412. Assessing and treating childhood asthma and allergy

P4090

Usefulness of paediatric dyspnoea scores for evaluative purpose in acute wheeze

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Clinical dyspnea scores are the most commonly used methods to assess wheeze severity and response to bronchodilator treatment in young children. We performed a prospective observational study to assess the (external) validity of 3 frequently used dyspnoea scores: Asthma Score (AS), Clinical Asthma Score (CAS) and Pulmonary Index (PI), before and after bronchodilator treatment. We studied 46 hospitalized children (0-8 yrs) with a wheeze exacerbation. Video and audio recordings of breathing pattern and lung sounds were made before and after salbutamol inhalation. 5 paediatricians and 4 nurse practitioners independently reviewed these recordings and rated the degree of dyspnoea using the three scores. This was repeated after 4 weeks to evaluate intra-observer reliability. Inter- and intra-observer reliability were evaluated by intraclass correlation coefficient (ICC, considered adequate when >0.70), responsiveness by Guyatt's RR (considered adequate when > 1.96). Differences in scores within and between observers were larger than those before and after treatment.

Inter-, intraobserver reliability and responsiveness of three dyspnoea scores

	Interobserver ICC	Intraobserver ICC	Guyatt's RR
AS	0.72	0.77	0.89
CAS	0.69	0.71	0.83
PI	0.61	0.66	0.51

We conclude that the poor within- and between-observer reliability of these three dyspnea scores renders them invalid for use as an evaluative instrument in children 0-8 years of age with an acute wheeze exacerbation.

P4091

Clinical scores for the assessment of acute dyspnoea in wheezing children: Systematic review

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A reliable, valid, and easy-to-use assessment of the degree of wheeze-associated dyspnoea is important to provide individualised treatment for children with acute asthma, wheeze or bronchiolitis.
We conducted a systematic review to assess validity, reliability, and utility of all available paediatric dyspnoea scores. We searched Pubmed, Cochrane library, National Guideline Clearinghouse, Embase and Cinahl for eligible studies. We included studies describing the development or use of a score, assessing two or more clinical symptoms and signs, for the assessment of severity of dyspnoea in an acute episode of asthma, wheeze or bronchiolitis in children aged 0-18 years. Study selection and data extraction was done independently by two reviewers. Validity, reliability and utility of the retrieved dyspnoea scores were assessed by 15 quality criteria for clinimetric studies. We retrieved 41 articles describing 32 dyspnoea scores. Thirteen scores were judged unsuitable for clinical use, because of insufficient face validity, use of items unsuitable for children, difficult scoring system or need of auscultation skills, leaving 19 possibly useful scores. The median number of quality criteria that could be assessed was 6 (range 5-10). The median number of positively rated quality criteria was 2 (range 1-5). In conclusion, none of the published dyspnoea scores has been sufficiently validated to allow for clinically meaningful use in children with acute wheeze. Proper additional validation of existing scores is warranted to allow clinicians and researchers to use the available paediatric dyspnoea score for clinical or research purposes.

P4092

Clinical predictive rules to identify preschool wheezers at risk for subsequent asthma: Can we rely on them? Could we improve their performance?

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Background: Various predictive rules have been developed to identify wheezy preschoolers at risk for persistent asthma. The aim of this study was to evaluate the performance of the asthma predictive index (API), modified API (mAPI), and PIAMA score, and to examine whether the presence of reversible airflow obstruction (RAO) could improve the prediction of later asthma.
Methods: This retrospective study included 92 children aged 6-8 years with recurrent wheeze who had regular follow-up for the last 4 years. Active asthma was defined as doctor-diagnosed asthma or wheeze that required long-term medication in the previous 12 months. RAO was defined as bronchodilator response ≥30% for respiratory resistance and ≥35% for respiratory reactance determined with the forced oscillation technique (FOT).
Results: Active asthma was present in 32 children (34.8%). 21 children (22.8%) had positive API, 10 (10.9%) positive mAPI, and 55 (59.8%) had PIAMA score ≥20. RAO was documented in 25 children (27.2%). The stringent API had positive and negative likelihood ratio (LR+ and LR–) 3.0 and 0.69 respectively. The mAPI had LR+ 16.9 and LR– 0.73, and the PIAMA score LR+ 1.5 and LR– 0.52. The combination of API (or mAPI) and RAO resulted in LR+ 3.8 and LR– 0.24 (LR+ 3.2 and LR– 0.4, respectively), whereas the combination of PIAMA score and RAO resulted in LR+ 1.4 and LR– 0.39.
Conclusion: All tested indices had limited overall ability to predict –especially to rule-out– subsequent asthma in preschoolers with recurrent wheeze. Combination of asthma predictive models with FOT-determined RAO may improve the prediction of later asthma in wheezy young children.

