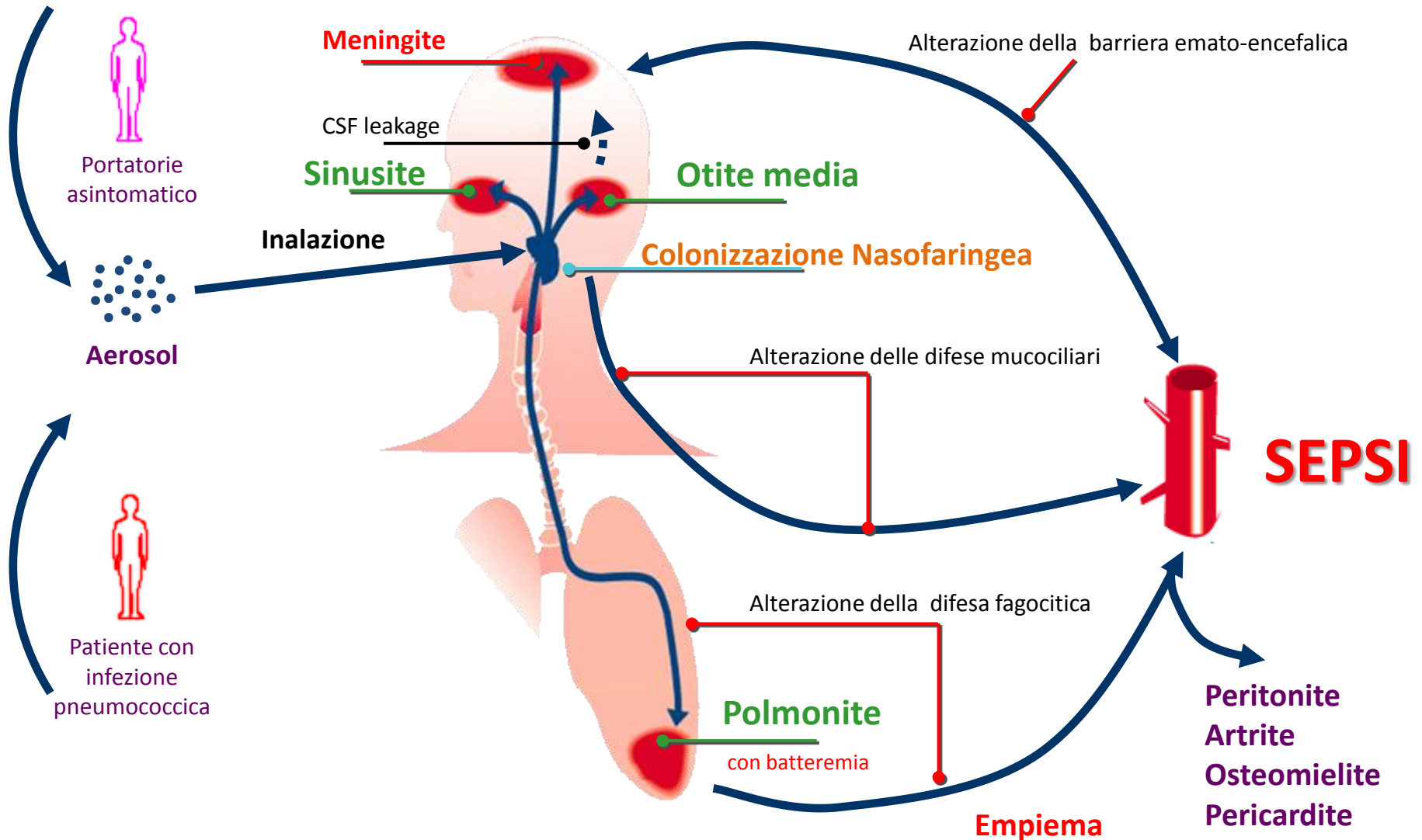
Infections of the middle ear (otitis media), tracheobronchial tree and lung are the result of direct spread of the organism from the nasopharynx.

Pneumococci may also cause **systemic infections** and **invasive pneumococcal disease (IPD)** is defined by the detection of *S. pneumoniae* in the bloodstream or other normally sterile sites such as cerebrospinal fluid, pleural fluid, or synovial fluid.



# Streptococcus pneumoniae

## transmissione e patogenesi

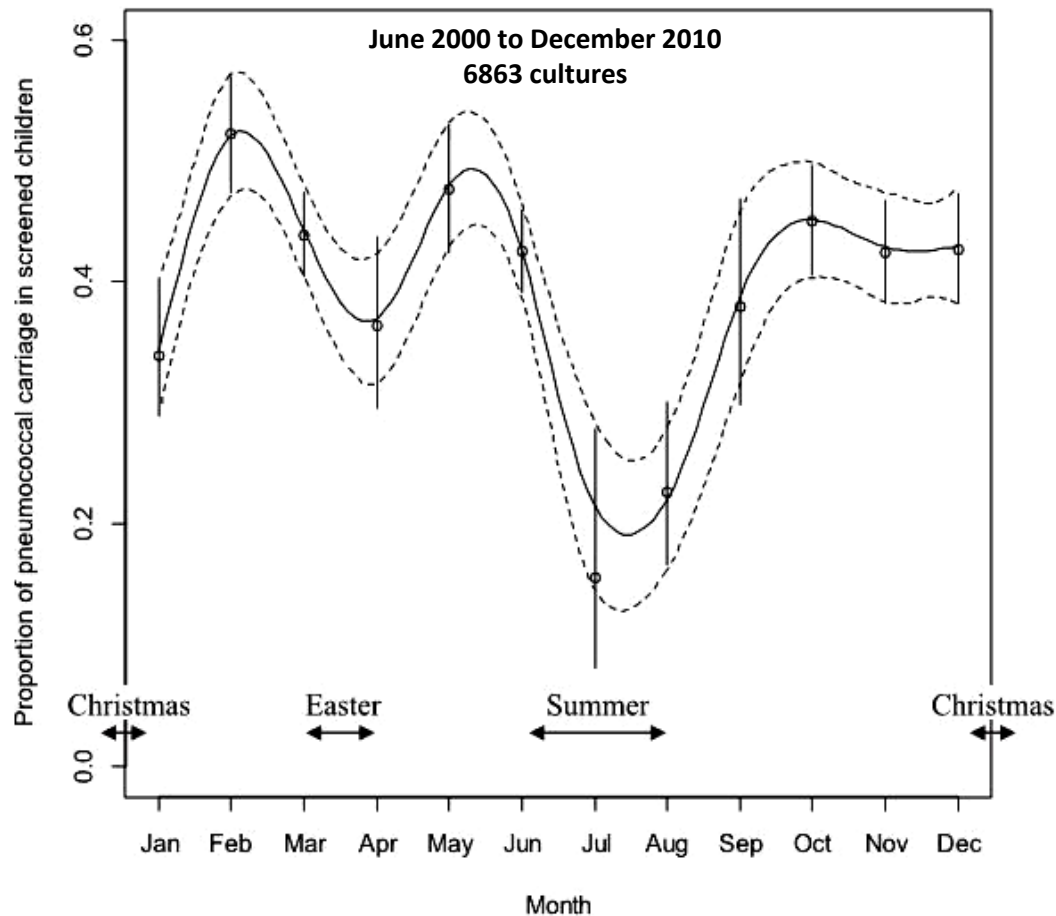




# RISK FACTORS FOR PNEUMOCOCCAL CARRIAGE IN DAY CARE CENTERS *a retrospective study during a 10-year period*

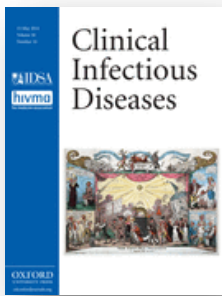
Jonas Ahl, Eva Melander, Inga Odenholt, Lisa Tvetman, Tora Thörnblad, Kristian Riesbeck and Håkan Ringberg

*The Pediatric Infectious Disease Journal* Volume 33, Number 5, May 2014



The rate of acquisition depends on the **age of the host** but varies in relation to:

- **demographic factors**
- **genetic background**
- **smoking**
- **socioeconomic conditions**
- **family size**
- **recent antibiotic**
- **vaccination**



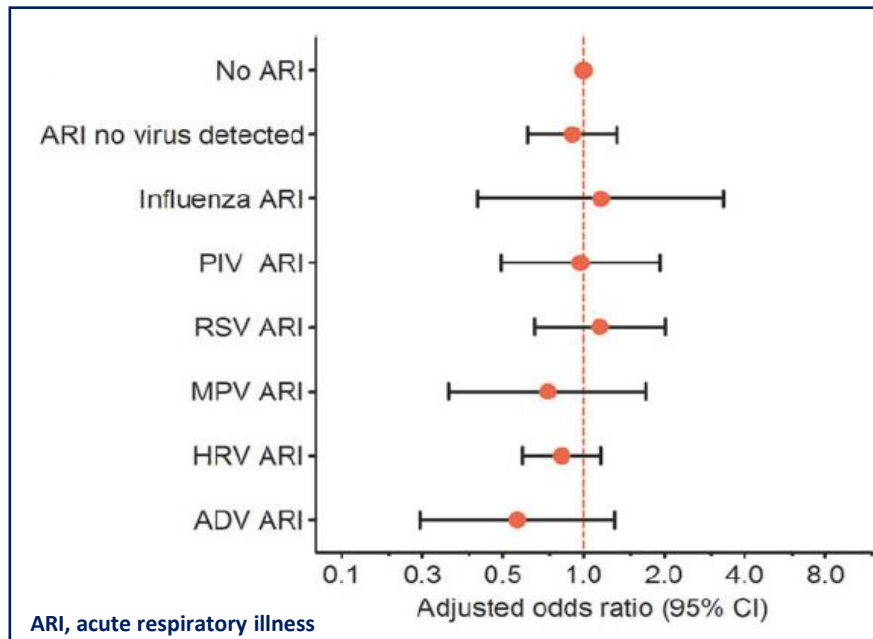
# The Role of Influenza and Parainfluenza Infections in Nasopharyngeal Pneumococcal Acquisition Among Young Children

