7° Congreso Argentino de Neumonología Pediátrica

El laboratorio pulmonar en la práctica diaria

Enfermedad Pulmonar Crónica Post Viral, Asma, DBP, ¿Cuál es el lugar del EFR?

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Enfermedad crónica (WikiPedia)

En medicina, se llama **enfermedad crónica** a las afecciones de larga duración y por lo general, de progresión lenta. No hay un consenso acerca del plazo a partir del cual una enfermedad pasa a considerarse crónica; pero por término medio, toda enfermedad que tenga una duración mayor a seis meses puede considerarse como crónica.

El término "crónico", del griego Χρονος (*Chronos*): «dios del tiempo», como su etimología lo indica, se refiere al tiempo de evolución de la enfermedad, pero nada dice acerca de su gravedad.

¿Cuál es el lugar del EFR?

- **Enfermedad Pulmonar Crónica Post Viral: Sigue a una severa injuria pulmonar en etapas tempranas de la vida.**

Bronquiolitis Proliferativa exudados intraluminales y una Bronquiolitis Constrictiva con alteraciones en la pared de los bronquiolos terminales presentando desde inflamación hasta fibrosis y llevando a una Obliteración completa del Lumen.

Acta Pædiatr 82: 557–61. 1993

Adenovirus type 7h respiratory infections: a report of 29 cases of acute lower respiratory disease

Patricia Murtagh[1], Cristina Cerqueiro[2], Alicia Halac[1], María Avila[3] and Adriana Kajon[3]

Hospital Nacional de Pediatría "Juan P Garrahan"[1], Hospital de Niños "Ricardo Gutierrez"[2] and Departamento de Microbiología[3], Facultad de Medicina, Universidad de Buenos Aires, Argentina

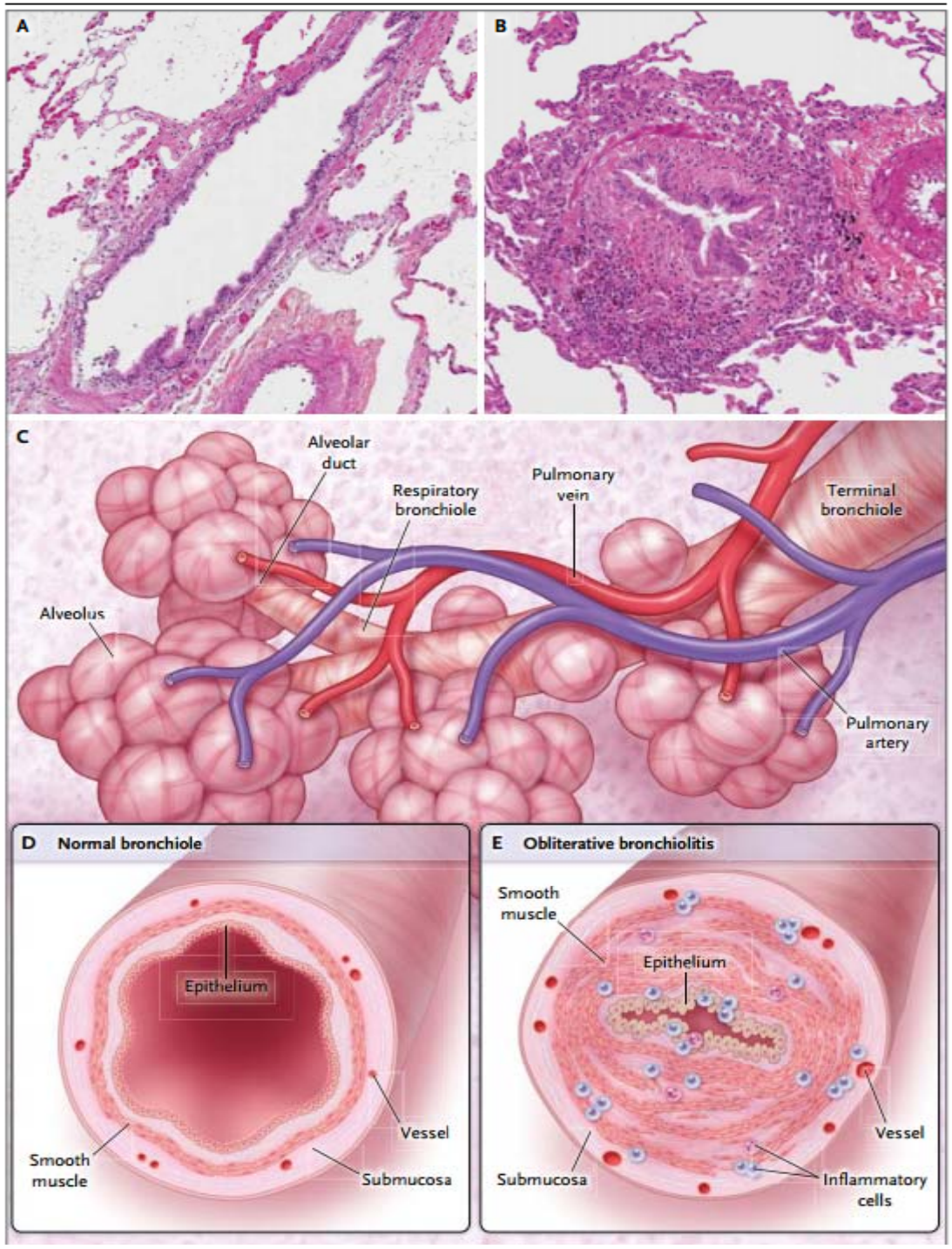
Murtagh P, Cerqueiro C, Halac A, Avila M, Kajon A. Adenovirus type 7h respiratory infections: a report of 29 cases of acute lower respiratory disease. Acta Pædiatr 1993;82:557–61. Stockholm. ISSN 0803–5253

Twenty-nine cases of pediatric acute lower respiratory disease associated with adenovirus genome type 7h were evaluated retrospectively. They constituted 2.4% of 1233 cases of acute respiratory infections treated in five hospitals in Buenos Aires, between September 1984 and September 1988. Pneumonia and bronchiolitis were the principal diagnoses. The mean age of patients was 8.8 months and 82.7% of the children were less than one year of age. None of the patients had previously been exposed to measles or was immunocompromised. A mixed infection, viral or bacterial, was demonstrated in 8 of the 29 patients. Sixteen children developed a severe pulmonary disease which required intensive care. Ten with a clinical diagnosis of multifocal pneumonia and necrotizing bronchiolitis died. Extrapulmonary manifestations were observed in the most severe cases. Observations suggest a possible high pathogenicity of adenovirus type 7h and emphasize the need for adequate control and case management programs. □ *Acute respiratory infections, adenovirus 7, pneumonia*

A Kajon, Departmento de Microbiología, Facultad de Medicina, Universidad de Buenos Aires, Paraguay 2155 piso 11 CP 1121, Buenos Aires, Argentina

Discussion

This paper presents, for the first time, a clinical description of 29 cases associated with Ad7h respiratory infection. Considering the high incidence of severe disease and the fact that Ad7h was the only respiratory pathogen detected in 21 of the 29 cases studied, this new genome type recently described in our country appears to have an increased pathogenicity.


A
B
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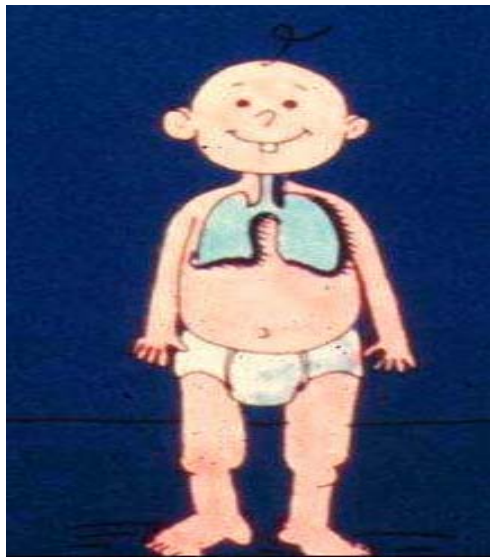
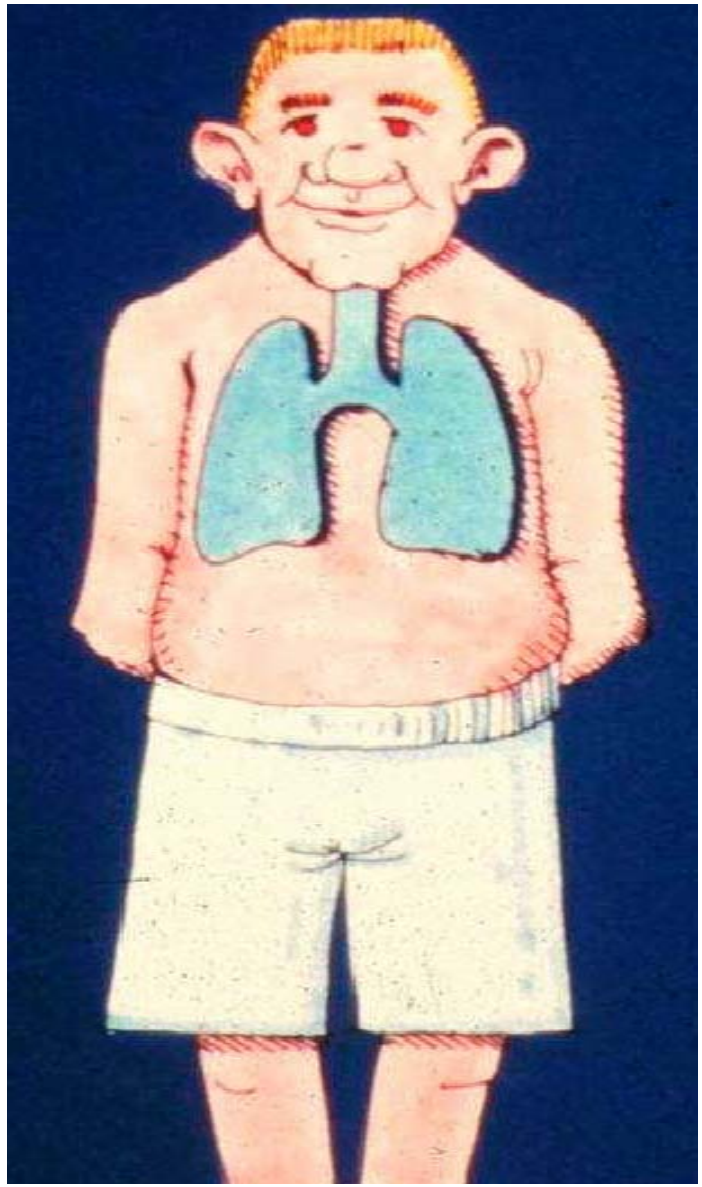
Alveolar duct
Respiratory bronchiole
Pulmonary vein
Terminal bronchiole
Alveolus
Pulmonary artery
D Normal bronchiole
Epithelium
Vessel
Smooth muscle
Submucosa
E Obliterative bronchiolitis
Smooth muscle
Epithelium
Vessel
Submucosa
Inflammatory cells

Crecimiento y Desarrollo Pulmonar





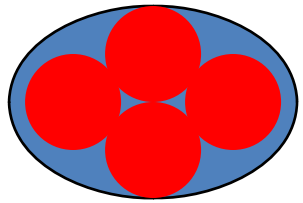
Crecimiento y Desarrollo Pulmonar

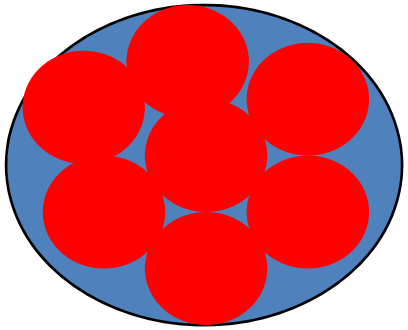
Niños hasta Adultez

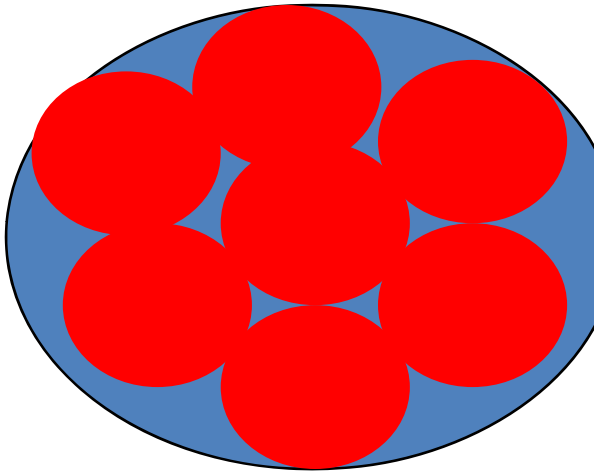
Expansion Alveolar

RN y Lactantes

Aumenta el N° Alveolos







Lung function in infants with chronic pulmonary disease after severe adenoviral illness

Alejandro M. Teper, MD, Carlos D. Kofman, MD, Alberto F. Maffey, MD, and Santiago M. Vidaurreta, MD

Objective: To evaluate pulmonary function and bronchodilator responses in young children with chronic pulmonary disease (CPD) after a severe adenoviral lower respiratory tract infection.