P4093

Recurrent respiratory symptoms in preschool children: What is the outcome at school age?

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Background: Diagnosis in preschool children with symptoms like wheeze, cough and shortness of breath is still a challenge. Therefore, we developed a questionnaire for distinguishing children with persistent symptoms from children with transient symptoms at preschool age.
Aim: To determine the outcome at school age in children with respiratory symptoms at preschool age and to determine the predictive value of this questionnaire.
Methods: Children with symptoms suggestive of asthma at young age are reinvestigated at school age. The cohort of children consists of 200 participants (mean age 3.0 yrs, 66% boys) enrolled in two clinical trials. Parents of these children filled

out the diagnostic questionnaire at preschool age. At school age data on asthma symptoms and medication use are collected using a questionnaire based on the ISAAC.
Results: Data were collected in 127 children (age 11.5±1.3 yrs., 68% boys). Parents reported asthma symptoms in the past 12 months in 57 children. Asthma maintenance medication was used in the past 12 months in 38 children. The diagnostic questionnaire total score (0-100) was significantly different between children with (n=63) or without symptoms and/or asthma medication use at follow-up (54 versus 42, p=0.005). Sensitivity, specificity, positive and negative predictive values of the questionnaire were 40%, 82%, 69% and 56%, respectively.
Conclusions: These preliminary results show asthma symptoms and/or medication use at school age in half of the children with respiratory symptoms at preschool age. Further analyses of the final database are needed to draw definite conclusions with regard to the diagnostic accuracy of this newly developed diagnostic tool.

P4094
Usefulness of the asthma predictive index in clinical practice: A systematic review and clinical epidemiological analysis
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The Asthma Predictive Index (API) has been developed from follow-up data of the Tucson population-based study to predict whether preschool children with wheeze develop asthma by age 6 years. The stringent API (> 3 episodes of wheeze + one or more major criteria [eczema; parental asthma] or two or more minor criteria [allergic rhinitis; eosinophilia; wheezing apart from colds]) has been praised for its simplicity and its ability to rule out later asthma.
We conducted a systematic review of studies using the API to predict the outcome of preschool wheeze, using likelihood ratios (LR) and Bayes' theorem to calculate the diagnostic value of the API to predict asthma in situations of different prevalence of disease.
We found one study preliminary validating the API in the derivation cohort, two studies validating the API in different birth cohorts, and one study using the index in a clinical cohort. In the derivation cohort, the positive (LR+) and negative likelihood ratios (LR-) were 7.3 and 0.8, respectively, indicating poor to modest predictive value to rule asthma in or out at age 6. In the two population validation studies, the LR- was comparable (0.68-0.87), whilst the LR+ was lower (2.06-2.50). In the clinical study, LR+ was 2.1, LR- 0.72. In a clinical population with pretest likelihood (prevalence) of asthma at age 6 of 40%, using the API misclassifies 1 in 3 children with a negative, and 1 in 5 children with a positive API.
We conclude that the API is insufficiently accurate to be used in predicting the outcome of preschool wheezing in clinical practice.

P4095
Pulmonary function and inflammation discriminated by symptom-pattern phenotypes in preschool wheezers
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Background: The discrimination of episodic and multiple-trigger wheezing is commonly used among preschoolers with wheeze. However, symptom-patterns of wheeze have not been related to pulmonary function tests or markers of airway inflammation.
Objective: We investigated whether multiple-trigger wheezers were more likely to have abnormal FEV_1, increased ventilation inhomogeneity (LCI) and increased fraction of exhaled nitric oxide (FeNO) than episodic wheezers. We also investigated whether multiple-trigger wheezers were more likely to have a positive reversibility test, than episodic wheezers.
Methods: FeNO, LCI and FEV_1 were measured in healthy children and those with recurrent wheeze aged 4 to 6 years.
Results: Twenty-six control subjects and 25 wheezers (11 episodic and 14 multiple-trigger wheezers) were tested. FEV_1 FeNO and LCI did not differ significantly among wheezers and healthy preschoolers. On average, LCI was abnormal in 18 wheezers (72%). Multiple-trigger wheezers had an average increase of 3. 1% (P<0.0001) in LCI, compared with episodic wheezers. FEV1 and FeNO did not differ significantly among episodic and multiple trigger wheezers. The presence of current atopy was associated with higher FeNO (p=0.024) but did not influence pulmonary function and LCI significantly. Eight out of the 25 (32%) wheezers showed a significant increase in FEV1 and 15 out of the 25 (60%) wheezers showed a significant decrease in LCI, after administration of inhaled salbutamol.
Conclusions: Multiple-trigger wheeze is associated with pulmonary function abnormalities independent of atopic status. LCI is the most sensitive indicator of abnormal pulmonary function in preschool wheezers.

