to identify desirable attributes of an inhaler.(2,3) "Ease of use" is an important characteristic but is often determined after instructed training. Whilst the importance of initial and repeat correct inhaler technique training cannot be overlooked, a dry powder inhaler (DPI) device that is intuitively easy to use may be more beneficial for those patients with poor technique recall or with barriers to access adequate training. An intuitively easy to use inhaler such as the Sandoz Forspiro™ device may facilitate correct patient handling. A 28 day study to assess the intuitive ease of use of the Forspiro device was conducted in 24 Accuhaler® users (≥ 1 year use), aged 20–86 years (mean age = 53.8). Participants were separated into 2 groups of 12 and received either limited written instructions about the use of the device (Uninstructed) or were given fully illustrated instructions for use (Instructed). See table 1. The correlation of the ease of use assessment by Uninstructed and Instructed subjects has shown that the new Forspiro DPI is intuitive to use, even in patients that had received minimal instructions for use. The introduction of innovative generic versions of inhaled medications enables the much needed economic rationalisation of drug use in these times of austerity within the NHS. Benefitting from advanced design technology, drawn from years of patient feedback, generic versions of inhaled medications may be more readily adopted by patients and HCPs if the device is intuitive to use. The importance of initial and repeat correct inhaler technique training cannot be overlooked, however intuitively easy to use inhalers, such as the Forspiro device, may facilitate correct patient handling. Refs: 1. Giraud 2002; 2. Virchow 2008; 3. Chrystyn 2007

Abstract P7 Table 1 Subject ratings of ease of use of the novel Forspiro DPI device

	Instructed (n=12)		Uninstructed (n=12)	
	Very easy	Fairly easy	Very easy	Fairly easy
Overall ease of use	8	4	3*	8
Ease of determining the number of doses left	10	2	7*	4
Ease of preparing a dose	10	2	8	4
Ease of removing used blisters	8	4	8	4

*One subject in the uninstructed group rated this aspect "Fairly difficult".

P8 VITAMIN D DEFICIENCY IN THE DIFFICULT ASTHMA POPULATION; FINDINGS FROM A DIFFICULT ASTHMA CLINIC

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Introduction Recent interest has focussed on potential regulatory roles for vitamin D in the development and course of asthma.
Aim We assessed the prevalence and characteristics of patients with vitamin D deficiency, during a calendar year, among our Regional Difficult Asthma Clinic population.
Methods Retrospective study was undertaken to assess vitamin D deficiency prevalence plus characterisation of "deficient" compared to "normal" vitamin D level patients. Characterisation included demographic factors, associated comorbidities, asthma severity (BTS steps), and spirometry during that 12 month period. Comorbidities recorded included BodyMass Index (BMI), smoking status, atopic status, rhinitis, food allergy, salicylate sensitivity, sulphite sensitivity, Gastro-oesophageal Reflux disease (GORD), dysfunctional breathing, and psychological comorbidity.
Results Serum vitamin D3 assessment was available for 85.4% (158/185) patients during the previous 12 months. First measured vitamin D3 levels were used for primary analysis showing a mean clinic vitamin D3 level of 45.1nmol/L. Normal vitamin D3 levels (>72nmol/L) occurred in 18.9%, 14.6% had insufficient levels (52–72nmol/L) and 65.5% had deficient levels (<52nmol/L). Severe deficiency (<20nmol/L) occurred in 14.6%. Vitamin D deficiency showed highest prevalence during Winter, Autumn and Spring(83–79%) and lowest level in Summer (53.3%). Two thirds of patients received a course of vitamin D replacement therapy during the year.

Vitamin D deficient showed no difference compared to normal vitamin D3 status patients in atopic status, spirometry, inhaled medication usage, maintenance oral steroid use, Omalizumab use and asthma hospitalisations. No significant difference was observed between the two groups in respect to comorbidities like GORD, rhinitis, COPD, bronchiectasis, food allergy and dysfunctional breathing. However, vitamin D deficient subjects had significantly higher BMI (31.6 v 26.4 kg/m^2; p=0.007), obesity (BMI>30) (55.3% v 13%; p<0.001) and psychological comorbidity (26.7% v 3.6%; p =0.009).
Conclusion Vitamin D deficiency is highly prevalent in the Difficult Asthma group. The clinical relevance of this finding remains unclear. While vitamin D deficient patients did not show greater asthma treatment needs or healthcare use that might have reflected influence of receiving high dose vitamin D replacement. Patients with vitamin D deficiency showed significantly greater obesity and psychological comorbidity. The association of vitamin D and Difficult Asthma merits further attention.

