EUROPEAN RESPIRATORY JOURNAL
ORIGINAL RESEARCH ARTICLE
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Reference equations for evaluation of spirometry function tests in South Asia, and among South Asians living in other countries

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Newly derived spirometry reference equations greatly improve prediction of normal lung function in South Asians, thus filling the long-standing gap of appropriate reference values for this ethnic group https://bit.ly/3H7ZGt5

Cite this article as: Leong WY, Gupta A, Hasan M, *et al*. Reference equations for evaluation of spirometry function tests in South Asia, and among South Asians living in other countries. *Eur Respir J* 2022; 60: 2102962 [DOI: 10.1183/13993003.02962-2021].

This single-page version can be shared freely online.

This article has an editorial commentary: https://doi.org/10.1183/13993003.01608-2022

Received: 16 Nov 2021
Accepted: 2 June 2022

Abstract

Background There are few data to support accurate interpretation of spirometry data in South Asia, a major global region with a high reported burden of chronic respiratory disease.

Method We measured lung function in 7453 healthy men and women aged ⩾18 years, from Bangladesh, North India, South India, Pakistan and Sri Lanka, as part of the South Asia Biobank study. First, we assessed the accuracy of existing equations for predicting normal forced vital capacity (FVC), forced expiratory volume in 1 s (FEV_1) and FEV_1/FVC ratio. Then, we used our data to derive (n=5589) and internally validate (n=1864) new prediction equations among South Asians, with further external validation among 339 healthy South Asians living in Singapore.

Results The Global Lung Initiative (GLI) and National Health and Nutrition Examination Survey consistently overestimated expiratory volumes (best fit GLI-African American, mean±SD z-score: FEV_1 −0.94±1.05, FVC −0.91±1.10; n=7453). Age, height and weight were strong predictors of lung function in our participants ($p<0.001$), and sex-specific reference equations using these three variables were highly accurate in both internal validation (z-scores: FEV_1 0.03±0.99, FVC 0.04±0.97, FEV_1/FVC −0.03±0.99) and external validation (z-scores: FEV_1 0.31±0.99, FVC 0.24±0.97, FEV_1/FVC 0.16±0.91). Further adjustment for study regions improves the model fit, with highest accuracy for estimation of region-specific lung function in South Asia.

Conclusion We present improved equations for predicting lung function in South Asians. These offer the opportunity to enhance diagnosis and management of acute and chronic lung diseases in this major global population.