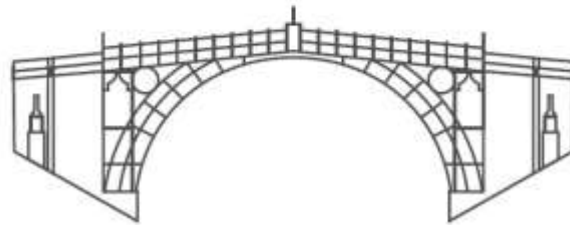


Annual Meeting  
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**Abstracts  
2015**

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# ORAL PRESENTATIONS

## Adult Clinical

### **O.1: Evaluation of outcomes from a low FODMAP diet in atopic and non-atopic patients presenting to an adult allergy service with functional gastrointestinal symptoms**

Hannah Hunter<sup>1</sup>, Rosan Meyer<sup>2</sup>, Carina Venter<sup>4</sup>, Stephen Till<sup>1,3</sup>

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#### *Objective*

A diet low in fermentable carbohydrates (FODMAPs) has been shown to improve gastrointestinal symptoms in adults with functional gastrointestinal disorders such as irritable bowel syndrome. Although gastrointestinal symptoms are commonly reported in atopic patients, the efficacy of this diet has never been established in this population. We therefore evaluated outcomes of the low FODMAP diet in atopic versus non-atopic individuals in an allergy clinic setting.

#### *Methods*

A service evaluation was carried out in patients recommended by the Allergy Dietitian to trial the low FODMAP diet between September 2013 and March 2015. Subjects were suspected of having a functional bowel disorder using Rome III criteria after other causes of symptoms (including food allergy) were ruled out. Patients were divided into non-atopic or atopic (defined as presence of atopic dermatitis, atopic asthma allergic rhinitis and/or food allergy with or without sensitisation to allergens). Symptom scores were prospectively completed before and after a six-week diet trial using the validated Gastrointestinal Symptom Rating Scale.

#### *Results*

20 atopic and 16 non-atopic patients aged 22-69 years completed a low FODMAP diet trial. In the atopic group, abdominal pain/ discomfort, bloating, wind, bowel urgency and overall symptoms showed improvement ( $P < 0.001$ ). In non-atopics improvements were seen in bloating ( $P = 0.029$ ), tiredness ( $P = 0.011$ ) and overall symptoms ( $P = 0.004$ ). Other symptoms improved but this did not reach statistical significance. There were no differences between the two groups' symptoms either before or after the diet except for bowel urgency, which was lower in the non-atopic group pre-intervention ( $P = 0.032$ ).

#### *Conclusions*

The low FODMAP diet appears to be effective in improving abdominal bloating and overall symptoms in both atopic and non-atopic patients that have suspected functional gastrointestinal disorders where other causes have been ruled out. Further larger cohort studies need to be performed to confirm findings and explore symptom aetiology and pathophysiology.

## **O.2: Healthcare resource use associated with omalizumab treatment of chronic spontaneous urticaria: a retrospective observational study**

David McKay<sup>1</sup>, Michael R. Ardern-Jones<sup>2</sup>, Sinisa Savic<sup>3</sup>, Tabi A. Leslie<sup>4</sup>, Alexander Marsland<sup>6</sup>, Frances Percival<sup>7</sup>, Olivier Somenzi<sup>8</sup>, Clive Grattan<sup>4,5</sup>

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**Objective:** To compare healthcare resource utilisation before and after omalizumab initiation in UK patients with chronic spontaneous urticaria (CSU).

**Methods:** A retrospective observational study conducted in 5 NHS hospitals with specialist dermatology or immunology services where omalizumab was initiated pre-licence between October 2009 and February 2014. Patients' medical records were reviewed for hospital visits and inpatient admissions in the 12 months before and after omalizumab initiation. Data are presented as number (%) or mean (standard deviation).