P9 ADRENAL SUPPRESSION IN DIFFICULT ASTHMA: A NEGLECTED CAUSE FOR CONCERN

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Introduction Inhaled corticosteroids (ICS) are the mainstay of treatment in asthma. Whilst they are felt to be safe in low doses, a number of case studies have demonstrated adrenal suppression in higher doses, particularly in paediatric patients. The relative frequency of this is largely unknown, but we believe it may be significantly underrecognised in patients with difficult to treat asthma. As part of our difficult asthma protocol we measure random cortisol levels and proceeded to further investigations if this was abnormal or the patient presented with symptoms of adrenal insufficiency.
Methods Patients were assessed through the Difficult Asthma Service in Leeds which is a tertiary referral centre for West Yorkshire. Patients who had non-specific symptoms out of keeping with asthma, either had a random serum cortisol taken or had a short synacthen test. Patients were classified as: adrenal insufficient with a cortisol less than 50nmol/L or a positive short synacthen test, and adrenal sufficient with a random cortisol greater than 120nmol/L or a negative short synacthen test. A further group was defined as suboptimal if their random cortisol was between 50–120nmol/L Data were also collected on ICS dose and type, and atopic status.
Results Ninety-two random cortisol samples have been taken to date. Of these, 8 patients who were not on oral corticosteroids were found to have adrenal insufficiency (8.7%). Seven patients had a random cortisol less than 50nmol/L and one had a positive short synacthen test. Of the patients with adrenal insufficiency six patients were on a combination inhaler including fluticasone, and all received a daily BDP dose over 1000mcg. None of the patients with adrenal insufficiency demonstrated evidence of atopy, except one patient with co-existent ABPA receiving itraconazole therapy.
Conclusions We have identified a significant number of patients with evidence of adrenal insufficiency, with the majority identified by a random cortisol. This is likely to be under-estimated, as the 92

samples include patients on maintenance oral corticosteroids. In patients with difficult asthma, multiple or atypical symptoms, there should be a low threshold to investigate for adrenal insufficiency particularly those receiving high dose ICS.

P10 RANDOMISED PLACEBO CONTROLLED TRIAL TO EVALUATE CHRONIC DOSING EFFECTS OF PROPRANOLOL IN STEROID TREATED PERSISTENT ASTHMATICS

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Introduction and Objectives Beta-blockers are associated with acute bronchospasm in asthmatics. However preliminary unblinded studies have shown potential therapeutic benefits with chronic beta-blockade on airway hyper-responsiveness (AHR) in steroid naïveasthmatics. We examined the effects on AHR of propranolol versus placebo in steroid treated persistent asthmatics.
Methods A double-blind randomised placebo controlled crossover trial of propranolol in mild-to-moderate asthmatics receiving inhaled corticosteroids (ICS) was performed (NCT01074853). Participants underwent a six to eight week dose titration of propranolol or placebo as tolerated to a maximum of 80mg per day. Tiotropium was given concurrently for the first four to six weeks of each treatment period. Primary outcome was methacholine challenge (without tiotropium). Secondary outcomes included histamine challenge (with and without tiotropium), pulmonary function, heart rate, blood pressure, mini-asthma quality of life questionnaire (mini-AQLQ) and asthma control questionnaire (ACQ).
Results 18 patients completed: mean (SEM); age 36 (4), FEV_1% 93 (2), ICS ug/day 440 (66). No significant difference was observed in methacholine or histamine challenge following exposure to propranolol versus placebo. For methacholine challenge (without tiotropium) the doubling dilution difference (DDD) was 0·04 (95%CI –0·56 – 0·63), p=0·89. For histamine challenge without tiotropium the DDD was 0·42 (95%CI –0·09 – 0·93), p=0·10; and with tiotropium was DDD 0·26 (95%CI –0·36 – 0·87), p=0·39. Salbutamol induced chronotropic response was significantly blunted following propranolol versus placebo: mean difference 25bpm (95%CI 14 – 37), p<0·001. No difference was found for ACQ, mean difference 0·18 (95%CI –0·23 – 0·58), p= 0.79 or mini-AQLQ, mean difference 0.14 (95%CI –0·19 – 0·46), p=0·84.
Conclusions This is the first placebo controlled study to assess the effects of chronic non selective beta-blockade in steroid treated persistent asthmatics, showing no significant effect of propranolol compared to placebo on AHR to either methacholine or histamine and no change in ACQ or AQLQ.