P4096
The childhood asthma control test: Children versus parents
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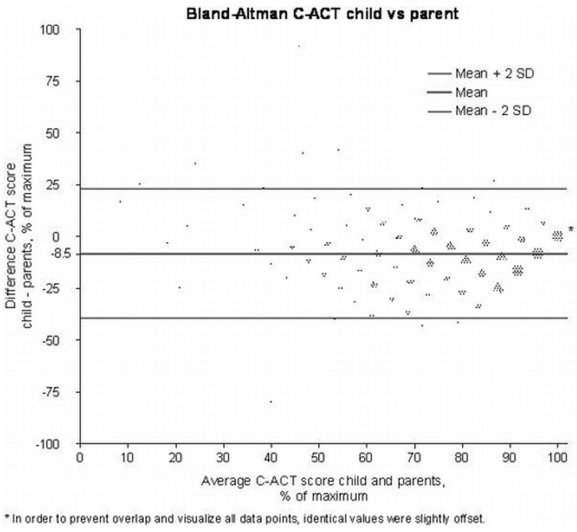
Introduction: The Childhood Asthma Control Test (C-ACT) is a validated patient-completed questionnaire to assess asthma control in children 4-11 years, which is divided into two parts. One part is filled in by the child, the second part by the parent.
Objectives: To compare asthma control scores between children and their parents.
Methods: Asthmatic children 4-11 years and their parents visiting our outpatient asthma clinic in 2011, completed the C-ACT as part of routine patient care. Spearmans correlation and Intraclass Correlation Coefficient (ICC) between C-ACT by child and parent were calculated. Both scores were expressed as percentage of the maximum and pair wise compared using the Wilcoxon Signed Ranks Test and a Bland-Altman plot.
Results: 272 children (aged 6.68 yrs, 66.8% male) and their parents participated. Correlation between C-ACT-score between children and parents was moderate (r=0.72, p<0.001); the ICC was reasonable (0.77, p<0.001). Children scored median 75% (0-100) of the maximal score, whereas parents scored median 87% (0-100). On average children scored 8.5% lower than parents (p<0.001, see figure 1). The difference between children and parents was independent of the child's age (p ANOVA=0.804).



* In order to prevent overlap and visualize all data points, identical values were slightly offset.

Conclusions: Asthmatic children report significantly lower asthma control than their parents using the C-ACT, irrespective of the child's age. This may indicate that parents underestimate asthmatic complaints of their children.

P4097
Level of asthma control among asthmatic children in Thessaloniki area in northern Greece
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Background: In spite of the use of international guidelines for the diagnosis and treatment of asthma, there is continuing evidence of poor asthma control among asthmatic children. Level of asthma control has not been previously evaluated in Greece.
Aim: To evaluate the level of asthma control among asthmatic children in the city of Thessaloniki (Northern Greece).
Method: Parents of children > 2 years old with doctor's diagnosis of asthma interviewed by the same physician using a detailed questionnaire including asthma symptoms, limitation of activities, need for rescue medication, asthma exacerbations and emergency visits. 365 children were examined either in Asthma Clinic, or the Emergency Department from November 2010 to May 2011.
Results: Mean age of the children was 7.8 years. 93/365 (25.48%) of them achieved adequate control of asthma, as defined by GINA (Global Initiative for Asthma), 176/365 (48.22%) had partly controlled asthma, whereas uncontrolled asthma was found in the 96/365 (26.3%) of the children. 104/365 (30%) of the study population had used rescue medication for more than two days during the previous week, whereas 70/365 (19.2%) of them reported limitation of activities and 62/365 (17%) had nocturnal symptoms within the previous month.
Conclusions: One out four of the children suffering from asthma in Thessaloniki area achieves control of the disease. An increased use of rescue medication for more than two days was reported in 1/3 children, limitation of activities and nocturnal symptoms in around 1/5 of the children.