**Results:** Forty-six patients with CSU were included (36 [78%] female, mean age at omalizumab initiation 43.3 years). Mean Urticaria Activity Score over 7 days improved from 29.2 (9.1) at omalizumab initiation to a lowest score of 3.8 (7.0) during treatment in 22 patients with paired scores. The number of patients with outpatient visits increased from 42 (91%) pre-omalizumab initiation to 46 (100%) post-initiation, due to the need for monthly outpatient visits for omalizumab administration (mean outpatient visits per patient for omalizumab administration: 9.5 [4.7]). Consultant-led outpatient visits per patient (excluding those for omalizumab) reduced from 5.1 (3.8) pre-initiation to 2.9 (2.4) post-initiation. A&E attendances decreased from 10 patients (22%) pre-initiation (mean per patient 3.0 [2.8]) to 4 patients (9%) post-initiation (mean per patient 0.8 [1.6]). Inpatient admissions fell from 8 patients (17%) pre-initiation (mean admissions per patient 1.6 [1.4]; mean bed-days per patient 7.8 [12.2]) to 5 patients (11%) post-initiation (mean admissions per patient 1.1 [1.6]; mean bed-days per patient 3.9 [7.4]).

**Conclusions:** Whilst initiation of omalizumab for treatment of CSU required outpatient visits for omalizumab administration, the number of consultant-led (non-omalizumab) outpatient visits, A&E attendances and inpatient admissions decreased in the 12 months post-initiation. Application of local costs to these results would allow NHS organisations to estimate the financial impact of achieving improved clinical outcomes from treating CSU with omalizumab.

### **O.3: Review of food allergic patients in Primary Care**

Kathryn Mounde<sup>1</sup>, Carina Venter<sup>2</sup>

<sup>1</sup>Imperial College, London, UK, <sup>2</sup>Southampton, Hampshire, UK

#### **OBJECTIVE**

This study aimed to investigate the impact of a primary care-based, face-to-face food allergy review, on the quality of life of adults with IgE-mediated food allergy.

#### **METHODS**

A randomised controlled trial was conducted in a rural Dorset general practice. 28 adults with IgE-mediated food allergy were randomised to intervention or control groups. All patients completed a baseline food-allergy specific quality of life questionnaire (FAQLQ-AF). The intervention group received a 1-hour, face-to-face food allergy review with the GP with additional allergy training. The control group received a list of contact details for allergy support organisations. All participants completed a repeat FAQLQ-AF 4-6 weeks later. The questionnaire was analysed in terms of 4 different 'domains', each of which focused on specific aspects of quality of life.

#### **RESULTS**

Following the face-to-face review (intervention) the change in total QoL score was more favourable in the intervention group (-0.5 vs. 0) ( $p=0.068$ ). Changes in QoL score change between the two groups (intervention vs. control) according to domain were: Allergen avoidance and dietary restriction -0.3 vs. -0.1 ( $p=0.233$ ), emotional impact -0.3 vs. +0.05 ( $p=0.005$ ), risk of accidental exposure -0.3 vs. +0.05 ( $p=0.285$ ) and food allergy-related health 0 vs. 0 ( $p=0.433$ ). Negative scores equates to better quality of life. The improved post-intervention QoL scores were replicated across all domains with the exception of food allergy related health. The change in the 'emotional impact' domain score was of strongest statistical significance ( $p= 0.005$ ).

#### **CONCLUSION**

A primary care based allergy-focused review may positively impact the quality of life in food allergic adults. This study is the first to measure change in adult quality of life scores following an intervention focusing on the individual domains of a validated questionnaire. Primary care based allergy clinics may be an appropriate way of addressing the significant shortfall in UK allergy care provision.

#### **O.4: Pollen Low dose Intradermal Therapy Evaluation (PollenLITE): A double-blind randomised controlled trial of low-dose intradermal grass pollen immunotherapy in seasonal allergic rhinitis.**

Anna Slovick<sup>1,6</sup>, Abdel Douiri<sup>2</sup>, Emily Lam<sup>1</sup>, Joanna Kelly<sup>3</sup>, Andrea Guerra<sup>4</sup>, Rachel Muir<sup>4</sup>, Konstantinos Tsioulos<sup>1,6</sup>, Evie Hay<sup>1</sup>, Mohamed Shamji<sup>5,6</sup>, Sun Ying<sup>1,6</sup>, Stephen Durham<sup>5,6</sup>, Stephen Till<sup>1,6</sup>

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**Objective:** Subcutaneous immunotherapy (SCIT) with high dose grass pollen (micrograms of allergen) is clinically effective and inhibits allergen-induced late cutaneous responses. We previously reported that six 2-weekly intradermal injections of grass pollen (nanograms of allergen) suppressed allergen-induced cutaneous responses by >90%. This trial tested whether intradermal immunotherapy (IDIT) injections with grass pollen might be a clinically effective treatment for seasonal allergic rhinitis.