Carlos G. Grijalva, Marie R. Griffin, Kathryn M. Edwards, John V. Williams, Ana I. Gil, Hector Verastegui, Stella M. Hartinger, Jorge E. Vidal, Keith P. Klugman, and Claudio F. Lanata

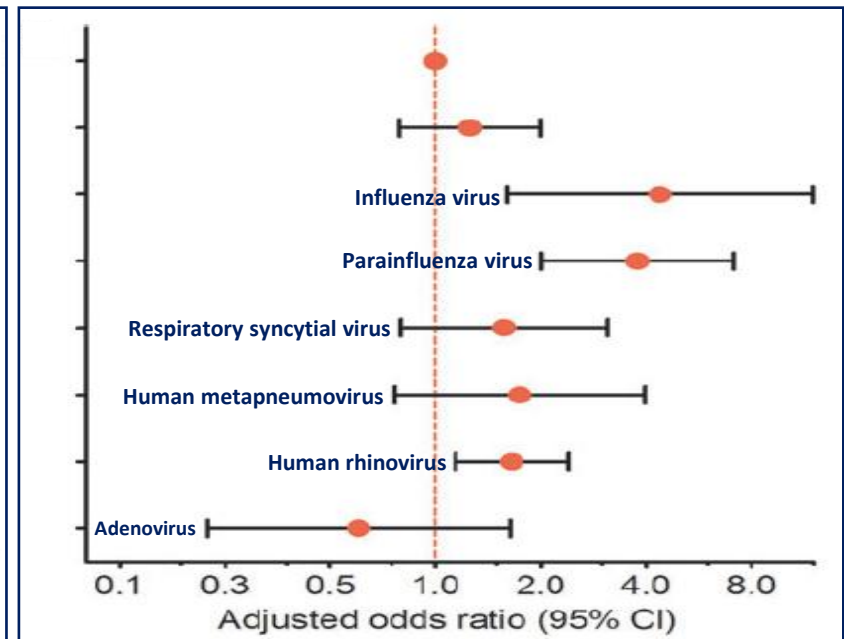
*Clinical Infectious Diseases* 15 May 2014;58(10):1369–76

## Association between acquisition of a new pneumococcal serotype and previous acute respiratory infections by acquisition type, San Marcos, Peru, 2009–2011

From no colonization to colonization



From colonization to colonization with a different serotype



# WORLD IMMUNIZATION WEEK 2014

Four vaccines, millions of lives



MALARIA



PNEUMONIA



ROTAVIRUS

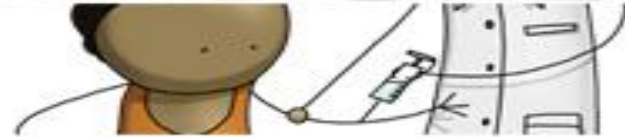


JAPANESE  
ENCEPHALITIS

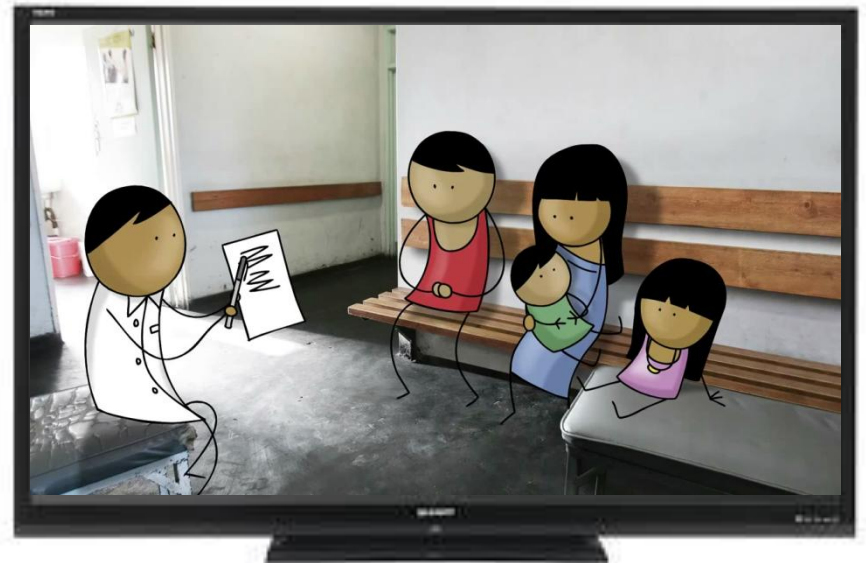


World Health  
Organization

## IMMUNIZE FOR A HEALTHY FUTURE



World Immunization Week 2014, 24-30 April





## Missing immunization is deadly

Annual child deaths due to diseases easily prevented by vaccines



**Haemophilus influenzae type B**  
Can cause pneumonia and meningitis



**Pertussis**  
Whooping cough



**Measles** **Tetanus**



**Pneumococcal disease**  
Can cause pneumonia, meningitis and blood infection



**Rotavirus**  
Can cause severe diarrhea

DRC  
ETHIOPIA  
INDIA  
INDONESIA  
IRAQ  
NIGERIA  
PAKISTAN  
PHILIPPINES  
UGANDA  
SOUTH AFRICA

**70%**  
of unvaccinated children live in 10 countries



## Pneumococcal vaccines WHO position paper - 2012

On average, about 75% of IPD cases and 83% of pneumococcal meningitis occur in children aged <2 years

For pneumonia, between 8.7% and 52.4% of cases occur in infants aged <6 months.(16)

Apart from the high incidence in children <2 years of age, the risk for pneumococcal disease is increased in the elderly (>65 years of age), and in people who use tobacco or alcohol excessively.

Among meningitis survivors, long-term neurological sequelae such as hearing loss, mental retardation, motor abnormalities and seizures have been observed in frequencies as high as 58% of cases. (17)

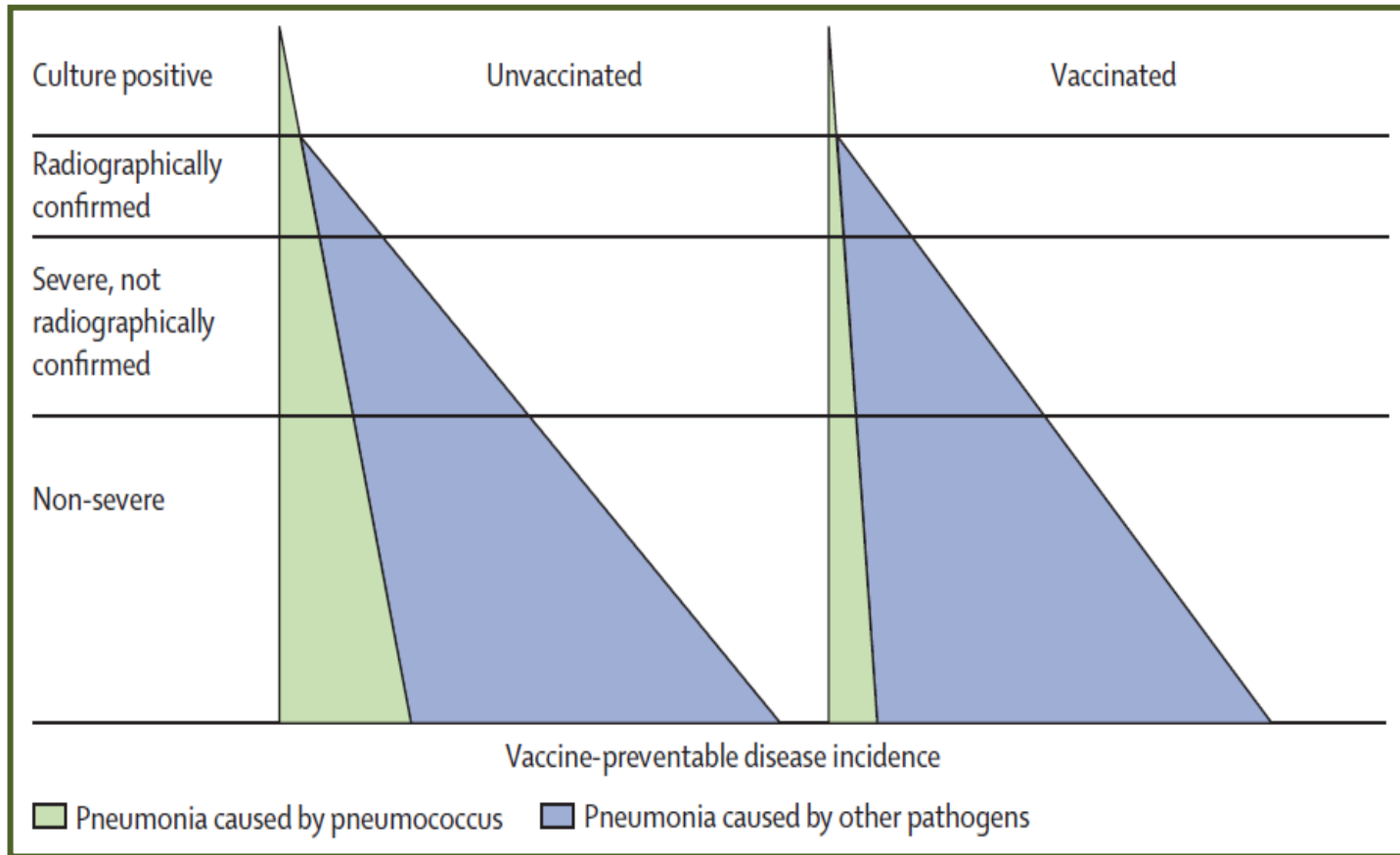
This risk is also increased in individuals who suffer from chronic medical conditions, such as heart disease, lung disease, diabetes, or asplenia, or from other conditions that suppress the immune system, such as advanced HIV infection.

