

Abstract S29 Table 1 NEWS Scoring system for oxygen saturation levels (SpO<sub>2</sub>) and our proposed alternative oxygen scoring system

EWS Score for SpO <sub>2</sub>	3	2	1	0	1	2	3
NEWS System	≤91%	92–93%	94–95%	≥96			
Proposed modification to NEWS system	≥5% Below target range	3–4% Below target range	1–2% Below target range	In target range	1–2% Above target range on oxygen*	3–4% Above target range on oxygen*	≥5% Above target range on oxygen*

\*Patients do not score for high oxygen saturation if breathing air.

## Determinants of lung disease in children

### S30 DOES OBESITY MAKE FOR WORSE CHILDHOOD ASTHMA?

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**Introduction** Obesity may be important to asthma causation but the relationship between obesity and outcomes within populations of children with established asthma is inconsistent across studies. This study tested the hypothesis that obese children who have asthma have worse asthma outcomes in comparison with non-obese, non-overweight children with asthma.

**Methods** Cross-sectionally, children with asthma were recruited from hospitals across Scotland using published methods.<sup>1</sup> A respiratory questionnaire and quality of life questionnaire (PAQLQ) were completed with measured height, weight, spirometry and exhaled NO. Obesity was defined as body mass index (BMI) >95<sup>th</sup>% and non-obese or overweight as BMI <85<sup>th</sup>%. Asthma outcomes were categorised as severity (emergency prednisolone treatment, BTS treatment step, spirometry) and control (PAQLQ).

**Results** There were 693 children recruited in whom BMI was determined in 501 including 103 who were obese and 71 overweight (ie BMI >85<sup>th</sup>% but ≤95<sup>th</sup>%). In unadjusted comparisons and compared to non-obese non-overweight children, obese children had higher %FVC (mean difference 6.0% [95% CI 0.7, 11.2] p=0.026), reduced %FEV<sub>1</sub>/FVC (mean difference 4.5% [95% CI 1.2, 7.8] p=0.007), a trend for lower PAQLQ score (4.8 versus 5.8, p=0.071) and were less likely to have co-existent eczema or hayfever (OR 0.8 [0.7, 0.9] p=0.001). In the multivariate analysis and compared with non-obese non-overweight children, obese children had reduced %FEV<sub>1</sub>/FVC and also reduced risk for eczema or hayfever but not for other outcomes.

**Conclusion** This is the first study of associations between obesity and asthma outcomes in a UK paediatric population. Although children with asthma may have slightly different physiology (i.e., obstructed lung function and reduced atopy) compared to non-obese, non-overweight individuals, these differences are unlikely to be of clinical relevance. Weight reduction interventions targeted specifically at obese children with established asthma are unlikely to improve asthma severity or control.

#### References

1. Turner *et al.* A methodology to establish a database to study gene environment interactions for childhood asthma. *BMC Medical Research Methodology*, 2010, 10–107.

### S31 VARIATION AT GLCCI1: ASSOCIATION WITH INCREASED STEROID DOSE BUT NOT ADRENAL SUPPRESSION IN ASTHMATIC CHILDREN

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**Introduction** Corticosteroids are the main stay of preventative therapy for asthma-related symptoms. There is a wide range of

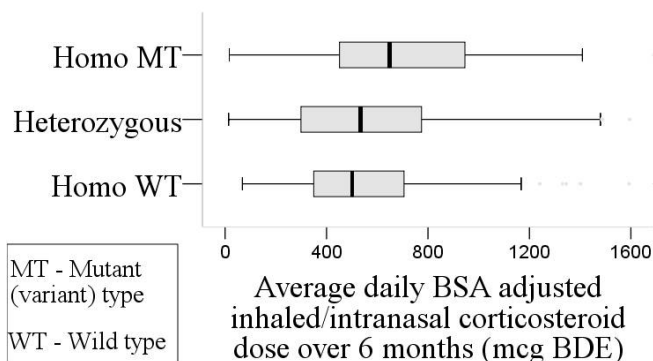
inter-patient variability both in terms of response to therapy, and suppression of the HPA axis leading to potentially fatal adrenal suppression. A recently undertaken GWAS identified the GLCCI1 variant rs37973 as a biomarker for corticosteroid efficacy using FEV<sub>1</sub> response as the outcome measure. The aim of this study was two-fold: (a) to replicate the association with corticosteroid efficacy (using steroid dose and an increase in asthma exacerbations as surrogate measures) and (b) to determine whether the same variant is associated with adrenal suppression in asthmatic patients on inhaled corticosteroids.

**Methods** The study included data on 402 asthmatic children (age 5–18yrs), who were recruited to the Pharmacogenetics of Adrenal Suppression with inhaled Steroids (PASS) study, all of whom were on long term corticosteroid therapy (>6 months), and had a clinically indicated low dose short Synacthen test (LDSST). Detailed history of their medication use and exacerbations were recorded for the 6 months prior to LDSST. Regression models, adjusted for significant clinical factors, were used to test for association between the SNP and each outcome.

**Results** The rs37973 variant was associated with an increase in prescribed total inhaled/intranasal corticosteroid doses both before and after adjustment for body surface area. This association was significant when assuming both an additive mode of inheritance (p-value=0.020 for BSA adjusted total) as previously reported, and a recessive model (p-value =0.006 for BSA adjusted total). The variant was also associated with increased hospital admissions over the 6 month period (OR 2.16, 95% CI:1.10–4.33 when comparing homozygous states). There was no association with adrenal suppression (baseline or peak) or the number of rescue oral steroid courses.

**Conclusion** In the first replication study in a European population, we have shown that the rs37973 SNP is associated with increased corticosteroid dose and an increase in asthma-related hospital admissions, further supporting the evidence that GLCCI1 is a determinant of steroid efficacy in asthma. However, this SNP was not associated with steroid-induced adrenal suppression, divorcing efficacy from toxicity, at least with respect to this gene.

### Effect of rs37973 variant on corticosteroid dose in asthmatic children



Abstract S31 Figure 1