Methods: Pulmonary function tests were performed in 13 patients (mean age, 1.32 ± 0.8 years) with CPD and were compared with a control group of 13 healthy infants (mean age, 1.16 ± 0.4 years).

Results: Respiratory rate, peak tidal expiratory flow (PTEF), PTEF/tidal volume, absolute time up to PTEF, time percentage to PTEF, volume percentage for PTEF, and compliance and resistance of the respiratory system were significantly affected in the CPD group. Similarly, maximal flow at functional residual capacity (V′maxFRC) was 56.0 ± 42 mL/s and 373 ± 107 mL/s in the CPD and control groups, respectively (P = .001). No within-group differences with baseline values or between-group differences were noted in response to treatment with ipratropium bromide or albuterol.

chodilators of young children with CPD after a severe adenoviral lower respiratory tract infection.

CPD	Chronic pulmonary disease
PFTs	Pulmonary function tests
PTEF	Peak tidal expiratory flow
SaO_2	Arterial oxygen saturation
TV	Tidal volume
V̇maxFRC	Maximal flow at functional residual capacity

Methods

Population

Three hundred seventy of 2513 children admitted to the hospital because

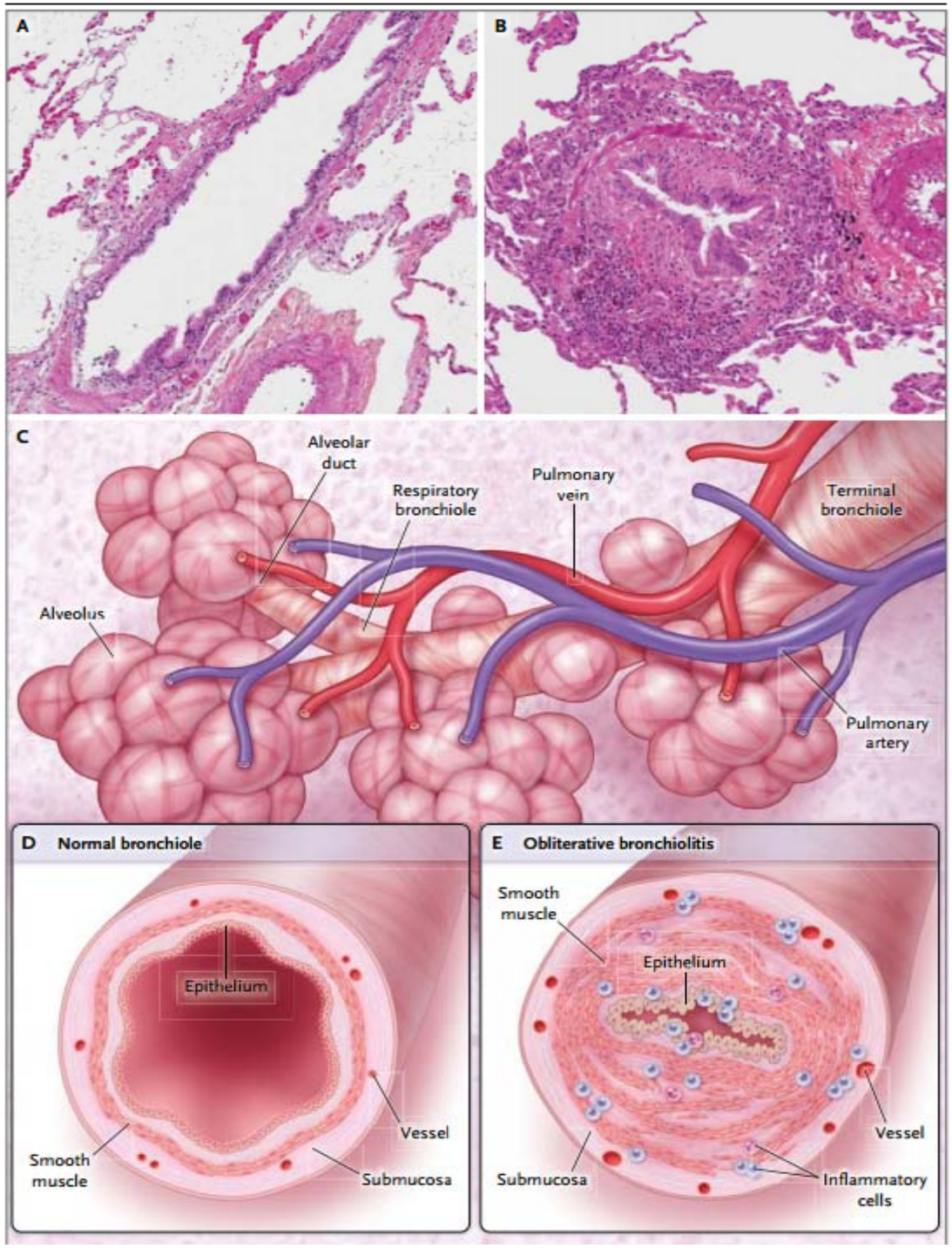
Table I. Demographic and anthropometric characteristics in 13 young children with CPD and 13 control children

	CPD group (n = 13)	Control group (n = 13)
Age (y)	1.32 ± 0.8	1.16 ± 0.4
Sex (M/F)	5/8	9/4
Height (cm)	71.9 ± 6.8	76.2 ± 7.4
Z score for height*	–1.8 ± 1.9	–0.3 ± 0.9
Weight (kg)	8.09 ± 1.9	10.2 ± 2

	CPD	Control	
Vmax FRC (mL/s)	56 ±42 mL/s	373 ± 107 mL/s	P<0,001
Vmax FRC (%)	20% (±9%)	109% (±12%)	

RR	40.7 ± 12	30.1 ± 4	.007
PTEF (mL/s)	146 ± 46	113 ± 25	.03
PTEF/TV	2.20 ± 0.9	1.18 ± 0.2	.001
T-PTEF (s)	0.09 ± 0.04	0.24 ± 0.1	.001
Tme/Te	0.09 ± 0.04	0.28 ± 0.1	.001
%V-PF	0.16 ± 0.05	0.27 ± 0.1	.001
Compliance (mL/cm H_2O/kg)	1.25 ± 0.74	2.07 ± 0.9	.015
Resistance (cm H_2O/mL/s)	0.06 ± 0.03	0.03 ± 0.01	.003

Values are expressed as mean ± SD.
RR, Respiratory rate; *T-PTEF,* absolute time to PTEF; *Tme/Te,* time percentage for PTEF; *%V-PF* volume percentage for PTEF.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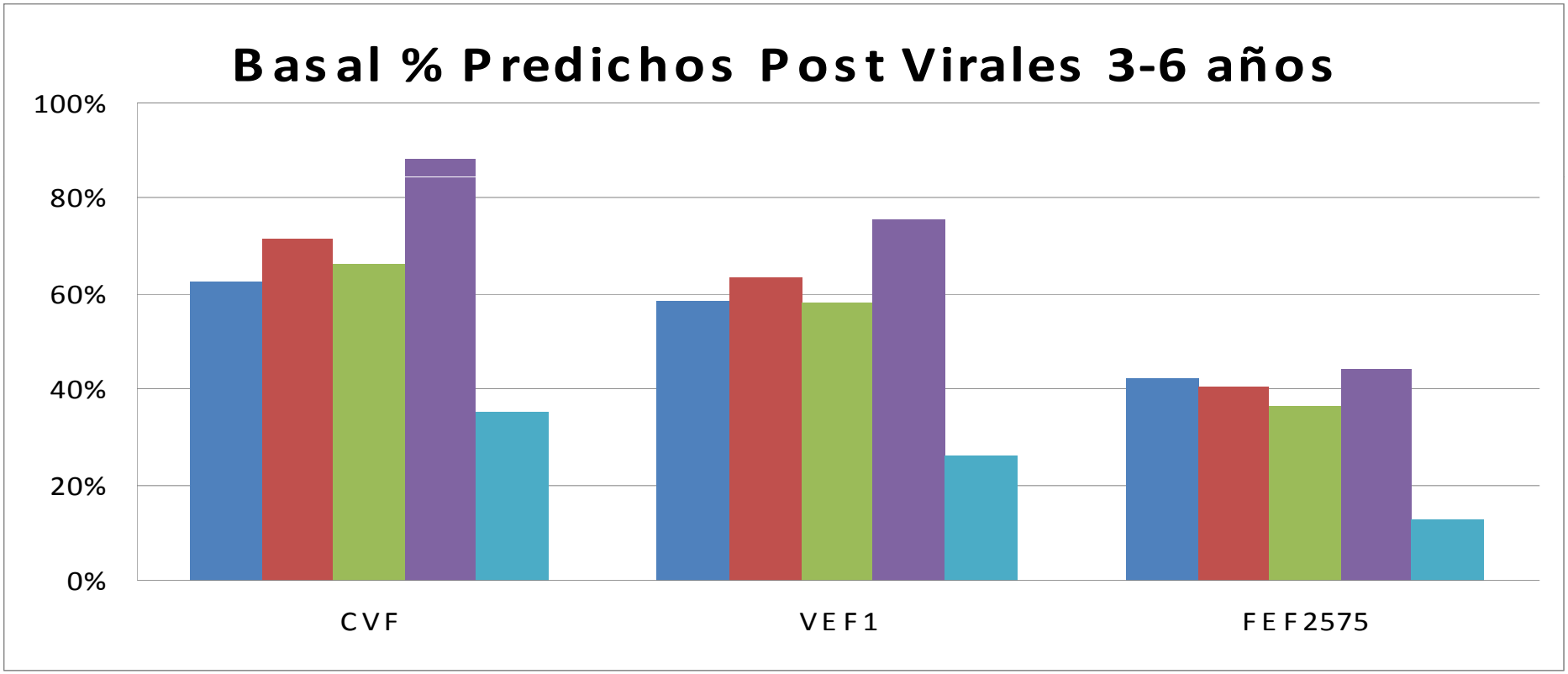
Submucosa
E Obliterative bronchiolitis
Smooth muscle
Epithelium
Vessel
Submucosa
Inflammatory cells

Espirometrías de 3 a 6 años en niños con Bronquiolitis obliterante



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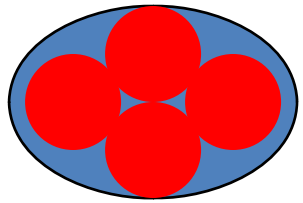