P4098

Can response to inhaled corticosteroids in preschool children with recurrent wheezing predict asthma at age six years?

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Background: A reliable asthma diagnosis is not possible below the age of 6 years. Asthma is effectively treated by inhaled corticosteroids (ICS), however, ICS efficacy in transient wheezers is questionable.
Aims and objectives: Prediction of asthma diagnosis at age 6 years by an ICS response at age 2-4 years in recurrent wheezers.
Methods: From the Asthma DEtection and Monitoring (ADEM) study, 160 recurrent wheezers aged 2-4 years (≥2 episodes, ISAAC questionnaire) received 200μg Beclomethasone for eight weeks. Before and after treatment symptom score (inversely to severity), airway resistance (Rint) before and after 300 μg Salbutamol, Fractional exhaled Nitric Oxide (FeNO), and exhaled breath condensate markers (pH, interleukin (IL) 1a, IL-2, IL-4, IL-5, IL-8, IL-10, IL-13, IFNg, sICAM, and Eotaxin) were assessed. At the age of 6 years a final diagnose (asthma or transient wheeze) was based on symptoms, lung function, and medication use. Analysis was performed by logistic regression.
Results: At the age of 6 the study group consisted of 61 asthmatics and 99 transient wheezers. At the age of 2-4 years symptom score before ($OR_{adjusted}$=0.86 95%CI=0.79-0.94, p<0.01), and after treatment ($OR_{adjusted}$=0.88, 95%CI=0.81-0.96, p<0.01), and prebronchodilator Rint after treatment ($OR_{unadjusted}$=2.80 95%CI=1.07-7.31, p=0.04) were significantly associated with asthma at the age of 6 years. However, all parameters tested did not change during treatment.
Conclusions: In recurrent wheezing children, asthma at 6 years was associated with more severe symptoms before and after ICS treatment and increased prebronchodilator airway resistance after ICS treatment at 2-4 years of age.

P4099

Asthma-related quality of life in children: Correlation with asthma control and lung function

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Introduction: Children with asthma often have sleep disturbances, absence from school and limitations of physical activity that may reduce their quality of life (QOL). Therefore, asthma-related QOL is an important endpoint in childhood asthma.
Objectives: To assess QOL in children and adolescents with asthma, and to correlate QOL with asthma control, lung function and FENO.
Methods: QOL was assessed by caregivers of asthmatic children aged 4-11 yrs and by adolescents with asthma (12-18 yrs) using the Pediatric Asthma (Caregivers) Quality of Life Questionnaire (PAQLQ). PAQLQ scores were correlated with asthma control (assessed by the (Childhood) Asthma Control Test ((C)-ACT) and GINA classification) and with FEV1 and FENO.
Results: 221 children (mean age 10.5 yrs, 148 male, n=76 > 11 yrs) participated. Median FEV1 was 97.1% (59-139) and median FeNO 18.6 ppb (4-170). Median PAQLQ score of caregivers was 6.46 (3.69-7), with median sub domain scores of 6.75 (activity) and 6.44 (emotional). Median PAQLQ score of adolescents was 6.18 (3.52-7), with sub domain scores of 6.10 (symptoms), 5.40 (activity) and 6.88 (emotional). Median PAQLQ score in children with controlled asthma (n=43) was 6.85 (5.54-7), in partly controlled asthma (n=84) 6.52 (4.23-7) and in uncontrolled asthma (n=78) 5.92 (3.52-7) (p<0.05). PAQLQ scores correlated strongly with (C)ACT scores (r= 0.604, p<0.05), but not with FeNO (r=0.048, p=0.49) or FEV1 (r= -0.168, p=0.35).
Conclusions: Caregivers reported few problems due to their child's asthma whereas adolescents reported lower QOL, in particular on activity. Pediatric asthma QOL correlated strongly with asthma control, but not with FeNO and FEV1.

