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Title: FeNO and web-based monitoring in paediatric asthma management; the BATMAN study

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Body: Introduction: Asthma control in children is far from optimal. We studied 3 treatment strategies for their ability to improve asthma control: (1) usual care, (2) 4-monthly monitoring of the fraction of nitric oxide in exhaled air (FeNO) in addition to usual care and (3) web-based monthly monitoring of asthma control. Methods: In this randomized, controlled multi-centre trial, asthmatic children 4-18 years were randomized to 1 of the 3 groups. All children were seen every 4 months for 1 year. Asthma control was assessed using the Asthma Control Test (ACT or C-ACT). In the usual care and web group, treatment was adapted according to the ACT score respectively at 4 and 1 months intervals; in the FeNO group according to ACT and FeNO. Primary endpoint was the proportion of symptom-free days (SFD), for which a 4-week web-based diary was filled in at the start and after 1 year. Changes from baseline of SFD were compared between groups with ANCOVA. Results: 280 children (mean age 10.4 yrs, 66% boys) were included, 268 completed the study. Overall median ACT score at baseline was 22, range 19-24. Mean changes from baseline in SFD did not significantly differ between the groups. A significant within-group change was only seen in the FeNO group (improvement SFD 0.53 to 0.61, $p < 0.05$). Daily ICS dose decreased significantly more in the web-based monitoring group compared to both other groups (200 ug/day, $p < 0.004$). Conclusion: The change from baseline in SFD after 1 year of treatment did not differ between treatment strategies. Only the FeNO strategy showed within-group improvement of SFD, while in children with additional monthly web-based consultations the dose of ICS could be reduced while control was maintained.