Supplementary material

Birth weight, early childhood growth and lung function in middle to early old age: 1946 British birth cohort

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Year of data collection	Type of data	Method of data collection	Number of manoeuvres	Satisfactory techniques recorded	
1989	FEV ₁ and FVC	Home visit	Three	No	
1999	FEV ₁ and FVC	Home visit	Two	Yes	
2006-2010	FEV ₁ and FVC	Clinic and home visits	Two	Yes	

S1 Spirometry data collection in 1989, 1999 and 2006/10 in NSHD.

Lung function cleaning procedure for 1989, 1999 and 06-10

1989

Three manoeuvres were taken for both FEV₁ and FVC.

1999

Two manoeuvres were taken for FEV_1 and FVC and an assessment given by the nurse as to whether the technique was satisfactory or not.

2006-10

Two manoeuvres were taken for FEV_1 and FVC and an assessment given by the nurse as to whether the technique was satisfactory or not.

Step 1

The values were converted to litres (Divide values by 100)

Any values less than 0.30 and more than 9.0 were considered outliers and excluded (these values are considered implausible according to medical practice but have been retained in data file to allow for comparative investigation and checks on potential bias).

In 1999 and 2006/10 those who had 'unsatisfactory' techniques were also excluded.

Step 2

The maximum valid value recorded from each study member was computed. If there was only 1 valid manoeuvres then this was counted as the 'maximum' value; if there were two or more valid values then the maximum was the highest of all the valid values for that study member.

Step 3

The maximum value from the 3 manoeuvres was generated provided there were at least 2 valid measures available. (i.e. those who only gave one valid measurement were excluded)

Step 4

If the difference between the maximum two manoeuvres is more than 0.30 L the respondent is this is considered to be an outlier and should be removed.

Step 5

Using the ATS method^[1]

The ATS has stricter criteria. If the difference between the maximum two manoeuvres is more than 0.15 L the respondent is this is considered to be an outlier and should be removed. **Optional**

Comparing the NSHD distribution to other European cohorts it appears that the NSHD is systematically lower than these cohorts.

Orfei et al $^{[2]}$ have used the following correction when comparing the 1946 cohort to the 1958 cohort: 0.24L is added to FEV₁ and 0.34L to FVC.







Men(N=313)	FEV ₁ (ml)					
Birth weight (per 1kg increase)	Age 43 years		Age 53 years		Age 60-64 years	
M0: unadjusted	61.5	(-67.2 to 190.2)	139.6	(16.6 to 262.6)	164.3	(28.9 to 299.6)
M1: M0+ adult height †	-83.3	(-207.6 to 41.0)	-14.2	(-130.2 to 101.8)	2.0	(-12.5 to 128.9)
M2: M1+adult covariates i	-79.3	(-199.8 to 41.3)	-11.2	(-121.9to 99.5)	19.1	(-99.2 to 137.4)
M3: M2+early life covariates*	-66.1	(-188.5 to 56.2)	4.6	(-107.7 to 11.7)	39.0	(-80.9 to 158.9)
Men(N=247)	FVC(ml)					
Birth weight (per 1kg increase)	Age 43 years		Age 53 years		Age 60-64 years	
M0: unadjusted	221.1	(17.9 to 424.3)	252.1	(88.6 to 415.7)	210.5	(29.2 to 391.8)
M1: M0+ adult height †	46.3	(-155.3 to 247.9)	51.6	(-98.6 to 201.8)	19.1	(-150.1 to 188.3)
M2: M1+adult covariates l	46.1	(-146.3 to 238.6)	76.6	(-70.8 to 224.1)	40.1	(-122.7 to 202.9)
M3: M2+early life covariates*	61.1	(-135.0 to 257.1)	102.8	(-46.0 to 251.5)	65.3	(-99.9 to 230.5)

S2a Associations (coefficient and 95%Cl) between birth weight and both FEV_1 (ml) and FVC (ml) at every age in men: complete-case analysis

T: adjusted for age at 2006-10 follow-up (aged 60-64 years).

+: Adult covariates included education level, smoking status, asthma status, smoking pack years.