P4100

Assessment of quality of life in asthmatic children. A case- control study

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Introduction: Health-related quality of life(HRQL)has become an increasingly important issue in the management of asthma and it is now often used to evaluate the effectiveness of antiasthma drugs.
Objective: To assess impairment in QOL in asthmatic children and to determine the influencing factors.
Methods: 230 asthmatic outpatients, aged 7-18 years,from chest outpatient clinic in school health insurance,Assiut,compared with another 272 non asthmatic patients.Two questionnaires were used for each patient;asthma questionnaire and St George's Respiratory Questionnaire(SGRQ)to assess QOL.
Results: Asthma affected boys more than girls(62.2%and37.8%).The mean age of asthmatic children was 9.1±2.1 years.Allergic rhinitis were highly significant associated with asthmatic patients.About40% diagnosed as uncontrolled asthma based on their night awakenings,70%and 26.5% based on their activity limitation and daytime symptoms.Severe asthma reported in 42.6%.Asthma affects quality of life of all patients.There were significant differences between the two groups as regard Symptom, Activity, Impact and Total score (all P < 0.0001)of St George'.There was a negative correlation between asthma severity and quality-of-life score.Allergic rhinitis,was strongly and negatively associated with the overall SGQLQ score(p =0.038).Lower QoL was associated with school absences,younger females(<10 years)and among patients with poorer adherence to treatment.Asthma affected all life style of the majority of patients as, physical exercise limitation,sleep disturbance, and emotional function etc.
Conclusions: Bronchial asthma significantly affected QOL of children,so reduce asthma severity and improve asthma symptom attempts to improve their QOL.

P4101

Effect of asthma control and quality of life on the use of alternative medicine

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Asthma is the most common chronic lower respiratory tract disease of childhood. It may affect the quality of life of the child and the parents. Nowadays, use of alternative treatment (AT) methods are increased in treatment of asthma and/or relief of symptoms. But there are limited studies showing the efficiency of AT and evaluating the asssociation between asthma control and AT usage. We investigated the prevalance of AT usage and effect of AT usage on asthma control and quality of life in patients with asthma.
Study included 80 patients with asthma followed up in Pediatric Pulmonology Department. "Pediatric Asthma Quality of Life Questionnaire" (PAQLQ) was used to evaluate the quality of life; "Asthma Control Test" (ACT) and "Asthma Control Questionnaire" (ACQ) were used to measure asthma control.
Mean age of the patients were 9.2±3.2. 63.8% of the patients used at least one method of AT in their life besides the recommended treatment. The most commonly used methods were; carob molasses (36.3%), herbals (%26.3), quails (22.5%), honey in black radish (15%), chestnut honey (11.3%) and bee pollen (5%), respectively. Of whole, 59.6% of the patients got benefit from AT. Mean score of PAQLQ was 5.9±1.0. Parents with younger kids were found to use more AT methods (p=0.002). There were no association between the use of AT and time of the diagnosis of asthma, time of anti-inflammatory drugs usage, PAQLQ, ACT and ACQ (p>0.05).
In conclusion, AT is frequently used in our patients. We found that there was no effect of level of asthma control and quality of life on preferring AT.

P4102

Allergy and asthma severity

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Background: Asthma, allergic rhinitis (AR) and atopic dermatitis (AD) are multifactorial illnesses determined by complex interplay between genetic and environmental factors with different phenotype expression. The majority of asthmatics have AR and studies have shown that treatment of AR helps control asthma symptoms. The objective of this study was to evaluate if the presence of AR and/or AD interfere with asthma severity.
Methods: We evaluated 1,350 asthmatic children aged 0 – 18 years (median 9 years), attending Health Center Nis. These data were collected by standard protocol and registered in a computer data base. Asthma diagnosis and severity were established by GINA (1995) criteria. Skin prick tests (SPT) were performed with common aeroallergen extracts and tests were considered positive if wheal diameter greater than or equal 3 mm. Data were analyzed by chi square test.
Results: Asthma severity was mild in 61.8%, moderate in 28.0% and severe in 10.2%. Male to female ratio was 1.3:1. AR was present in 59% of the patients, AD in 6.2%., and both AR and AD in 2.1%. Regardless asthma severity there was no difference in the frequency of AR and/or AD among asthmatics. SPT was positive to at least one allergen in 78% of patients. The frequency of SPT positivity was 58% in mild asthma and increased to 85% in severe asthma (p< 0,001).
Conclusion: Asthma severity was not related to the presence of AR and/or AD in this group of asthmatic children, but there was a relationship in the frequency of positive skin tests according to asthma severity.

