

ONLINE SUPPLEMENTARY MATERIAL

Details on measurement of symptomatic airflow obstruction (outcome)

Spirometry was performed using the Vitalograph Micro spirometer (Vitalograph, Maids Moreton, UK) by trained nurses in accordance to the American Thoracic Society guidelines in standing position without nose clips[1]. At least three satisfactory measures were obtained and the highest technically satisfactory values for forced expiratory volume in one second (FEV₁) and forced vital capacity (FVC) were used.

Respiratory symptoms data were not collected at the 45 year old sweep, hence symptom data were taken from the previous sweep (42 years of age) which were collected using the Medical Research Council questionnaire [2].

Details on definitions of life course factors:

Smoking exposures

Childhood passive smoke exposure: considered present based on maternal smoking status (mother's smoking status at four months pregnant collected in 1958) or if either parent smoked when the cohort participant was 16 years. No data on parental smoking status were collected at the 7 and 11 years old sweep.

Adulthood passive smoke exposure: considered present if the cohort participant reported living with any smoker at 23, 33 or 42 years old.

Smoking status: The cohort participant's smoking status (current/ non-smoker) was collected when they were 23, 33 and 42 years old. Data for smoking status needed to be available in at least two of the three sweeps for the individual to be included in the study sample. Three adulthood smoking status categories were created: persistent smoker (current smoker based on available data), ever smoker (mixture of current/non-smoker based on available data), and never smoker (non-smoker based on available data). A binary classification as persistent smoker and ever smoker variable was created.

Cumulative smoke exposure: was a combined measured of exposure to passive and active smoking by counting the reports of passive smoke exposure in childhood, adulthood and smoking status that ranged from 0 (never exposure to passive or active smoke) to 4 (persistent exposure to passive and active smoke and persistent smoker).

Social class

Social class was measured using the Registrar General's social class system as: I - professional occupation, II – managerial and technical occupations, IIIN – skill occupations (non-manual), IIIM – skilled occupations (manual), IV – partly skilled occupations and V – unskilled occupations. The categories were collapsed into four social class (SC) categories: SC1 - professional/managerial (I and II), SC2 - unskilled non-manual (IIIN), SC3 - skilled manual (IIIM) and SC4 - unskilled manual (IV and V) for analysis based on prior work on these data [3].

Social class at birth: was derived from the occupation of the male head of the household at the time of the participants' birth

Childhood social class: was derived from the occupation of the male head of the household at the time when the participant was aged 11 years.

Adulthood social class: was derived from the participant's own occupation in middle life at 42 years.

Missing social class information at birth, 11 years and 42 years were imputed with data from the recent sweep in the same life period (n= 207 at birth from 7 years; n = 516 at age 11 from 7 years, n = 82 age 11 from 16 years; n = 655 at age 42 from 33 years) in accordance to previous studies[4].

Cumulative social class: was a combined measure of social class at birth, childhood and adulthood that ranged from 0 (professional occupation at all three time points) to 9 (unskilled manual occupation at all three time points).

Asthma

Childhood asthma: Data on the cohort member's respiratory medical history were collected throughout all sweeps of data collection. As consensus on differential diagnosis between asthma and wheezy bronchitis in children was not clearly established when early data were collected [5], the cohort member was considered to have childhood asthma if they reported yes to "ever asthma or bronchitis" at ages 7, 11 or 16.

Adulthood asthma: was considered present if they reported yes to "ever asthma" at age 33 or 42 [6]. Data on "ever asthma or bronchitis" were available from the 23 year old sweep, however the data were not included in our definition of adulthood asthma, because it was not possible to

differentiate between the number of participants who had asthma and those who had bronchitis at that time point.

Cumulative asthma: was a combined measure of the presence of asthma by counting the reports of asthma in childhood and adulthood that ranged from 0 (never asthma) to 2 (reported asthma in childhood and adulthood).

Others

Low birth weight: was defined as a birth weight of <2.5kg [7]. Birth weights were collected by the midwife in charge of the delivery and converted from pounds to kilograms.

Preterm birth: was defined as less than 37 weeks gestation age [8]. Cohort member's gestational age were collected by the midwife in charge of the delivery.

Childhood pneumonia: Data on whether the cohort participant ever had pneumonia were collected from the cohort's mother or father when the cohort member was seven years old.

Biomass exposure: Exposure to indoor biomass during adulthood was considered present if the cohort participant reported using paraffin or solid fuel as the heating source at home at 33 years old. This information was not available at other sweeps of data collection.

