

Le Immunodeficienze nell'ambulatorio del Pediatra: dalla cellula dendritica all'asma ed alle infezioni respiratorie ricorrenti

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The logo of the Società Italiana di Pediatria Preventiva e Sociale (SIPPS), featuring stylized figures of children and the acronym 'SIPPS' in a circular arrangement.

fimp Federazione Italiana Medici *Pediatr*
Sezione di Caserta

SIPPS & FIMPAGGIORNA 2017

LE NUOVE SFIDE DELLA PEDIATRIA:
"INNOVAZIONE ED APPROPRIATEZZA PRESCRITTIVA"

A small photograph showing a group of people, likely participants or organizers of the course.

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

Sede del Corso
GOLDEN TULIP PLAZA HOTEL, Via Lamberti - Caserta

Coordinatore Scientifico
Giuseppe Di Mauro

Celestino 3 a e 2/12

Ricovero per polmonite febbrile e enterite

(S. typhi)

Benessere fino a 2 anni

In 14 mesi 17 episodi febbrili trattati
con antibiotici, 4 ricoveri: per
polmonite (2) e gastroenterite (2)



DD

1. Asma

2. Sinusite cronica

3. Fibrosi cistica

4. Immunodeficienza

5. Discinesia ciliare

5. Tubercolosi



	15
Globuli Rossi	4.83
HGB	11.9
HCT	35.2
MCV	67
MCH	20
MCHC	33.2
RDW	15.9
Globuli Bianchi	2.77
Neutrofili #	1.75
Linfociti #	0.11
Monociti #	0.66
Eosinofili #	0.20
Basofili #	0.05
LUC#	0.05
Piastrine	323
MPV	7.6



15

Gherardo 26 mesi, ricovero per polmonite

3 mesi

OMA

4 mesi

OMA

5 mesi

bronchiolite

7 mesi

OMA: inizia asilo nido

↓
26 mesi

wheezing ricorrente e almeno un episodio di febbre /mese.

faringotonsilliti

26 mesi

polmonite lobo medio

Nando 28 mesi, polmonite basale destra

3 mesi

OMA

9 mesi

rinorrea purulenta e tosse; ricaduta una settimana dopo la sospensione dell'antibiotico terapia

10 mesi

wheezing persistente; da allora circa 1 episodio/settimana

13 mesi

OMA con otorrea, inizia la frequenza all'asilo

13 - 28 mesi

febbre ad ogni immissione all'asilo con rinorrea purulenta, tosse, wheezing. 4 OMA

Gherardo

Nando

v.n.

IgG 330 mg/dL

230 mg/dL (v. n. 460 – 1700)

IgA 10 mg/dL

< 5 mg/dL (v. n. 27 – 170)

IgM 180 mg/dL

38 mg/dL (v. n. 60 – 260)

Quali altri accertamenti clinici vi possono guidare?

Stazioni linfonodali

Parametri auxologici

Palpazione addome (fegato-milza)

Ispezione faringe/tonsille

otoscopia

Gherardo

Nando

v.n.

IgG 330 mg/dL

230 mg/dL (v. n. 460 – 1700)

IgA 10 mg/dL

< 5 mg/dL (v. n. 27 – 170)

IgM 180 mg/dL

38 mg/dL (v. n. 60 – 260)

Quali altri accertamenti fareste di prima istanza?

Prick test

Sottoclassi IgG

Sottopopolazioni linfocitarie

Titoli anticorpali

IgA secretorie

Gherardo

Nando

v.n.

IgG 330 mg/dL

230 mg/dL (v. n. 460 – 1700)

IgA 10 mg/dL

< 5 mg/dL (v. n. 27 – 170)

IgM 180 mg/dL

38 mg/dL (v. n. 60 – 260)