**Methods:** 93 adults with moderate-severe grass pollen allergic rhinitis were randomised to receive 7 pre-seasonal IDIT injections (each containing 7ng of Phl p 5 major allergen) or histamine control. The primary endpoint was a combined daily symptom/medication score (CSMS) during the 2013 pollen season. Sera were collected for antibody measurements. Skin biopsies were taken after the pollen season following an intradermal allergen and control diluent challenge. Cutaneous late responses were measured 4, 7, 10 and/or 13 months post-IDIT.

**Results:** There was no significant difference in the CSMS between the groups treated with grass pollen IDIT or histamine ( $p=0.91$ ). Paradoxically, amongst pre-specified secondary endpoints total nasal symptom scores ( $P=0.08$ ) and nasal visual analogue scale scores ( $P=0.02$ ) were higher in the IDIT group. IDIT was associated with significant increases in Phl p, Phl p 1 and Phl p 5-specific IgE (all  $P<0.001$ ) compared to the control group. CD4+ T cells expanded from skin biopsies of IDIT subjects showed higher expression of Th2 marker CRTH2 ( $p=0.04$ ) and lower expression of Th1 marker CXCR3 ( $p=0.01$ ). Cutaneous late responses to grass pollen were inhibited up to 7 months but not at 10-13 months post-IDIT ( $p=0.03$ ).

**Conclusion:** The regimen of grass pollen IDIT employed suppressed skin late responses but was not clinically effective for allergic rhinitis. The observation that IDIT worsened nasal symptoms, elicited IgE responses and promoted cutaneous Th2 CD4+ responses indicates that repeated low dose intradermal allergen exposure may induce immunological priming.

## **O.5: Differing in Symptomology Dimension in Different Foods: An Exploratory Analysis of Double-blind Placebo-controlled Food Challenges Using Principle Component Analysis**

Ran Wang, Matthew Sperrin, Mattia Prosperi, Adnan Custovic, Clare Mills  
*University of Manchester, Manchester, UK*

**Objective.** When interpreting the results of double-blind placebo-controlled food challenges (DBPCFC), a focus on distinctive collections of symptoms developed during the challenge may be more informative and may allow better clinical risk stratification than any individual symptoms. We explored the latent dimensions of symptoms in DBPCFC carried out in EuroPrevall study, and investigate the association between symptom components and type of food used in the challenge.

**Methods.** Standardised DBPCFC to nine different foods (peanut, hazelnut, fish, shrimp, celery, apple, peach, milk and egg) were performed across 16 European centres (2005-2010). Twenty symptoms and signs were recorded. Patients were stratified into two age groups for the analysis (" $<3$  years" and " $\geq 3$  years"). We used principal component analysis to infer symptom components, and multivariate logistic regression to investigate the association between these components and different foods.

**Results.** We included 1155 DBPCFCs in this analysis. In " $<3$  years" group ( $n=463$ ), six component solution explained 56.4% of variances observed. In " $\geq 3$  years" group ( $n=627$ ), seven component solution explained 58.6% variances observed. In " $\geq 3$  years" group, oral symptoms were significantly more likely to be observed in hazelnut (OR=3.2) and peach (OR=2.8) challenges than other foods, whilst they were significantly less common in milk (OR=0.1) and egg (OR=0.3) challenges. Upper and lower gastrointestinal symptoms were significantly more likely to be observed in egg challenges than other foods (OR=12.7, 95%CI [4.2-38.0],  $p<0.001$ ; OR=3.7, 95%CI [1.7-8.1]  $p=0.001$ , respectively). In " $<3$  years" group, gastrointestinal and cutaneous symptoms were more common in egg challenges when compared to other foods tested (OR=2.5, 95%CI [1.4-4.2],  $p=0.001$ ; OR=2.7, 95%CI [1.7-4.3],  $p<0.001$ , respectively).

**Conclusions.** In food allergy, the pattern of symptoms upon exposure differs between different foods, suggesting possible food-specific pathophysiological processes.

## Basic Science

### O.6: Autoreactivity and Immunologic profile of Chronic Spontaneous Urticaria

Ankit Bharti

*Baroda Medical College, Vadodara, Gujarat, India*

**Objectives:** Autologous serum skin test (ASST) is a valuable marker of auto-reactivity, facilitating diagnosis of CAU. The aim of present study was to investigate the autoreactivity using ASST in cases with chronic spontaneous urticaria (CSU) and to correlate the clinical and immunological profile of CSU cases with positive and negative ASST.