P4103

Assessment of facemask seal leakage from six VHC systems on two pediatric simulated anatomical models under simulated breathing conditions

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Facemasks establish the vital patient-device interface to facilitate drug delivery from a pressurized metered dose inhaler (pMDI) with an attached valved holding chamber (VHC). Leakage from a VHC facemask seal can reduce the delivered dose. We used two pediatric simulated anatomical models (SAMs, Figure 1 Right) to test the leakage from six VHC facemasks. Testing was conducted using an apparatus which allowed reproducible facemask placement with a constant applied force of 1.9kg.[1] Each facemask with associated VHC (Figure 1 Left) was applied to each SAM in turn. A constant flow of 15 L/min was extracted from the rear of the SAM. The difference (ΔTSI, L/min) between flow into the VHC and flow exiting the SAM was measured using two flow meters (TSI Inc, Shoreview, MN). The vertical location of the SAM in relation to the VHC was altered by 1 mm increments until the minimum ΔTSI (leakage) was found. Figure 1 Left shows the minimum leakage for each VHC/facemask combination with each SAM.

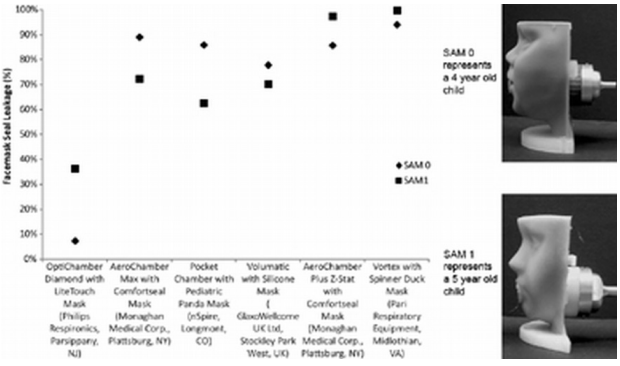

Figure 1. Left: Facemask seal leakage (%); Top right: SAM 0; Bottom right: SAM 1.

There was a wide variation in leakage from different VHC facemasks and also between SAMs. The smallest amount of leakage for both SAMs was seen with the OptiChamber Diamond VHC with LiteTouch facemask.

Reference:

[1] Hsu et al. Proceedings of Respiratory Drug Delivery Europe 2011; www.rddonline.com.

P4104

***In vitro* comparison of the effect of inhalation delay on the variability of the delivered dose from valved holding chambers**

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The valved holding chamber (VHC) has been designed to optimize delivery for those using pressurized metered dose inhalers (pMDIs). We tested the effects on delivered dose of increasing delay between pMDI actuation and flow through the VHC, using both anti-static and conventional VHCs.

Ten anti-static Diamond (Diamond; Philips Respironics) VHCs, anti-static AeroChamber Plus Z-Stat and conventional AeroChamber Plus (Z-stat and AC Plus; Monaghan Medical Corp.) VHCs were washed and air dried and six HFA albuterol sulfate pMDIs (ProAir HFA, 90 µg albuterol, Teva Specialty Pharmaceuticals LLC) were primed before use. For each run the pMDI was actuated into the VHC, after a delay of 0, 5 or 10 s flow through the VHC and attached filter occurred at an extraction flow rate of 5, 15 or 30 L/min for 10 s. The pMDI was actuated 10 times for each of the 10 VHCs of each brand at each delay/flow rate combination.

Table 1. Coefficient of variation for delivered dose at each time delay/flow rate combination (n=10)

Time delay (s) / Flow rate (L/min) combination	Coefficient of variation (%)		
	Diamond	Z-Stat	AC Plus
(0 / 5)	5%	6%	8%
(5 / 5)	5%	8%	18%
(10 / 5)	7%	10%	16%
(0 / 15)	4%	4%	9%
(5 / 15)	4%	7%	14%
(10 / 15)	4%	6%	8%
(0 / 30)	2%	5%	7%
(5 / 30)	2%	4%	5%
(10 / 30)	6%	4%	12%

Drug deposits were analyzed using HPLC. Results are presented as coefficient of variation of the delivered doses.

The co-efficient of variation was highest for the conventional VHC for all test conditions. Use of an anti-static VHC can minimize variability (improve reproducibility) in delivered dose under *in vitro* test conditions.

P4105

Wheeze in preschool age is associated with pulmonary bacterial infection and resolves after antibiotic therapy

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Introduction: Preschool children with persistent wheezing often respond insufficiently to conventional asthma therapy and management of persistent symptoms is difficult and costly. Recent studies show that colonization of the airways with H. influenzae, Strep. pneumoniae or M. catarrhalis is associated with an increased risk for recurrent wheeze and asthma.

Objectives: We assessed the relevance of bacterial colonization and chronic airway infection in preschool children with severe persistent wheezing and evaluated the outcome of long-time antibiotic treatment on the clinical course in such children.