Ab α TT titolo protettivo

assenti

Ab α Hib titolo protettivo

assenti

CD19 12%

3%

CD20 9%

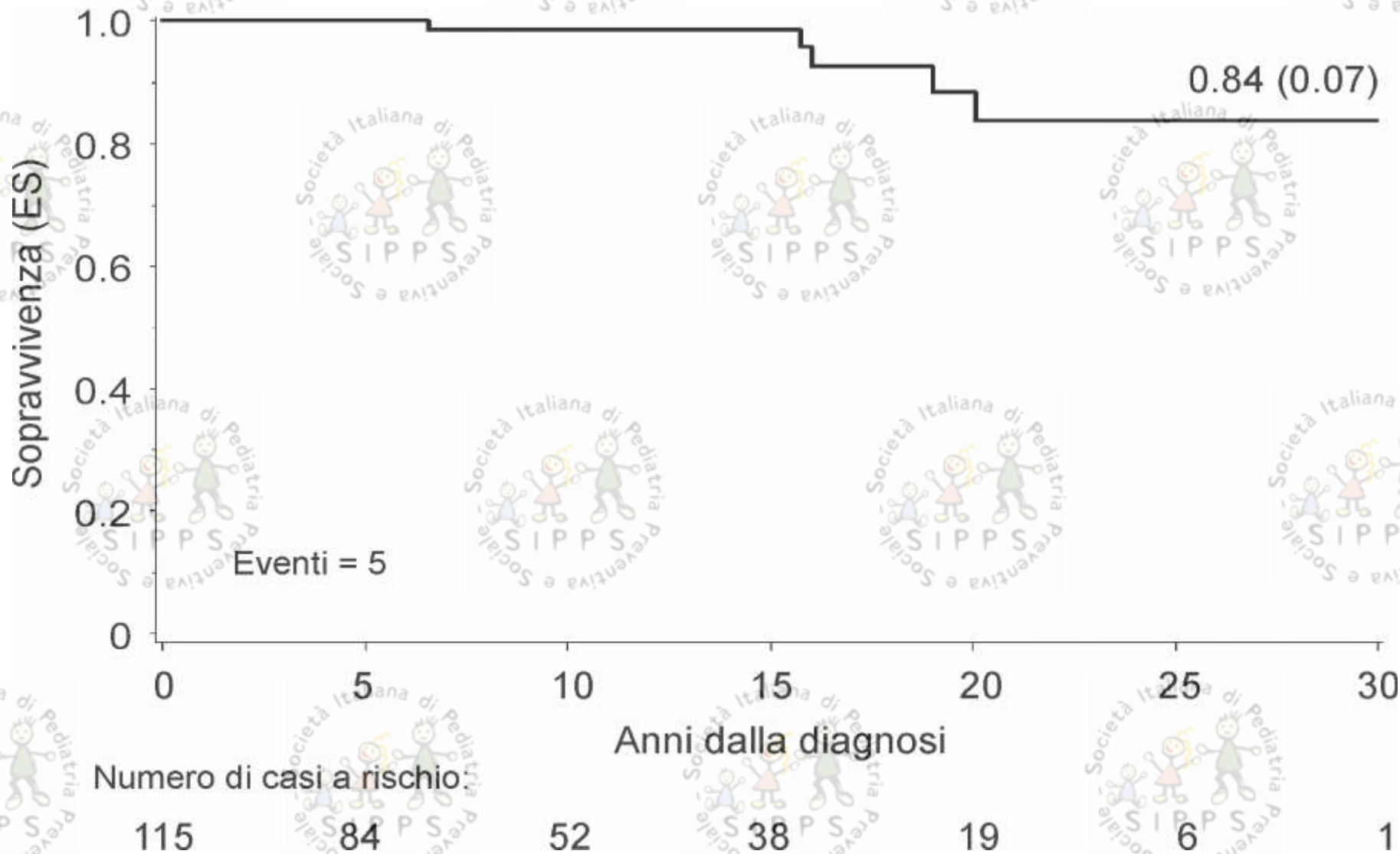
1%

Prick test + alternaria



Italian Primary Glioma and Meningeoma Study

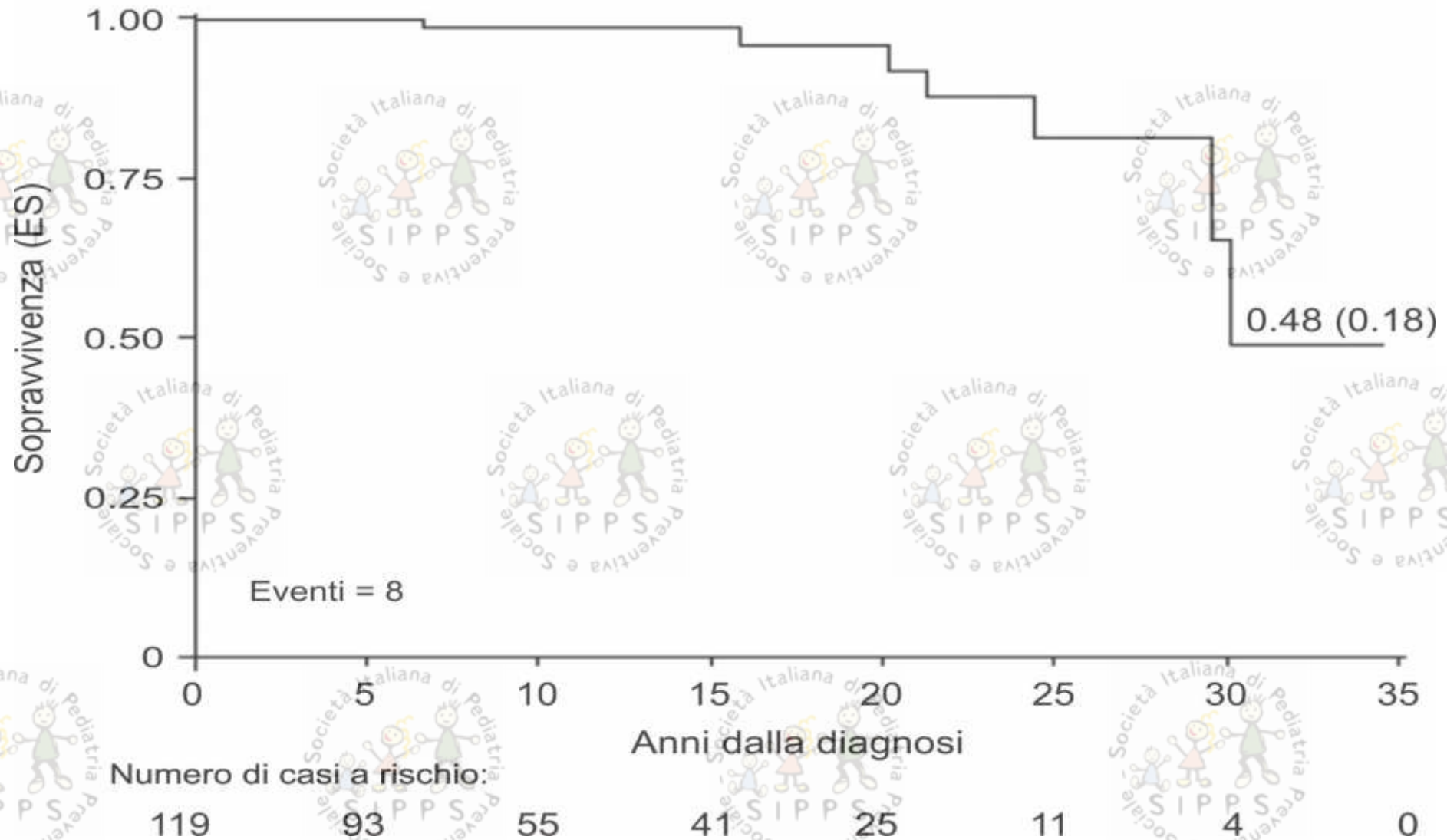
AIEOP XLA: sopravvivenza



Maggio 2003



AIEOP XLA: sopravvivenza



Lucilla, ♀, 6 anni 9/12

Ricovero per febbre alta, tosse e dispnea. Diagnosi di ammissione: *“Sospetto di BPN destra in soggetto con storia di bronchiti e BPN recidivanti”*

1 anno

24m

3° anno

4° anno

5° anno

6° anno

3 OMA + bronchiolite (ricovero)

ricovero per BPN del lobo medio dx

bronchiti febbrili con wheezing (4)

rinite cronica-ricorrente con tosse.

inizia la frequenza all'asilo che interrompe per BPN sin + 3 sinusiti, tosse e wheezing;

prick test + DPP e DPF, alternaria, aspergillus tonsilliti e bronchiti mensili. Inizia terapia di fondo per asma. Adenotonsillectomia.

tosse. BPN

Rx torace

1. È legittimo considerare in dd asma bronchiale e la condizione di atopia?

2. Predispongono alle infezioni respiratorie ricorrenti?

2. Sinusite cronica

3. Fibrosi cistica

4. Discinesia ciliare

4. Immunodeficienza

5. Tubercolosi

Increasing strength of clinical evidence to support increased susceptibility to infection

Association between asthma and viral infections

Up to 85% of asthma exacerbations in children are due to viral URI 3

RSV and RV bronchiolitis in infancy associated with increased risk of asthma 1

Frequency and severity of respiratory infections

Higher rates of influenza attributable morbidity and CAP 7-13

More frequent and more severe LRTI 5

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Susceptibility to infections outside of the respiratory tract

Increased rates of otitis media and gastroenteritis in infancy 16-18

Delayed clearance of viral skin infections 21

Colonization and infection latency

Higher rates of latent infections 26-33

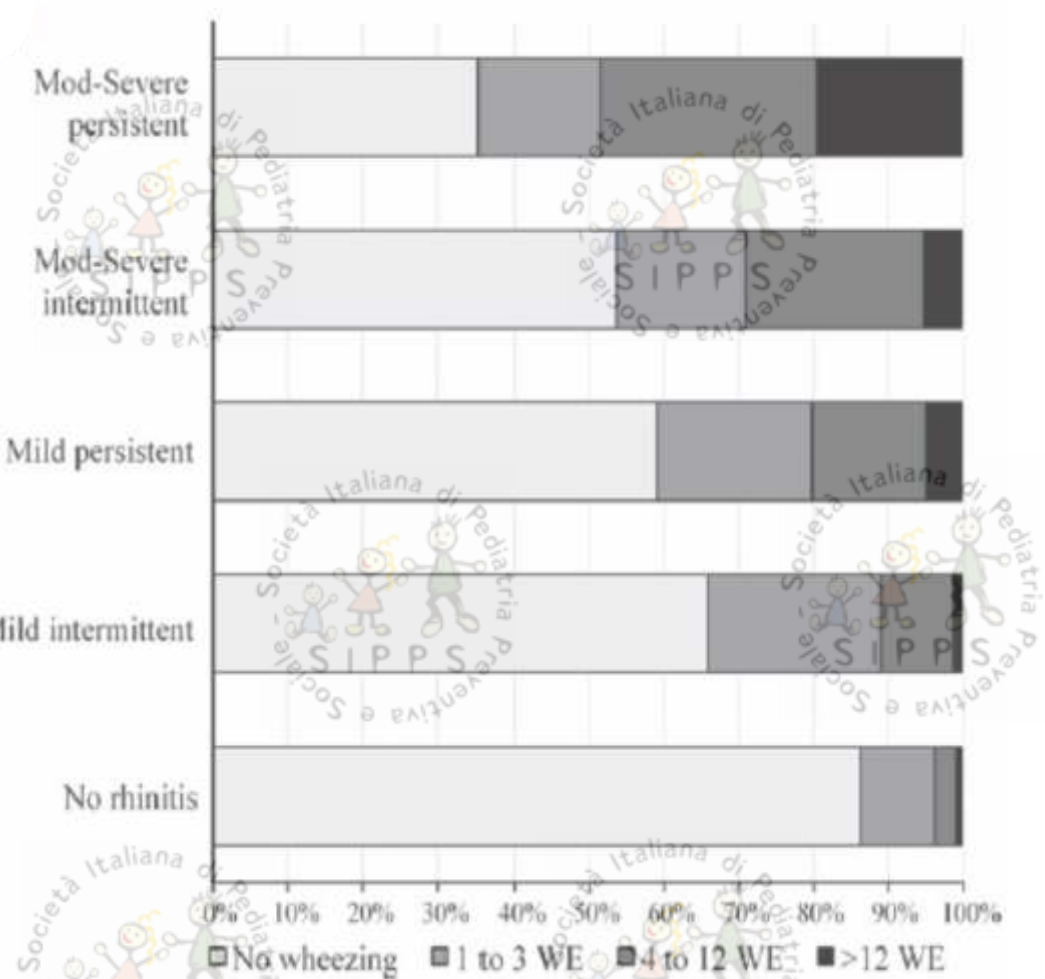
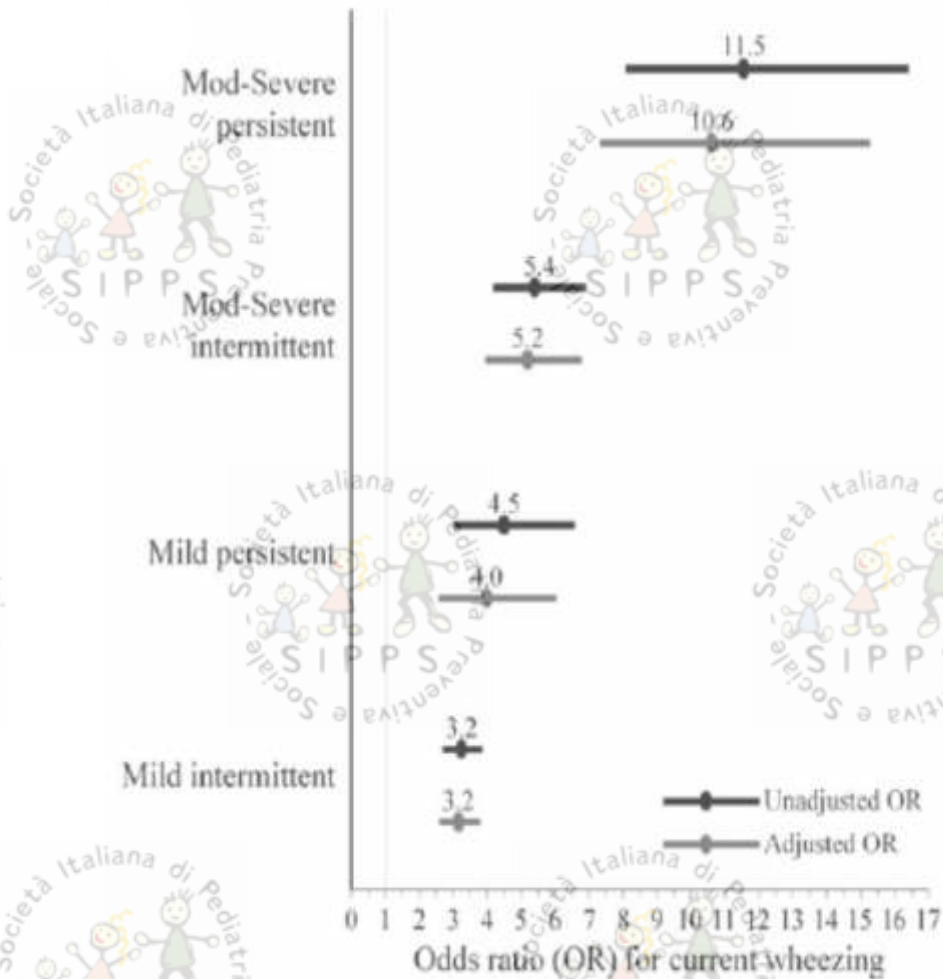
Bacterial colonization of the airways at 1 month of age associated with asthma at age 5 years 22

Invasive infections

Increased risk of invasive pneumococcal disease 45-48

Higher incidence of rhinoviremia 44

OR for CW and Number of wheezing episodes according to the ARIA classification of rhinitis among 5003 children 3-5y



Pereira AM et al, PAI 2015

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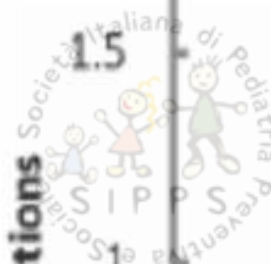
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Higher incidence of rhinoviremia 44

