

# Predictive equations of pulmonary function for healthy children in Portugal

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There is a scarcity of data on lung function reference values for healthy children in Portugal. This study aims to develop predictive equations for spirometric reference values for children aged 8 to 12 years in North Portugal.

A random sample of 352 children from 10 primary schools in Oporto were screened by a health questionnaire and physical examination and those found "normal" underwent spirometry according to the standardized procedure recommended by the ATS/ERS task force in 2005. Exclusion criteria were inability to correctly perform spirometry, premature birth (<37 weeks), reported having wheeze in last 12 months or any history of asthma. Each subject's weight and height were measured, and lung function was performed using a MIR Spirobank, with WinSpiroPRO software. Spirometric parameters recorded were forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1), forced expiratory flow between 25 and 75% of exhalation (FEF2575) and peak expiratory flow (PEF). All computer derived flow-volume curves were reviewed for technical acceptability and the best flow-volume curve was selected to derive the reference equations using multiple regression analysis.

A total of 111 subjects, aged 8.09(0.75) years (mean (SD)), 51(45.9%) girls, were included in the study. Both in boys and girls, FVC, FEV1 and PEF showed moderate to strong correlations with height (CC=0.736, p<0.001; CC=0.699, p<0.001; CC=0.439, p<0.001 respectively), weight (CC=0.593, p<0.001; CC=0.615, p<0.001; CC=0.412, p<0.001) and age (CC=0.302, p<0.001; CC=0.403, p<0.001; CC=0.276, p=0.003); while FEF2575 only with height (CC=0.309, p=0.001) and weight (CC=0.420, p<0.001). Using *Student's T* test and confirmed by linear regression, all spirometric parameters were independent of gender. For FVC, FEV1 and PEF the predictive variables are height and weight. For FEF2575 only weight was statistically significant, but the authors opt to maintain the variable height in the model. Results are summarized in table 1.

Spirometric index	$\beta$ (C.I.)	Height (C.I.)	Weight (C.I.)	R <sup>2</sup>
FVC	-1.929 (-2.79 - (-1.067))	0.028 (0.021-0.036)	0.006 (0.000-0.013)	0.542
FEV1	-1.237 (-2.002-(-0.529))	0.021 (0.015-0.027)	0.008 (0.002-0.013)	0.511
FEF2575	0.386 (-1.917-2.311)	0.010 (-0.005-0.028)	0.018 (0.007-0.030)	0.171
PEF	-0.490 (-2.884-1.858)	0.029 (2.962-0.004)	0.017 (-0.002-0.035)	0.229

In conclusion, we present newly developed predictive equations regression for spirometry variables that may be applied to calculate lung function in Portuguese children aged 8 to 12 years.