Influence of the practice setting on diagnostic prediction rules using FENO measurement in combination with clinical signs and symptoms of asthma.

To evaluate the influence of the practice setting on diagnostic accuracy of fractional exhaled nitric oxide (FENO) for diagnosing asthma; and to develop prediction rules for diagnostic decision-making including clinical signs and symptoms (CSS). Patients from 10 general practices and 1 private practice of 5 pneumologists in ambulatory care. 553 patients, 57.9% female. Consecutive inclusion of diagnostic-naive patients suspected of suffering from obstructive airway disease. Exclusion criteria were respiratory tract infections within the last 6 weeks. The index test was FENO measurement. Reference standard was the Tiffeneau ratio (forced expiratory volume in 1 s/vital capacity) or airway resistance as assessed by whole body plethysmography, with additional bronchoprovocation or bronchodilator testing. Asthma as determined by pneumologists, who were blind to FENO measurement results. Prediction rules were derived from multiple logistic regression analysis. A freely available calculator that allows computing all combinations was developed. The practice setting only had minor influence on sensitivities of FENO cut-off points. In the final model (n=472), allergic rhinitis, wheezing and previous medication were positively associated with asthma. Increasing age and recurrent respiratory tract infections were negatively associated.
The area under the curve (AUC) of FENO (AUC=0.650; 95% CI 0.599 to 0.701) increased significantly (p<0.001). Ruling out with FENO<16 ppb in patients<43 years was only possible without allergic symptoms when recurrent respiratory tract infections were present. FENO results should be interpreted in the context of CSS to enhance their diagnostic value in primary care. The final diagnostic model appears as a sound algorithm fitting well to the established diagnostic rules related to CSS of asthma. FENO appears more effective for ruling in asthma than for ruling it out.