Variable	AD (n = 856)									
	No AD (n = 856)		With no other atopic disease (n = 460)				With other atopic disease (n = 396)			
	Frequency	% Prevalence (95% CI)	Frequency	% Prevalence (95% CI)	aOR (95% CI)	P value	Frequency	% Prevalence (95% CI)	aOR (95% CI)	P value
Warts										
No	8347	96.8 (96.3-97.3)	447	97.4 (95.6-99.2)	1.00 (reference)	—	370	92.3 (89.0-95.6)	1.00 (reference)	—
Yes	205	3.2 (2.7-3.7)	13	2.6 (0.8-4.4)	0.91 (0.90-0.92)	<.0001	26	7.7 (4.4-11.0)	1.83 (1.82-1.84)	<.0001
Strep throat										
No	7690	88.6 (87.7-89.4)	395	85.8 (81.8-89.4)	1.00 (reference)	—	314	77.3 (71.7-82.8)	1.00 (reference)	—
Yes	855	11.4 (10.5-12.3)	65	14.2 (10.6-18.2)	1.56 (1.54-1.57)	<.0001	81	22.7 (17.2-28.3)	1.47 (1.46-1.47)	<.0001
Other sore throat										
No	6106	69.3 (68.0-70.5)	285	58.6 (52.9-64.3)	1.00 (reference)	—	193	47.2 (41.2-53.2)	1.00 (reference)	—
Yes	2435	30.7 (29.5-32.0)	171	41.4 (35.7-47.1)	1.91 (1.91-1.92)	<.0001	201	52.8 (46.8-58.8)	1.61 (1.61-1.62)	<.0001
Head or chest cold										
No	7341	86.5 (85.7-87.4)	367	81.1 (76.8-85.3)	1.00 (reference)	—	303	77.7 (72.8-82.6)	1.00 (reference)	—
Yes	1193	13.5 (12.6-14.3)	90	18.9 (14.7-23.2)	1.48 (1.47-1.48)	<.0001	92	22.3 (17.4-27.2)	1.47 (1.46-1.47)	<.0001
Influenza/pneumonia										
No	8064	93.9 (93.3-94.6)	423	92.4 (89.5-95.2)	1.00 (reference)	—	349	88.0 (84.1-91.8)	1.00 (reference)	—
Yes	487	6.1 (5.4-6.7)	37	7.6 (4.8-10.5)	1.67 (1.66-1.67)	<.0001	47	12.0 (8.2-15.9)	1.24 (1.23-1.24)	<.0001
Sinus infections										
No	8028	93.7 (93.1-94.3)	420	91.5 (88.4-94.7)	1.00 (reference)	—	299	73.7 (68.0-79.3)	1.00 (reference)	—
Yes	526	6.3 (5.7-6.9)	40	8.5 (5.3-11.6)	2.59 (2.58-2.60)	<.0001	97	26.3 (20.7-32.0)	2.18 (2.18-2.19)	<.0001
Recurrent ear infections										
No	8139	95.2 (94.6-95.8)	426	93.7 (91.2-96.2)	1.00 (reference)	—	358	90.5 (87.0-93.9)	1.00 (reference)	—
Yes	412	4.8 (4.2-5.4)	34	6.3 (3.8-8.8)	1.33 (1.32-1.34)	<.0001	38	9.5 (6.1-13.0)	1.41 (1.40-1.41)	<.0001
Chickenpox infections										
No	6132	71.6 (70.3-72.8)	348	77.2 (72.5-82.0)	1.00 (reference)	—	274	67.7 (61.8-73.6)	1.00 (reference)	—
Yes	2318	28.4 (27.2-29.7)	104	22.8 (18.0-27.5)	1.19 (1.19-1.20)	<.0001	118	32.3 (26.4-38.2)	1.33 (1.32-1.33)	<.0001
Urinary tract infections										
No	8454	98.8 (98.5-99.1)	449	97.2 (95.3-99.1)	1.00 (reference)	—	384	97.1 (95.3-98.9)	1.00 (reference)	—
Yes	102	1.2 (0.9-1.5)	11	2.8 (0.9-4.7)	3.12 (3.10-3.14)	<.0001	12	2.9 (1.1-4.7)	1.72 (1.70-1.73)	<.0001

Association between AD/eczema and number of infections: The independent variables were history of AD/eczema and history of other atopic disease

Variable	No AD (n = 8556)		AD (n = 856)							
	Frequency	% Prevalence (95% CI)	With no warts (n = 817)		With warts (n = 39)					
			Frequency	% Prevalence (95% CI)	aOR (95% CI)	P value	Frequency	% Prevalence (95% CI)	aOR (95% CI)	P value
Ever asthma										
No	7512	87.8 (86.9-88.7)	644	79.0 (75.4-82.5)	1.00 (reference)	—	3.2	61.7 (42.8-80.6)	1.00 (reference)	—
Yes	1033	22.2 (11.3-13.1)	171	21.0 (17.5-24.6)	1.95 (1.94-1.95)	<.0001		29.3 (19.4-57.2)	3.20 (3.17-3.23)	<.0001
Current asthma										
No	1319	31.2 (27.6-34.9)	37	20.5 (13.2-27.8)	1.00 (reference)	—	4	16.2 (0.0-33.7)	1.00 (reference)	—
Yes	706	68.8 (65.1-72.4)	133	79.5 (72.2-86.8)	1.62 (1.61-1.62)	<.0001	7	83.8 (66.3-100.0)	2.37 (2.33-2.42)	<.0001
Asthma exacerbation in past year										
No	642	62.8 (59.0-66.7)	79	43.9 (34.5-53.3)	1.00 (reference)	—	8	49.1 (15.9-82.3)	1.00 (reference)	—
Yes	389	37.2 (33.3-41.0)	92	56.1 (46.7-65.5)	1.96 (1.95-1.97)	<.0001	4	50.1 (17.7-84.1)	2.40 (2.37-2.43)	<.0001
Hay fever										
No	7771	90.9 (90.1-91.6)	665	81.3 (78.0-84.5)	1.00 (reference)	—	5.17	70.4 (31.6-69.2)	1.00 (reference)	—
Yes	767	9.1 (8.4-9.9)	148	18.7 (15.5-22.0)	2.60 (2.60-2.61)	<.0001	16	49.6 (30.8-68.4)	5.17 (5.13-5.21)	<.0001
Food allergy										
No	8291	96.8 (96.3-97.3)	706	88.2 (85.8-90.7)	1.00 (reference)	—	8.07	92.6 (69.0-96.3)	1.00 (reference)	—
Yes	262	3.2 (2.7-3.7)	110	11.8 (9.3-14.2)	3.87 (3.86-3.89)	<.0001	6	17.4 (3.7-31.0)	8.07 (7.97-8.17)	<.0001



Least-squared mean number of infections



AD/eczema

Other atopic disease

No

No

Yes

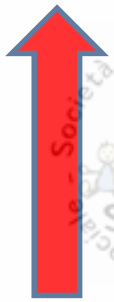
Yes

No

Yes

No

Yes



Association between asthma and pertussis in 391 children (+101 adults)

Ethnicity, no. (%)			
Nonwhites	13 (3.9)	3 (1.8)	Referent
Whites	255 (78)	134 (82)	2.36 (0.65-6.57), .193
Unknown	60 (18.3)	27 (16.5)	1.98 (0.52-7.60), .321
Educational status,* no. (%)			
High school or less	20 (6.1)	13 (7.9)	Referent
Some college	33 (10.1)	20 (12.2)	0.89 (0.35-2.29), .812
Variables	All subjects (n = 492), OR (95% CI), P value	Children (n = 391), OR (95% CI), P value	Adults (n = 101), OR (95% CI), P value
Asthma before index date			
Unadjusted	1.83 (1.20-2.80), .005	2.01 (1.26-3.20), .003	1.10 (0.38-3.22), .855
Adjusted*	1.73 (1.12-2.67), .013	1.92 (1.20-3.09), .007	1.14 (0.37-3.55), .820
Up-to-date status on pertussis vaccination, no. (%)			
Not up to date	42 (12.8)	27 (16.5)	Referent
Up to date	226 (68.9)	107 (65.2)	0.63 (0.32-1.22), .172
Unknown	60 (18.3)	30 (18.3)	0.81 (0.33-2.02), .656
Antibiotic use before index date, no. (%)			
No	318 (97.0)	153 (93.3)	Referent
Yes	10 (3.0)	11 (6.7)	2.20 (0.93-5.18), .071

Atopy (other than asthma) and risk of H1N1 infection in 453 children

	Controls (n = 172)	Cases (n = 168)	OR (95% CI), p Value
History of receiving H1N1 influenza vaccine before H1N1 index date, n (%)			
No	165 (95.9)	163 (97.0)	Referent
Yes	7 (4.1)	5 (3.0)	0.72 (0.23–2.33), 0.585
History of asthma before H1N1 index date, n (%)			
No	116 (67.4)	105 (62.5)	Referent
Yes	56 (32.6)	63 (37.6)	1.24 (0.80–1.94), 0.340
History of atopic conditions before index date, n (%)			
Allergic rhinitis only	24 (13.9)	32 (19.1)	1.45 (0.81–2.59), 0.206
Atopic dermatitis only	17 (9.9)	27 (16.1)	1.75 (0.91–3.34), 0.089
Atopic dermatitis and allergic rhinitis	13 (7.6)	13 (7.7)	1.03 (0.46–2.28), 0.950
Atopic dermatitis and/or allergic rhinitis	54 (31.4)	72 (42.9)	1.63 (1.05–2.55), 0.029
History of atopic conditions ever, # n (%)			
Allergic rhinitis only	24 (13.9)	32 (19.1)	1.45 (0.81–2.59), 0.206
Atopic dermatitis only	16 (9.3)	30 (17.9)	2.12 (1.11–4.05), 0.021
Atopic dermatitis and allergic rhinitis	14 (8.1)	17 (10.1)	1.27 (0.61–2.67), 0.526
Atopic dermatitis and/or allergic rhinitis	54 (31.4)	79 (47.2)	1.93 (1.25–3.02), 0.003