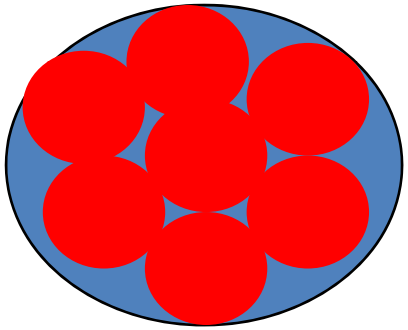

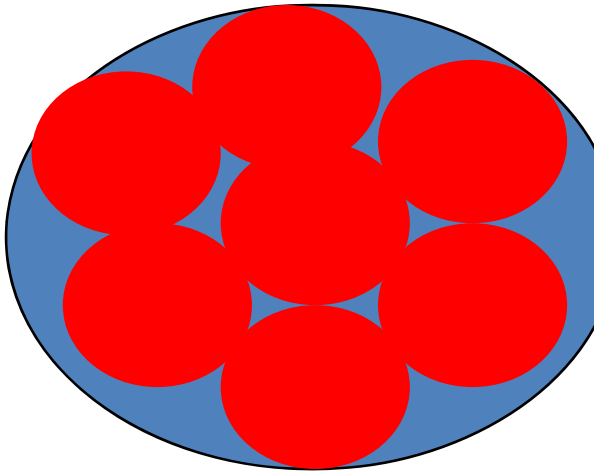

Como llega el pulmón a la edad de 8años

Pediatric Pulmonology 45:1180–1185 (2010)

Postinfectious Bronchiolitis Obliterans in Children:
Clinical and Pulmonary Function Findings

V. Aguerre, MD,* C. Castaños, MD, H. Gonzalez Pena, MD,
M. Grenoville, MD, and P. Murtagh, MD

Summary. Aim: Postinfectious bronchiolitis obliterans (PIBO) is an infrequent yet potentially severe disorder following acute lower pulmonary infection (ALRI) in children. In infants and young children PIBO have been strongly associated with Adenovirus (Ad). The purpose of this study was to analyze the clinical features and pulmonary function findings in children with PIBO. Cases caused by Ad were compared with cases in which no viral agent was identified. Methods: Fifty-eight children with PIBO were prospectively studied. Clinical data and pulmonary function tests (spirometry and plethysmography) were evaluated. Patients were divided in two groups according to the identification of the causal agent. Group 1 (G1): Adenovirus (+) Group 2: No etiologic agent identified. Results: Fifty-eight patients (male/female ratio 3.4:1); median age 8 years; mean age at initial injury 11 months; median time of hospitalization at acute stage of disease 60 days. Spirometry: FVC 68 ± 13%, FEV1 40.5 ± 11%, $FMMF_{25-75\%}$ 16.7 ± 7.5%. Pletysmography: TLC 136 ± 22%, FRC 208 ± 50%, RV 343 ± 102%, RV/TLC 59 ± 10, SGaw 0.05 ± 0.02. When clinical, spirometric and plethysmographic data were compared, no statistically significant difference was found between the two groups. Conclusions: PIBO is an extremely crippling lung disease with significant obstructive pattern in PFT. Both analyzed groups shared similar characteristics in the acute phase of the disease and in the severity of the sequelar pulmonary disease. **Pediatr Pulmonol. 2010; 45:1180–1185.**

TABLE 2—Pulmonary Function Data of all Cases (n = 58) and in G1 and G2

	Total cases, n = 58	G1, n = 22	G2, n = 36	P^1
Spirometry				
FVC (%)[2]	68.75 (13.6)	68.90 (12.75)	68.66 (14.2)	0.95
FEV_1 (%)[2]	40.5 (11.1)	43.6 (9)	38.5 (11.9)	0.06
FEV_1/FVC (%)[3]	56.1 (10.9)	59.9 (7.7)	53.83 (12)	0.04
$FEF_{25-75\%}$ (%)[2]	16.7 (7.5)	18.4 (6.7)	15.6 (7.8)	0.11
Plethysmography				
TLC (%)[2]	136 (21.9)	132.7 (19)	138.1 (23.5)	0.37
FRC (%)[2]	207.7 (49.6)	196.5 (48.5)	214.6 (49.7)	0.18
RV (%)[2]	343.1 (102.1)	319.3 (89.8)	357.7 (107.6)	0.17
RV/TLC (%)[3]	58.6 (10.1)	57 (10.5)	59.6 (9.8)	0.35
Sgaw[3]	0.05 (0.02)	0.06 (0.02)	0.05 (0.02)	0.07

[1] *P* value = comparing G1versus G2.
[2] Percentage of predicted values. Mean (SD).
[3] Absolute values.

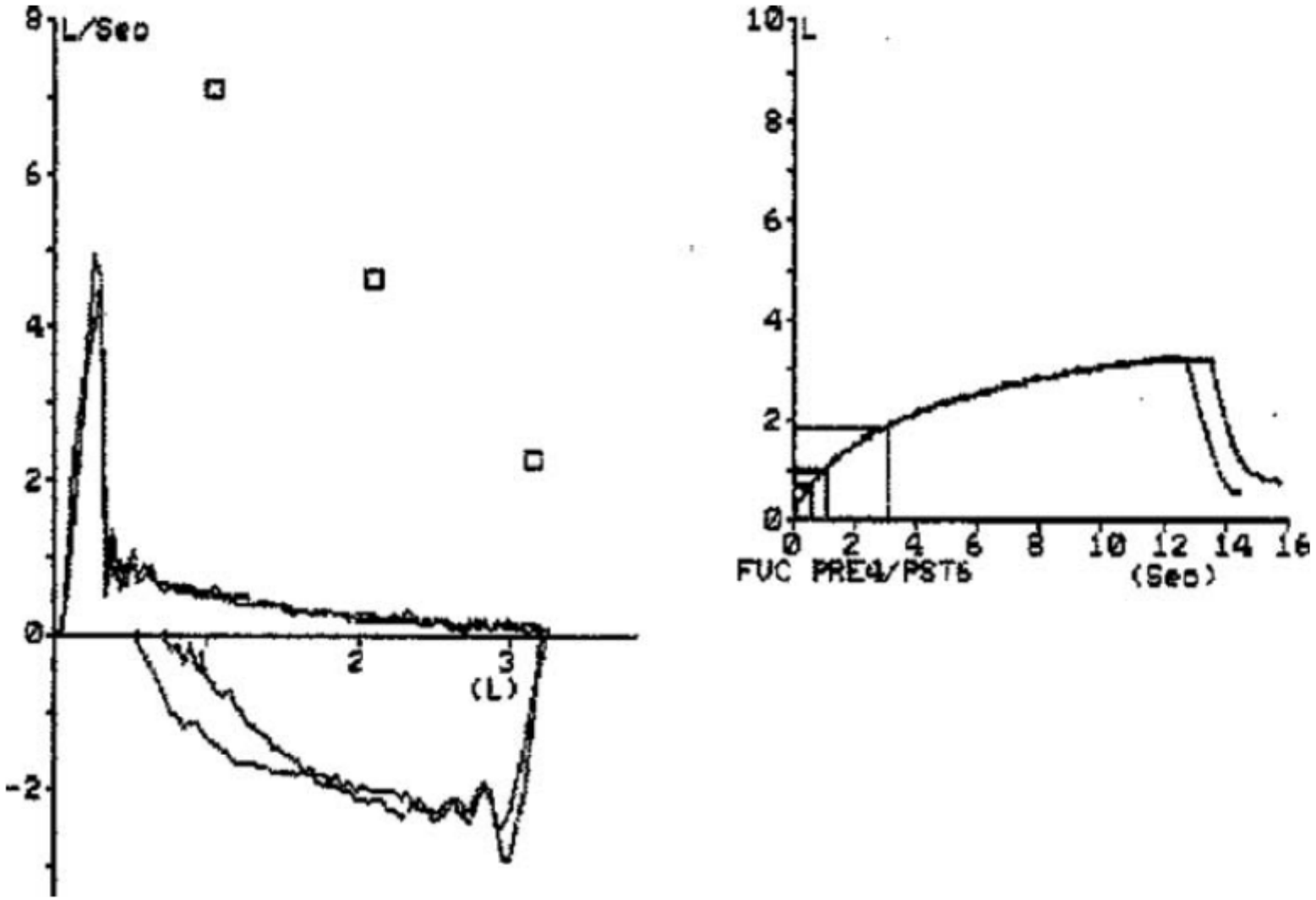

Fig. 1. Distinctive flow-volume curve in a case of PIBO.

Original Article

Pulmonary function in children and adolescents with postinfectious bronchiolitis obliterans*, **

Função pulmonar de crianças e adolescentes com bronquiolite obliterante pós-infecciosa

Rita Mattiello, Javier Mallol, Gilberto Bueno Fischer, Helena Teresinha Mocelin, Belkys Rueda, Edgar Enrique Sarria

J Bras Pneumol. 2010;36(4):453-459

Table 2 - Pulmonary function parameters of the participants, by country.

Parameter[a]	Brazil[b]	Chile[b]	Both countries[b]
	(n = 41)	(n = 36)	(n = 77)
FVC	61.7 (56.9-66.4)	72.5 (68.2-76.8)	66.8 (63.4-70.2)
FEV_1	42.5 (37.6-47.0)	49.7 (44.7-54.8)	45.9 (42.4-49.4)
$FEF_{25-75\%}$	19.9 (16.0-23.8)	23.4 (19.1-27.7)	21.5 (18.6-24.4)
FEV_1/FVC	67.6 (63.1-72.1)	66.8 (62.5-71.1)	67.2 (64.1-70.3)
TLC	116.8 (113.1-120.5)	112.5 (10.8-117.1)	116.8 (113.2-120.5)
ITGV	162.7 (154.0-171.4)	144.5 (134.6-154.3)	162.7 (154.0-171.4)
RV	281.1 (258.6-303.7)	231.0 (203.2-258.7)	281.1 (258.6-303.7)
RV/TLC	236.2 (222.5-250.40)	200.9 (184.7-217.1)	236.2 (222.5-250.0)
sRaw	746.6 (597.5-895.7)	572.8 (431.9-713.6)	665.3 (562.5-768.2)

ITGV: intrathoracic gas volume; and sRaw: specific airway resistance. [a]Values expressed as percentage of the predict value. [b]Values expressed as mean (95% CI).

Como Crece el Pulmón de Un Niño con BO

The Clinical Respiratory Journal ORIGINAL ARTICLE

Dysanaptic growth of lung and airway in children with post-infectious bronchiolitis obliterans

Ricardo A. Mosquera[1], Syed S. Hashmi[2], Susan E. Pacheco[1], Alexandra Reverdin[1], Justyna Chevallier[1] and Giuseppe N. Colasurdo[1]

1 Division of Pulmonary Medicine, Department of Pediatrics, University of Texas Medical School at Houston, Houston, TX, USA
2 Pediatric Research Center, Department of Pediatrics, University of Texas Medical School at Houston, Houston, TX, USA

Abstract

Rationale: Post-infectious bronchiolitis obliterans (PBO) is a rare form of chronic obstructive lung disease associated with small airway fibrosis following a severe insult to the lower respiratory tract. It has been suggested that PBO is a non-progressive disease. However, evidence supporting this statement is limited. In this case series, we sought to determine the changes of pulmonary function tests (PFT) over time in children with PBO.