**Materials & Methods:** Ethical clearance for human study was obtained from the Institutional Ethics Committee for Human Research, Baroda Medical College, Vadodara and total 100 patients with CSU were enrolled in the present study. A detailed history, clinical examination along with baseline urticaria activity score, ASST, anti-thyroid peroxidase (TPO) antibody levels, serum Immunoglobulin E (IgE) levels were determined using standard methods.

**Results:** 47/100 CSU cases were positive for ASST and showed autoreactivity. 36/100 CSU cases had angioedema where, 21/36 (58.3%) cases were ASST positive. Cases with positive ASST showed significantly higher intensity ( $p < 0.0001$ ), frequency ( $p = 0.014$ ), higher wheal score ( $p = 0.001$ ) as well as higher urticaria activity score ( $p < 0.05$ ) as compared to cases with negative ASST. Anti-TPO antibody levels were found to be elevated in 16/100 cases ( $p < 0.0001$ ) where, ASST positive group of cases 14 (87.5%) showed significantly higher anti-TPO antibody levels ( $p < 0.0046$ ) compared to ASST negative group 2 (12.5%). Serum IgE levels were significantly elevated in 14/100 cases ( $p < 0.0001$ ). Interestingly, ASST positive group of cases (6/14) showed significantly higher ( $p = 0.0465$ ) serum IgE levels compared to ASST negative group (8/14).

**Conclusions:** ASST positive CAU cases had clinically more severe urticaria in terms of frequency, intensity, wheal score, urticaria activity score, angioedema, anti-TPO antibody and IgE levels as compared to ASST negative group, suggesting positive correlation between autoreactivity and immunological profile in cases with chronic spontaneous urticaria.



## **O.7: Dose of specific allergens in a peanut snack (Bamba) associated with prevention of peanut allergy.**

James Hindley<sup>1</sup>, Stephanie Filep<sup>2</sup>, Denise Block<sup>2</sup>, Eva King<sup>2</sup>, Martin Chapman<sup>2</sup>

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**Objective:** The LEAP study recently showed that peanut consumption in early life dramatically reduced the prevalence of peanut allergy among high risk children. The preferred peanut snack used for the study was Bamba, a corn puff containing ~50% peanut. Our objective was to measure levels of Ara h 1, Ara h 2 and Ara h 6 in Bamba and to estimate the dose of specific peanut allergens associated with oral tolerance.

**Methods:** Samples (100mg) of 15 lots of Bamba, from either the UK (n=7) or the US (n=8), were extracted in PBS/0.05% Tween. Ara h 1, Ara h 2 and Ara h 6 were measured by ELISA using purified natural allergen standards. The limits of detection of the ELISA were: Arah1, 32ng/ml; Arah2, 2ng/ml and Arah6, 0.8ng/ml).

**Results:** The absolute amounts of peanut allergens in Bamba were remarkably consistent: n=15, Arah1, 2427 $\mu$ g/g (11% CV); Arah2, 1970 $\mu$ g/g (15% CV); and Arah6, 2379 $\mu$ g/g (15% CV), with no significant differences between lots purchased in the UK or the US. Moreover, the levels of each allergen were present in ~1:1:1 ratio. Median peanut consumption in the LEAP study was 7.7g peanut per week. This extrapolates to weekly doses of 18.7mg Arah1, 15.2mg Arah2 and 18.3mg Arah6 (total 52.2mg) and to cumulative doses of 4862mg, 3952mg and 4758mg each allergen, respectively, during the 60 month study period.

**Conclusions:** The results show that, unlike many other peanut food products, Bamba is a reproducible and consistent formulation of peanut allergens with each of these three major allergens present in uniform amounts. The results provide, for the first time, target doses of specific peanut allergens that are associated with prevention of peanut allergy and which, by extension, could apply to the induction of tolerance to other food allergens.