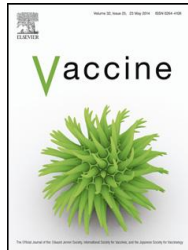


# Use of vaccines as probes to define disease burden

Daniel R Feikin, J Anthony G Scott, Bradford D Gessner

**Lancet** Volume 383, Issue 9930, 17–23 May 2014, Pages 1762–1770





## European enhanced surveillance of invasive pneumococcal disease in 2010: Data from 26 European countries in the post-heptavalent conjugate vaccine era

Adoración Navarro Torné, Joana Gomes Dias, Chantal Quinten, Frantiska Hrubá, Marta Cecilia Busana, Pier Luigi Lopalco, Andrew J. Amato Gauci, Lucia Pastore-Celentano, *the ECDC country experts for pneumococcal disease*

### Characteristics of national pneumococcal vaccination programmes in EU/EEA countries in 2010

Country	Date PCV7 introduction	Scope of PCV7 vaccination programme	Immunisation schedule	1st d (m)	2nd d (m)	3rd d (m)	4th d (m)	Vaccine coverage <sup>d</sup>	Year of measurement
Austria	July 2004	Universal	3+1 dose	3	5	7	12–24	–	–
Belgium	January 2005	Universal	2+1 dose	2	4	12		97	2010
Bulgaria	April 2010	Universal	3+1 dose/2+1 dose	2	3	4	12	–	–
Cyprus	August 2008	Universal	3+1 dose	2	4	6	12–15	–	–
Czech Republic	January 2010	Risk-based	3+1 dose	2	4	6	18	86.3	2010
Denmark	October 2007	Universal	2+1 dose	3	5	12		85	2010
Estonia	–	–	not decided	–	–	–	–	–	–
Finland	January 2009	Risk-based	2+1 dose	3	5	12		–	–
France	June 2006	Universal	2+1 dose	2	4	12		81	2008
Germany	July 2006	Universal	3+1 dose	2	3	4	11–14	52.9	2010
Greece	January 2006	Universal	3+1 dose	2	4	6	12–15	–	–
Hungary	October 2008	Universal	2+1 dose	2	4	15		81.1	2009
Iceland	December 2006	Risk-based	2+1 dose	3	5	12		–	–
Ireland	October 2007	Universal	2+1 dose	2	6	12		89	2009
Italy	May 2005	Universal/risk-based	2+1 dose	3	5	11		55	2008
Latvia	January 2010	Universal	3+1 dose	2	4	6	12–15	51	2010
Lithuania	–	–	3+1 dose	2	4	6	24	–	–
Luxembourg	February 2003	Universal	3+1 dose	2	3	4	12–15	86	2010
Malta	January 2007	Risk-based	3+1 dose	2	4	13	None	–	–
Netherlands	June 2006	Universal	3+1 dose	2	3	4	11	94	2009
Norway	July 2006	Universal	2+1 dose	3	5	12		90	2009
Poland	May 2008	Risk-based	3+1 dose/2+1 dose	NA	NA	NA	NA	1.70	2008
Portugal	June 2010	Risk-based	2+1 dose	2	4	12–15		52	2009
Romania <sup>a</sup>			3+1 dose	2	4	6	15–18	–	–
Slovakia <sup>b</sup>	January 2006	Risk-based	2+1 dose	2	4	10		99.2	2009
Slovenia	September 2005	Risk-based	3+1 dose	2–3	4	6	24	–	–
Spain <sup>c</sup>	June 2001	Risk-based	3+1 dose	2	4	6	15	–	–
Sweden	January 2009	Universal	2+1 dose	3	5	12		–	–
United Kingdom	September 2006	Universal	2+1 dose	2	4	13		90	2010

a) PCV7 was registered in September 2007 for voluntary use on a private basis.

b) Universal as of April 2008.

c) Universal introduction in the autonomous region of Madrid in November 2006

d) Sources: VENICE II and WHO estimates of PCV7 coverage.



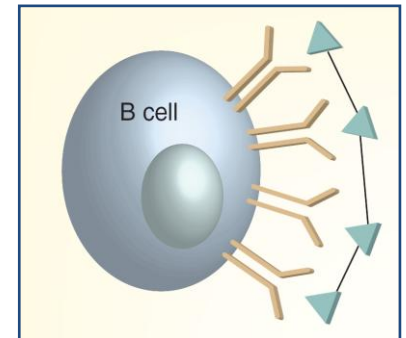
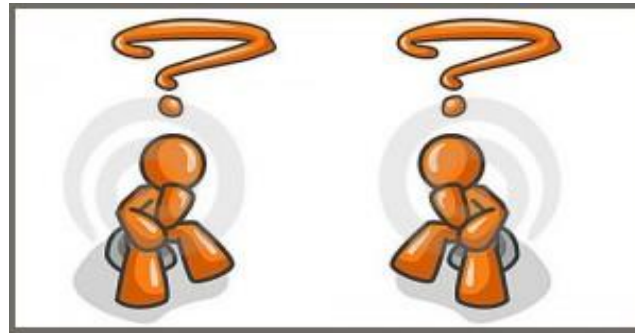
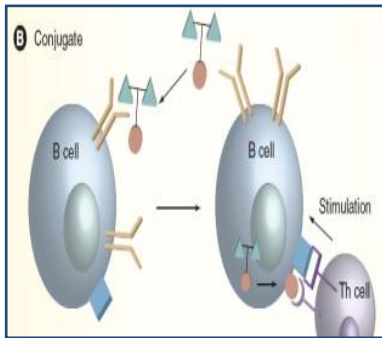
# DATI E EVIDENZE DISPONIBILI PER L'UTILIZZO DEI VACCINI ANTIPNEUMOCOCCICI NEI SOGGETTI A RISCHIO DI QUALSIASI ETÀ E PER L'EVENTUALE AMPLIAMENTO DELL'OFFERTA AI SOGGETTI ANZIANI

A cura del Gruppo di Lavoro  
Centro Nazionale di Epidemiologia, Sorveglianza e Promozione della Salute (CNESPS)  
Dicembre 2013



## Sintesi delle raccomandazioni relative alla vaccinazione pneumococcica nei soggetti a rischio in alcuni Paesi europei e extraeuropei

GRUPPI	SCHEDULA VACCINALE	PAESI
Nuovi nati a rischio	3 dosi PCV13	UK
	4 dosi PCV13	DE, FR, USA, CAN, AU, NZ, ES
Bambini a 2-5 anni già vaccinati con PCV	1 dose PPV23	DE, FR, USA, CAN, ES
	1 dose PPV23 + 1 dose supplementare di PCV13 in casi particolari*	UK, AU, NZ
Bambini a 2-5 anni mai/parzialmente vaccinati con PCV	1 dose PCV13 + 1 dose PPV23	DE, CAN
	2 dosi PCV13 + 1 dose PPV23	FR, AU, NZ, ES
	1 o 2 dosi PCV13* + 1 dose PPV23	UK, USA
Soggetti a rischio 5+	1 dose di PPV23	DE, FR, UK
	PCV13 + PPV23	CAN, ES USA, AU in soggetti ad alto rischio NZ in caso di pre/post splenectomia
Rivaccinazione	1 dose PPV23 dopo 3-5 anni per un massimo di 2-3 dosi	USA, AU DE, CAN, NZ in soggetti ad alto rischio

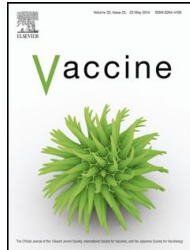


## Antigeni proteici T-dipendenti

- ✓ Buon effetto priming
- ✓ Buono switch IgM-IgG
- ✓ Produzione di tutti gli isotipi di IgG
- ✓ Buon effetto booster

