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From the authors:

We thank C. Thamrin and co-workers for their interest in our paper and their reflection, which continues the discussion on how to express bronchodilator responsiveness. This has been an important topic of debate for decades in the adult and the paediatric pulmonary field. In their letter, C. Thamrin and co-workers state that if a bronchodilator change is related to anthropometric factors or baseline lung function, these factors should be taken into account.

The worse the baseline lung function the more room for improvement, at least for the asthmatic patient. This has been recognised and translated in the guideline that the bronchodilator response as assessed with forced expiration is expressed as percent change from baseline for forced expiratory volume in 1 s (FEV1) [1, 2]. Of course, in order to be significant, the response must exceed the threshold for natural short-term variability and, therefore, the response in FEV1 should exceed 200 mL. The 95th percentile for the increase in FEV1 in healthy adults is ~10% baseline [1]. Asthma is characterised by episodic shortness of breath and variable airway obstruction. A reversibility in FEV1 after bronchodilation $\geqslant$12% and $\geqslant$200 mL indicates a diagnosis of asthma in children and adults according to the 2009 Global Initiative for Asthma guidelines [2].

The worse the baseline lung function the more room for improvement. However, contrary to FEV1, which decreases with increasing level of airway obstruction, airway resistance increases when lung function worsens. By expressing the bronchodilator response as percent change from the baseline airway resistance, the differences that existed between groups with different baseline lung function and disappear after bronchodilation will be blunted. This is exactly what we found in our study [3]. We measured baseline lung function and bronchodilator response in 4-yr-old children who took part in a prospective birth cohort study in Antwerp, Belgium. The group of children with persistent wheeze had significantly larger baseline resistance and a significantly larger absolute change in resistance after bronchodilation than the group of children who never wheeze. However, the relative changes in the two groups of children were similar (table 1 in the online supplement to our manuscript [3]). Similarly, when we used the 95th percentile of the absolute bronchodilator change in resistance, significantly more responders were found in the group of children with persistent wheeze compared with the group with never wheeze (13% and 4%, respectively). No significant differences in responders were found in the two groups when using a threshold based on the relative change (table 3 in our manuscript [3]).

It has been documented that the bronchodilator response depends on anthropometric variables and baseline lung function. Both for the relative change in FEV1 as assessed in adults and the absolute change in resistance assessed in (pre)school children, multiple studies have revealed these dependencies [4–7]. The real challenge is to find the threshold value in the expression of the bronchodilator response which best separates the asthmatic from the healthy response, especially in the pre-school child who is unable to perform forced expiration reliably. Although our study was not designed to find an answer to this question, the results strongly suggest that expression of the response as absolute change should not be ruled out.

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