**O.8: Imiquimod-induced psoriasis-like skin inflammation in mice is suppressed by BET bromodomain inhibitor, JQ-1 through inhibition of RORC signature cytokines**

*Ahmed Nadeem, Naif Al-Harbi, Mohamed Al-Harbi, Ahmed El-Sherbeeney, Sheikh Ahmad King Saud University, Riyadh, Saudi Arabia*

**Objective:** Psoriasis is one of the most common skin disorders characterized by acanthosis and hyperkeratosis. Recent studies suggest that IL-23/IL-17A/IL-22 cytokine axis plays an important role in the pathogenesis of psoriasis. Interaction of bromodomain and extraterminal (BET) domain proteins with acetylated histones causes inflammation through regulation of various transcription factors. The transcription factor, retinoic acid receptor-related orphan receptor C (RORC) required for IL-17A/IL-22 expression may be regulated by BET bromodomains in the context of skin inflammation. Therefore, this study investigated the role of BET inhibitor, JQ-1 in well-known mouse model of psoriasis-like inflammation.

**Methods:** Mice were topically applied imiquimod (IMQ) to develop psoriasis-like inflammation on the back and ear followed by assessment of inflammation [myeloperoxidase activity (MPO), ear thickness, and histopathology], RORC and its signature cytokines expression (IL-17A/IL-22) in the skin/blood/spleen. The concentrations of JQ-1 used in this study were 30 and 100 µg/cm<sup>2</sup>.

**Results:** IMQ application led to increased skin inflammation as evidenced by increased ear thickness/MPO activity and acanthosis. Topical treatment with JQ-1 dose dependently attenuated IMQ-induced increase in ear thickness/MPO activity and skin acanthosis. Application of IMQ also led to up regulation of IL-17A, IL-23p19, STAT-3, and TNF-α at both mRNA and protein levels in the skin/blood as compared to control mice. Topical treatment with JQ-1 dose dependently attenuated IMQ-induced increase in protein/mRNA levels of only Th-17 related cytokines (IL-17A/IL-22) but not other inflammatory markers/cytokines, i.e. IL-23, STAT-3 and TNF-α. IMQ also led to increased expression of RORC in skin, and splenic CD4+IL17A+ T lymphocytes, which was reversed by JQ-1 treatment without having any effect on Treg/Th1/Th2 cells.

**Conclusions:** The current study suggests that BET bromodomains are involved in psoriasis-like inflammation through induction of RORC/IL-17A/IL-22 pathway. Therefore, inhibition of BET bromodomains may provide a new therapy against skin inflammation.

## **O.9: Efficiency of TGF- $\beta$ <sub>1</sub>-induced differentiation of asthmatic human bronchial fibroblasts depends on the cooperative Cx43/Smad signaling**

Milena Paw<sup>1</sup>, Izabela Borek<sup>1</sup>, Damian Ryszawy<sup>1</sup>, Katarzyna Anna Wójcik<sup>1,2</sup>, Katarzyna Piwowarczyk<sup>1</sup>, Zbigniew Madeja<sup>1</sup>, Marek Sanak<sup>1,2</sup>, Marta Michalik<sup>1</sup>, Jarosław Czyż<sup>1</sup>  
<sup>1</sup>Jagiellonian University, Krakow, Poland, <sup>2</sup>Jagiellonian University, Collegium Medicum, Krakow, Poland

### **Objective**

Airway wall remodeling during bronchial asthma is associated with the prolonged exposure of human bronchial fibroblasts (HBFs) to pro-inflammatory cytokines, such as TGF- $\beta$ <sub>1</sub>. It results in fibroblast-to-myofibroblast transition (FMT). This process is regulated by the activation of Smad signaling and leads to the development of  $\alpha$ -SMA<sup>+</sup> myofibroblasts. Reports on the involvement of connexin(Cx)43, a gap junctional protein, in the regulation of FMT in cardiac tissue prompted us to estimate the role of Cx43 in TGF- $\beta$ <sub>1</sub>-induced FMT in HBFs.

### **Methods**

HBFs were obtained from bronchial biopsies derived from asthmatic patients. Cells were treated with TGF- $\beta$ <sub>1</sub> [5ng/ml] in serum-free conditions. Functional links between Cx43, Smad2 and FMT were elucidated in HBFs using immunofluorescence, immunoblotting, flow cytometry and Cx43 silencing (siRNA). FRET and co-immunoprecipitation was employed to analyze the interactions between both proteins.