## Polisaccaridi T-indipendenti

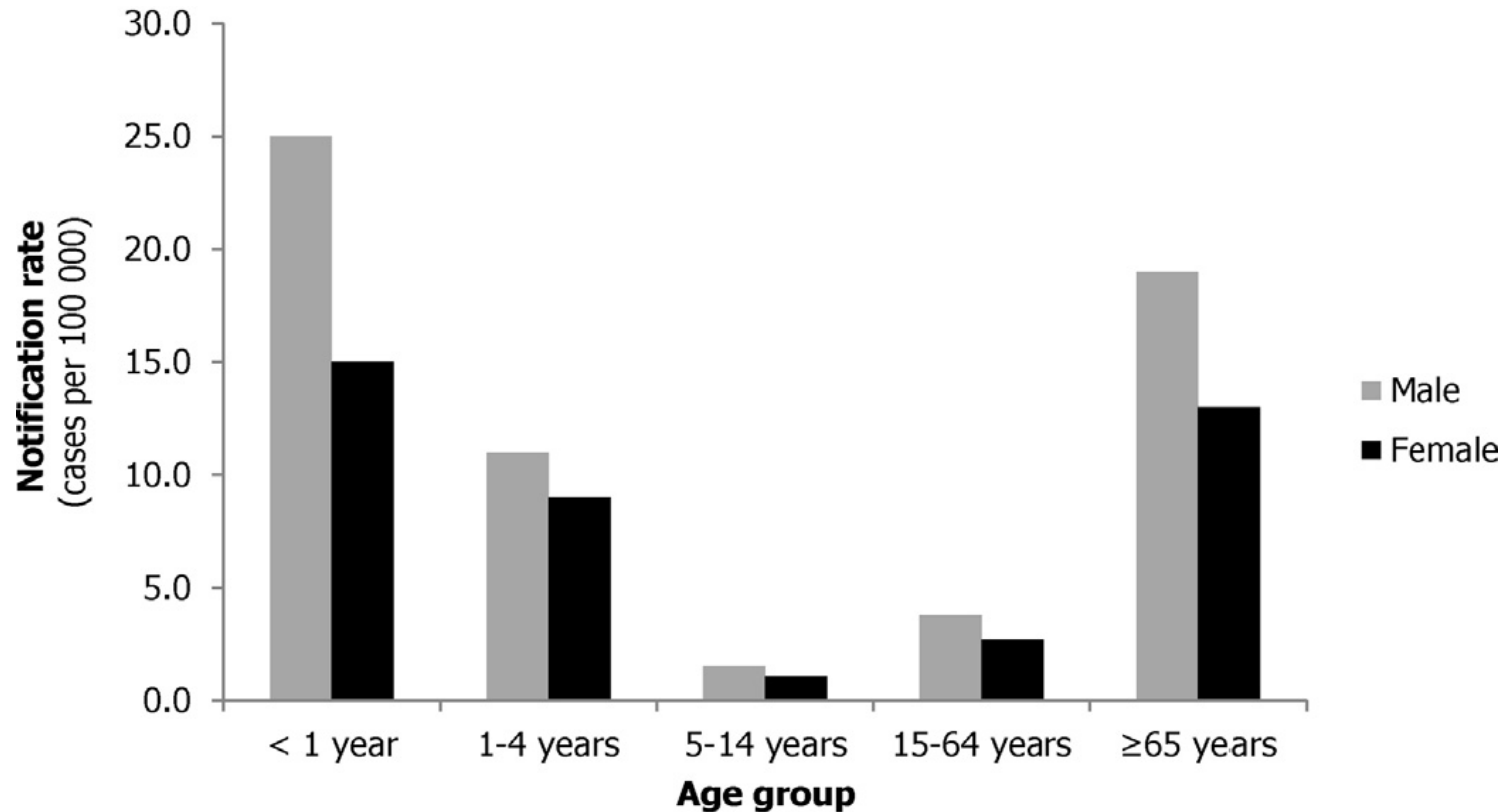
- ✓ Scarso effetto priming
- ✓ Scarso switch IgM-IgG
- ✓ Produzione soprattutto di IgG2
- ✓ Scarso effetto booster

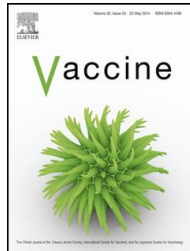


## European enhanced surveillance of invasive pneumococcal disease in 2010: Data from 26 European countries in the post-heptavalent conjugate vaccine era

Adoración Navarro Torné, Joana Gomes Dias, Chantal Quinten, Frantiska Hrubá, Marta Cecilia Busana, Pier Luigi Lopalco, Andrew J. Amato Gauci, Lucia Pastore-Celentano, *the ECDC country experts for pneumococcal disease*

Notification rate of IPD cases by age group and gender, EU/EEA countries, 2010 (N = 21,496).





## European enhanced surveillance of invasive pneumococcal disease in 2010: Data from 26 European countries in the post-heptavalent conjugate vaccine era

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### Number of reported cases and notification rates of invasive pneumococcal disease cases in EU/EEA countries, 2010 (N = 21,565).

		Country	No. of reported cases (N)								Notification rate (cases per 100,000)
	Quadro clinico	n.i.	0	1 - 4	5 - 9	10 - 14	15 - 24	25 - 64	> 64	TOTALE	
2010	Meningite	1	15	14	3	6	2	146	120	307	
	Sepsi	2	14	42	14	5	6	166	292	541	
	Altro	0	0	0	0	0	0	0	0	0	

Italy	854	1.3
Latvia	16	0.7
Lithuania	9	0.3
Malta	11	2.7
Netherlands <sup>d</sup>	55	4.9
Poland	333	0.9
Romania	80	0.4
Slovakia	18	0.3
Slovenia	224	10.7
Spain <sup>e</sup>	2212	4.7
Sweden	1456	14.8
United Kingdom <sup>f</sup>	5616	9.0
EU Total	20,785	5.1
Iceland	32	11.5
Norway	748	16.2
Total	21,565	5.2

- a) Aggregated reporting.  
 b) France: no national coverage for invasive pneumococcal disease  
 c) National coverage only for meningitis  
 d) Netherlands reports data on IPD only on children up to 5 years. Notification rates were calculated accordingly.

- e) No national surveillance in Spain. The notification rate needs to be interpreted cautiously and may be much higher.  
 f) There is not a single surveillance system in the UK covering the four health services.



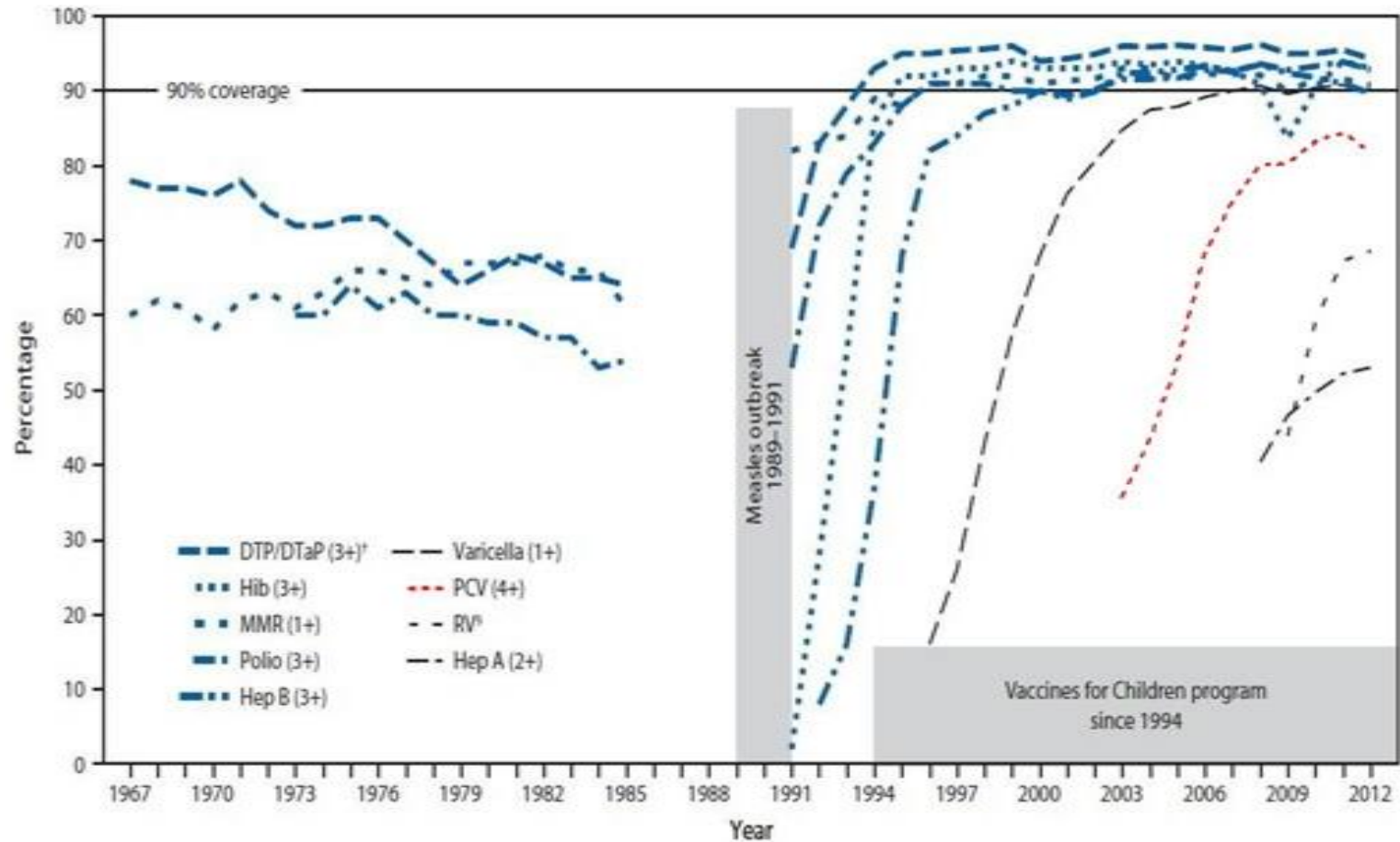




# BENEFITS FROM IMMUNIZATION DURING THE VACCINES FOR CHILDREN PROGRAM ERA — UNITED STATES, 1994–2013

Cynthia G. Whitney, Fangjun Zhou, James Singleton, Anne Schuchat

MMWR / April 25, 2014 / Vol. 63 / No. 16



Vaccine coverage rates among preschool-aged children\* United States, 1967–2012



## Dati e evidenze disponibili per l'utilizzo dei vaccini anti-pneumococcici nei soggetti a rischio di qualsiasi età e per l'eventuale ampliamento dell'offerta ai soggetti anziani