Key words
bronchiolitis obliterans – dysanaptic growth – immunomodulation – inhaled corticosteroids – pulmonary function test

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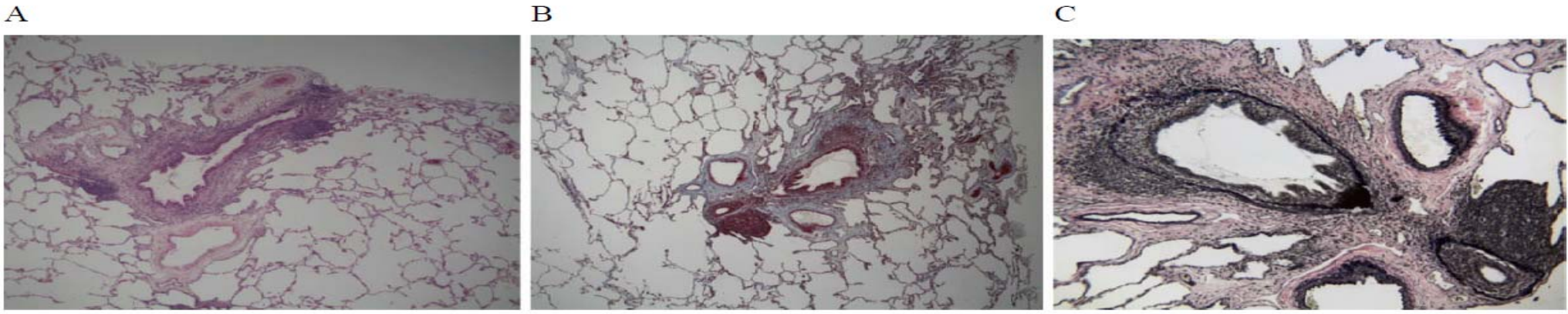


Figure 1. Lung biopsy of a 15-year-old boy with post-infectious bronchiolitis obliterans, showing pulmonary parenchyma with peribronchial inflammation and fibrosis. (A) H&E magnification 40×. (B) Trichrome stain magnification 40×. (C) The thickened basement membrane and increased elastic tissue (Van Gieson elastic stain, magnification 200×).

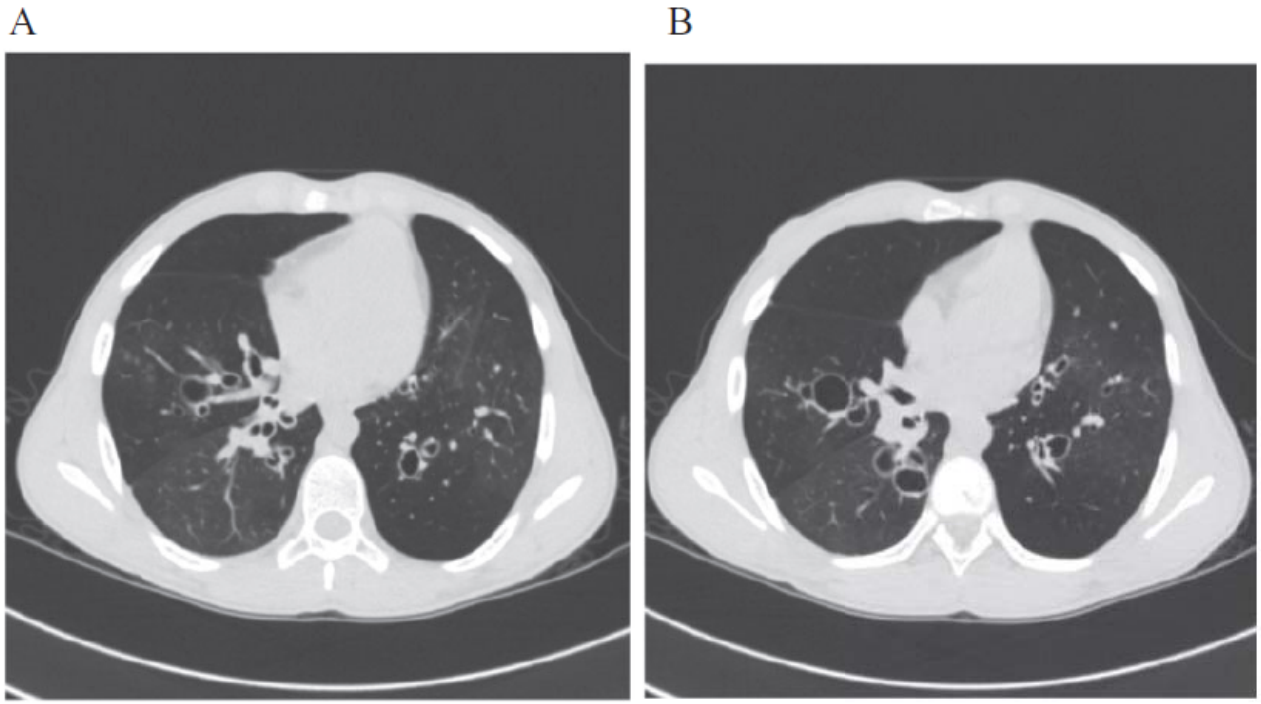


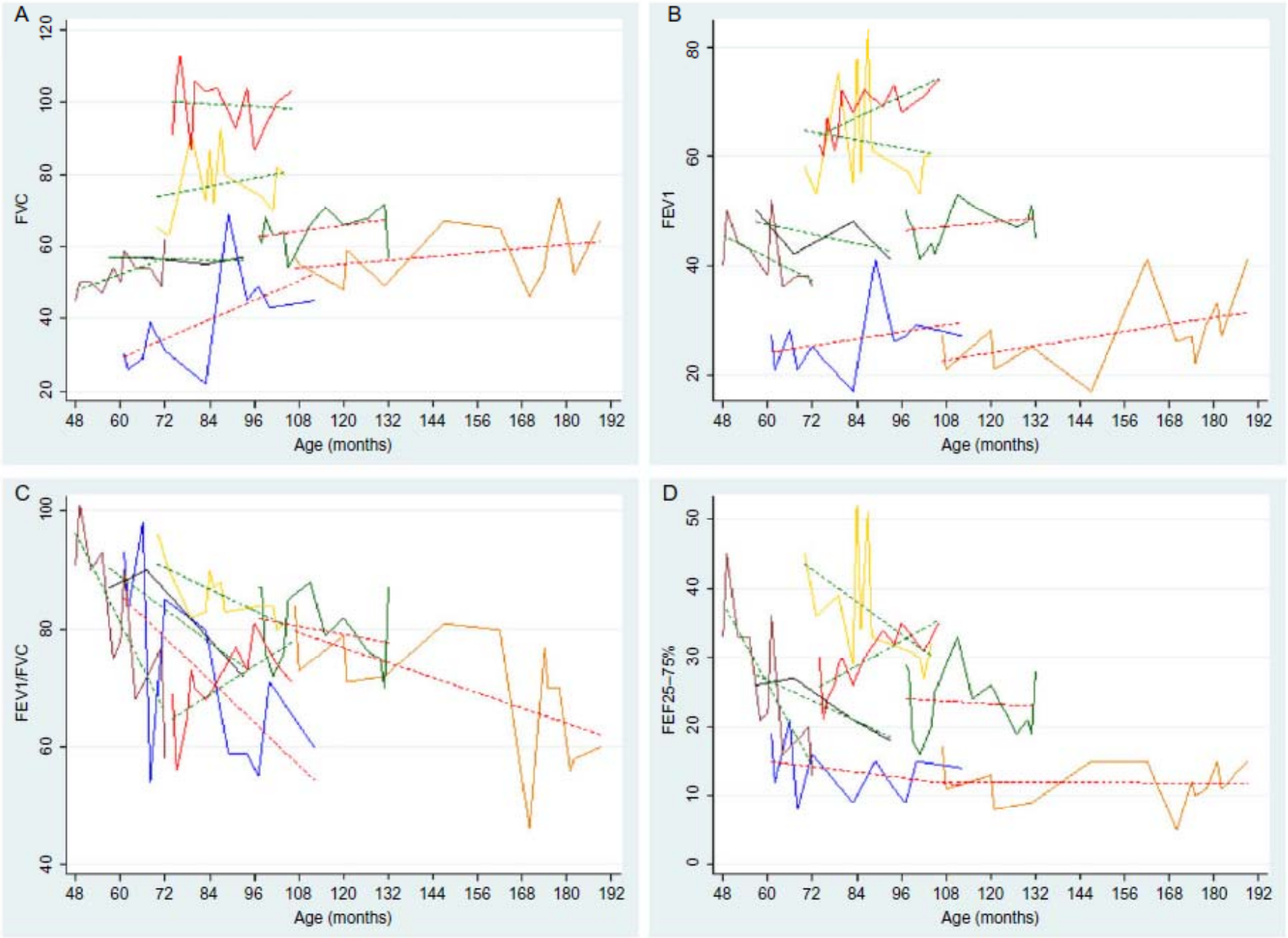
Figure 2. Chest high-resolution computed tomography scans of a 15-year-old boy with post-infectious bronchiolitis obliterans. (A) Patchy areas of hyperinflation giving pattern of attenuation. (B) Bronchial dilation, bronchial wall thickening and bronchiectasis.

Table 2. Baseline and final median PFT values

	PFT values (median)				
	Baseline	End of study	Change per year*	95% CI	*P* value
FVC	57%	62%	1.8%	0.4 to 1.3	0.008
FEV1	50%	41%	0.8%	–0.2 to 1.8	0.112
FEV1/FVC	87%	71%	–2.6%	–3.8 to –1.4	<0.001
FEF25–75%	29%	18%	–0.9%	–1.8 to 0.0	0.060

*Average increase (positive) or decrease (negative) in PFT value for every unit increase in age; statistical model did not include IVIG as a covariate.

PFT, pulmonary function test; IVIG, intravenous immunoglobulin; FVC, forced vital capacity; FEV1, forced expiratory volume in 1 s; FEF, forced expiratory flow; CI, confidence interval.


A
FVC
20
40
60
80
100
120
48 60 72 84 96 108 120 132 144 156 168 180 192
Age (months)
B
FEV1
20
40
60
80
48 60 72 84 96 108 120 132 144 156 168 180 192
Age (months)
C
FEV1/FVC
40
60
80
100
48 60 72 84 96 108 120 132 144 156 168 180 192
Age (months)
D
FEF25–75%
0
10
20
30
40
50
48 60 72 84 96 108 120 132 144 156 168 180 192
Age (months)

¿Cuál es el lugar del EFR? Displasia Broncopulmonar

DBP Necesidad de oxigeno aumentada:

- Lactantes <32 semanas de EG: Requerimientos de Oxigeno a la 36 semana o al alta (lo que suceda primero)
- Lactantes ≥32 semanas de EG:Requerimientos de Oxigeno >28 dias de vida o al alta (lo que suceda primero)

Atelectasias y enfisemas hiperplasia del epitelio de las vías aéreas y edema intersticial.

Crecimiento y Desarrollo Pulmonar

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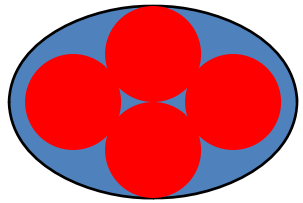
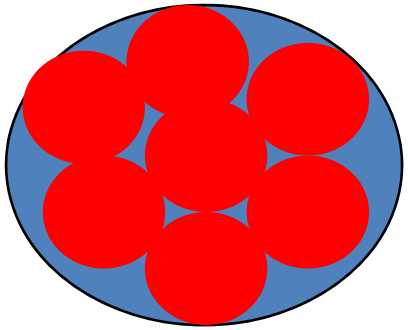
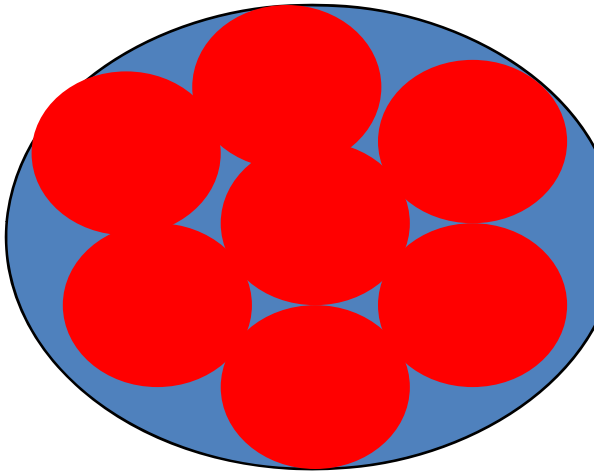
Aumenta el N° Alveolos







Reduced Lung Function in Healthy Preterm Infants in the First Months of Life

Luciana Friedrich, Renato T. Stein, Paulo M. C. Pitrez, Andrea L. Corso, and Marcus H. Jones

Department of Pediatrics, Pontificia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brazil