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Rischio di SPD in 522 bambini e adulti

(Yung JJ et al, JACI 2008)

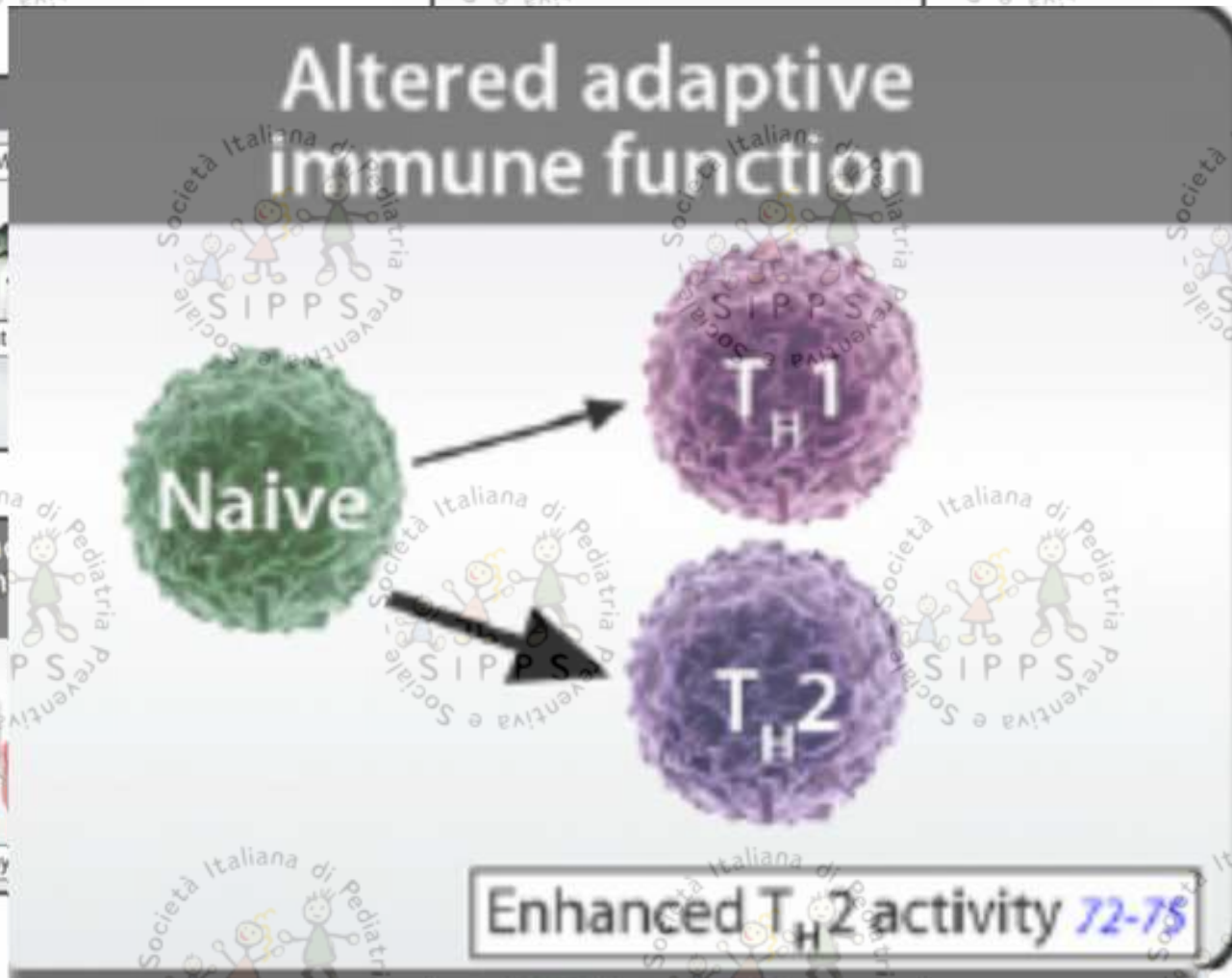
Variables	All subjects		Adult subjects only	
	Unadjusted OR for SPD with 95% CI, P value	Adjusted OR for SPD with 95% CI, P value	Unadjusted OR for SPD with 95% CI, P value	Adjusted OR for SPD with 95% CI, P value
Asthma status				
No	Referent	Referent	Referent	Referent
Yes	1.79 (0.76-4.18), .18	2.40 (0.88-6.56), .09	2.91 (1.04-8.13), .04	6.70 (1.64-27.30), .01
Ethnicity				
White	Referent	Referent	Referent	Referent
Nonwhite	2.50 (0.99-6.33), .05	3.98 (1.37-11.59), .01	1.33 (0.38-4.73), .66	3.18 (0.73-13.86), .12
Tobacco smoke exposure at the index date				
Active	Referent	Referent	Referent	Referent
Passive	1.76 (0.60-5.13), .30	1.70 (0.51-5.80), .39	2.15 (0.69-6.70), .22	2.25 (0.61-8.35), .22
Nonsmokers	0.31 (0.18-0.52), .001	0.27 (0.15-0.48), .001	0.26 (0.150-0.45), .001	0.22 (0.11-0.42), .001
High-risk conditions (before the index date)				
No	Referent	Referent	Referent	Referent
Yes	7.31 (3.96-13.47), .001	8.17 (4.19-15.0), .001	6.69 (3.61-12.42), .001	8.3 (4.04-16.88), .001
Educational status*				
<High school	Referent	Referent	Referent	Referent
High school graduate	0.69 (0.38-1.25), .22	0.83 (0.40-1.70), .61	0.68 (0.36-1.26), .22	0.84 (0.40-1.70), .61
Some college	0.33 (0.14-0.76), .01	0.91 (0.40-2.06), .82	0.30 (0.12-0.71), .01	0.31 (0.13-0.83), .02
College graduate	0.70 (0.35-1.41), .32	1.36 (0.69-2.70), .37	0.66 (0.32-1.36), .26	0.88 (0.37-2.08), .82

Subjects Variables	All subjects	
	Unadjusted OR for SPD (95% CI), P value	Adjusted OR for SPD (95% CI), P value
Atopic conditions		
No	Referent	Referent
Yes	1.98 (1.11-3.55), P = .02	2.13 (1.04- 4.35), P = .04
Ethnicity		
Caucasian	Referent	Referent
Non-Caucasian	2.50 (0.99-6.33), P = .05	3.88 (1.34-11.27), P = .01
Tobacco smoke exposure at index date		
Active	Referent	Referent
Passive	1.76 (0.60-5.13), P = .30	1.80 (0.52-6.19), P = .35
Nonsmokers	0.31 (0.18-0.52), P < .001	0.28 (0.15-0.51), P < .001



Teleological advantage
 Enhanced T_H2 activity confers protective advantage against parasite infection [86-88, 90](#)

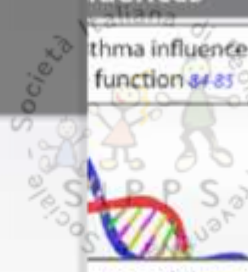
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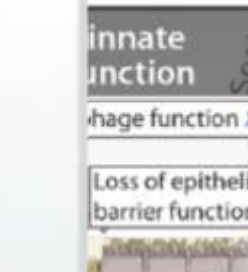
Abn
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 Airway hy



Influences
 Asthma influences immune function [84-85](#)
 Susceptibility genes increase infection risk [50, 78-81](#)



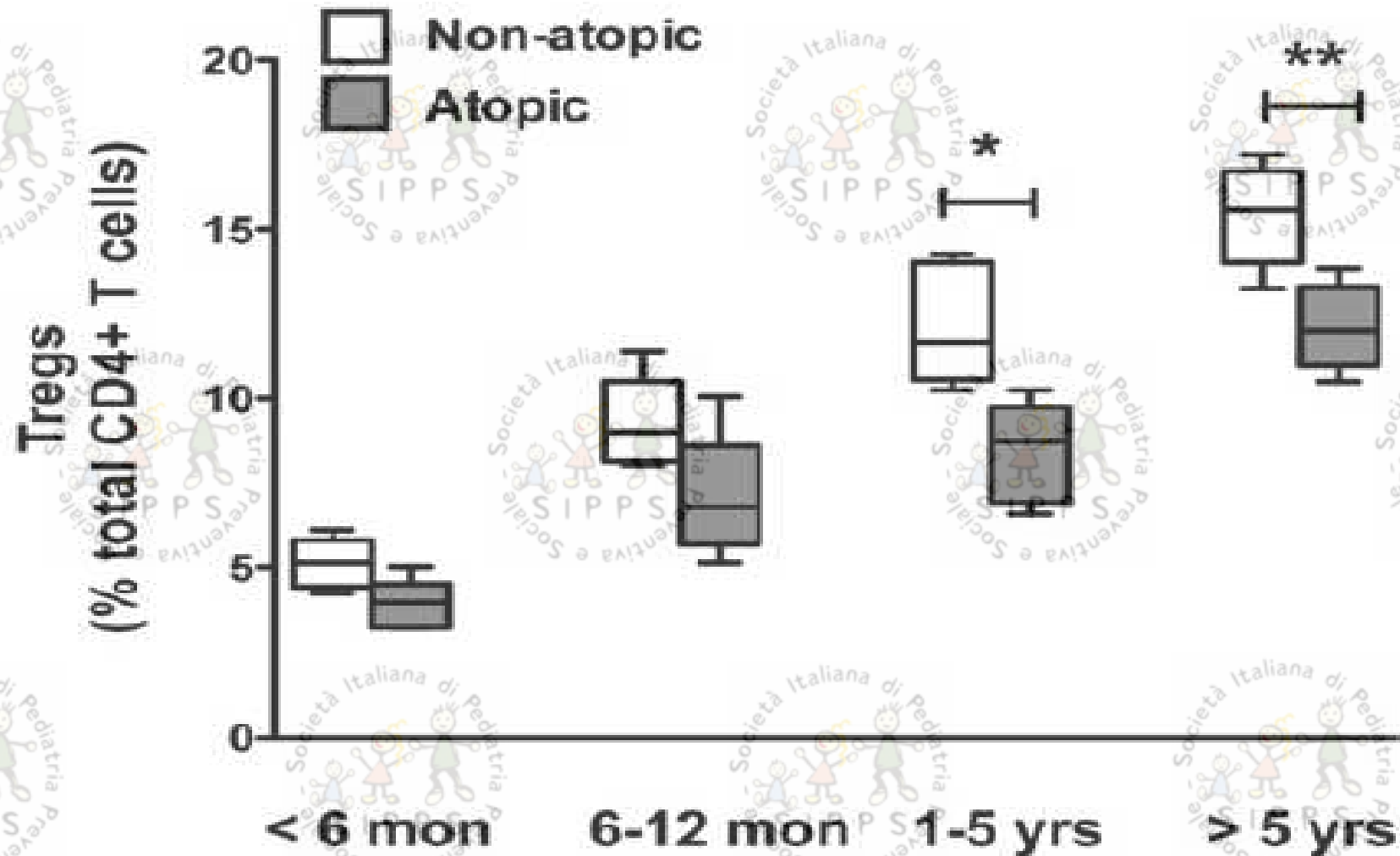
Innate function
 Phage function [70-71](#)
 Loss of epithelial barrier function [52-57](#)
 -59/
 Immune tolerance [51, 94](#)
 Innate responses [60-66, 69](#)