**Dicembre 2013**

Copertura vaccinale a 24 mesi per vaccino anti-pneumococcico coniugato in alcune Regioni/PP.AA. per anno di rilevazione (coorti di nascita 2005-2009)

	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>Basilicata</b>	92,7	92,7	96,3	97,3	98,5
<b>Calabria</b>	57,1	68,1	75,3	81,4	86,9
<b>Emilia Romagna</b>	43,3	n.d	94,3	94,6	94,1
<b>Friuli Venezia Giulia</b>	n.d	n.d	n.d	n.d	74,9
<b>Lombardia</b>	35,9	46,9	58,5	66,1	71,7
<b>Marche</b>	24,2	35,5	45,5	59,7	65,8
<b>P.A. Bolzano</b>	14,3	23,6	40,2	72,6	75,5
<b>Piemonte</b>	10,8	19,3	27,8	29,1	44,7
<b>Puglia</b>	75,7	80,4	85,4	86,3	82,8
<b>Sicilia</b>	83,9	88,7	90,7	93,6	94,3
<b>Toscana</b>	n.d	n.d	n.d	88,2	93,5
<b>Trento</b>	37,7	69,5	85,1	84	84,6
<b>Valle d'Aosta</b>	n.d	n.d	85,4	89,7	90,4
<b>Veneto</b>	83,7	86,1	87,5	88,3	78,2



# BENEFITS FROM IMMUNIZATION DURING THE VACCINES FOR CHILDREN PROGRAM ERA — UNITED STATES, 1994–2013

*Cynthia G. Whitney, Fangjun Zhou, James Singleton, Anne Schuchat*

*MMWR / April 25, 2014 / Vol. 63 / No. 16*

Vaccine-preventable disease*	Cases prevented (in thousands)		
	<i>Among 78.6 million American children born during 1994–2013</i>		
	Illnesses	Hospitalizations	Deaths
Diphtheria	5,073	5,073	507.3
Tetanus	3	3	0.5
Pertussis	54,406	2,697	20.3
Haemophilus influenzae type B	361	334	13.7
Polio	1,244	530	14.8
Measles	70,748	8,877	57.3
Mumps	42,704	1,361	0.2
Rubella	36,540	134	0.3
Congenital rubella syndrome	12	17	1.3
Hepatitis B	4,007	623	59.7
Varicella	68,445	176	1.2
<b>Pneumococcus-related diseases†</b>	<b>26,578</b>	<b>903</b>	<b>55.0</b>
Rotavirus	11,968	327	0.1
<b>Total</b>	<b>322,089</b>	<b>21,055</b>	<b>731.7</b>

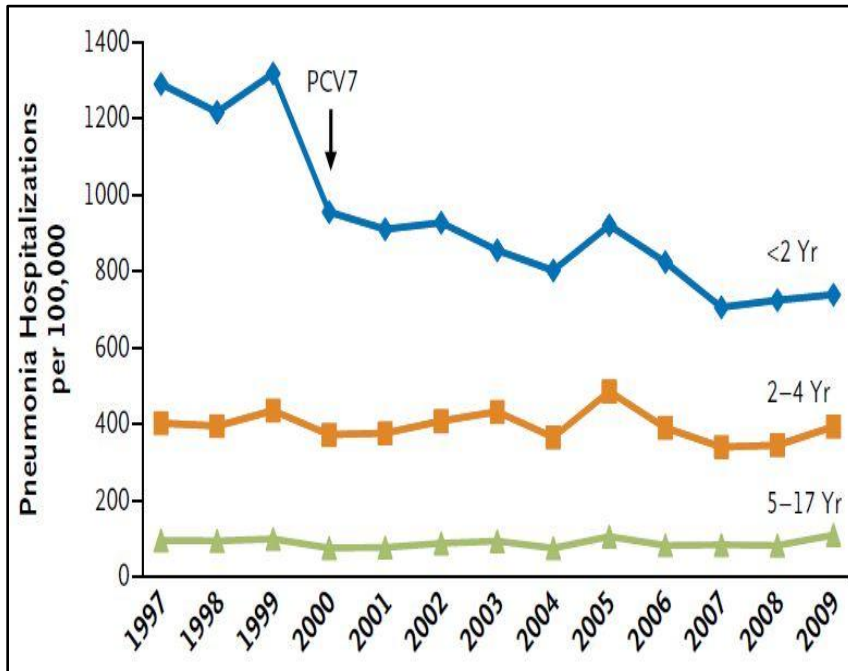
Estimated number of illnesses, hospitalizations, and deaths prevented by routine childhood immunization for selected vaccine-preventable diseases among children born during the Vaccines for Children era

ORIGINAL ARTICLE

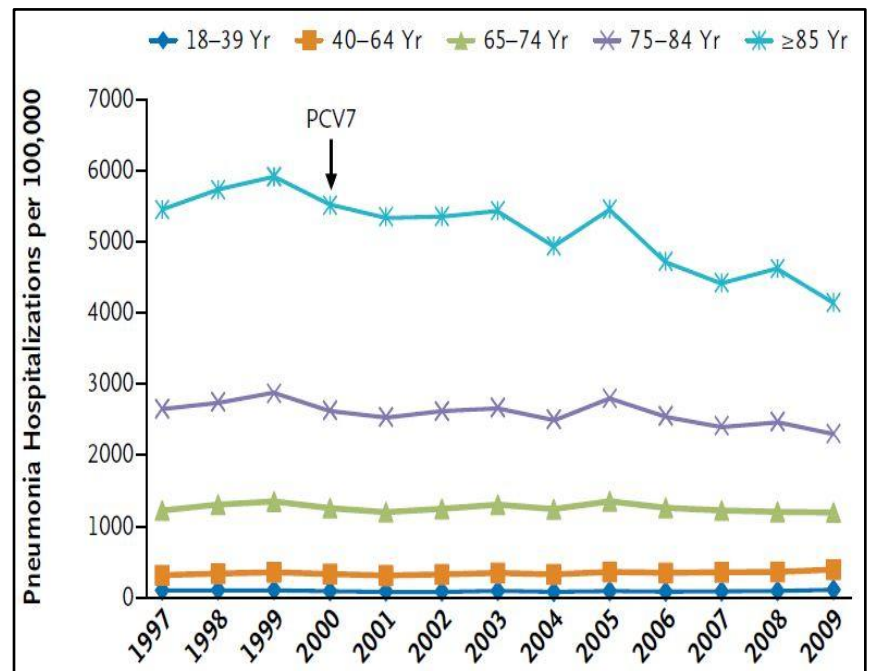
# U.S. Hospitalizations for Pneumonia after a Decade of Pneumococcal Vaccination

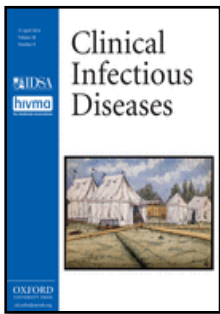
Marie R. Griffin, M.D., M.P.H., Yuwei Zhu, M.D., Matthew R. Moore, M.D., M.P.H.,  
Cynthia G. Whitney, M.D., M.P.H., and Carlos G. Grijalva, M.D., M.P.H.

### Hospitalizations for Pneumonia among U.S. Children



### Hospitalizations for Pneumonia among U.S. Adults





# Early Impact of 13-Valent Pneumococcal Conjugate Vaccine on Community-Acquired Pneumonia in Children

F. Angoulvant, C. Levy, E. Grimprel, E. Varon, M. Lorrot, S. Biscardi, P. Minodier, M. A. Dommergues, L. Hees, Y. Gillet, I. Craiu, F. Zenkhri, F. Dubos, C. Gras-Le Guen, E. Launay, A. Martinot, and R. Cohen

*Clin Infect Dis.* (2014) 58 (7): 918-924

## Evolution of Community-Acquired Pneumonia Cases During the Three 1-Year Study Periods

Characteristic	Periods			P Value <sup>b</sup>	% of Reduction Comparing Pre vs Post
	Pre-PCV13 <sup>a</sup> (n = 2060)	Transitional (n = 1860)	Post-PCV13 (n = 1725)		
Age, y, median (Q1-Q3)	2.9 (1.4-4.7)	3.1 (1.4-5.3)	3.4 (1.7-5.6)	<.001	
< 2 y	757 (36.8%)	645 (34.7%)	516 (29.9%)	<.001	<b>-31.8%</b>
2 - 5 y	833 (40.4%)	723 (38.9%)	695 (40.3%)	<.001	<b>-16.6%</b>
≥ 5 y	470 (22.8%)	492 (26.5%)	514 (29.8%)	<.001	
CRP level >120 mg/dL	408 (41.3%)	312 (37.2%)	235 (29.7%)	<.001	<b>-42,4%</b>
PCT level >4 ng/mL	116 (40.1%)	87 (34.4%)	63 (27.3%)	.002	<b>-45,7%</b>
Pleural effusion	167 (8.1%)	119 (6.4%)	79 (4.6%)	<.001	<b>-52,7%</b>
P-CAP	64 (3.1%)	48 (2.6%)	24 (1.4%)	.002	<b>-62,5%</b>