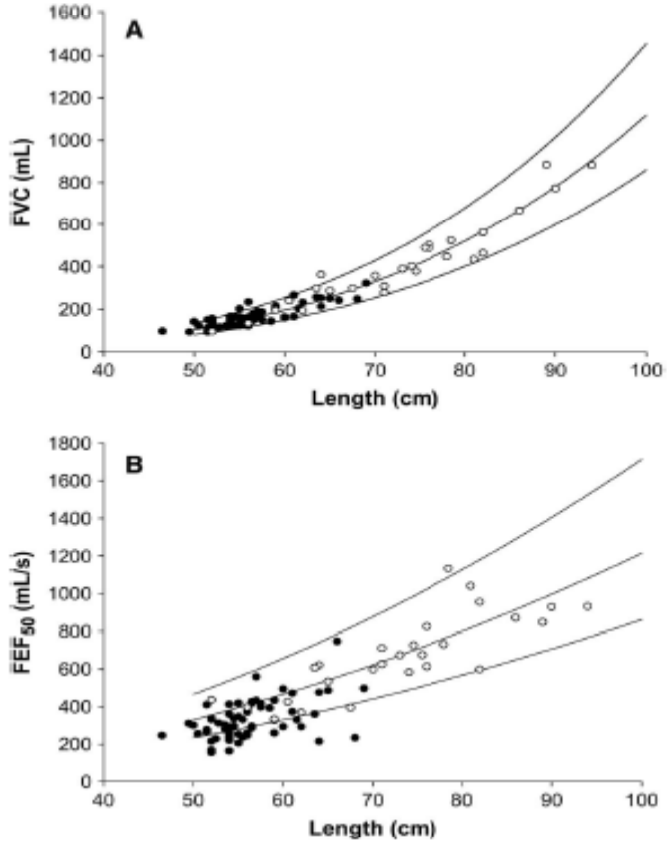


Figure 1. (*A*) FVC and (*B*) forced expiratory flow measured at 50% expired volume (FEF_{50}) plotted against length in 62 preterm infants (*solid circles*) and 27 full-term control infants (*open circles*). *Lines* represent 5th, 50th, and 95th percentiles from published equations (22).

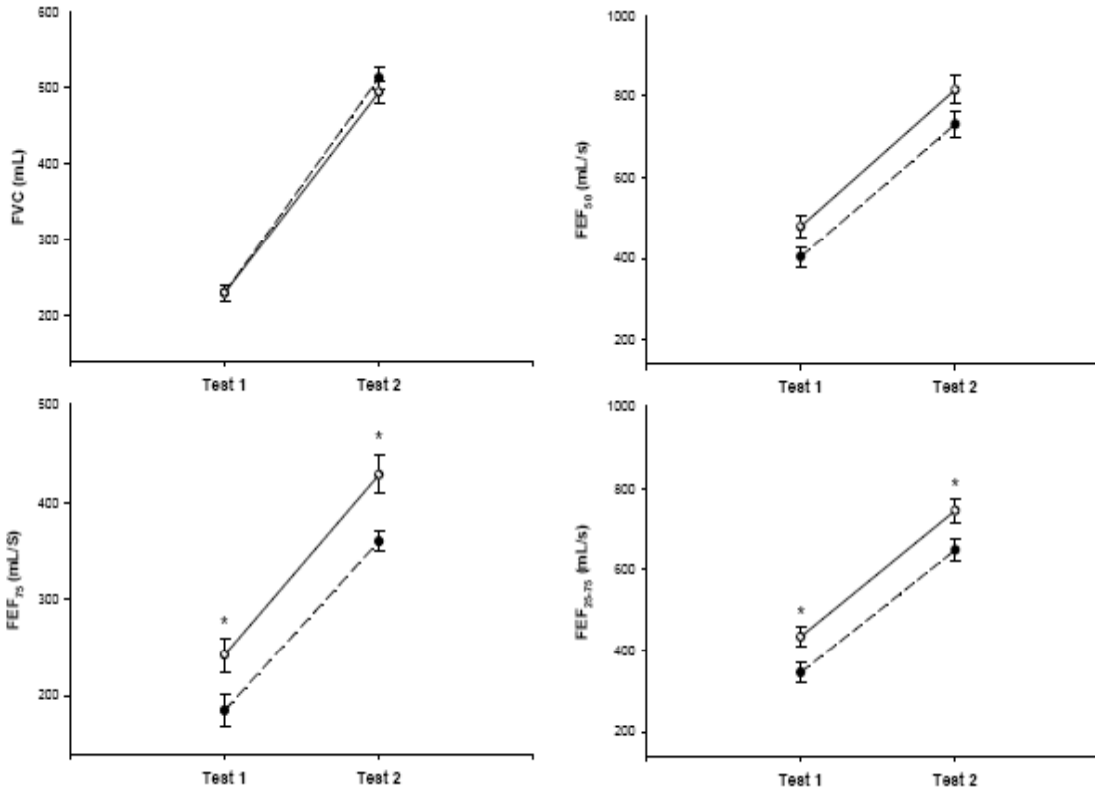
AJRCCM Articles in Press. Published on September 20, 2007 as doi:10.1164/rccm.200703-476OC

Growth rate of lung function in healthy preterm infants

Luciana Friedrich, MD[1]; Paulo M. C. Pitrez, MD PhD[2]; Renato T. Stein, MD PhD[2]; Marcelo Goldani MD PhD[1], PhD; Robert Tepper, MD PhD[3], Marcus H. Jones, MD PhD[2].

	Adjusted Least-Square Means			
	Preterm	Control	95% CI	*p*
TEST 1				
FVC	230±10	234±11	-29 to 37	0.814
FEF_{50}	404±26	480±27	-157 to 6	0.068
FEF_{75}	185±16	242±17	-109 to -6	0.030
FEF_{25-75}	346±24	435±25	-165 to -13	0.022
$FEV_{0.5}$	179±8	191±9	-39 to 15	0.371
$FEV_{0.5}$/FVC	0.78±0.02	0.86±0.02	-0.14 to -0.02	0.006
TEST 2				
FVC	513±14	494±15	-22 to 60	0.364
FEF_{50}	731±32	816±34	-179 to 10	0.078
FEF_{75}	360±19	428±20	-124 to -13	0.017
FEF_{25-75}	649±29	746±30	-182 to -12	0.027
$FEV_{0.5}$	364±11	379±11	-47 to 17	0.348
$FEV_{0.5}$/FVC	0.72±0.01	0.78±0.01	-0.10 to -0.03	0.001

Figure 1.



EDITOR'S CHOICE

ORIGINAL ARTICLE

Effect of late preterm birth on longitudinal lung spirometry in school age children and adolescents

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Table 4 Mean and SD of z-score of lung function measures adjusted for age, gender and height at age 8–9 years, with CIs for the difference of means (premature – term), unadjusted and adjusted for maternal smoking in pregnancy and social status

	25–32 weeks (n=65)		Term (n=6144)		Difference (95% CI) (unadjusted)	Difference (95% CI) (adjusted)	p Value for adjusted analysis
	Mean	SD	Mean	SD			
FEV_1	−0.461	0.876	0.011	1.000	−0.472 (−0.716 to −0.228)	−0.487 (−0.791 to −0.184)	0.002
FVC	−0.204	0.950	0.005	1.001	−0.209 (−0.453 to 0.035)	−0.151 (−0.454 to 0.152)	0.329
FEF_{25-75}	−0.573	0.928	0.013	1.001	−0.586 (−0.829 to −0.342)	−0.627 (−0.930 to −0.325)	< 0.001
FEV_1/FVC	−0.362	1.183	0.009	0.997	−0.371 (−0.617 to −0.125)	−0.488 (−0.793 to −0.182)	0.002
FEF_{25-75}/FVC	−0.457	0.963	0.010	1.001	−0.467 (−0.713 to −0.221)	−0.512 (−0.818 to −0.207)	0.001
	33–34 weeks (n=79)		Term (n=6144)		Difference and 95% CI (unadjusted)	Difference and 95% CI (adjusted)	p Value for adjusted analysis
	Mean	SD	Mean	SD			
FEV_1	−0.498	1.094	0.011	1.000	−0.509 (−0.733 to −0.285)	−0.485 (−0.724 to −0.246)	<0.001
FVC	−0.313	1.036	0.005	1.001	−0.318 (−0.540 to −0.096)	−0.352 (−0.589 to −0.115)	0.004
FEF_{25-75}	−0.425	1.095	0.013	1.001	−0.438 (−0.659 to −0.217)	−0.434 (−0.670 to −0.197)	< 0.001
FEV_1/FVC	−0.312	1.169	0.009	0.997	−0.320 (−0.545 to −0.096)	−0.239 (−0.477 to −0.001)	0.049
FEF_{25-75}/FVC	−0.271	1.059	0.010	1.001	−0.281 (−0.503 to −0.060)	−0.267 (−0.503 to −0.031)	0.027
	35–36 weeks (n=238)		Term (n=6144)		Difference and 95% CI (unadjusted)	Difference and 95% CI (adjusted)	p Value for adjusted analysis
	Mean	SD	Mean	SD			
FEV_1	0.008	0.908	0.011	1.000	−0.003 (−0.133 to 0.127)	−0.012 (−0.147 to 0.123)	0.867
FVC	0.015	0.950	0.005	1.001	0.010 (−0.120 to 0.139)	0.009 (−0.125 to 0.143)	0.893
FEF_{25-75}	−0.010	0.879	0.013	1.001	−0.023 (−0.152 to 0.106)	−0.034 (−0.168 to 0.099)	0.616
FEV_1/FVC	0.004	0.906	0.009	0.997	−0.005 (−0.135 to 0.125)	−0.017 (−0.151 to 0.117)	0.805
FEF_{25-75}/FVC	−0.022	0.925	0.010	1.001	−0.033 (−0.162 to 0.097)		0.582

FEF_{25-75}, forced expiratory volume at 25–75% of FVC; FEV_1, forced expiratory volume in 1 s; FVC, forced vital capacity.

Table 5 Mean and SD of z-scores of lung function measures adjusted for age, gender and height at age 14–17 years, with CIs for the difference of means (premature – term), unadjusted and adjusted for maternal smoking in pregnancy and social status

	25–32 weeks (n=42)		Term (n=4105)		Difference (95% CI) (unadjusted)	Difference (95% CI) (adjusted)	p Value for adjusted analysis
	Mean	SD	Mean	SD			
FEV_1	−0.186	0.850	0.001	1.004	−0.186 (−0.494 to 0.121)	−0.145 (−0.534 to 0.244)	0.464
FVC	−0.151	1.034	−0.004	1.002	−0.148 (−0.452 to 0.156)	−0.041 (−0.427 to 0.346)	0.836
FEF_{25-75}	−0.438	0.899	0.011	1.001	−0.449 (−0.753 to −0.145)	−0.382 (−0.768 to 0.005)	0.053
FEV_1/FVC	−0.195	1.117	0.010	0.995	−0.205 (−0.517 to 0.106)	−0.150 (−0.535 to 0.236)	0.446
FEF_{25-75}/FVC	−0.260	1.006	0.013	1.000	−0.274 (−0.581 to 0.034)	−0.338 (−0.723 to 0.046)	0.084
	33–34 weeks (n=49)		Term (n=4105)		Difference and 95% CI (unadjusted)	Difference and 95% CI (adjusted)	p Value for adjusted analysis
	Mean	SD	Mean	SD			
FEV_1	−0.022	1.135	0.001	1.004	−0.023 (−0.304 to 0.259)	−0.059 (−0.348 to 0.231)	0.691
FVC	0.169	0.905	−0.004	1.002	0.173 (−0.109 to 0.454)	0.127 (−0.161 to 0.415)	0.386
FEF_{25-75}	−0.279	1.143	0.011	1.001	−0.290 (−0.572 to −0.009)	−0.289 (−0.577 to −0.001)	0.049
FEV_1/FVC	−0.401	1.104	0.010	0.995	−0.411 (−0.693 to −0.130)	−0.379 (−0.666 to −0.092)	0.010
FEF_{25-75}/FVC	−0.415	0.984	0.013	1.000	−0.428 (−0.709 to −0.147)	−0.397 (−0.683 to −0.110)	0.007
	35–36 weeks (n=129)		Term (n=4105)		Difference and 95% CI (unadjusted)	Difference and 95% CI (adjusted)	p Value for adjusted analysis
	Mean	SD	Mean	SD			
FEV_1	0.057	0.859	0.001	1.004	0.057 (−0.120 to 0.234)	0.094 (−0.089 to 0.276)	0.315
FVC	0.095	0.956	−0.004	1.002	0.099 (−0.077 to 0.274)	0.119 (−0.060 to 0.299)	0.191
FEF_{25-75}	−0.077	0.877	0.011	1.001	−0.088 (−0.263 to 0.087)	−0.056 (−0.235 to 0.124)	0.543
FEV_1/FVC	−0.079	1.047	0.010	0.995	−0.089 (−0.267 to 0.088)	−0.062 (−0.243 to 0.119)	0.502
FEF_{25-75}/FVC	−0.137	0.957	0.013	1.000	−0.151 (−0.326 to 0.024)	−0.133 (−0.311 to 0.045)	0.143

FEF_{25-75}, forced expiratory volume at 25–75% of FVC; FEV_1, forced expiratory volume in 1 s; FVC, forced vital capacity.