### **Results**

Prolonged exposure of asthmatic HBFs to TGF- $\beta$ <sub>1</sub> induced Cx43 up-regulation and led to  $\alpha$ -SMA accumulation through the activation of Smad2 proteins. These events were suppressed by a Smad inhibitor (SB431542) and by transient down-regulation of Cx43 expression. In contrast, the inhibition of gap junctional intercellular coupling by 18- $\alpha$ -glycyrrhetic acid considerably attenuated  $\alpha$ -SMA incorporation into microfilament bundles, in the absence of any effects on TGF- $\beta$ <sub>1</sub>-induced activation of Smad2 and on Cx43 expression in HBFs. Co-immunoprecipitation and FRET assays suggested that Cx43 facilitated Smad2 activation in HBFs through the effect on Smad2 sequestration on microtubules.

### **Conclusions**

Our findings demonstrate that Cx43 can modulate FMT efficiency in asthmatic HBFs and show the interrelations between Cx43- and Smad2-dependent signaling during airway wall remodeling in bronchial asthma.

## **O.10: The effect of the common cold (Rhinovirus) on local and peripheral B cell responses in allergic asthma**

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**Overview:** Rhinovirus (RV) infection is associated with over 50% of asthma exacerbations. We hypothesised that RV infection propagates underlying allergic IgE<sup>+</sup> B cell responses locally in the bronchial mucosa and in peripheral blood as a consequence of leakage, in moderate allergic asthmatics.

**Methods:** Allergic asthmatics and healthy controls were experimentally infected with RV. Peripheral blood, bronchial biopsies and B cells from bronchoalveolar lavage were obtained before and after infection. Flow cytometry sorting, qPCR, next generation sequencing and ImmunoCap ISAC array were used to determine changes in B cell subset and IgE<sup>+</sup> B cell populations, IgE repertoire and levels of secreted total and allergen-specific IgE, locally in the bronchial mucosa and in peripheral blood.

**Preliminary results:** Experimental RV infection resulted in increased circulating IgE<sup>+</sup> B cells and total serum IgE in allergic asthmatics. Increases in IgE were accompanied by increased circulating Basophils responsive to ex vivo Anti-IgE stimulation

**Impact:** These preliminary results indicate that RV infection alters IgE<sup>+</sup> B cell responses in the blood of allergic asthmatics. Further analysis is warranted to better understand our findings and so the effect and location of RV on susceptibility to IgE-mediated inflammatory reactions in allergic asthma.

## Paediatric Clinical

### O.11: Nasal influenza immunisation with LAIV is safe in egg-allergic children - results from the SNIFFLE-2 study

Heather Hanna<sup>1</sup>, Jo Southern<sup>2</sup>, Nick Andrews<sup>2</sup>, Elizabeth Miller<sup>2</sup>, Michel Erlewyn-Lajeunesse<sup>3</sup>, Paul Turner<sup>1,2</sup>, on behalf of SNIFFLE-2 Study Investigators<sup>2</sup>

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**Objective:** Egg allergy affects 2-9% of children. Live Attenuated Influenza Vaccine (LAIV; FluMist®, Fluenz®) is an intranasal vaccine now incorporated into the UK National Immunization Schedule. However, in many countries, its use is restricted in children with egg allergy and/or asthma. We sought to assess the safety of intranasal LAIV in egg-allergic children with and without asthma.

**Methods:** Multi-centre phase IV observational study in children with a physician-diagnosis of egg allergy. LAIV was administered under medical supervision in hospital. Local ethical and regulatory approval was granted, and full informed consent was obtained. ClinicalTrials.gov Identifier: NCT02111512.

**Results:** 808 doses were administered in 779 children (median 5.3yrs, IQR 3.5-8.7 yrs). 57% had asthma; 46% received preventer therapy (Step 2+, British Thoracic Society (BTS) classification) while 18% also received additional preventer therapy (BTS Step 3+). 88% had experienced a previous allergic reaction to egg, 35% with prior anaphylaxis (WAO criteria). There were no systemic reactions. Seven children experienced mild adverse reaction which may be due an IgE-mediated allergic reaction (3 localised pruritus/urticaria, 2 rhinitis, 2 acute flares in eczema). There was no significant increase in wheeze in the 3 days post vaccination.

**Conclusion:** On the basis of this analysis, we calculate that the 95% upper confidence interval for occurrence of a systemic or significant local allergic reaction to LAIV in egg-allergic children is <0.5%. In contrast to current recommendations, LAIV appears to be safe for use in children with egg allergy. Furthermore, the vaccine was well tolerated in children with a diagnosis of asthma or recurrent wheeze.

