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From the authors:

A. D'Urzo has correctly identified from our data [1] that bronchial challenge testing seems to be a more sensitive test to confirm asthma compared to pre- and post-bronchodilator spirometry. Our results were similar to those of GOLDSTEIN *et al.* [2] who demonstrated that bronchial challenge testing with methacholine has far greater sensitivity to diagnose asthma compared with post-bronchodilator spirometry. Despite these findings, pre- and post-bronchodilator spirometry should probably be the first-line test to diagnose or confirm asthma for several reasons. Inducing bronchoconstriction with a bronchial challenge test poses a risk to the patient that could be avoided if that patient is able to have asthma diagnosed, or confirmed, with post-bronchodilator spirometry. Admittedly, the risk may be more theoretical than evidence-based. For example, to date there are no reported deaths from methacholine challenge testing [3] and there are studies demonstrating that it is quite safe, even in patients with severe obstruction [4]. That being said, there have been fatalities following specific antigen challenges and the current American Thoracic Society guidelines cite moderate obstruction (forced expiratory volume in 1 s (FEV_1) $\leqslant$60–70% predicted) as a contraindication to methacholine challenge testing [3]. Bronchial challenge testing is also more time consuming and more expensive than spirometry, less readily available than spirometry and potentially uncomfortable for patients (approximately a third of patients develop symptoms) [3]. Furthermore, a physician must be available onsite during the bronchial challenge test, which adds to expense. In contrast to bronchial challenge testing, pre- and post-bronchodilator spirometry is completely safe, inexpensive and can be more easily performed in primary care. Thus, although sensitivity is an issue, we feel that pre- and post-bronchodilator spirometry, which is the cheapest, safest and most readily available test, is probably preferred as a first step in confirming a diagnosis of asthma.

S.K. Chhabra and M. Gupta correctly state that there is debate and a relative lack of gold standard criteria on which to base a diagnosis of asthma. We used first-step criteria of FEV_1 improvement $\geqslant$200 mL and $\geqslant$15% (rather than 12%) because, as S.K. Chhabra and M. Gupta point out, bronchodilator responsiveness lacks specificity. Our intention was to be conservative and to avoid false-positive results in the first step of the diagnostic algorithm. As all patients who did not exhibit 15% reversibility proceeded to a bronchial challenge test we surmised that true asthmatics would have their diagnosis confirmed at the following visit. S.K. Chhabra and M. Gupta also point out that bronchodilator responsiveness lacks specificity and can be positive in patients with chronic obstructive pulmonary disease (COPD). We agree that many patients with COPD may exhibit bronchodilator responsiveness and positive bronchial challenge tests, therefore, our study excluded any patients with a >10 pack-yr smoking history, specifically to avoid applying our diagnostic algorithm to patients with possible COPD.

The aim of our study was to confirm a diagnosis of asthma in those who had already received a physician diagnosis of asthma in the past. According to the Canadian Asthma Consensus guidelines, asthma is defined as ''A disease characterised by paroxysmal or persistent symptoms of dyspnoea, chest tightness, wheezing, sputum production and cough, associated with variable airflow limitation and airway hyperresponsiveness to endogenous or exogenous stimuli'' [5]. Similarly the Global Initiative for Asthma (GINA) guidelines define asthma as ''a chronic inflammatory disorder of the airways associated with airway hyperresponsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing, particularly at night or in the early morning'' [6]. A necessary condition of both the Canadian and GINA definitions is that asthma must be diagnosed based on the evidence of: 1) respiratory symptoms; and 2) physiological evidence of reversible airflow obstruction and/or airway hyperresponsiveness. Thus, we used our algorithm to confirm physiological evidence of asthma in those who had been previously diagnosed. We agree with S.K. Chhabra and M. Gupta that in the absence of a gold standard for diagnosis, a weighted multi-dimensional diagnostic scoring system that incorporates physiological testing, patient history and symptoms, and perhaps responsiveness to asthma medications, needs to be developed to comprehensively evaluate patients for a diagnosis of asthma. To date, this 'gold standard' diagnostic scoring system remains elusive; however, we feel that studies such as ours are the first necessary step towards the development of such a gold standard.

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