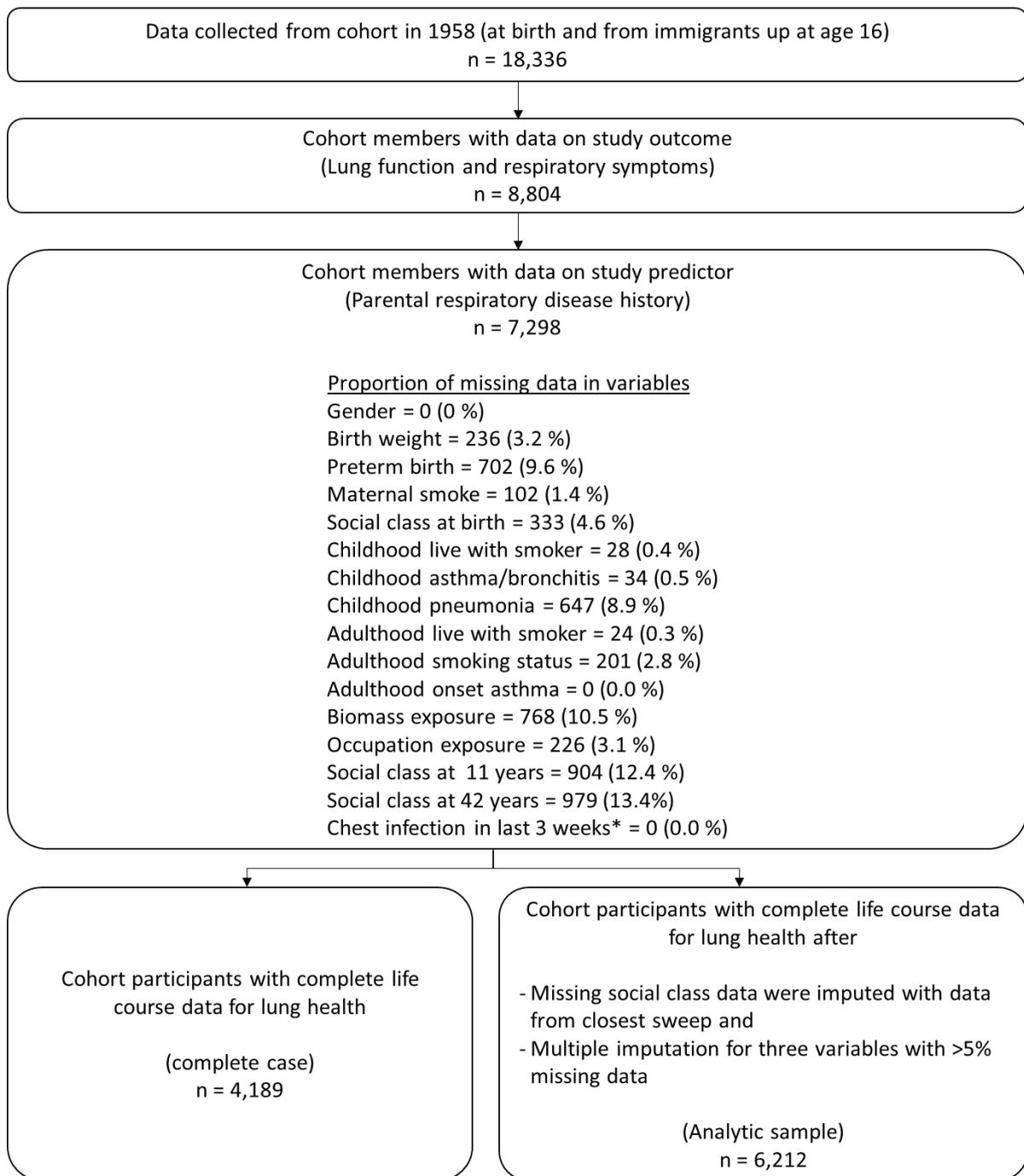
Occupational exposure: Participants' occupations were originally coded according to the Standard Classification of Occupations and were recoded into the International Standard Classification of Occupations (ISCO-88)[9]. Based on previous research on occupation with exposure to dust, gases and fumes which have been linked with greater COPD risk [10, 11], three researchers (KL, CP and KJ) discussed and categorised the list of ISCO-88 occupations expressed at the 3-digit level into either minimal or potential occupation exposure to dust, gases and fume. A variable on ever or never occupational exposure was derived based on the cohort member's occupation at 33 and 42 years old.

Details on statistical analysis of life course models

Critical Period Model: Similar types of life course factors (e.g. smoking exposure) at different life stages were first added separately and then simultaneously to the base model. Results of the models were compared to examine whether effect of earlier factors remained unchanged after inclusion of more recent factors.

The chain of risk model: When similar life course factors from multiple life periods (e.g. childhood asthma and adulthood asthma) were significant when added simultaneously to the base model in the critical period model, the chain of risk model was investigated. The chain of risk models were examined through modelling similar life course factors chronologically through path analysis (such as childhood passive smoke exposure to adulthood persistent smoker).

Accumulation of risk model: To test the cumulative risk model, the life time cumulative variable for smoke exposure, social class and asthma were created and entered to the model separately.



Supplementary Figure 1: Flow chart showing sample selection

*Refers to last three weeks prior to undertaking spirometry

Supplementary Table 1: Distribution of factors from the analytic sample and original cohort

Life course factors	Analytic sample (n = 6212)	Original 1958 cohort* (n=18554)	P value [#]
Gender			<0.001
Male / Female	49.1%/50.9%	51.7% / 48.3%	
Parental respiratory disease history		(n=12966)	0.023
	3.7%	4.4%	
Smoking status		(n=12031)	
Never smoker	60.4%	57.5%	<0.001
Ever smoker	21.4%	20.0%	
Current smoker	18.2%	22.4%	
SC at birth (0 yrs)		(n=17556)	
SC1	19.6%	17.8%	0.001
SC2	10%	9.6%	
SC3	49.9%	50.2%	
SC4	20.6%	22.4%	
SC at 42 years		(n=12154)	
SC1	40.8%	37.0%	<0.001
SC2	24.4%	24.4%	
SC3	19.0%	20.9%	
SC4	15.9%	17.8%	
Asthma			
Childhood asthma		(n=16533)	0.991
	22.4%	22.4%	
Adulthood asthma		(n=16560)	<0.001
	6.4%	4.6%	

*number of cohort members with data available listed for individual life course factors; yrs = years; SD = standard deviation; SC = social class (SC1 = professional/managerial; SC2 = unskilled non-manual; SC3 = skilled manual; SC4 = unskilled manual)

[#]calculated by Chi square

References

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