Methods: Preschool children (n=42) with severe persistent wheeze but no symptoms of acute pulmonary infection were investigated by bronchoscopy and bronchoalveolar lavage (BAL). Differential cell counts and microbiological and virological analyses were performed on BAL samples. Patients diagnosed with bacterial infection were treated with antibiotics for a mean of 6 weeks (n=29). A modified ISAAC questionnaire was used for follow-up assessment of children at least 6 months after bronchoscopy.

Main results: Of the 42 children with severe wheezing, 34 (81%) showed a neutrophilic inflammation and 20 (59%) of this subgroup had elevated bacterial counts suggesting infection. H. influenzae, Strep. pneumoniae and M. catarrhalis were the most frequently isolated species. After treatment with appropriate antibiotics 92% of patients showed a marked improvement of symptoms upon follow-up examination.

Conclusion: Chronic bacterial infections are relevant in a subgroup of preschool children with persistent wheezing and such children benefit significantly from antibiotic therapy.

P4106

Hypothalamic-pituitary-adrenal axis suppression in children at Cape Town allergy units – Prevalence and predictive factors

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Background: Hypothalamic-pituitary-adrenal axis suppression (HPAS) is generally thought to be rare in children treated with corticosteroids (CS), since HPAS may be partially masked by recovering HPA function.

Objective: To determine the prevalence & predictive factors for HPAS in children treated with CS at the allergy clinics in Cape Town.

Methods: 143 asthmatic children, 5-18 years old, on inhaled CS (ICS) with additional CS were recruited. Clinical features compatible with HPAS were documented. Daily and cumulative CS dose, adherence, asthma score and lung functions were recorded. A metyrapone test was performed if the 08:00 hr cortisol (C) was >83nmol/l. Spearman correlation coefficients (r) were calculated between the post-metyrapone (PMTP) ACTH, 11-deoxycortisol (11DOC), 11DOC+C, and each variable. A multiple linear regression model of $\sqrt{ACTH}$ & a logistic regression model for HPAS were developed.

Results: Prevalence: All HPAS 65.1 (56.5-72.9)%; low (PMTP 11DOC, 11DOC + cortisol) 32.3 (23.7-40.9)%; low (PMTP ACTH, 11DOC, 11DOC + cortisol) 16.3 (9.3-23.3)%; hypocortisolaemia 6.1 (1.8-10.5)%. GIT symptoms in hypocortisolaemic children were associated with HPAS in 2/8 (p=0.016). Log daily NS/m^2 was associated with HPAS [OR=3.7 (1.1-13.6)]. Daily ICS + nasal steroid dose (NS)/m^2 correlated with ACTH (r=-0.29, p<0.001). BMI (p=0.048), poor adherence to ICS (p<0.001) and NS (p=0.002) were predictive to $\sqrt{ACTH}$.

Conclusions: About 2/3 of asthmatic children on CS may have a degree of HPAS. In one third the adrenals may still be suppressed while hypothalamic-pituitary function may have recovered. Predictive factors for HPAS are concomitant NS use, BMI, adherence to ICS and NS.

P4107

Fatigue: A symptom of asthma in children?

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Introduction: In children with symptoms of fatigue asthma is frequently diag-

nosed. However fatigue is not mentioned as a symptom in definitions of asthma in children.
Aim of the study: Exploration of the consistency between the symptom fatigue and the diagnosis asthma in children. Consequently asthma can be diagnosed earlier and faster and the care for these patients will improve.
Method: A retrospective analysis of the files of 440 patients between the age of 5 and 18 years with the diagnose Asthma de Novo between May 15th 2009 and May 15th 2011. The data of patient characteristics, pulmonary function tests and symptoms were analyzed.

Patients characteristics

	Boys	Girls
Patients	254 (58%)	186 (42%)
Age	9.9 (SD 3.1)	11.0 (SD 3.6)
FEV1 in %	92.4 (42-135%)	95.0 (38-133%)
PD20 mcg	835	713
Fatigue	127 (50,0%)	101 (54.3%)

Results: There was an uneven distribution between boys (58%) and girls. The boys had a average age of 9.9 years, the girls of 11.0 years. In both groups the various pulmonary function parameters were abnormal. 52% of the patients complained of fatigue. The distribution of symptoms in boys and girls is equally.

