Abstract

Decreased spirometric indices are characteristic of asthma and other respiratory diseases. The aim of this study was to investigate the genetic and environmental components of variance of forced expiratory volume in one second (FEV1) and forced vital capacity (FVC) measured in adulthood in an Australian population-based sample of 468 Caucasian nuclear families. The inter-relationships of the genetic determinants of these traits with asthma and atopic rhinitis were also investigated.

Serial cross-sectional studies were conducted in the town of Busselton in Western Australia between 1966 and 1981 and follow-up of previous attendees was undertaken in 1995. Data from each subject included in this study were from a single survey in adulthood (25-60 years of age) when the subject was as close to age 45 years as possible.

Multivariate analysis suggested that FEV1 and FVC levels were associated with age, sex, height, tobacco smoke exposure, asthma and atopic rhinitis. After adjustment for relevant covariates, FEV1 levels had a narrow-sense heritability (h2N) of 38.9% (SE 9.1%). FVC levels had an h2N of 40.6% (SE 8.9%). Extended modelling demonstrated little overlap in the genetic determinants of asthma or atopic rhinitis and either FEV1 or FVC levels.

The results of this study were consistent with the existence of important genetic determinants of adult lung function that are independent of asthma or other atopic disease, cigarette smoking, height, age or sex.