

LUNG FUNCTION BETWEEN 18-25 YEARS – A COMPARISON OF DIFFERENT REFERENCE VALUE SYSTEMS

**E. Marek^{1,2}, J. Volke¹, K. Mückenhoff³, H.-J. Smith⁴, B. Serbetci³, H. Kalhoff⁵,
N. Kotschy-Lang⁶, M. Kohlhäufel⁷, R. Merget², and W. Marek†³,**

¹Department of Sports Medicine and Nutrition, Ruhr-University Bochum, Bochum;

²Institut für Prävention und Arbeitsmedizin der Deutschen Gesetzlichen Unfallversicherung, Bochum;

³Institute of Occupational Physiology, Augusta-Kranken-Anstalt, Bochum;

⁴CareFusion, Höchberg, Dortmund;

⁶Berufsgenossenschaftliche Klinik für Berufskrankheiten Falkenstein;

⁷Klinik Schillerhöhe, Zentrum für Pneumologie und Thoraxchirurgie, Stuttgart Gerlingen, Germany

The anthropometrical data of the Caucasian population have significantly changed within the last five decades. Therefore the question arises if the commonly used reference recommendations for lung function of the European Community for Coal and Steel (ECCS) can still be accepted today. The ECCS assumes a plateau phase and recommends the entry of 25 years for calculation of reference values in this age range (hockey stick). It was the aim of this study to find out if the ECCS reference recommendations can still be accepted. Methods: Standardized spirometric lung function tests were performed by pneumotachography, recording lung volumes and flows (IVC, FVC, FEV1, FEV1%FVC, PEF, MEF75,50,25; MasterScreen Pneumo, CareFusion, Höchberg, Germany) in 202 female and 201 male asymptomatic nonsmoking medical students, aged 18 to 26 years, according to the ATS/ERS criteria. Results were compared with the reference recommendations of ECCS, SAPALDIA, LuftiBus, and Bochum (only males). Results: No significant correlation between height and BMI with age was found in males and females, but there was a slight tendency of increasing BMI with age. All measured absolute lung function values showed a significant correlation ($p < 0.01$) with height. With respect to FVC and FEV1, SAPALDIA and Bochum reference values were comparable and close to 100 (range 97.6- 101.4) %pred, whereas both ECCS and Luftibus showed considerably higher values (range 103.6 - 109.9 %pred). There was no main difference between males and females. The FEV1/FVC ratio was close to 100 (range 97.6 - 101.7) %pred in all reference systems, whereas flows showed a wide variability between reference systems (77.1 - 114.6 %pred), single flows (e.g. 96.9 - 114.2 %pred for MEF50) and males/females (males: 93.6 - 114.6 %pred; females: 77.1 - 107.9 %pred). Summary: SAPALDIA reference values for FVC and FEV1 should be used, as they better represent lung function in the age group from 18 to 26 years and are available for males and females. ECCS and Luftibus reference values are significantly (about 4 to 10%) lower. Differences between reference systems were less important for the FEV1/FVC ratio and lung flows.