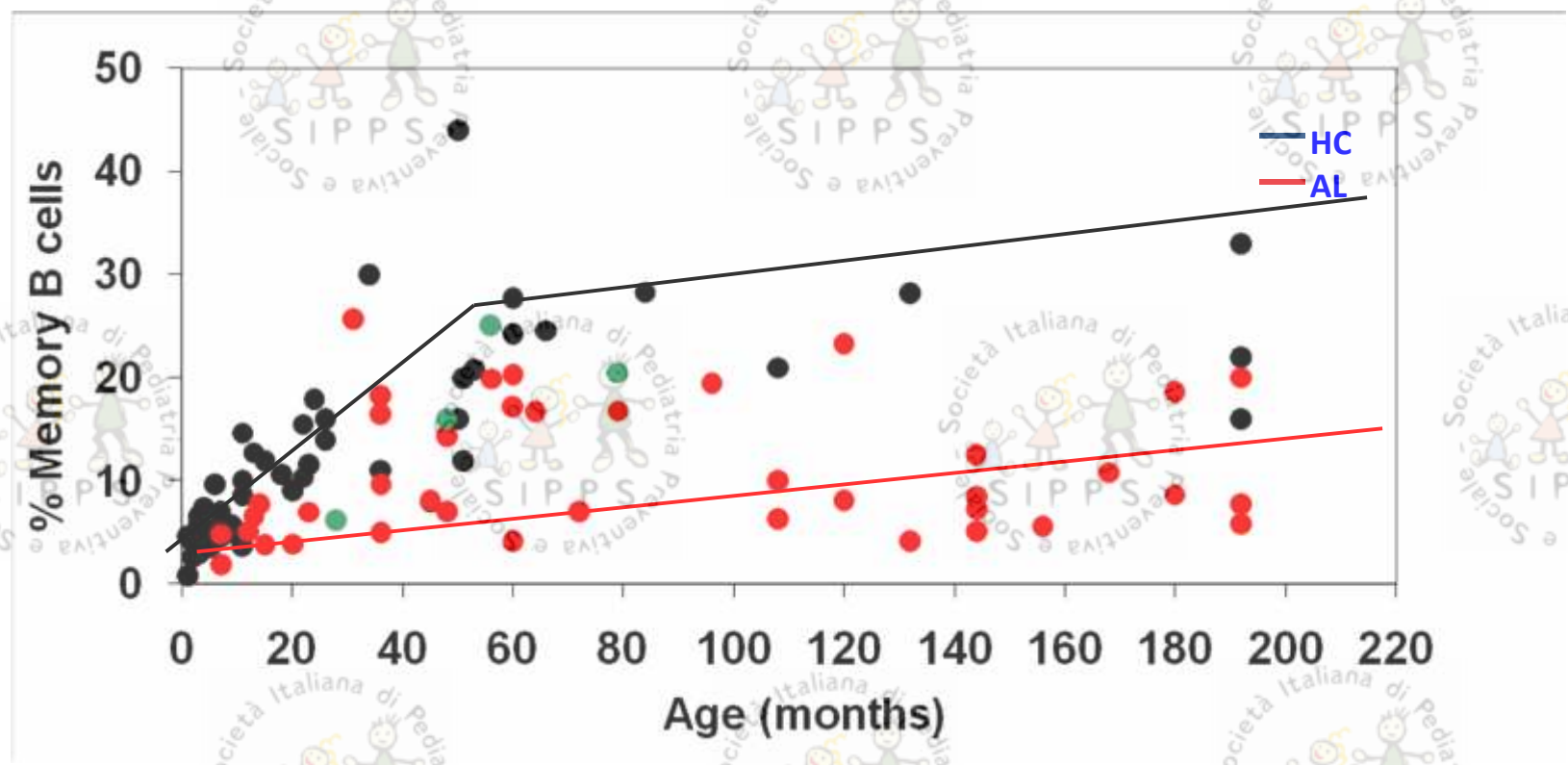
T_H2
 Enhanced T_H2 activity [72-75](#)

James KM et al, JACI 2012

Regulatory T cell maturation from birth to puberty, in atopic and non atopic children



Frequenza dei B linfociti di memoria nei bambini allergici e nei bambini non allergici



R. Carsetti, Immunol Rev 2006



Extrinsic factors

Maternal smoking [23, 700](#)

Air pollutants [701-704](#)

Teleological advantage

Enhanced T_H2 activity confers protective advantage against parasite infection [86-88, 90](#)

Genetic influences

Maternal atopy or asthma influences newborn immune function [84-85](#)

Abnormal airway structure and function following prior infections

Goblet cell hyperplasia [92, 95](#)

Altered epithelial cell function [94](#)

Airway hyperreactivity [38, 92, 93, 95](#)

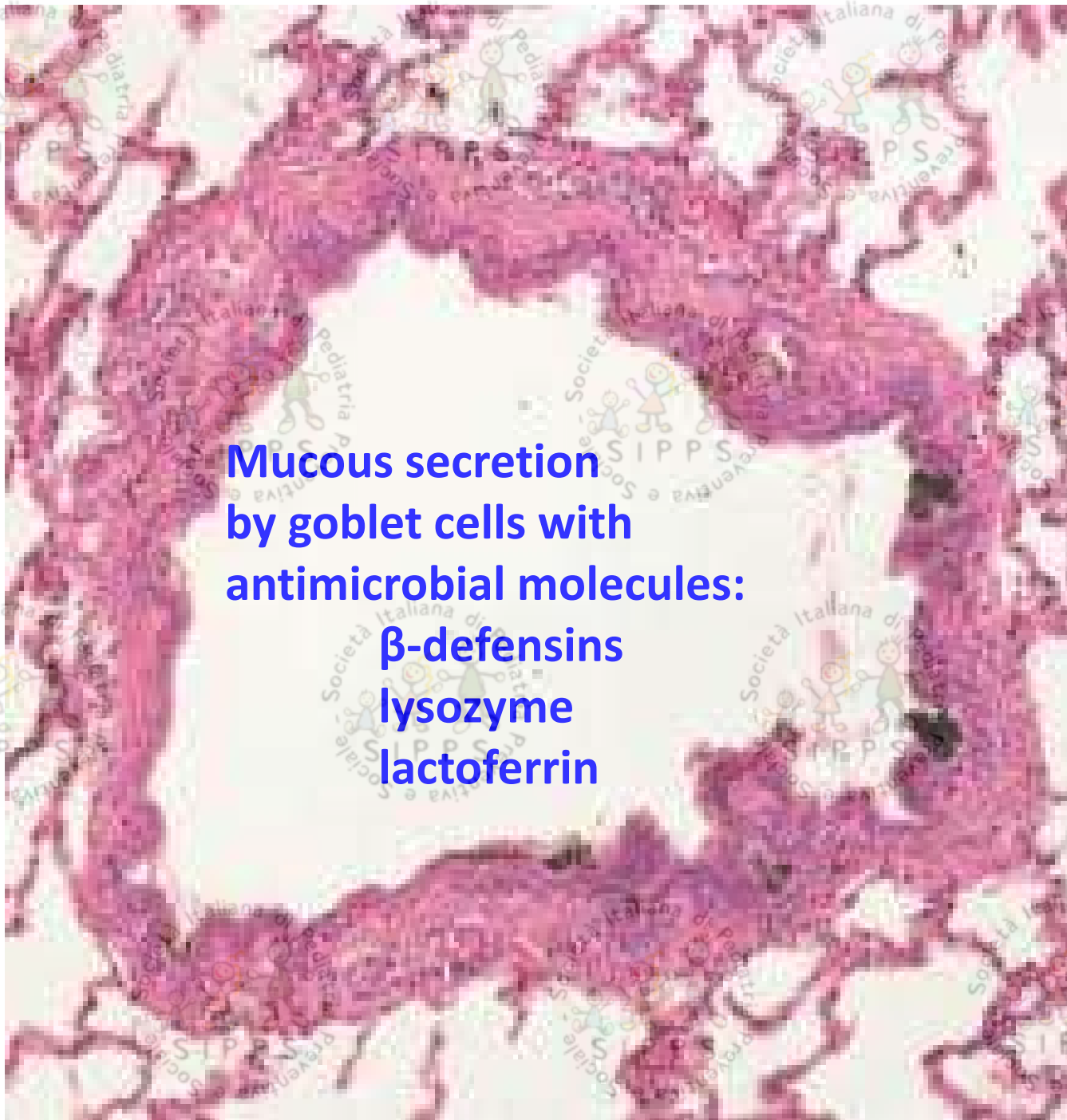
Impaired innate immune function

Impaired alveolar macrophage function [70-71](#)

