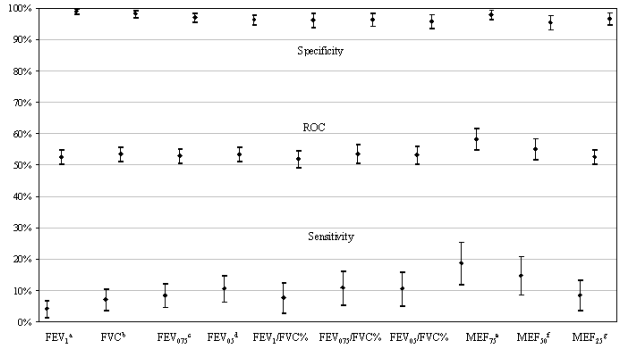

Figure 1
Sensitivity and specificity (and CI95%) versus symptoms in children of reduced function parameters. ROC = Receiver Operating Characteristic. [a]FVC = forced vital capacity; [b]FEV_1= forced expiratory volume in one second; [c]$FEV_{0.75}$ = forced expiratory volume in 3/4 of a second; [d]$FEV_{0.5}$ = forced expiratory volume in half a second; [e]MEF_{75} = instantaneous expiratory flow when 25% of FVC has to be expired. [f]MEF_{50} = instantaneous expiratory flow when 50% of FVC has to be expired. [g]MEF_{25} = instantaneous expiratory flow when 75% of FVC has to be expired

could be that of accepting tests with at least 2 curves of maximum effort (PEF easily observable) and with a difference among parameters within 100 ml (10% of FVC in our sample), to exclude tests lasting less than 0.5 seconds and to accept tests with small early interruptions of expiration.

Reference equations

Using the previously discussed quality control criteria we were able to propose the first reference equation for FEV0.75 (as far as we know) and new reference values for FVC, FEV1, FEV0.5 and for instantaneous expiratory flows (MEF75-MEF50-MEF25) based on a large sample of young children.

The increase of lung volumes with BMI, accounting for height, age and gender, reflects the effect of body size [13]or physical fitness[30,31]; although obesity is reported to determine a reduction of lung function values[32], this is not proved in our sample due to the BMI being within normal ranges in more than 95% of the population studied. Body weight seems to have a less important effect when controlling for the BMI.

The lack of a significant effect of age on FVC is probably due to the small size of the sample with an acceptable FVC measurement and to the limited age range in our study: in any case, we observed an increase in dynamic volumes of 23 ml in FEV1 and of 15 ml in FEV0.75 for each year of age increase.

About the gender effect found in our study, it is known that girls have better physiological performances than males in preadolescence[13,33]: the lack of any significant effect described in other studies on young children is probably the consequence of a lower statistical power[12]. Concerning the validity of reference values, studies con-

Table 8: Odds ratios (OR) of lung function parameters lower than 5th percentile of reference value versus symptoms using "list-wise deletion"* of missing values and a single parameter

Parameter	OR	CI 95%	*p* value
FVC	4.05	1.41–11.61	0.009
FEV_1	4.17	1.85–9.39	0.001
FEV_{075}	2.93	1.48–5.82	0.002
$FEV_{0.5}$	3.10	1.66–5.76	0.000
FEV_1/FVC	2.10	0.84–5.20	0.111
$FEV_{0.5}$/FVC	3.22	1.45–7.18	0.004
$FEV_{0.75}$/FVC	2.71	1.22–6.02	0.015
MEF_{75}	10.55	4.42–25.19	0.000
MEF_{50}	3.63	1.78–7.38	0.000
MEF_{25}	2.70	1.14–6.40	0.024

* The single case is eliminated for the variable in which a missing value is present
FVC = forced vital capacity;
FEV_1 = forced expiratory volume in one second;
$FEV_{0.75}$ = forced expiratory volume in 3/4 of a second;
$FEV_{0.5}$ = forced expiratory volume in half a second;
MEF_{75} = instantaneous expiratory flow when 25% of FVC has to be expired
MEF_{50} = instantaneous expiratory flow when 50% of FVC has to be expired
MEF_{25} = instantaneous expiratory flow when 75% of FVC has to be expired