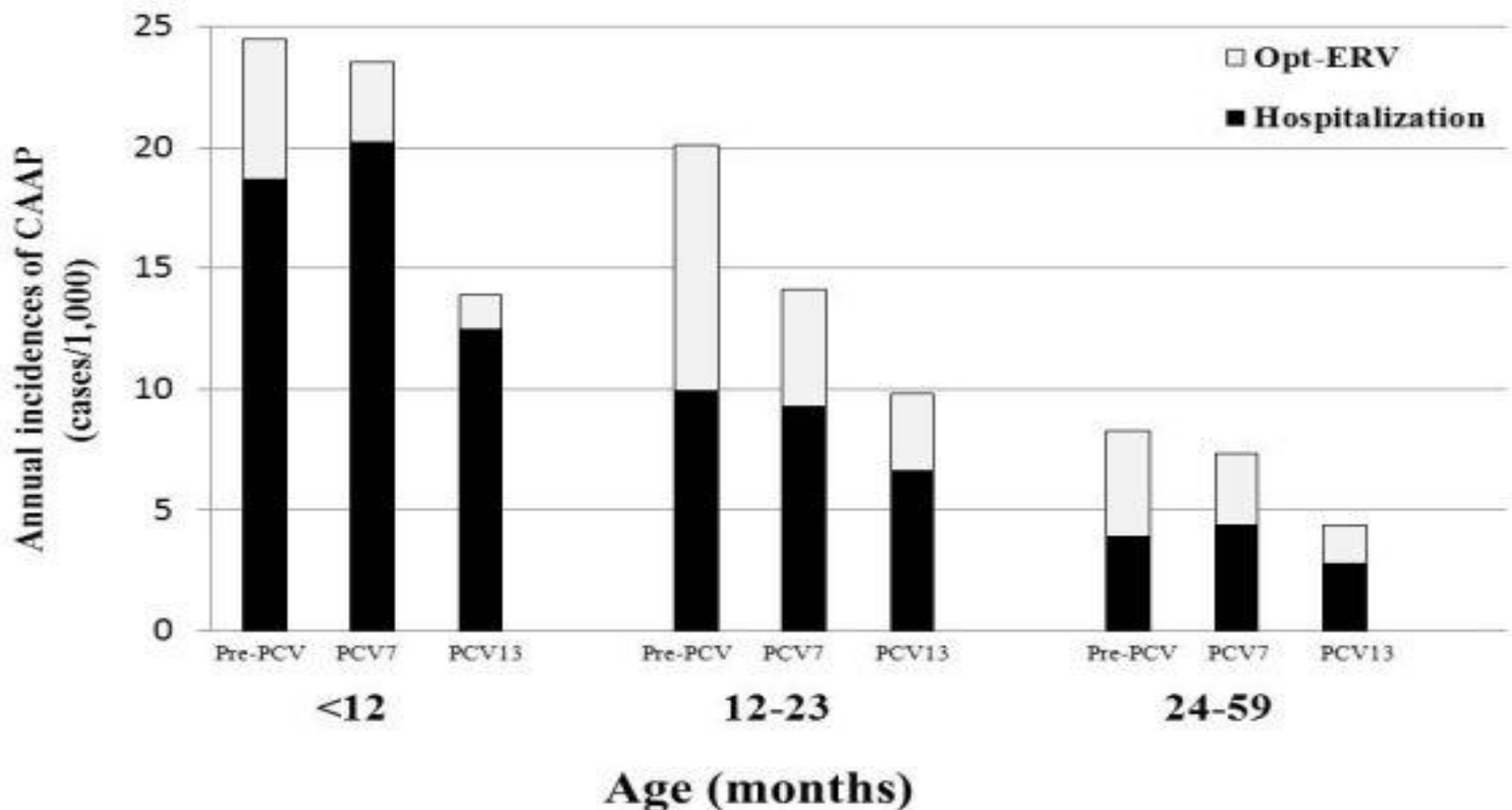
Data are presented as No. (%) unless otherwise indicated.

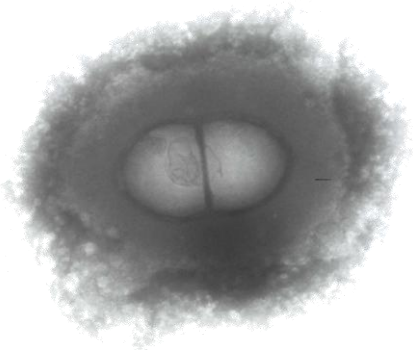
Abbreviations: CRP, C-reactive protein; P-CAP, pneumococcal community-acquired pneumonia; PCT, procalcitonin; PCV13, 13-valent pneumococcal conjugate vaccine; Q1–Q3, quartile 1 to 3.

<sup>a</sup> The pre-PCV13 era was defined as from June 2009 to May 2010, the transition period from June 2010 to May 2011, and the post-PCV13 period from June 2011 to May 2012.

<sup>b</sup> Cochran-Armitage test for trend.

**Figure 2: Incidences of outpatient ER visits and hospitalizations for CAAP in children <12, 12-23 and 24-59 months during Pre-PCV, PCV7 and PCV13 periods, southern Israel**





# Clinical burden dei 6 sierotipi contenuti nel PCV13

<b>Serotype 1</b>	Associated with parapneumonic empyema <sup>1,2</sup>
<b>Serotype 3</b>	Associated with parapneumonic empyema <sup>2</sup>
<b>Serotype 5</b>	Associated with IPD <sup>3</sup>
<b>Serotype 6A</b>	<b>Multidrug resistant</b> <sup>4</sup>
<b>Serotype 7F</b>	Associated with high case-fatality rate <sup>5</sup>
<b>Serotype 19A</b>	A leading serotype in IPD <sup>6</sup> and parapneumonic empyema; <sup>3</sup> <b>multidrug resistant</b> <sup>4</sup>

IPD, invasive pneumococcal disease; PCV13, 13-valent pneumococcal conjugate vaccine

<b>PCV13</b>	Carrier: CRM 197	<b>4</b>	<b>6B</b>	<b>9V</b>	<b>14</b>	<b>18C</b>	<b>19F</b>	<b>23F</b>	<b>1</b>	<b>3</b>	<b>5</b>	<b>6A</b>	<b>7F</b>	<b>19A</b>
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1. Van Hoek AJ *et al. PLoS One* 2012;7(7):e39150. 2. Byington CL *et al. Pediatr Infect Dis* 2006;25:250–4. 3. Shouval DS *et al. Pediatr Infect Dis J* 2006; 25(7):602–7. 4. EARSS Annual Report 2008. Accessed Nov 2011. 5. Ruckinger S *et al. Pediatr Infect Dis J* 2009;28:118–22.



STATO DELL'AUTORIZZAZIONE DI IMMISSIONE SUL MERCATO DEL  
**PREVENAR 13** PER DIFFERENTI GRUPPI D'ETA', DALL'AGENZIA  
EUROPEA PER I MEDICINALI (EMA), LA *FOOD AND DRUG*  
*ADMINISTRATION (FDA) AMERICANA*



## GRUPPI D'ETA'

**2 mesi-5 anni**

**6-17 anni**

**18-49 anni**

**≥50 anni**

	<b>2 mesi-5 anni</b>	<b>6-17 anni</b>	<b>18-49 anni</b>	<b>≥50 anni</b>
	<b>SI</b> <b>24/02/2010</b> Our STN: BL 125324/0	<b>SI</b> <b>25/01/2013</b> Our STN: BL 125324/767	<i>in esame</i>	<b>SI</b> <b>30/12/2011</b> Our STN: BL 125324/262
	<b>SI</b> <b>24/09/2009</b> EMA/CHMP/546417/2009	<b>SI</b> <b>15/11/2012</b> EMA/CHMP/717080/2012	<b>SI</b> <b>30/05/2013</b> EMA/CHMP/327906/2013	<b>SI</b> <b>22/09/2011</b> EMA/CHMP/763049/2011



Ministero della Salute

DIPARTIMENTO DELLA PREVENZIONE E DELLA COMUNICAZIONE  
DIREZIONE GENERALE DELLA PREVENZIONE SANITARIA  
Ufficio V - Malattie Infettive e Profilassi Internazionale

DGPREV.V/

Prospetto al Foglio del

Ministero della Salute  
DGPREV

0024720-P-27/05/2010  
I.4.c.a. 9/2009/18



69762306

Roma

Agli Assessorati alla Sanità  
delle Regioni a Statuto  
Ordinario e Speciale

Loro Sedi

Agli Assessorati alla Sanità  
delle Province Autonome  
di Trento e Bolzano

Loro Sedi

e p.c. All'Istituto Superiore di Sanità

Roma

All' Agenzia Italiana per il Farmaco

Roma

Oggetto: Indicazioni in merito alla somministrazione del vaccino  
Antipneumococcico Prevenar 13 in età pediatrica

Per quanto riguarda i nati prematuri, si ritiene che una schedula 3+1 (prime 3 dosi a distanza di 2 mesi l'una dall'altra + 1 dose booster fra il 12° ed il 15° mese) sia preferibile alla schedula classica 2+1:

settimane e 5 anni.

L'AIFA, con determinazione del 16/04/2010 (Gazzetta Ufficiale n. 100 del 30.04.10, pag. 95) ne ha stabilito il regime di rimborsabilità ed il prezzo di vendita.

Il suddetto vaccino contiene i 7 sierotipi di *Streptococcus pneumoniae* presenti nel Prevenar (Pcv7) più 6 sierotipi aggiuntivi.

