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Title: Associations with a change in tracking of lung function

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Body: Background Recent work has demonstrated tracking of lung function from early infancy to ages 18 and 22 years. We hypothesised that factors associated with wheeze would be associated with a changing trajectory of lung function tracking during infancy and childhood. Methods Lung function was measured longitudinally at one, six and twelve months (V'maxFRC) of age and at ages six, twelve and eighteen years (FEF_{25-75}). Repeated measures analysis of variance was used to explore chronological changes in % lung function. Results were analysed using the 91 individuals with data at all ages apart from 6 years ("restricted analysis") and then for all individuals after replacing missing values with average values for that age ("whole cohort analysis"). Results The % lung function was determined in 241 individuals aged one month, 192 six months, 164 twelve months, 106 six years, 183 twelve years and 141 eighteen years. In the restricted analysis, maternal asthma was associated with reduced lung function from twelve months to 18 years ($p=0.006$). In the whole cohort analysis, associations were observed between: infant onset atopy and reduced lung function from six to 18 years ($p=0.005$); flow limitation at one month and reduced lung function only up to age six years ($p<0.001$); and maternal asthma and reduced lung function only at age 18 years ($p=0.016$). Conclusions The repeated measurements of lung function in our cohort have allowed identification of factors associated with changes in lung function growth. These include early lung function, early onset atopy and maternal asthma and one or other may be associated with acceleration in infants with low initial lung function or deceleration in those with normal initial lung function.