Table 6 Mean and SD of z-scores of lung function measures adjusted for age, gender and height at age 8–9 and 14–17 years, with CIs for the difference of means (14–17 – 8–9 years of age), unadjusted and adjusted for maternal smoking in pregnancy and social status

	25–32 weeks: age 8–9 (n=30)		25–32 weeks: age 14–17 (n=30)		Difference (95% CI) (unadjusted)	Difference (95% CI) (adjusted)	p Value for adjusted analysis
	Mean	SD	Mean	SD			
FEV_1	−0.441	0.946	−0.318	0.932	0.123 (−0.258 to 0.504)	0.013 (−0.471 to 0.497)	0.958
FVC	−0.032	1.050	−0.052	0.918	−0.021 (−0.408 to 0.367)	−0.275 (−0.764 to 0.214)	0.271
FEF_{25-75}	−0.717	0.944	−0.572	0.909	0.145 (−0.202 to 0.491)	0.227 (−0.214 to 0.688)	0.313
FEV_1/FVC	−0.605	1.294	−0.438	1.132	0.167 (−0.211 to 0.546)	0.397 (−0.082 to 0.877)	0.104
FEF_{25-75}/FVC	−0.665	0.941	−0.509	0.949	0.156 (−0.184 to 0.496)	0.296 (−0.134 to 0.727)	0.177
	33–34 weeks: age 8–9 (n=42)		33–34 weeks: age 14–17 (n=42)		Difference (95% CI) (unadjusted)	Difference (95% CI) (adjusted)	p Value for adjusted analysis
	Mean	SD	Mean	SD			
FEV_1	−0.483	1.039	−0.079	1.191	0.404 (0.082 to 0.726)	0.347 (0.015 to 0.680)	0.041
FVC	−0.090	0.938	0.130	0.960	0.220 (−0.108 to 0.547)	0.226 (−0.562 to 0.111)	0.188
FEF_{25-75}	−0.622	1.127	−0.336	1.173	0.287 (−0.006 to 0.580)	0.241 (−0.062 to 0.544)	0.119
FEV_1/FVC	−0.621	1.272	−0.432	1.156	0.190 (−0.130 to 0.510)	0.143 (−0.187 to 0.473)	0.395
FEF_{25-75}/FVC	−0.566	1.052	−0.445	1.017	0.121 (−0.166 to 0.408)	0.112 (−0.183 to 0.408)	0.456
	35–36 weeks: age 8–9 (n=107)		35–36 weeks: age 14–17 (n=107)		Difference (95% CI) (unadjusted	Difference (95% CI) (adjusted)	p Value for adjusted analysis
	Mean	SD	Mean	SD			
FEV_1	0.148	0.863	0.021	0.860	−0.127 (−0.332 to 0.079)	−0.130 (−0.343 to 0.084)	0.234
FVC	0.115	0.941	0.045	0.955	−0.070 (−0.275 to 0.135)	−0.097 (−0.308 to 0.115)	0.370
FEF_{25-75}	0.086	0.900	−0.076	0.888	−0.161 (−0.345 to 0.022)	−0.132 (−0.322 to 0.059)	0.175
FEV_1/FVC	0.006	0.911	−0.048	1.076	−0.054 (−0.258 to 0.150)	−0.007 (−0.218 to 0.205)	0.951
FEF_{25-75}/FVC	0.027	0.970	−0.104	0.992	−0.131 (−0.311 to 0.049)	−0.095 (−0.281 to 0.091)	0.318
	Term weeks: age 8–9 (n=3431)		Term weeks: age 14–17 (n=3431)		Difference (95% CI) (unadjusted)	Difference (95% CI) (adjusted)	p Value for adjusted analysis
	Mean	SD	Mean	SD			
FEV_1	−0.004	1.006	0.010	1.002	0.014 (−0.021 to 0.051)	−0.013 (−0.060 to 0.034)	0.582
FVC	−0.019	1.003	0.005	1.001	0.025 (−0.012 to 0.061)	0.007 (−0.054 to 0.040)	0.774
FEF_{25-75}	0.014	0.997	0.010	1.001	−0.005 (−0.037 to 0.028)	−0.016 (−0.058 to 0.027)	0.468
FEV_1/FVC	0.016	1.003	0.003	0.982	−0.013 (0.049 to 0.023)	−0.006 (−0.053 to 0.041)	0.801
FEF_{25-75}/FVC	0.023	1.005	0.005	0.989	−0.017 (−0.049 to −0.014)	−0.011 (−0.052 to −0.031)	0.616

FEF_{25-75}, forced expiratory volume at 25–75% of FVC; FEV_1, forced expiratory volume in 1 s; FVC, forced vital capacity.

ORIGINAL ARTICLE

Lung function after preterm birth: development from mid-childhood to adulthood

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ABSTRACT

Background As a result of advances in perinatal care, more small preterm infants survive. There are concerns that preterm birth and its treatments may harm pulmonary development and thereby lead to chronic airway obstruction in adulthood.

Objective To assess the development of spirometric lung function variables from mid-childhood to adulthood after extreme preterm birth.

Methods Two population-based cohorts born at gestational age ≤28 weeks or with birth weight ≤1000 g performed lung function tests at 10 and 18 and at 18 and 25 years of age, respectively, together with matched term-born controls. The results are

ır age, sex and
as compared for

Key messages

What is the key question?

- Does the development of lung function from childhood to adulthood after extremely preterm birth differ from that of peers born at term?

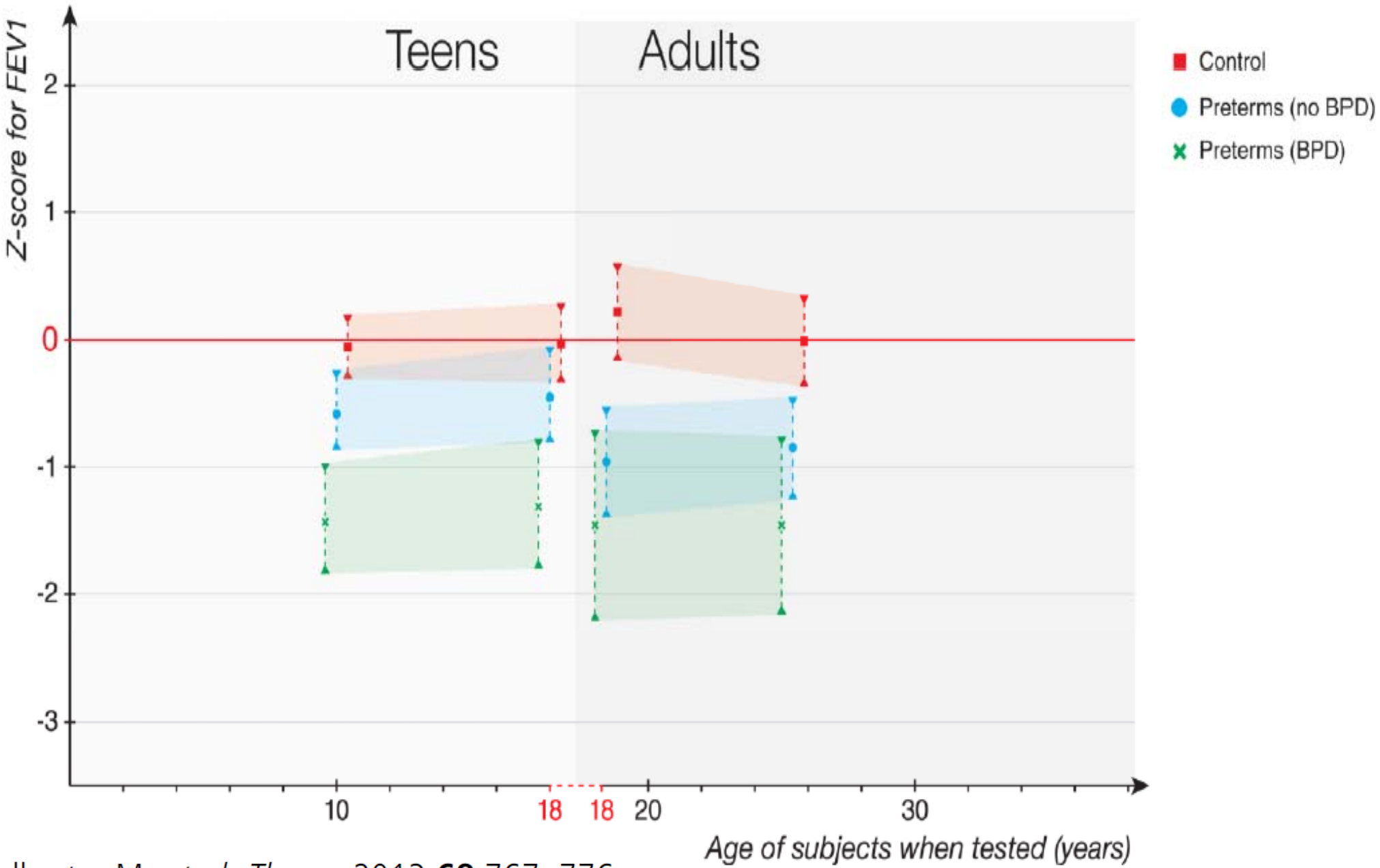
What is the bottom line?

- Airway obstruction was observed throughout the study period for those born preterm and was most pronounced after neonatal bronchopulmonary dysplasia; however, lung function trajectories were basically parallel in all subgroups.

Vollsæter M, *et al*. *Thorax* 2013;**68**:767–776.

