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Contactless and automated monitoring to study changes in nocturnal parameters before and after asthma attacks in children

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Background: Early detection of asthma attacks in children is limited by recognition and reporting of symptoms by the carer or the child. Moreover, the time taken for resolution of symptoms post attack in children is unknown. A contactless, bedside device which continuously monitors respiratory parameters at night may help early detection and identify resolution of an attack. We hypothesised that the Albus Home device can be used to detect changes in cough and respiratory rate pre and post attacks in children.

Methods: Children aged 6-16 years with asthma were recruited into the Childhood Home Asthma Monitoring Study (CHAMP). Participants with >3 months data meeting the quality control criteria were included. Changes in nocturnal cough frequency and respiratory rate were analysed as the daily aggregate 15 days before, and after, an asthma attack. Asthma attack was defined as a course of systemic steroids taken for asthma, and the attack day (dotted vertical lines) defined as the first day of starting steroids. Steroid courses which occurred within 3 weeks of each other were treated as one event, with the first pre-attack and last post-attack period included in analysis.

Results: Forty-seven attacks from 28 children (18 males) with a mean (SD) age 10.5 years (±2.7) were analysed. There was increased nocturnal cough frequency from 5 days before the attack, which improved post attack but did not reach baseline by day 15 (fig 1a). The nightly respiratory rate (RR) increased from 5 days prior to the attack but normalised by day 7 post attack (fig 1b).

Conclusion: The Albus device detected increased respiratory symptoms early, providing a potential therapeutic window to prevent asthma attacks in children and provides insight to the time taken for resolution of the symptoms.

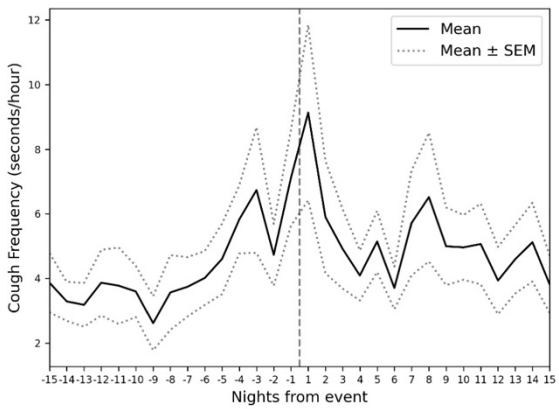

Fig. 1a. Mean and SEM of cough frequency

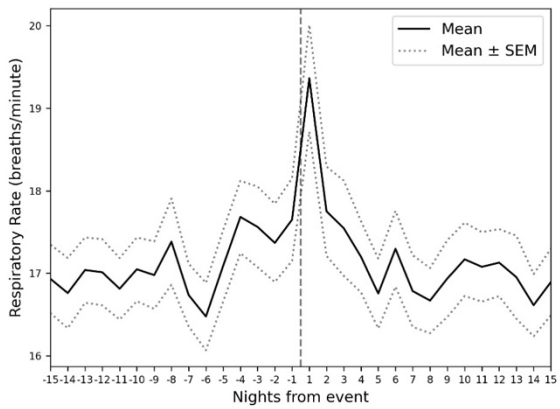

Fig. 1b. Mean and SEM of respiratory rate