Spirometric Reference Values in 236,606 Healthy, Non-Smoking Chinese Aged 4–90 Years

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Abstract : Objectives: Spirometry is a basic reference for health evaluation which is widely used in clinical. Previous reference of spirometry is not applicable because of drastic changes of social and natural circumstance in China. A new reference values for the spirometry of the Chinese population is extremely needed. Method: Spirometric reference value was established using the statistical modeling method Generalized Additive Models for Location, Scale and Shape for forced expiratory volume in 1 s (FEV1), forced vital capacity (FVC), FEV1/FVC, and maximal mid-expiratory flow (MMEF). Results: Data from 236,606 healthy non-smokers aged 4–90 years was collected from the MJ Health Check database. Spirometry equations for FEV1, FVC, MMEF, and FEV1/FVC were established, including the predicted values and lower limits of normal (LLNs) by sex. The predictive equations that were developed for the spirometric results elaborated the relationship between spirometry and age, and they eliminated the effects of height as a variable. Most previous predictive equations for Chinese spirometry were significantly overestimated (to be exact, with mean differences of 22.21% in FEV1 and 31.39% in FVC for males, along with differences of 26.93% in FEV1 and 35.76% in FVC for females) or underestimated (with mean differences of -5.81% in MMEF and -14.56% in FEV1/FVC for males, along with a difference of -14.54% in FEV1/FVC for females) the results of lung function measurements as found in this study. Through cross-validation, our equations were established as having good fit, and the means of the measured value and the estimated value were compared, with good results. Conclusions: Our study updates the spirometric reference equations for Chinese people of all ages and provides comprehensive values for both physical examination and clinical diagnosis.

Keywords : Chinese, GAMLSS model, reference values, spirometry
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