Table 4 Spirometric lung function data expressed as z scores from 10 to 25 years of age for 83 subjects born EP with and without neonatal BPD and 81 term-born control subjects

	1991–1992 cohort Development from childhood to adolescence			1982–1985 cohort Development from adolescence to adulthood		
Examination	First	Second		First	Second	
Mean (SD) age (years)	10.5 (0.4)	17.8 (0.4)		17.7 (1.2)	24.9 (1.2)	
	z Score	z Score	Difference ΔZ	z Score	z Score	Difference ΔZ
FEV_1 mean (95% CI)						
Control	−0.054 (−0.31 to 0.20)	−0.028 (−0.34 to 0.29)	0.026 (−0.19 to 0.24)	0.22 (−0.16 to 0.60)	−0.009 (−0.37 to 0.35)	−0.23 (−0.41 to −0.04
EP non-BPD	−0.25 (−0.75 to 0.24)	−0.12 (−0.74 to 0.50)	0.14 (−0.29 to 0.56)	−0.41 (−1.19 to 0.38)	−0.52 (−1.25 to 0.20)	−0.12 (−0.48 to 0.25)
EP mild BPD	−0.75 (−1.15 to −0.35)	−0.63 (−1.12 to −0.14)	0.12 (−0.20 to 0.45)	−1.24 (−1.76 to −0.71)	−1.03 (−1.53 to −0.53)	0.21 (−0.04 to 0.45)
EP m/s BPD	−1.41 (−1.84 to −0.98)	−1.29 (−1.80 to −0.78)	0.12 (−0.21 to 0.44)	−1.36 (−2.08 to −0.64)	−1.36 (−2.03 to −0.68)	0.001 (−0.35 to 0.35)
Control vs EP no BPD†	0.20 (−0.35 to 0.76)	0.09 (−0.61 to 0.78)		0.62 (−0.25 to 1.50)	0.52 (−0.30 to 1.33)	
Control vs EP mild BPD†	0.70 (0.23 to 1.17)	0.60 (0.02 to 1.17)	p=0.929	1.46 (0.81 to 2.10)	1.02 (0.41 to 1.64)	p=0.050
Control vs EP m/s BPD†	1.35 (0.86 to 1.85)	1.26 (0.66 to 1.86)		1.58 (0.76 to 2.39)	1.35 (0.58 to 2.11)	
FVC mean (95% CI)						
Control	−0.12 (−0.38 to 0.14)	−0.072 (−0.38 to 0.24)	0.05 (−0.18 to 0.27)	−0.16 (−0.58 to 0.27)	0.005 (−0.40 to 0.41)	0.16 (−0.05 to 0.37)
EP non-BPD	−0.38 (−0.89 to 0.14)	−0.047 (−0.66 to 0.57)	0.33 (−0.13 to 0.79)	−0.043 (−0.92 to 0.84)	0.29 (−0.52 to 1.10)	0.33 (−0.13 to 0.79)
EP mild BPD	−0.63 (−1.04 to −0.22)	−0.59 (−1.08 to −0.11)	0.03 (−0.32 to 0.38)	−1.30 (−1.89 to −0.71)	−0.66 (−1.21 to −0.10)	0.64 (0.37 to 0.92)
EP m/s BPD	−0.61 (−1.05 to −0.16)	−0.15 (−0.66 to 0.35)	0.46 (0.10, 0.81)	−1.07 (−1.87 to −0.25)	−0.68 (−1.43 to 0.072)	0.38 (−0.01 to 0.77)
Control vs EP no BPD†	0.26 (−0.32 to 0.83)	−0.03 (−0.72 to 0.66)		−0.11 (−1.09 to 0.87)	−0.28 (−1.19 to 0.62)	
Control vs EP mild BPD†	0.51 (0.02 to 0.99)	0.52 (−0.05 to 1.10)	p=0.190	1.14 (0.42 to 1.87)	0.66 (−0.02 to 1.35)	p=0.058
Control vs EP m/s BPD†	0.49 (−0.02 to 1.00)	0.08 (−0.51 to 0.67)		0.90 (−0.01 to 1.82)	0.68 (−0.17 to 1.54)	
FEV_1/FVC mean (95% CI)						
Control	0.009 (−0.32 to 0.33)	0.018 (−0.37 to 0.41)	0.01 (to 0.24 to 0.26)	0.53 (0.21 to 0.85)	−0.018 (−0.30 to 0.27)	−0.55 (−0.77 to −0.32
EP non-BPD	0.22 (−0.42 to 0.86)	−0.18 (−0.96 to 0.59)	−0.40 (−0.90 to 0.10)	−0.55 (−1.21 to 0.12)	−1.13 (−1.69 to −0.57)	−0.59 (−1.04 to −0.31
EP mild BPD	−0.18 (−0.70 to 0.33)	−0.031 (−0.64 to 0.58)	0.15 (−0.23 to 0.54)	0.037 (−0.40 to 0.48)	−0.62 (−1.01 to −0.24)	−0.66 (−0.96 to −0.35
EP m/s BPD	−1.34 (−1.89 to −0.78)	−1.44 (−2.08 to −0.79)	−0.10 (−0.48 to 0.29)	−0.42 (−1.04 to 0.19)	−0.78 (−1.31 to −0.25)	−0.35 (−0.79 to 0.07)
Control vs EP no BPD†	−0.21 (−0.93 to 0.51)	0.20 (−0.67 to 1.07)		1.08 (0.34, 1.81)	1.12 (0.49 to 1.74)	
Control vs EP mild BPD†	0.19 (−0.42 to 0.80)	0.05 (−0.68 to 0.77)	p=0.354	0.50 (−0.05 to 1.04)	0.60 (0.12 to 1.09)	p=0.721
Control vs EP m/s BPD†	1.35 (0.70 to 1.99)	1.45 (0.70 to 2.21)		0.95 (0.27 to 1.64)	0.80 (0.16 to 1.36)	



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¿Cuál es el lugar del EFR?
Asma

- **El asma es una enfermedad inflamatoria crónica de la via aerea, en el cual diversas células y elementos celulares desempeñan un papel importante. La inflamación crónica induce a un aumento en hiperreactividad de la vía aérea que provoca los episodios recurrentes de sibilancias, disnea, dificultad respiratoria, y la tos, particularmente en la noche o temprano en la mañana. Estos episodios se asocian generalmente a una obstrucción extensa y variable del flujo aéreo pulmonar que es a menudo reversible ya sea espontáneamente o con el tratamiento.**

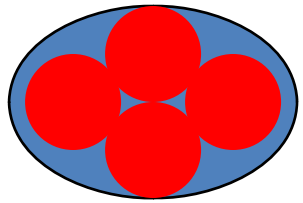
Crecimiento y Desarrollo Pulmonar

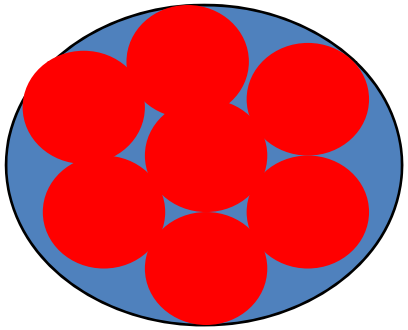
Niños hasta Adultez

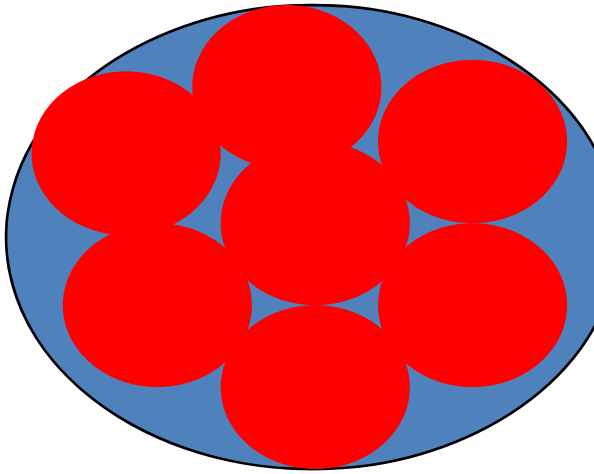
Expansion Alveolar

RN y Lactantes

Aumenta el N° Alveolos







Poor airway function in early infancy and lung function by age 22 years: a non-selective longitudinal cohort study

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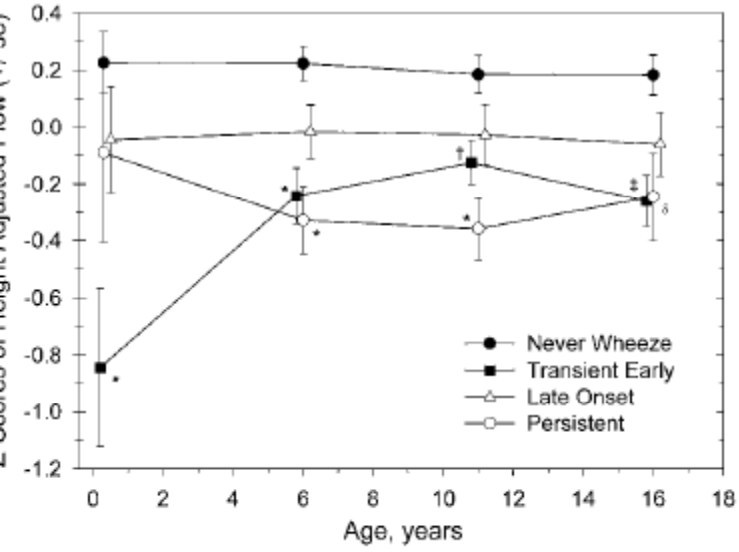
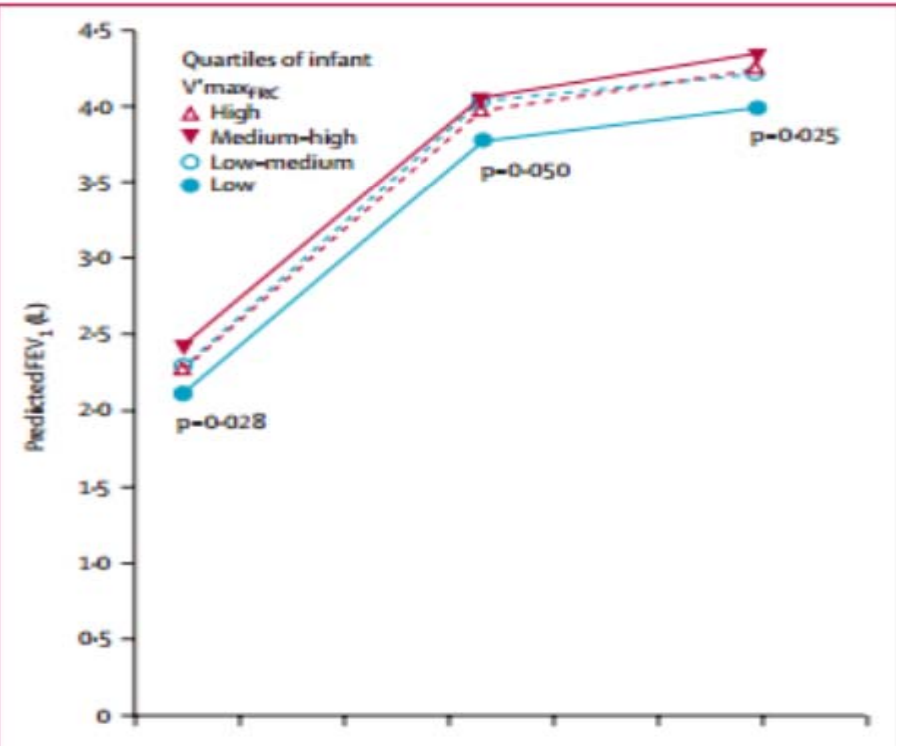
Summary

Background Together with smoking, the lung function attained in early adulthood is one of the strongest predictors of chronic obstructive pulmonary disease. We aimed to investigate whether lung function in early adulthood is, in turn, affected by airway function measured shortly after birth.

Methods Non-selected infants were enrolled at birth in the Tucson Children's Respiratory Study between 1980 and 1984. We measured maximal expiratory flows at functional residual capacity ($Vmax_{FRC}$) in 169 of these infants by the chest compression technique at a mean of 2·3 months (SD 1·9). We also obtained measurements of lung function for 123 of these participants at least once at ages 11, 16, and 22 years. Indices were forced expiratory volume in 1 s (FEV_1), forced vital capacity (FVC), and forced expiratory flow between 25% and 75% of FVC ($FEF_{25–75}$), both before and after treatment with a bronchodilator (180 µg of albuterol).





