severe asthma. We wished to investigate the effects on CANO of the addition of coarse or fine particle inhaled corticosteroids to standard therapy in severe asthma.

Methods Severe asthmatics taking =1600 μg/daybudesonide or equivalent performed a randomised open-label crossover study. Subjects with FEV_1<80%, gas trapping and elevated CANO (=2 ppb) entered a 6 week dose-ramp run-in of Fluticasone/Salmeterol (FPSM) 250/50 μg twice daily for 3 weeks, then 500/50 μg twice daily for 3 weeks. Patients then received additional HFA-BDP200 μg twice daily or FP 250 μg twice daily for 3 wks in a crossover. Participants then received prednisolone (PRED) 25 mg/day for 1 week. Nitric oxide, lung function, mannitol challenge, systemic inflammatory markers and urinary cortisol were measured.

Results 15 patients completed perprotocol: mean (SD) age, 51 (12) yr; FEV_1, 58 (13)% predicted; residual volume, 193 (100)% predicted; mannitol PD10 177 (2.8) μg. There was no significant difference between FPSM and any add-on therapy for CANO. FPSM/BDP and FPSM/PRED suppressed JawNO and FENO compared to FPSM alone. There was no significant difference between treatments for pulmonary function or bronchial challenge. ECP, e-selectin and ICAM-1 were significantly suppressed by FPSM/PRED compared to FPSM and FPSM/FP but not FPSM/BDP. Plasma cortisol was significantly suppressed by FPSM/PRED only.

Conclusion In severe asthma, alveolar nitric oxide is insensitive to changes in dose and delivery of inhaled corticosteroids and is not suppressed by systemic corticosteroids. Additional inhaled HFA-BDP caused reductions in FENO and JawNO without adrenal suppression. Oral prednisolone reduced FENO and JawNO with suppression of systemic inflammatory markers and urinary cortisol.

S10 IS A HIGH FeNO A MARKER OF NON-ADHERENCE IN DIFFICULT ASTHMA?

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Background Non-adherence to inhaled combination therapy (ICT) is a major contributor to poor control in difficult asthma[1]; however identifying non-adherence in this population is challenging. We have shown that suppression of fractional exhaled nitric oxide (FeNO), following directly observed inhaled corticosteroid can identify non-adherence[2]; it has previously been suggested that a single high FeNO measurement can identify non-adherence in difficult asthma.

Methods We performed a retrospective analysis of patients attending a difficult asthma clinic between January 2007 and December 2010. Prescription refill data, patient demographics, FeNO and lung function were collated. ICT prescription refill ratio % was calculated as the number of doses refilled/number of doses prescribed over 6 months × 100.[1] Non-parametric correlation analysis was performed. Tests for non-adherence defined as ICT prescription refill cut-offs of <80% and <50% were assessed.

Results One hundred and forty-six patients underwent systematic evaluation during the time period. Patient characteristics are displayed in Abstract S10 table 1. FeNO level and ICT prescription refill ratio did not correlate significantly (r=−0.11, p=0.2). For FeNO >45 ppb, there was a trend with ICT prescription refill ratio of <80% (p=0.06); significant in patients not prescribed oral steroids (n=99, p=0.016). No relationship existed between FeNO >100 ppb at both prescription refill ratio cut-offs. Using FeNO >45 ppb to define non-adherence, negative (NPV) and positive predictive values (PPV) were: 66% and 61% for <80% ICT prescription refill ratio; 71% and 33% for <50% prescription refill ratio. Using FeNO >100 ppb, NPV and PPV were: 55% and 52% for <80%; 69% and 32% for <50% prescription refill ratio.

Abstract S10 Table 1 Patient characteristics

Patient characteristic	n=146
Age (years) †	40.6±15.1
Sex (F/M)	100/46
Inhaled corticosteroid (BDP equivalent μg)*	1600 (800–2000)
Long acting β-agonist, n (%)	142 (97)
Theophylline, n (%)	75 (51)
Maintenance oral steroids, n (%)	47 (32)
FEV_1 (L) % predicted†	79±24
FEV_1 / FVC ratio %†	69±13
FeNO (ppb)*	46 (21–89)
ICT prescription refill ratio (%)*	89 (49–103)

*Median (IQR).
†Mean±SD.

Conclusion While there is a weak relationship between a single point-in-time FeNO measurement and non-adherence to ICT in difficult asthma, this cannot be used as an alternative to our previously described FeNO suppression test.

REFERENCES

1. **Gamble,** *et al*. *AJRCCM* 2010;**180**:817–22.
2. **McNicholl,** *et al*. *AJRCCM* 2011;**183**:A437.

S11 INAPPROPRIATE PRESCRIBING OF COMBINATION INHALERS IN ASTHMA IN NORTHERN IRELAND (NI)

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Introduction BTS/SIGN asthma management guidelines recommend a stepwise approach to the use of anti-inflammatory therapy, including the addition of inhaled combination therapy (ICT) at Step 3. In NI, ICT accounts for 47% (£23 million) of the entire respiratory drug spend suggesting excessive utilisation of ICT.

Methods Using data from a large representative sample of GP practices in NI, we looked at subjects who had a new prescription of ICT (Symbicort, Seretide, Fostair). Data were collected from the Information and Registration Unit of the Business Services Organisation for the period January to December 2010 inclusive for subjects aged 5 to 35. We examined treatment prior to ICT, SABA, oral steroid and antibiotic use and, prescription filling in the preceding 6 and 12 months.

Results 42 665 subjects received 2 or more prescriptions for any respiratory drug (BNF categories 3.1, 3.2, 3.3) and of these 12 989 received ICT with 3953 new ICT prescriptions. 2642 (67%) of these had no ICS in study year or 6 month lead in period. A further analysis of a 12-month lead in period showed 39 315 subjects with 2 or more respiratory prescriptions and out of these 11 962 received ICT with 2609 new ICT prescriptions. 1359 (52%) had no ICS in the study year or 12-month lead in. A sub-group analysis (n=600) showed that 51% of first prescriptions for ICT are made in Jan–April but in the previous 6 months only 23% are issued a SABA, 5% receive OCS and 31% receive an antibiotic.

Conclusion ICT is initiated in the majority of young asthmatic subjects without prior inhaled steroid therapy. Most prescriptions are initiated in the January–April period and do not appear to be driven by severe asthma exacerbation (oral steroid prescription) or worsening asthma control (SABA use). Significant reductions in ICT, with associated cost savings, would occur if the BTS/SIGN prescribing guidelines were followed in primary care. We are currently trying to identify the drivers and potential economic impact of poor adherence to national prescribing guidelines and