Loss of epithelial barrier function [52](#)

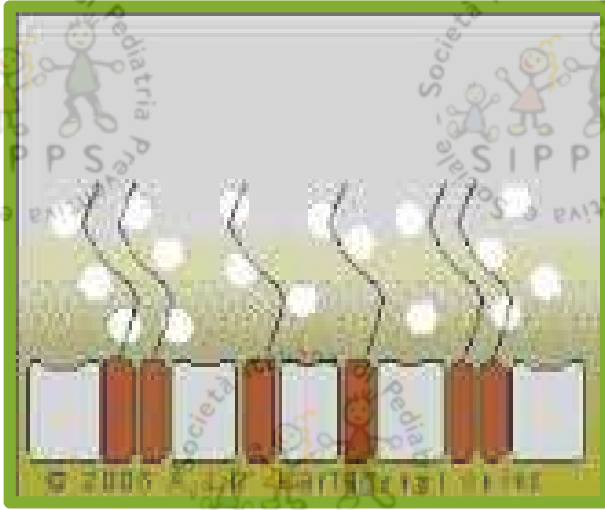
Mucus overproduction [58-59](#) / Impaired mucociliary clearance [51, 94](#)

Decreased IFN responses [60-66, 6](#)



**Mucous secretion
by goblet cells with
antimicrobial molecules:
 β -defensins
lysozyme
lactoferrin**





Intercellular junctions:

tight junctions

adherent junctions

desmosomes



IFN- γ

IL-6, IL-8

IL-1 β , IL-33

IL-25, IL-9

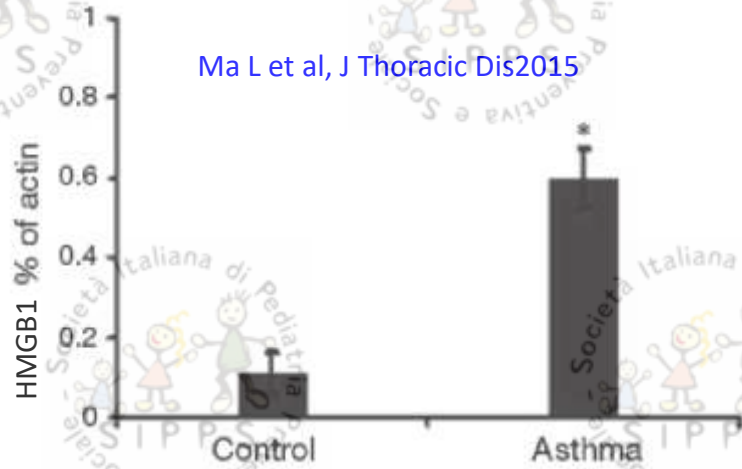
IL-13

TSLP

Periostin

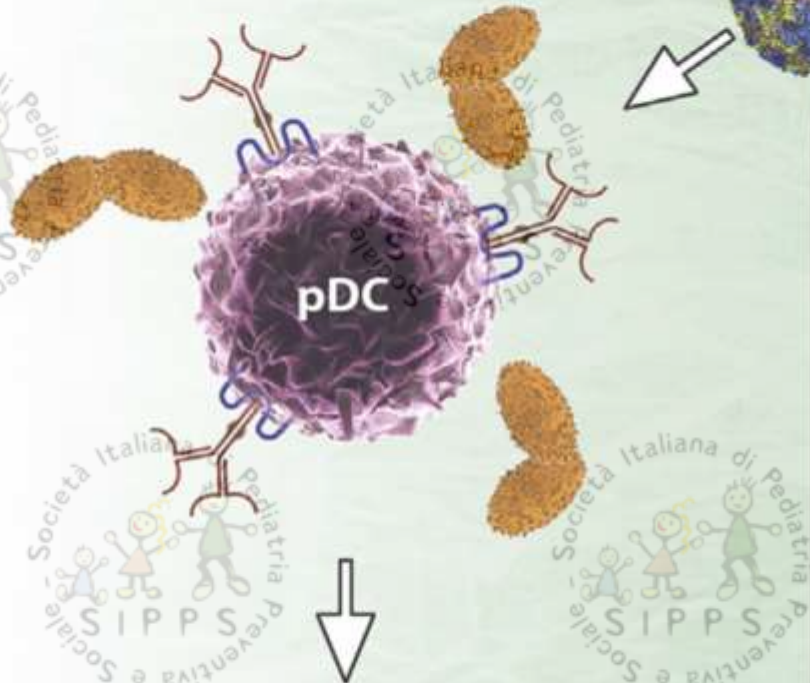
HMGB1

Ma L et al, J Thoracic Dis 2015



Normal Airway

Rhinovirus

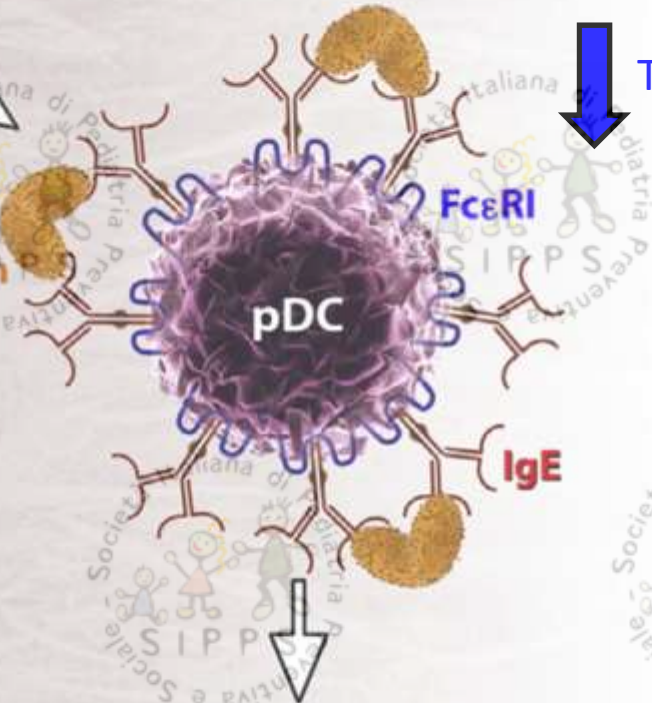


↑IFN-α

↓Viral Replication
Mild Illness

Allergic Airway Inflammation

Allergen



↓IFN-α

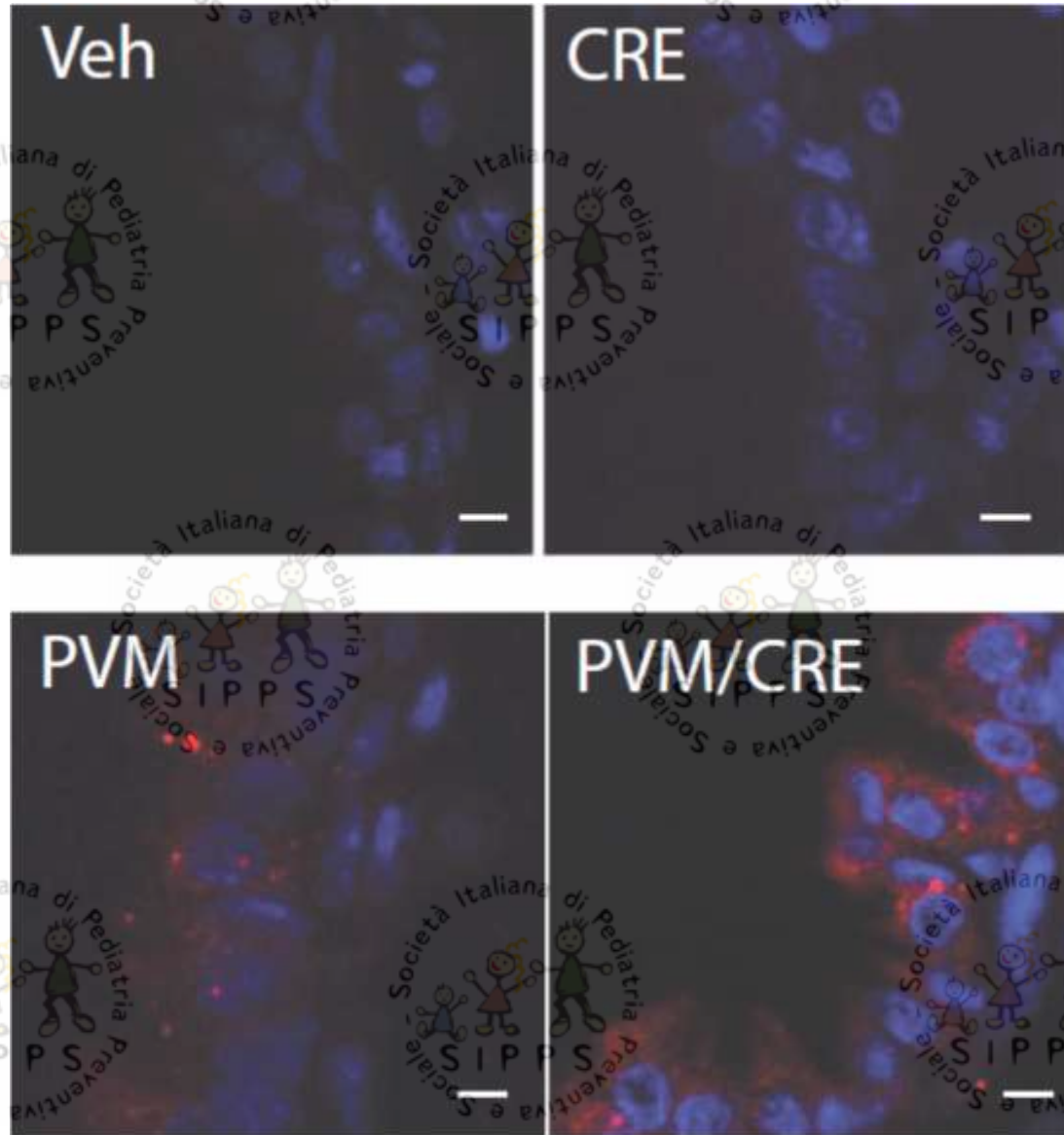
↑Viral Replication
Wheezing Illness
Asthma Exacerbation