Gli studi clinici controllati effettuati ad oggi hanno dimostrato una immunogenicità non inferiore a quella del Pcv7 per i 7 sierotipi comuni ed una immunogenicità superiore a 0,35 U.I./ml (valore considerato dall'Organizzazione Mondiale della Sanità come correlato di protezione) per i 6 nuovi sierotipi presenti nel Pcv13 (seppur con una certa variabilità tra i vari ceppi).

In considerazione del fatto che numerose Regioni, da tempo, hanno incluso nel proprio calendario vaccinale l'offerta attiva generalizzata ai nuovi nati della vaccinazione antipneumococcica (il Piano Nazionale



32<sup>nd</sup> Annual Meeting of the  
**EUROPEAN SOCIETY  
 FOR PAEDIATRIC  
 INFECTIOUS DISEASES**  
 Organized jointly by ESPID and the ESPID Foundation

**Dublin, Ireland, May 6-10, 2014**

Poster No: 0064

**13 VALENT PNEUMOCOCCAL CONJUGATE VACCINE  
 IMMUNOGENICITY IN PREMATURE INFANTS:  
 A COMPARISON OF 3 DIFFERENT PRIMARY SCHEDULES.**

Kent A.; Pollard A.J.; Scorrer T.; Clarke P.; Goldblatt D.; Andrews N.J.; Ladhani S.;  
 Miller E.; Heath P.T.; On behalf of the PUNS study group

ST	PCV7 serotypes			P
	Group 1 (2 & 4 m) n=65	Group 2 (2, 3 & 4 m) n=60	Group 3 (2, 4 & 6 m) n=68	
4	92.3 (83.0 – 97.5)	88.3 (77.4 – 95.2)	94.1 (85.6 – 98.4)	
6b	18.5 (9.9 – 30.0)	51.7 (38.4 – 64.8)	77.6 (65.8 – 86.9)	a** b* c**
9v	58.5 (45.6 – 70.6)	85.0 (73.4 – 92.9)	92.6 (83.7 – 97.7)	
14	93.8 (84.8 – 98.3)	98.3 (91.1 – 100.0)	98.8 (91.1 – 100.0)	
18c	87.7 (77.2 – 94.5)	86.0 (73.4 – 92.9)	92.6 (83.7 – 97.7)	
19f	96.8 (89.0 – 99.6)	96.7 (88.5 – 99.6)	100.0 (94.8 – 100.0)	
23f	46.0 (33.4 – 58.6)	86.0 (73.4 – 92.9)	92.6 (83.7 – 97.7)	

ST	Group 1 (2 & 4 m) n=65			P
	Group 2 (2, 3 & 4 m) n=60	Group 3 (2, 4 & 6 m) n=68		
1	84.6 (73.5 – 92.4)	84.6 (73.5 – 92.4)	84.6 (73.5 – 92.4)	
3	60.3 (47.2 – 72.4)	66.1 (52.6 – 77.9)	66.1 (52.6 – 77.9)	
5	36.9 (25.2 – 49.8)	46.7 (33.7 – 60.0)	73.5 (61.4 – 83.5)	b** c**
6a	56.9 (44.0 – 69.2)	71.7 (58.6 – 82.5)	94.0 (85.4 – 98.3)	b** c**
7f	90.8 (81.0 – 96.5)	96.7 (88.5 – 99.6)	100.0 (94.8 – 100.0)	c*
19a	83.1 (71.7 – 91.2)	94.9 (85.9 – 98.9)	95.6 (87.6 – 99.1)	a* c*

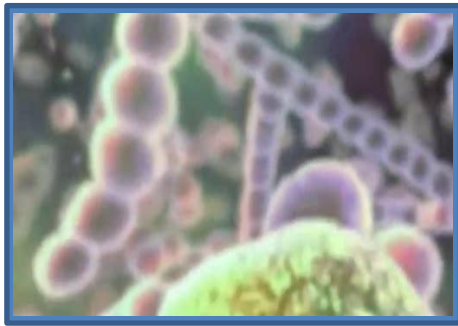
Percentage (CI) IgG >0.35µg/ml  
 a\*: p<0.05 for comparison between groups 1 & 2  
 b\*: p<0.05 for comparison between groups 2 & 3  
 c\*: p<0.05 for comparison between groups 1 & 3  
 a\*\*: p<0.001 for comparison between groups 1 & 2  
 b\*\*: p<0.001 for comparison between groups 2 & 3  
 c\*\*: p<0.001 for comparison between groups 1 & 3

**Conclusions:** Premature infants exhibit higher IgG GMCs for 12/13 PCV13 STs when vaccinated using a 3 dose compared to a two dose primary schedule. The proportion protected was unaffected by schedule for 4/13 STs, however better early protection is seen with a 2-3-4 schedule.

**Background & Aims:** Premature infants are at increased risk of invasive pneumococcal disease. Compared to term infants they are more likely to have lower antibody concentrations following vaccination. We assessed the immunogenicity of 13-valent pneumococcal conjugate vaccine in premature infants in response

to primary immunisation (either 5 or 6 weeks gestation) were compared to a 2-dose primary schedule (2 & 4 months (group 1), 2, 3 & 4 months (group 2), 2, 3 & 6 months (group 3)). Pneumococcal IgGs were measured at baseline and 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 months post-immunisation.

The median birth gestational age was 29<sup>+6</sup> weeks (IQR 28<sup>+1</sup>–33<sup>+1</sup>) and the median birth weight was 1387g (IQR 992–1800), 107 (52%) were male. Baseline geometric mean concentrations (GMCs, µg/mL) were low for all ST (range 0.08–0.25) with no significant differences between groups. Percentage of infants with protective concentrations (IgG>0.35 µg/mL) following primary immunization are shown in table 1.



## ***in conclusione...***



**Implementare** una sempre più valida sorveglianza;

**Espandere** la copertura del vaccino coniugato;

**Semplificare** la produzione, riducendo proporzionalmente i costi per un accesso globale;

**Importanza di studiare i ceppi:**

- Sierotipi (nuovi sierotipi)
- Antibioticoresistenza .....

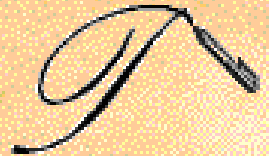
*2. Immune response stimulated*

*3. Specific reactions with pathogens*

*1. Vaccine antigen injected*

# Grazie

*4. Neutralization of pathogen*



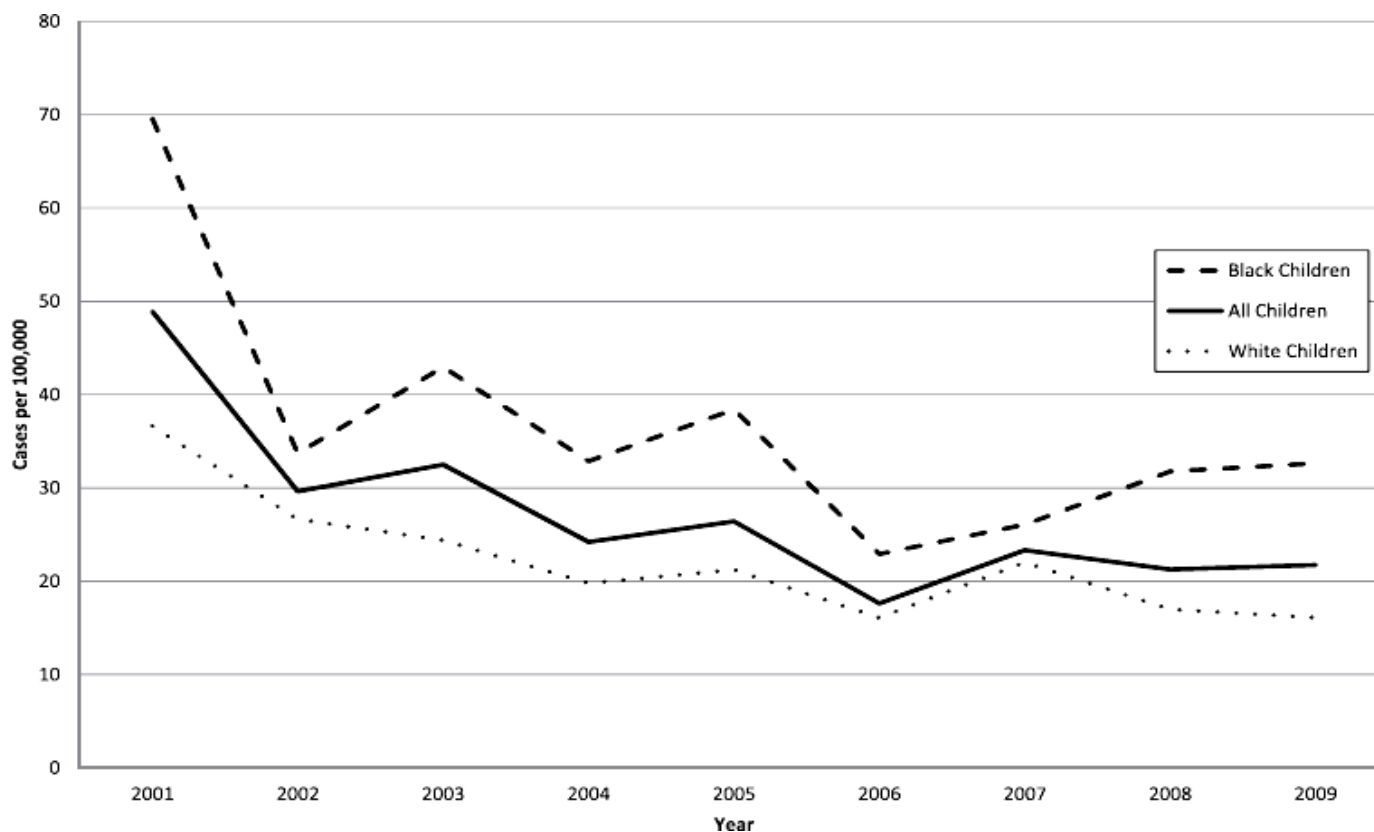




## Socioeconomic and Racial Disparities of Pediatric Invasive Pneumococcal Disease After the Introduction of the 7-valent Pneumococcal Conjugate Vaccine

Jennifer O. Spicer, MD, MPH,\* Stephanie Thomas, MPH,† Amy Holst, MPH,† Wendy Baughman, MPH,‡  
and Monica M. Farley, MD\*‡

*The Pediatric Infectious Disease Journal* • Volume 33, Number 2, February 2014



Invasive pneumococcal disease rates among children younger than 5 years in 20-county Metropolitan Atlanta, GA, 2001–2009. Rates are shown as cases per 100,000 children per year.

