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Title: Domiciliary diurnal variation of fractional exhaled nitric oxide (FeNO) to monitor asthma control

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Body: Background: A major goal of asthma management is achieving and maintaining optimal control. Current assessment is based on symptoms and lung function. Portable monitors for FeNO have now become available. Objectives: We evaluated whether domiciliary daily home FeNO monitoring could be useful as an index of asthma control. Methods: Fifty asthmatic subjects and 15 healthy volunteers with a range of asthma severity underwent asthma control questionnaire (ACQ), spirometry before and after salbutamol and sputum induction. FeNO and peak expiratory flow (PEF) were measured twice daily for 2 weeks. A record of exacerbations was obtained 3 months later. Results: Diurnal FeNO variation in uncontrolled asthmatics was significantly greater than in controlled asthmatics ($p < 0.01$). PEF variation was not different. The daily variation of FeNO levels was also greater in uncontrolled asthmatics compared to controlled asthmatic and healthy subjects ($p < 0.01$). 80% of uncontrolled asthmatics experienced at least one or more exacerbations over the 3 months after the enrolment. The combination of diurnal FeNO variation $\geq 16.6\%$ and ACQ scores ≤ 1.8 was best at predicting uncontrolled asthma (AUC; 0.91, 95%CI: 0.86-0.97, $p < 0.001$).

Conclusions: Diurnal variation in FeNO combined with ACQ scores can be used as a better marker of asthma control and as a predictor of the risk of future exacerbation. Prospective studies are warranted.