IL-33

IL-25

TLR7

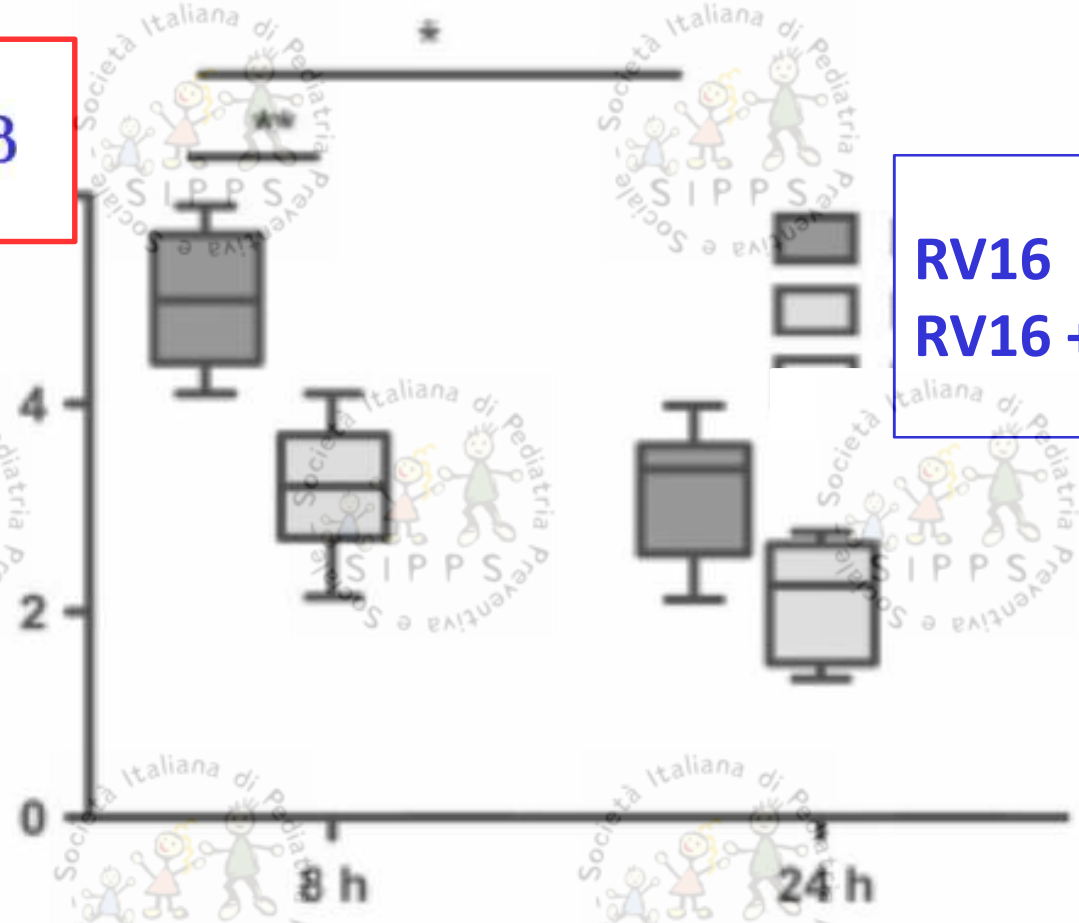
Aeroallergen-induce IL-33 predisposes to respiratory virus-induced asthma by dampening anti-viral immunity (TLR7)



Primary human bronchial epithelial cells (HBECs) obtained from bronchial brushings of non atopic subjects. 24 h pretreatment with Th2 cytokines (IL-4 and IL-13) **P < 0.01; *P < 0.05

IFN- β

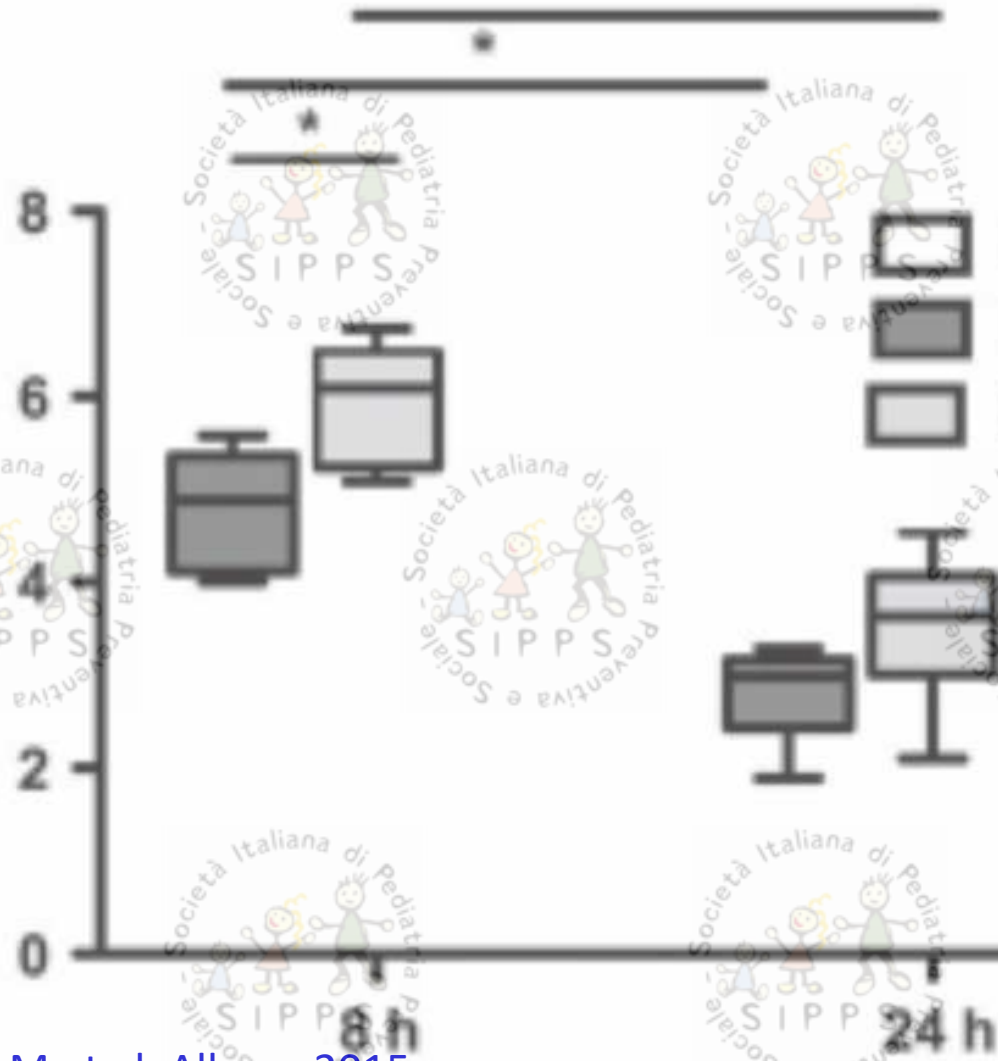
**IFN- β mRNA expressio
(log₁₀ copies/ μ g RNA)**



**RV16
RV16 +IL-4**

rhinovirus replication in human bronchial epithelial cells (HBECs).

RV16 vRNA expression
(log₁₀ copies/μg RNA)

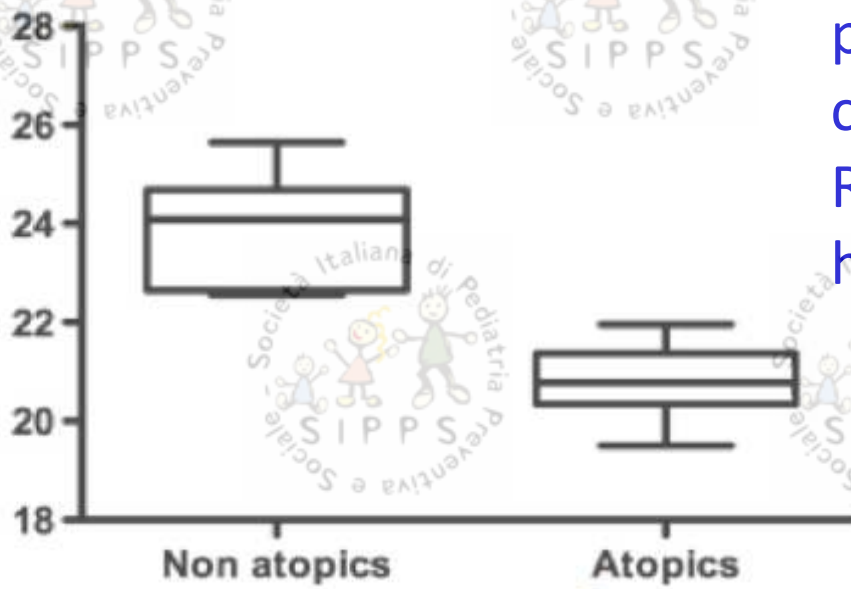


RV16
RV16 +IL-13

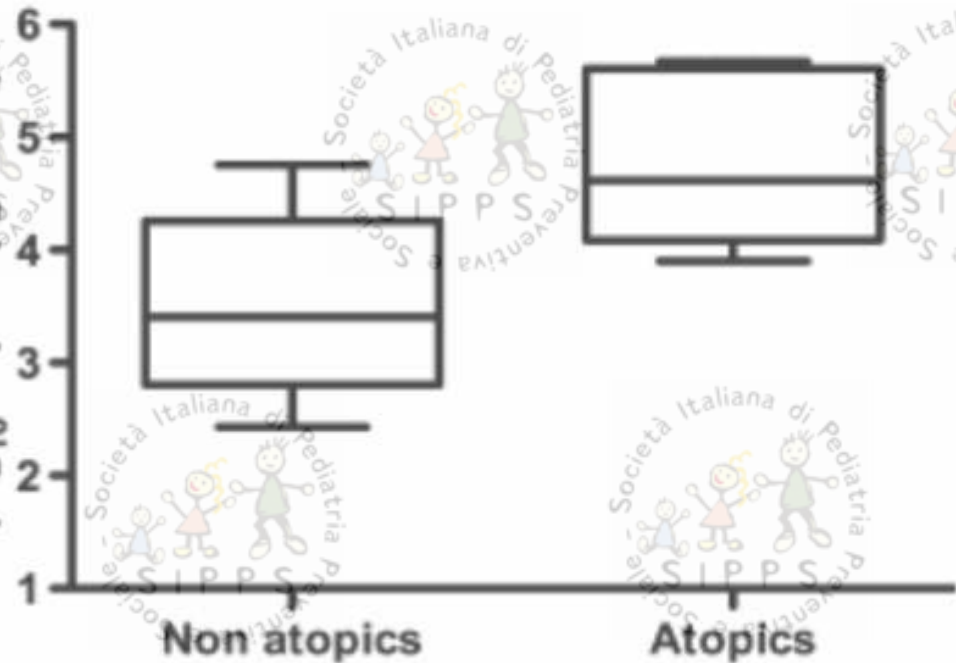
Baseline TLR3 mRNA levels in the primary cell cultures of epithelial cells of the nasal mucosae and Rhinovirus (RV)-16 vRNA levels 8 h after the infection