**TAB 12. Distribuzione (numerosità assoluta e percentuale) per sierotipo e per anno dei ceppi di *Streptococcus pneumoniae* isolati da infezioni invasive (meningiti e sepsi) e inviati all'Istituto Superiore di Sanità (1997-2013) e/o tipizzati da altro laboratorio (2009-2013)**

Sierotipo	2007	2008	2009	2010	2011	2012*	2013*
1 <sup>b</sup>	17	22	21	42	20	30	6
3 <sup>c</sup>	21	21	22	40	20	52	7
4 <sup>a</sup>	6	7	3	8	6	8	2
5 <sup>b</sup>	0	0	2	3	1	0	4
6A <sup>c</sup>	7	10	11	7	2	9	1
6B <sup>a</sup>	3	5	3	7	3	4	2
6C	0	3	3	3	6	8	0
7F <sup>b</sup>	17	21	23	35	14	39	4
8	3	5	8	7	8	18	5
9N	1	2	0	3	1	5	0
9V <sup>a</sup>	6	6	11	4	5	7	1
10A	4	3	5	5	6	8	0
11A	3	5	6	2	2	9	0
12F	4	5	5	3	3	21	0
14 <sup>a</sup>	33	19	18	13	6	21	4
15A	4	7	4	2	4	6	1
15B	6	7	7	1	1	3	2
18C <sup>a</sup>	7	4	6	3	1	6	0
19A <sup>c</sup>	12	33	31	26	20	42	2
19F <sup>a</sup>	15	7	8	8	6	9	2
20	4	0	0	11	2	18	2
22F	11	7	14	9	14	25	1
23A	4	2	5	6	3	6	0
23F <sup>a</sup>	10	13	8	4	3	10	0
24F	7	10	2	1	3	4	1
33F	3	3	3	1	1	2	1
Altri	50	13	21	35	38	74	12
TOTALE	258	240	250	289	199	444	60

Sierotipo	2007	2008	2009	2010	2011	2012*	2013*
1 <sup>b</sup>	6,6%	9,2%	8,4%	14,5%	10,1%	6,8%	10,0%
3 <sup>c</sup>	8,1%	8,8%	8,8%	13,8%	10,1%	11,7%	11,7%
4 <sup>a</sup>	2,3%	2,9%	1,2%	2,8%	3,0%	1,8%	3,3%
5 <sup>b</sup>	0,0%	0,0%	0,8%	1,0%	0,5%	0,0%	6,7%
6A <sup>c</sup>	2,7%	4,2%	4,4%	2,4%	1,0%	2,0%	1,7%
6B <sup>a</sup>	1,2%	2,1%	1,2%	2,4%	1,5%	0,9%	3,3%
6C	0,0%	1,3%	1,2%	1,0%	3,0%	1,8%	0,0%
7F <sup>b</sup>	6,6%	8,8%	9,2%	12,1%	7,0%	8,8%	6,7%
8	1,2%	2,1%	3,2%	2,4%	4,0%	4,1%	8,3%
9N	0,4%	0,8%	0,0%	1,0%	0,5%	1,1%	0,0%
9V <sup>a</sup>	2,3%	2,5%	4,4%	1,4%	2,5%	1,6%	1,7%
10A	1,6%	1,3%	2,0%	1,7%	3,0%	1,8%	0,0%
11A	1,2%	2,1%	2,4%	0,7%	1,0%	2,0%	0,0%
12F	1,6%	2,1%	2,0%	1,0%	1,5%	4,7%	0,0%
14 <sup>a</sup>	12,8%	7,9%	7,2%	4,5%	3,0%	4,7%	6,7%
15A	1,6%	2,9%	1,6%	0,7%	2,0%	1,4%	1,7%
15B	2,3%	2,9%	2,8%	0,3%	0,5%	0,7%	3,3%
18C <sup>a</sup>	2,7%	1,7%	2,4%	1,0%	0,5%	1,4%	0,0%
19A <sup>c</sup>	4,7%	13,8%	12,4%	9,0%	10,1%	9,5%	3,3%
19F <sup>a</sup>	5,8%	2,9%	3,2%	2,8%	3,0%	2,0%	3,3%
20	1,6%	0,0%	0,0%	3,8%	1,0%	4,1%	3,3%
22F	4,3%	2,9%	5,6%	3,1%	7,0%	5,6%	1,7%
23A	1,6%	0,8%	2,0%	2,1%	1,5%	1,4%	0,0%
23F <sup>a</sup>	3,9%	5,4%	3,2%	1,4%	1,5%	2,3%	0,0%
24F	2,7%	4,2%	0,8%	0,3%	1,5%	0,9%	1,7%
33F	1,2%	1,3%	1,2%	0,3%	0,5%	0,5%	1,7%
Altri	19,4%	5,4%	8,4%	12,1%	19,1%	16,7%	20,0%
TOTALE	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

\*Dati parziali

**TAB 13. Distribuzione per sierotipo e per anno dei ceppi di *Streptococcus pneumoniae* isolati da infezioni invasive (meningiti e sepsi) in bambini con età compresa tra 0 e 4 anni e inviati per tipizzazione all'Istituto Superiore di Sanità (1997-2013) o tipizzati da altro laboratorio (2009-2013)**

Sierotipo	2007	2008	2009	2010	2011	2012	2013*
1 <sup>b</sup>	1	4	3	10	7	2	0
3 <sup>c</sup>	1	2	2	6	0	5	0
4 <sup>a</sup>	0	1	1	0	0	0	0
5 <sup>b</sup>	0	0	0	1	0	0	0
6A <sup>c</sup>	4	3	3	1	0	0	0
6B <sup>a</sup>	0	1	1	2	0	1	0
7F <sup>b</sup>	4	6	3	8	2	3	0
9V <sup>a</sup>	0	1	2	2	1	0	0
14 <sup>a</sup>	18	7	10	4	1	5	0
15B	1	1	1	0	0	0	0
18C <sup>a</sup>	1	1	1	2	1	1	0
19A <sup>c</sup>	1	10	13	4	7	3	0
19F <sup>a</sup>	2	3	4	1	1	2	0
22F	0	2	2	2	3	1	1
23F <sup>a</sup>	3	6	4	0	1	1	0
24F	1	3	2	1	0	0	1
Altri	15	8	17	6	7	17	2
<b>TOTALE</b>	<b>52</b>	<b>59</b>	<b>69</b>	<b>50</b>	<b>31</b>	<b>41</b>	<b>4</b>

Sierotipo	2007	2008	2009	2010	2011	2012	2013*
1 <sup>b</sup>	1,9%	6,8%	4,3%	20,0%	22,6%	4,9%	0,0%
3 <sup>c</sup>	1,9%	3,4%	2,9%	12,0%	0,0%	12,2%	0,0%
4 <sup>a</sup>	0,0%	1,7%	1,4%	0,0%	0,0%	0,0%	0,0%
5 <sup>b</sup>	0,0%	0,0%	0,0%	2,0%	0,0%	0,0%	0,0%
6A <sup>c</sup>	7,7%	5,1%	4,3%	2,0%	0,0%	0,0%	0,0%
6B <sup>a</sup>	0,0%	1,7%	1,4%	4,0%	0,0%	2,4%	0,0%
7F <sup>b</sup>	7,7%	10,2%	4,3%	16,0%	6,5%	7,3%	0,0%
9V <sup>a</sup>	0,0%	1,7%	2,9%	4,0%	3,2%	0,0%	0,0%
14 <sup>a</sup>	34,6%	11,9%	14,5%	8,0%	3,2%	12,2%	0,0%
15B	1,9%	1,7%	1,4%	0,0%	0,0%	0,0%	0,0%
18C <sup>a</sup>	1,9%	1,7%	1,4%	4,0%	3,2%	2,4%	0,0%
19A <sup>c</sup>	1,9%	16,9%	18,8%	8,0%	22,6%	7,3%	0,0%
19F <sup>a</sup>	3,8%	5,1%	5,8%	2,0%	3,2%	4,9%	0,0%
22F	0,0%	3,4%	2,9%	4,0%	9,7%	2,4%	25,0%
23F <sup>a</sup>	5,8%	10,2%	5,8%	0,0%	3,2%	2,4%	0,0%
24F	1,9%	5,1%	2,9%	2,0%	0,0%	0,0%	25,0%
Altri	28,8%	13,6%	24,6%	12,0%	22,6%	41,5%	50,0%
<b>TOTALE</b>	<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>

\*Dati parziali

[http://www.simi.iss.it/files/Report\\_MBI.pdf](http://www.simi.iss.it/files/Report_MBI.pdf)