*: Early life covariates included weight gain at aged 2 years, LRTI under aged 2 years, and childhood social class at aged 4 years

Women(N=374)	FEV ₁ (ml)					
Birth weight (per 1kg increase)	Age 43 years		Age 53 years		Age 60-64 years	
M0: unadjusted	104.3	(20.9 to 187.7)	28.0	(-49.5 to 105.6)	42.8	(-40.6 to 126.1)
M1: M0+ adult height †	30.3	(-48.5 to 109.1)	-42.0	(-114.7 to 30.8)	-9.7	(-89.1 to 69.7)
M2: M1+adult covariates l	52.4	(-25.5 to 130.3)	-8.2	(-79.7 to 63.3)	29.7	(-44.2 to 103.5)
M3: M2+early life	52.1	(-26.8 to	-6.8	(-79.0 to	27.4	(-47.4 to
covariates*		131)		65.3)		102.2)
Women(N=342)	FVC(ml)					
Birth weight (per 1kg increase)	Age 43 years		Age 53 years		Age 60-64 years	
M0: unadjusted	104.5	(-13.1 to 222.1)	90.1 (-13.2 to 193.5)		33.6	(-68.6 to 135.7)
M1: M0+ adult height †	27.6	(-83.3 to 5.8 138.5)		(-87.2 to 98.7)	-39.2	(-131.8 to 53.4)
M2: M1+adult covariates l	ult covariatesŧ 43.6 (-67.5 to 1 154.7)		11.5 (-82.9 to 105.9)		-16.9	(-106.5 to 72.7)
M3: M2+early life covariates*	38.4	(-73.3 to 150.1)	7.6	(-87.2 to 102.5)	-25.3	(-115.3 to 64.8)

S2b Associations (coefficient and 95%CI) between birth weight and both FEV₁ (ml) and FVC (ml) at every age in women: complete-case analysis

T: adjusted for age at 2006-10 follow-up (aged 60-64 years).

+: Adult covariates included education level, smoking status, asthma status, smoking pack years.

*: Early life covariates included weight gain at aged 2 years, LRTI under aged 2 years, and childhood social class at aged 4 years.

	FEV ₁				FVC			
Men (N=875)	Age 43 years (ml),		Linear change from age 43 years, (ml/year),		Age 43 years (ml)		Linear change from age 43 years, (ml/year)	
Birth weight(per 1kg increase)								
M0: age, quadratic age, age*birth weight	121.7	(43.4 to 200.0)	2.4	(-1.5 to 6.4)	162.1	(55.3 to 268.9)	4.4	(-2.0 to 10.7)
M1: M0+ adult height	2.7	(-72.5 to 77.8)	2.3	(-1.7 to 6.3)	-11.0	(-113.2 to 91.2)	3.7	(-2.6 to 10.0)
M2: M1+adult covariates l	31.1	(-41.2 to 103.4)	2.7	(-1.2 to 6.5)	8.6	(-90.8 to 108.0)	3.7	(-2.5 to 10.0)
M3: M2+ early life covariates*	41.8	(-31.1 to 114.8)	2.7	(-1.2 to 6.5)	16.2	(-84.1 to 116.5)	3.7	(-2.5 to 9.9)
	FEV ₁				FVC			
Women (N=893)	Age 43 years (ml),		Linear change from age 43 years, (ml/year),		Age 43 years (ml)		Linear change from age 43 years, (ml/year)	
Birth weight(per 1kg increase)								
M0: age, quadratic age, age*birth weight	110.6	(53.1 to 168.1)	-2.5	(-4.8 to -0.1)	135.0	(60.3 to 209.7)	-3.7	(-7.3 to -0.1)
M1: M0+ adult height	50.9	(-3.5 to 105.4)	-2.5	(-4.8 to -0.1)	50.7	(-20.0 to 121.4)	-3.7	(-7.3 to -0.05)
M2: M1+adult covariatesł	54.2	(1.6 to 106.9)	-2.3	(-4.6 to -0.01)	48.8	(-20.5 to 118.1)	-3.6	(-7.3 to 0.007)
M3: M2+ early life covariates*	60.3	(7.6 to 113.0)	-2.4	(-4.7 to -0.1)	54.7	(-14.5 to 123.8)	-3.9	(-7.5 to -0.2)

S3 Changes of effects between birth weight and FEV₁ (ml) and FVC (ml) from ages 43 years to 60-64 years: a complete-case analysis of multilevel model

References:

(1) M.R. Miller, J. Hankinson, V. Brusasco, F. Burgos, R. Casaburi, A. Coates, R. Crapo, P. Enright, C.P.M. van der Grinten, P. Gustafsson, R. Jensen, D.C. Johnson, N. MacIntyre, R. McKay, D.Navajas, O.F. Pedersen, R. Pellegrino, G. Viegi and J. Wanger.. Eur Respir J 2005; 26: 319–338

(2) Orfei L, Strachan DP, Rudnicka AR, Wadsworth ME. Early influences on adult lung function in two national British cohorts. Archives of Disease in Childhood 2008 Jul;93(7): pp. 570-574.