P11 REDUCTION IN HEALTHCARE RESOURCE UTILISATION WITH 2 YEARS TREATMENT WITH OMALIZUMAB IN SEVERE ATOPIC ASTHMATICS: A SINGLE CENTRE OBSERVATION

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Background While asthma is a chronic inflammatory disorder that is managed with inhaled controller and reliever drugs, there remains a large unmet need at the severe end of the disease spectrum.

Omalizumab is licenced as add-on therapy for patients with uncontrolled severe persistent atopic (IgE-mediated) asthma.
Aim Retrospective review of healthcare utilisation and clinical outcomes of the efficacy of Omalizumab administered as per NICE approval on a 2- or 4-weekly basis in adults with severe allergic asthma in our tertiary centre in Hull.
Methods We compared data in our cohort of patients on Omalizumab therapy at 2-years pre-Omalizumab, 16-weeks, 1- and 2-years post-Omalizumab. Our primary outcome was healthcare utilisation (asthma-related hospital admissions, bed and critical care bed days, oral corticosteroid courses (OCS) and reduction in overall OCS dose). Secondary parameters assessed included subjective (asthma control test (ACT), and quality-of-life (AQLQ) and its domain scores) and objective parameters (spirometry and morning peak flows) outcomes.
Results Our 9 patients (2 M, 7 F) on Omalizumab therapy had an average (±SD) age of 52 (±11.9) Overall in-hospital admissions reduced from 28 days in the 2 years pre-Omalizumab to 0, 4 and 3 days at 16-weeks, 1- and 2-years respectively. Correspondingly, medical bed days diminished from 163 pre-treatment to 0, 17 and 10 at 16-weeks, 1- and 2-years respectively. Astonishingly, critical care bed day's utility declined from 36 pre-Omalizumab, to 0 at all post-Omalizumab time points. Furthermore, total OCS courses usage reduced noticeably from 39 pre-treatment to 5, 9 and 10 at 16-weeks, 1- and 2-years respectively. There were marked improvements in AQLQ and its domains, and ACT scores, however changes in objective measures assessed were minimal (see Table 1).
Conclusion Results from our single centre, in a small cohort of severe atopic asthmatics treated with Omalizumab, have shown striking reductions in healthcare resource utilisation, OCS use and subjective assessments compared to the two years prior to its initiation. This real-life effectiveness of Omalizumab supports its utility in this group of severely allergic asthmatics refractory to standard treatment.

P12 FLUTICASONE PROPIONATE/FORMOTEROL FUMARATE COMBINATION THERAPY: TREATMENT EFFECTS IN PATIENTS BY BASELINE ASTHMA SEVERITY ACROSS THE DOSE RANGE

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Background A new asthma therapy containing a combination of the inhaled steroid fluticasone propionate (FLUT) and the long-acting β_2 agonist (LABA) formoterol fumarate (FORM) in a metered-dose inhaler has been developed (FLUT/FORM; *flutiform®*). In a double-blind, double-dummy, randomised, multicentre, four arm parallel group study, the efficacy and safety of FLUT/FORM *vs.* FLUT and FORM administered concurrently (FLUT+FORM) was assessed. Here, we present efficacy results of a post-hoc analysis that compared FLUT/FORM 500/20 µg with FLUT/FORM 100/10 µg (both twice-daily) by baseline asthma severity.
Methods In total, 620 patients were randomised 1:1:1:1 to receive FLUT/FORM 500/20 µg, FLUT/FORM 100/10 µg, FLUT+FORM 500 µg + 24 µg or FLUT 500 µg. Randomisation was stratified by percentage predicted FEV_1 at baseline [≥40 – ≤60% ('severe asthma'; 52% of patients) *vs.* >60% – ≤80% ('moderate asthma'; 48% of patients)], allowing a post-hoc dichotomised analysis by baseline FEV_1 severity of spirometric and symptom-based endpoints.
Results There was no dose-response relationship between FLUT/FORM 500/20 µg and FLUT/FORM 100/10 µg for the spirometric variables overall or in either subgroup.

Treatment effect differences between FLUT/FORM 500/20 µg and 100/10 µg, in favour of the high dose, were however evident for almost all symptom-based endpoints and were more pronounced in the severe asthma group. These included changes in: mean symptom scores, percentage symptom-free days, mean sleep disturbance scores, awakening free nights, percentage rescue medication-free days, percentage asthma control days, AQLQ score and the incidence of any asthma exacerbations. The differences between FLUT/