Supplementary material

CT scanning for emphysema.

Emphysema, although defined in morbid anatomical terms, can now be diagnosed and quantified non-invasively with computed tomography. Various parameters derived from the frequency distribution histogram of lung voxel densities have been proposed as accurate measures. The most widely applied parameters are the percentile point and voxel index methods. The percentile point is defined as the cut off value in Hounsfield units (HU) below which a specified percentage of all voxels are distributed, and the voxel index is defined as the proportion of lung voxels of low density below a specified threshold. In the only study to validate the percentile point method against a pathological standard, comparison between alveolar wall surface area per unit volume (AWUV) and CT densitometry was restricted to the 15th percentile point. Therefore we applied the 15th percentile point to analyse the density of lung tissue in our study population as described in Respir Med. 2007;101:1924-30.

Table S1. Clinical data of Healthy Premature and Hyaline Membrane Disease groups

	Healthy preterm	HMD	Missing (healthy/HMD)	P-value
Male	11/14 (79%)	7/14 (50%)	0	0.12
Mean weeks of pregnancy (SD)	31.8 (2.9)	30.3 (2,1)	0	0.13
Mean birth weight, gram (SD)	1605 (467)	1363 (391)	0	0.15
Mean birth weight percentiles (SD)	52 (35)	53 (24)	0	0.94
Surfactant therapy	0/14	11/14 (79%)	0	<0.001
Prenatal dexamethasone	4/14 (29%)	3/14 (21%)	0	0.68
Postnatal dexamethasone	0/14	0/14	0	
Gestational corrected age at LF in months (SD)	7.3 (4.2)	12.0 (1.3)	1/0	0.00049
Crown-heel length at LF in cm (SD)	66 (11)	75 (3)	1/0	0.010
Mean FRC z-score for CHL (SD)	-0.06 (0.77)	0.15 (1.24)	1/0	0.59
Mean Compliance z-score for CHL (SD)	0.09 (1.11)	0.53 (0.95)	1/0	0.28
Mean Mixing Efficiency percent (SD)	53 (7)	59 (11)	2/0	0.12

Legend to Table S1. Prenatal dexamethasone was administered antepartum to mothers if admitted on time before delivery to the hospital. Mean weeks of pregnancy and mean birth weight were not significantly different between groups.

Table S2 Lung function and density at adulthood.

	Non-BPD, mean (SD)	BPD, mean (SD)	Mean difference of BPD - non-BPD* (99.5% CI)	Ancova* p-value
zFEV$_1$/FVC	0.00 (1.14)	-1.28 (1.60)	-1.22 (-2.21, -0.23)	0.00011
zFEV$_1$	-0.27 (1.24)	-2.00 (1.61)	-1.71 (-2.82, -0.60)	0.00044
zFVC	-0.28 (1.18)	-1.18 (1.29)	-0.93 (-1.85, -0.01)	0.010
zDLCO	-0.16 (0.78)	-0.80 (0.83)	-0.62 (-1.19, -0.05)	0.00063
zFRC	0.08 (1.13)	-0.04 (1.19)	-0.14 (-1.00, 0.73)	0.53
zTLC	-0.73 (1.32)	-1.20 (1,31)	-0.48 (-1.52, 0.56)	0.57
zRV/TLC	-0.10 (1.69)	1.17 (1.93)	1.31 (-0.02, 2.65)	0.012
ME	46.3 (12.1)	38.5 (12.9)	-7.8 (-17.2, 1.7)	0.12
SMS	-0.12 (1.18)	-1.11 (1.22)	-1.02 (-1.89, -0.15)	0.0009
SGRQ	3.4 (4.7)	9.2 (9.0)	5.9 (0.3, 11.5)	0.022

Legend to Table S2. Mean difference of BPD - non-BPD* and ANCOVA* valuables were corrected for covariables 'birthweight percentile' and 'smoking' after prior confirmation of independence of these covariates. zFEV$_1$/FVC, zFEV$_1$, zFVC, zDLCO are z-scores for adult lung function outcomes with GLI-references. zFRC, zTLC, zRV/TLC are z-scores for adult lung function outcomes with ERS-references. ME is mixing efficiency of Helium in-wash, SMS is

standard mass score. SGRQ, St. George's Respiratory Questionnaire. Significance level of ANCOVA was set at $p < 0.005$.
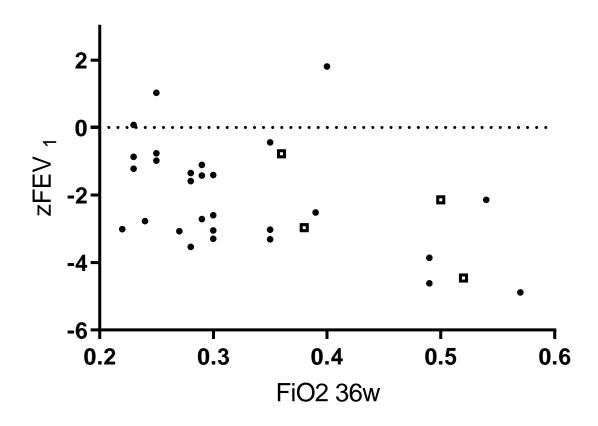
Table S3. Regression analysis of infant lung function on outcomes in BPD-group

Adult outcome parameters	Lung function at GCA 1 year	B	unadjusted p value	adjusted R^2
zFEV$_1$/FVC	Infant FRC perc pred	-0.025	0.034	0.12
	Infant Compliance perc pred	0.016	0.098	0.06
	Infant Mixing Efficiency	0.009	0.63	-0.03
zFEV$_1$	Infant FRC perc pred	-0.017	0.14	0.04
	Infant Compliance perc pred	0.014	0.11	0.06
	Infant Mixing Efficiency	0.023	0.23	0.02
zDLCO	Infant FRC perc pred	0.014	0.023	0.13
	Infant Compliance perc pred	0.010	0.029	0.12
	Infant Mixing Efficiency	0.018	0.029	0.11
SMS	Infant FRC perc pred	-0.004	0.67	-0.03
	Infant Compliance perc pred	-0.006	0.32	0.00
	Infant Mixing Efficiency	-0.006	0.66	-0.03
SGRQ	Infant FRC perc pred	0.026	0.68	-0.03
	Infant Compliance perc pred	-0.024	0.64	-0.03
	Infant Mixing Efficiency	-0.083	0.35	0.00

Legend Table S3.
Univariate linear regression models were used to define if lung function at GCA 1 year (gestational corrected age 1 year) predicts outcome parameters at adulthood. None of the dependent variables at adulthood reached a significance level set at $p < 0.003$ by Bonferroni correction. zFEV$_1$/FVC, zFEV$_1$, zFVC, zDLCO are z-scores for adult lung function outcomes with GLI-references and ECCS references, respectively.

Figure S1. $zFEV_1$ at adulthood and FiO_2 of neonates using incubator, oxygen tent or nasopharyngeal canula

Legend Figure S1.
Airflow limitation in 29 BPD adult subjects in relation to the FiO2 at 36 weeks post conception was measured while they were treated with oxygen administered to the spontaneously breathing infant, either in an incubator or in an oxygen tent (•). Four patients received oxygen supplementation via a nasopharyngeal cannula (□). When we applied the low flow FiO2 oxygen calculator as described by Finer et al., Pediatr Pulmonol. 1996; 21:48-51, the FiO2 values calculated from the 4 canula patients were statistically significantly different. Therefore, we excluded those values from the analysis to predict the FEV_1 at adult age.