SELECTION OF PULMONARY FUNCTION REFERENCE EQUATIONS FOR THE CHRISTCHURCH POPULATION

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The ATS recommends that reference equations be reviewed regularly. It has been 10 years since our last appraisal and we recently reassessed the suitability of our reference equations.

Methods: We analysed the lung function tests of at least 10 healthy non-smoking males and females in each decade from 8 to 80 years. Lung function data were compared with a range of reference equations to establish the equation with the smallest mean difference (Bias) and the least variation (S.D.) of the difference (Precision). Each equation was ranked from the lowest to the highest bias. We quantified the discrepancies between the reference values and our data. We related the differences to age, gender, and BMI (and found an association).

Results: We measured the pulmonary function in 98 male and 100 female volunteers whose results met the ATS criteria for test quality. The mean and standard deviation for FEV_1 and FVC for each reference equation are shown in the table. The NHANES III equations had the smallest standard error of the mean.

Equation	NHANES	Morris	ERS	Knudson	Crapo	Polgar
Age range	8 - 80	20 - 80	18 - 70	8 - 80	15 - 80	≤ 18
Number	198	149	131	198	160	49
FEV_1 Mean (Bias)	0.069	-0.131	-0.079	-0.003	0.122	0.150
S.D. (Precision)	0.424	0.538	0.460	0.432	0.448	0.449
FVC Mean (Bias)	0.123	-0.001	-0.284	0.737	0.061	-0.071
S.D. (Precision)	0.478	0.519	0.532	2.881	0.520	0.557

Conclusion: Some equations work better for different parameters. Overall the NHANES III reference equation ranked the best for our population. We have changed our spirometry reference equations from Morris to NHANES III.

Key Words: Reference equations, lung function, spirometry, FEV_1, FVC