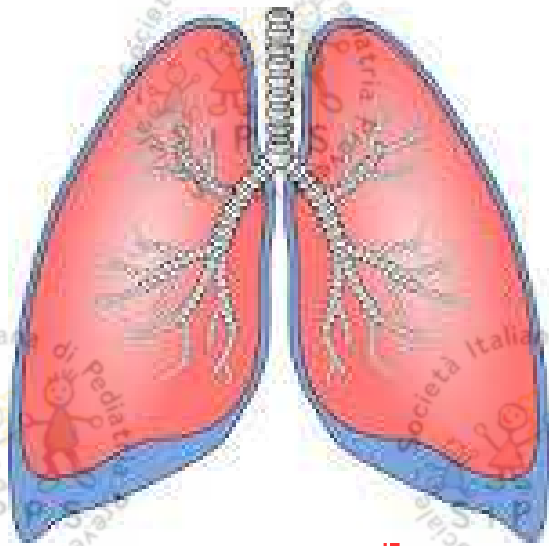
C

TLR3 mRNA (45-ct)

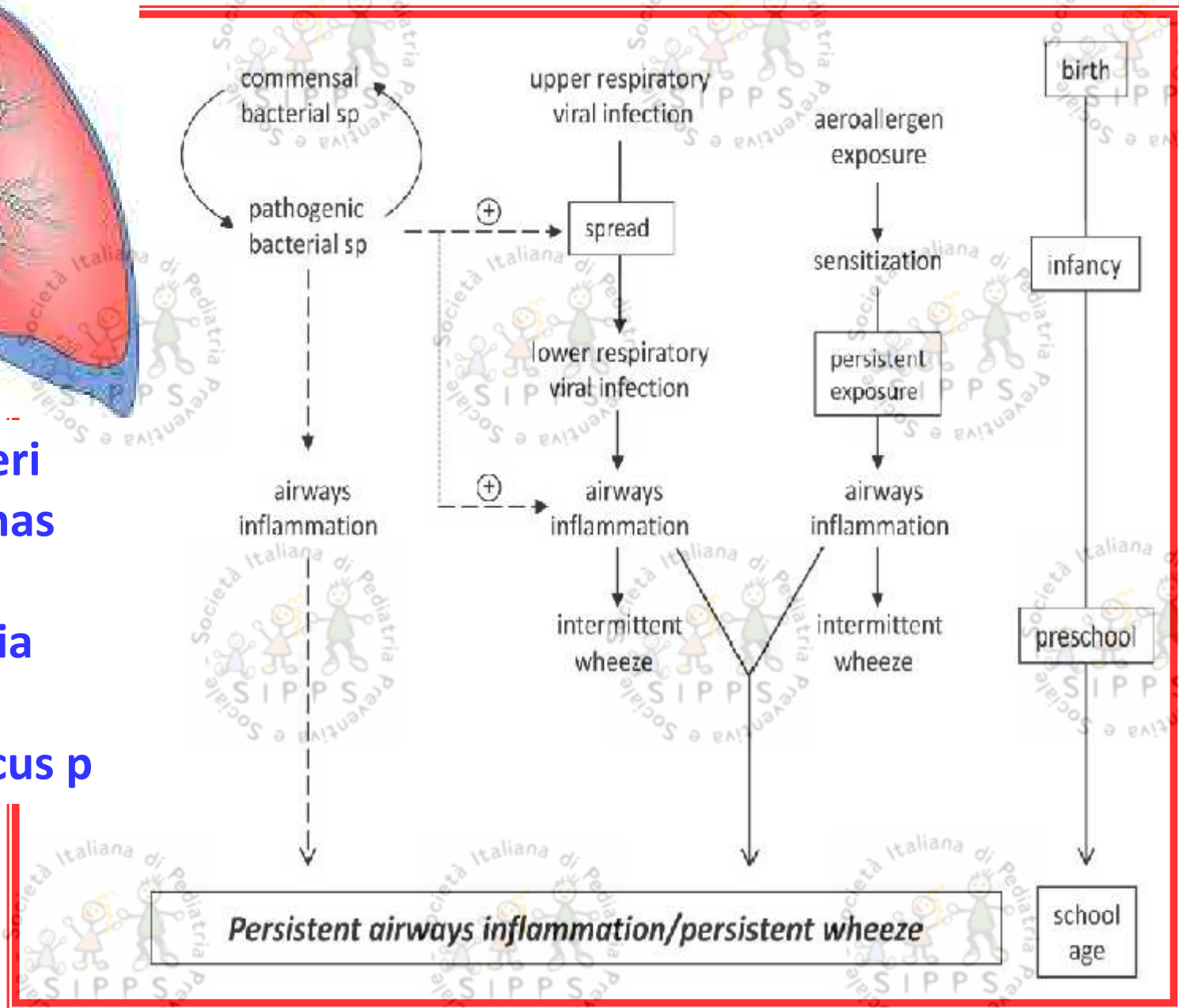


RV16 vRNA expression (log₁₀ copies/μg RNA)





Enterobatteri
Pseudomonas
Neisseria
Burkholderia
Moraxella
Streptococcus p



Dobbiamo rispondere a

Lucilla!

.....siamo autorizzati a

ipotizzare che le IRR siano così
frequenti perché è
atopica/asmatica?

The background of the slide is a repeating pattern of the SIPPSS logo. The logo is circular and contains the text "Società Italiana di Pediatria Preventiva e Sociale" around the perimeter and "SIPPSS" in the center. In the center of the logo are three stylized figures: a yellow figure on the left, a pink figure in the middle, and a green figure on the right, all holding hands.

Dobbiamo curarla

Dobbiamo dare indicazioni ai genitori

COME???????



un evento
organizzato da



BioMEDIA
La condizione del sapere



save the date

19

19° Congresso Nazionale
della Società di Allergologia
e Immunologia Pediatrica

Firenze
4-6 maggio 2017

Palazzo dei Congressi e
Palazzo degli Affari - Firenze Fiera


PRESIDENTI DEL CONGRESSO
Roberto Bernardini, Marzia Duse



Dobbiamo curarla



**Dobbiamo dare indicazioni ai
genitori**



**Dobbiamo prevenire le
recidive**



Immunostimolanti?

Steroidi topici?

Vaccini polibatterici?

Vaccinazioni?

Integratori/polivitaminici?

Profilassi antibiotica?

Rimedi naturali?

ITS?





un evento
organizzato da



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Vaccinazione antipneumococcica in soggetti con asma e COPD

	COPD		Controls		P value	Asthma		Controls		P value
N	16,074		14,028			2,746		1,345		
Year of vaccination, N (%)					<0.001					0.274
1998	5,367	(33.4)	4,020	(28.7)		742	(27.0)	337	(25.1)	
1999	3,120	(19.4)	2,684	(19.1)		503	(18.3)	274	(20.4)	
2000	2,694	(16.8)	2,461	(17.5)		479	(17.4)	254	(18.9)	
2001	2,820	(17.5)	2,774	(19.8)		572	(20.8)	263	(19.6)	
2002	2,073	(12.9)	2,089	(14.9)		450	(16.4)	217	(16.1)	
Overall health care utilization, avg. (SD)										
Hosp	0.45	(1.0)	0.20	(0.6)	<0.001	0.18	(0.6)	0.23	(0.9)	0.060
ED visits	0.92	(2.0)	0.42	(1.2)	<0.001	0.84	(1.8)	0.46	(1.2)	<0.001
Outpt	20.62	(22.7)	14.54	(18.3)	<0.001	18.33	(21.8)	15.56	(22.8)	<0.001

Recommendations for annual influenza vaccination

- High-risk groups who should receive annual influenza vaccination
 - Persons 6 mo through 4 y (59 mo) of age
 - Persons aged ≥ 50 y
 - Persons with chronic pulmonary (including asthma), cardiovascular (except hypertension), renal, hepatic, neurologic, hematologic, or metabolic disorders (including diabetes mellitus)
 - Persons who are immunosuppressed (including immunosuppression caused by medications or by HIV)
 - Persons who are or will be pregnant during the influenza season
 - Persons aged 6 mo through 18 y and receiving long-term aspirin therapy who therefore might be at risk for experiencing Reye syndrome after influenza virus infection
 - Persons who are residents of nursing homes and other chronic care facilities



nuovi vaccini
antivirali:

Contro il HRV
Contro l'adenovirus
Contro il RSV



la profilassi passiva con
anticorpi monoclonali
bloccanti la replicazione
del RSV

Riduzione % del numero di infezioni all'anno dei bambini in terapia con SLIT rispetto ai controlli

Primo anno

12,92%

Secondo anno

31,26%

Terzo anno

66,7%