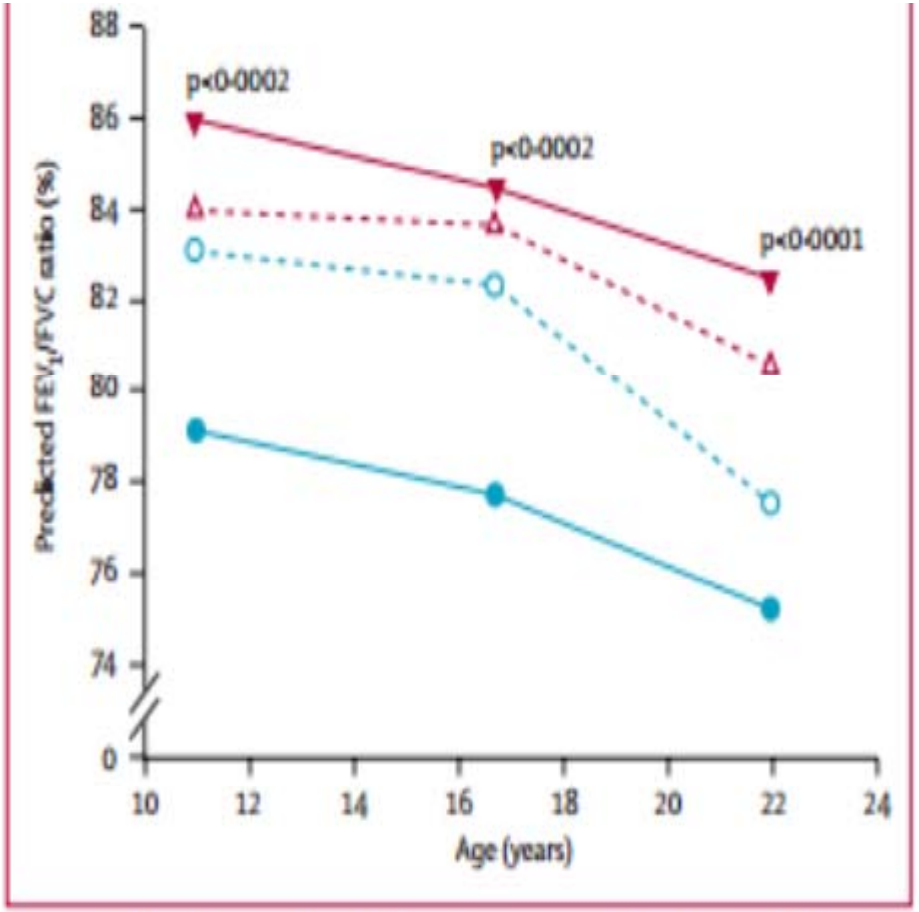


Figure: Predicted mean values for lung function in males at ages 11, 16, and 22 years by length-adjusted infant $Vmax_{FRC}$

Predicted values were standardised to the mean height and weight for male participants at ages 11, 16, and 22 years. We included an interaction term between survey (age 11, 16, and 22) and quartiles of infant $Vmax_{FRC}$ in the random-effects models. P values were estimated at each survey from the models.

Lung function trajectories from birth through puberty reflect asthma phenotypes with allergic comorbidity

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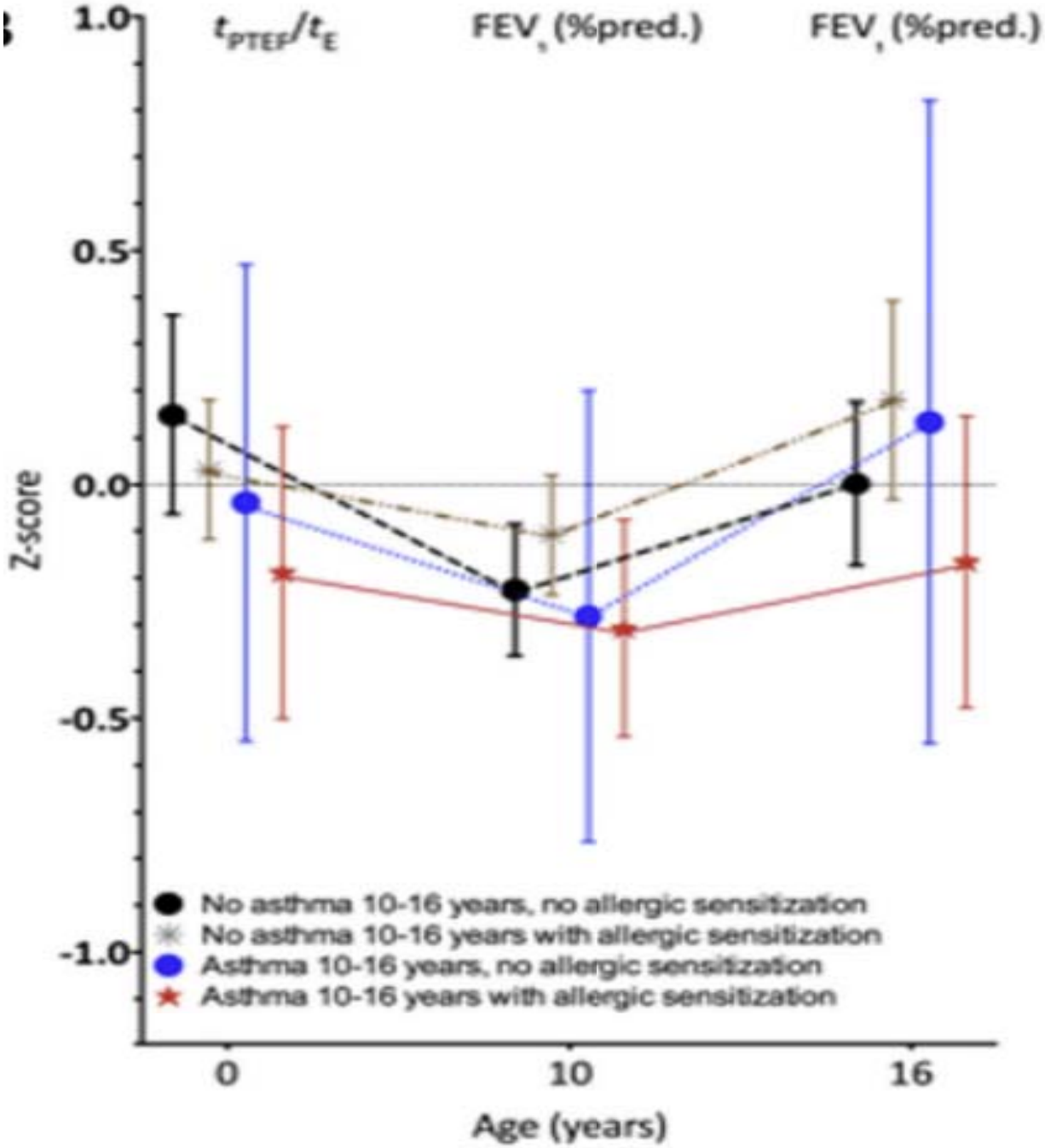
Background: Childhood asthma phenotypes reflecting underlying developmental mechanisms are sought, with little information on asthma phenotypes based on allergic comorbidities.

Objective: We asked whether lung function trajectories from birth to 16 years were associated with asthma phenotypes with comorbid allergic rhinitis and atopic dermatitis.

Methods: Lung function (given as *z* scores) was measured at birth in 329 subjects in the "Environment and Childhood Asthma" birth cohort study in Oslo by using tidal flow volume loops, and at 10 and 16 years by using spirometry. Asthma phenotypes were classified on the basis of recurrent bronchial obstruction at 0 to 2 years, and asthma from the 2- to 10-year and 10- to 16-year intervals, and by combining asthma, atopic dermatitis, and/or allergic rhinitis from 10 to 16 years, stratifying for allergic sensitization. The reference group subjects with asthma, atopic dermatitis, and allergic rhinitis. Lung function trajectories in subjects with asthma at 10 to 16 years or asthma in remission differed significantly for all 3 spirometric values compared with the trajectories in those who never had asthma ($P < .0001$), but not between asthma groups. Allergic sensitization was not significantly associated with asthma phenotype lung function trajectories.

Conclusions: The trajectory consisting of impaired lung function from birth throughout childhood in children with asthma, atopic dermatitis, and allergic rhinitis appears less likely to be driven by allergic sensitization, and may imply disease onset *in utero*, with clinical presentation later in childhood. (J Allergy Clin Immunol 2014;134:917-23.)

Key words: *Lung function trajectory, asthma, allergic disease, child, birth cohort*


1.0
0.5
0.0
-0.5
-1.0
Z-score
t_{PTEF}/t_E
FEV_1 (%pred.)
FEV_1 (%pred.)
No asthma 10-16 years, no allergic sensitization
No asthma 10-16 years with allergic sensitization
Asthma 10-16 years, no allergic sensitization
Asthma 10-16 years with allergic sensitization
0
10
16
Age (years)

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ORIGINAL ARTICLE
IN PRESS | CORRECTED PROOF

Longitudinal assessment of airway responsiveness from 1 month to 18 years in the PIAF birth cohort

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ABSTRACT The Perth Infant Asthma Follow-up (PIAF) study involves a birth cohort of unselected subjects who have undergone longitudinal assessments of airway responsiveness at 1, 6 and 12 months and 6, 11 and 18 years of age. The aim of this study was to determine the relationship between increased airway responsiveness throughout childhood and asthma in early adult life.

Airway responsiveness to histamine, assessed as a dose–response slope (DRS), and a respiratory questionnaire were completed at 1, 6 and 12 months and 6, 11 and 18 years of age.

TABLE 2 Patient demographics comparing those participants with doctor-diagnosed asthma with those who reported wheeze but did not have doctor-diagnosed asthma at 18 years of age

	Asthma at 18 years	Wheeze but no asthma at 18 years	p-value
Subjects n	20	18	
Male	55.0 (11)	38.9 (7)	0.35
Parental asthma#	50.0 (10)	50.0 (9)	0.51
Maternal smoking during pregnancy	30.0 (6)	27.8 (5)	1.00
Outcomes during infancy			
V'_{maxFRC} z-score at 1 month	−0.23±0.99	0.90±1.3	0.29
LRTI in first year	50.0 (5/10)	50.0 (4/8)	1.00
Atopy in 1st year	40.0 (8)	11.1 (2)	0.67
DRS at 1 month	47.97±49.62; n=13	72.39±67.81; n=15	0.29
DRS at 6 months	27.05±27.14; n=17	55.34±59.40; n=13	0.09
DRS at 12 months	22.49±23.54; n=14	49.74±76.05; n=11	0.21
Outcomes at 6 years			
FEV_1 z-score	−0.04±1.06; n=15	−0.13±0.77; n=11	0.81
Atopy	66.7 (10/15)	33.3 (4/12)	0.13
Asthma	43.8 (7/16)	35.7 (5/14)	0.72
DRS	39.40±76.65; n=12	5.58±5.96; n=11	0.16
Outcomes at 12 years			
FEV_1 z-score	−0.19±0.75; n=18	0.09±1.02; n=16	0.35
Atopy	88.9 (16/18)	68.8 (11/16)	0.21
Asthma	66.7 (12/18)	17.6 (3/17)	0.006*
DRS	17.43±7.44; n=18	2.62±1.48; n=16	0.01*
Outcomes at 18 years			
FEV_1 z-score	−0.35±1.49; n=19	−0.11±0.89; n=17	0.41
Atopy	70.0 (14)	58.8 (10)	0.48
DRS	2.62±5.14; n=19	0.93±1.56; n=17	0.23

Data are presented as % (n), % (n/N) or mean±SD, unless otherwise stated. Forced expiratory volume in 1 s (FEV_1) z-scores were derived from previously published reference values [12]. V'_{maxFRC}: maximal flow at functional residual capacity; LRTI: lower respiratory tract infection; DRS: dose–response slope. #: at least one asthmatic parent at enrolment. *: $p<0.05$.

¿Cuál es el lugar del EFR?

- **Enfermedad Pulmonar Crónica Post Viral:**

EFR muestra una obstrucción moderada a severa al poco tiempo de la Injuria Inicial y que empeora lentamente con el transcurso del tiempo.

- **Displasia Broncopulmonar:**

EFR muestra una obstrucción del flujo de aire al poco tiempo de vida y se mantiene en los carriles de crecimiento.

- **Asma:**

EFR puede mostrar obstrucción muy leve de la vías aéreas en etapas tempranas de la vida y empeorar muy lentamente en las formas mas severa.


DASANI

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Patricia Murtagh

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