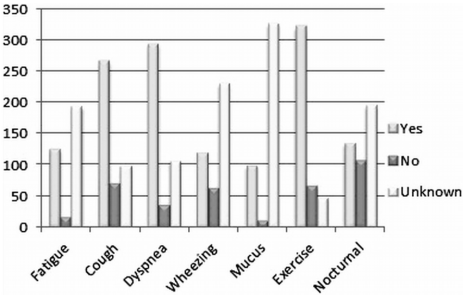

Figure 1. Symptoms in asthma.

Conclusion: Fatigue is the most frequently mentioned symptom of asthma in children, after complaints during exercise, dyspnea and coughing. Fatigue is not a specific symptom. The results can therefore only be an assumption. It is recommended to involve asthma in the differential diagnosis of unexplained fatigue in children.

P4108
Role of MgSO4 in PICU management of children with status asthmaticus
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Background: This retrospective study was done to understand the use of MgSO4 for treatment of children with status asthmaticus in a pediatric intensive care unit (PICU).
Methods: Charts of all patients ≥5 years of age admitted to the PICU with status asthmaticus, at Nationwide Children's Hospital, Columbus, OH, between 2000-2007 were reviewed.
Results: Among 222 encounters, 203 received continuous albuterol, 216 received IV steroids, 113 receive Terbutaline, 17 received mechanical ventilation, and 57 (25.7%) received MgSO4. All patients survived. Children who received MgSO4 vs. those who did, median PICU and hospital stay were one day longer and differences were significant. There were no significant differences between groups in any other features. Significant improvements in median pH (p-0.027) and PaCO2 (p=0.017) were noted in both groups.

	MgSO4 (n=57) Median (Min–Max)	No MgSO4 (n=165) Median (Min–Max)	p
Age in years	11 (6–18)	10 (6–21)	NS
Duration of Symptoms (years)	10 (1–17)	9 (0–20)	NS
PICU Stay (days)	2 (1–17)	1 (1–12)	0.038
Hospital Stay (days)	4 (1–15)	3 (1–10)	0.002
Initial CBG (pH)	7.36 (7.06–7.65)	7.36 (6.85–7.58)	NS
Initial CBG (PaCO2)	38 (16–109)	38 (21–130)	NS
Last CBG (pH)	7.44 (7.38–7.51)	7.39 (7.28–7.51)	0.009
Last CBG (PaCO2)	35 (30–40)	38 (24–47)	NS
Air space disease on CXR	16 (32.8%)	39 (35.6%)	NS
Required Mechanical Ventilation	6 (10.5%)	11 (6.7%)	NS

Conclusion: Among children admitted to PICU for status asthmaticus, MgSO4 recipients stayed longer in PICU and in the hospital though their acute illness was not significantly worse than those not receiving MgSO4 as observed by their initial CBG, need for mechanical ventilation or presence of air space disease on chest radiographs.

P4109
Systemic activity of two different dry powder combinations of inhaled corticosteroids and long-acting β2-agonists in children with asthma assessed by knemometry
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Rationale: A combination of the inhaled corticosteroid budesonide and the long-acting β2-agonist formoterol has been formulated in a novel dry powder inhaler, Spiromax®.
Objective: To compare lower leg growth in children with asthma treated with inhaled budesonide+formoterol (BF) delivered from the Spiromax inhaler with BF from the Symbicort Turbohaler®.
Methods: Prebubescent children with persistent asthma (n=75, ages 6-11 years) were included in a randomised, double-blind, double-dummy, placebo controlled, three-way crossover study with active treatment and placebo periods of 2 weeks duration. Lower leg length was measured by knemometry. Interventions were inhaled BF 120+9 μg bid delivered from the Spiromax inhaler and BF 200+12 bid μg from the Symbicort Turbohaler.
Results: The LS mean difference in lower leg growth rates between BF Spiromax and Symbicort Turbohaler was -0.086 mm/week (95% confidence interval (CI) -0.203, 0.032). The pre-specified non-inferiority margin was -0.200 mm/week, so, the lower limit of the 95% CI was just outside this margin. The difference between Spiromax and placebo was -0.20 mm/week (95% CI: -0.322, 0.086); P<0.001), between Symbicort Turbohaler and placebo -0.118 mm/week (95% CI: -0.236, -0.001; P=0.048).
Conclusions: The lower limit of the confidence interval was only marginally outside of the prespecified non-inferiority margin. Further studies may be needed for comparison of systemic activity of Spiromax and Symbicort Turbohaler before firm conclusions may be drawn.
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