## **O.12: Should siblings of children with peanut allergy also be tested?**

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Peanut allergy (PNA) is more common in siblings of affected individuals. Early introduction of peanut in high risk individuals has been recently shown to prevent PNA. We routinely test siblings for PNA as part of our clinical service, and undertook a service evaluation of our practice.

### **Objective**

To determine the coverage and outcomes of screening in siblings of PNA children, and to sample parental views regarding the service, and its affect on quality of life.

### **Methods**

Parents of follow up PNA children with siblings undertook a short face-to-face administered questionnaire in clinic. We do not test siblings under two years of age, these were excluded for the analysis, as were siblings who were already eating peanuts. Research ethical approval was granted by the University of Southampton (ERGO ID 9840).

### **Results**

69 siblings from 50 families were recruited. 29 siblings were eligible for testing and included in the analysis. 31% (9/29) had not been tested; however, none had suffered an allergic reaction to peanut in consequence. 69% had successfully been screened before having been exposed to peanuts, with 6/20 (30%) testing positive. Of the 14/20 (70%) testing negative only 21% (3/14) reported to eat peanuts. 58% (29/50) of recruited families agreed they felt/would feel less anxious having had siblings screened and 90% (45/50) would recommend sibling screening. Skin prick testing is the preferred method and the younger the child the better.

### **Conclusion**

Nearly one third of tested siblings showed signs of peanut allergy. This highlights the importance of offering testing for siblings. However, few parents introduce peanut to the diet of siblings with negative tests. Continued peanut avoidance may be a continued risk for the development of PNA. Parents value screening siblings of a PNA child, and early introduction of peanuts may prevent disease in this high risk group.

### **O.13: Adolescents' views on adrenaline auto-injector design: a qualitative study**

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#### **Objective**

A recent study showed adolescent compliance with adrenaline auto-injectors (AAI) to be as low as 41%, yet there is a lack of research exploring patient preferences regarding devices. The aim of this qualitative study was to explore adolescents' ideal AAI design features.

#### **Methods**

In-depth, semi-structured, face-to-face interviews were conducted with 25 adolescents (aged 13-17) in primary and secondary care who had been prescribed an AAI. Interviews were audio-taped, transcribed verbatim and analysed using thematic content analysis.

#### **Results**

Perception of AAIs as "scary" was a major barrier to use. A strong desire was expressed for features which reduced scariness, such as non-alarming colours and smaller needle-guards. Adolescents were fearful of current trigger mechanisms with the perception that AAIs required a great amount of force to trigger the injection. Misconceptions were observed with some adolescents believing that the pressure applied affected the amount of adrenaline injected. AAI appearance affected perception of function, for example small devices were seen as less painful, having smaller needles and being safer. Self-conflict was observed regarding certain features, especially between functionality and aesthetics or carriage. Personalisation and customising of the AAI was an important theme, more for girls than boys. Adolescents reported that the large size of current models impeded carriage and that smaller pens would facilitate discrete pocket carriage. The importance of familiarity, precision, speed and ease of use was highlighted; a lack of confidence was reported with the resultant desire for designs and instructions to facilitate self-administration as well as bystander-use.

#### **Conclusions**

Adolescents have a significant fear of their AAI exacerbated by the design, which may further impact the health burden of their condition, as well as being a considerable barrier to use. We have shown that there is substantial scope for adaptations in design to improve adolescents' perception of the device and facilitate their carriage and use.

## **O.14: Appropriate prescribing (AP) of paediatric allergy specialist milk formulae (PASMf) in Barnet**

Juliana Scapin<sup>1</sup>, Zoe Bloomfield<sup>1</sup>, Suzanne Lever<sup>2</sup>

<sup>1</sup>Central London Community Healthcare NHS Trust, London, UK, <sup>2</sup>Barnet Clinical Commissioning Group, London, UK

**Objective:** To review the appropriateness of PASMf prescribed and increase GP awareness of AP in Barnet aiming to reduce unnecessary spend, improve patients' safety, clinical outcomes and satisfaction.

### **Methods:**

1. Working closely with the Barnet Clinical Commissioning Group Medicine Management Team for current PASMf spend data - 5 months project funded by Barnet CCG;
2. Searching the top spend surgeries' system for patients on PASMf;
3. Seeing patients in clinic for dietary/growth assessment, and advice provided by a Paediatric Dietitian following by recommendations & PASMf guidelines sent to GPs;
4. Training GPs on PASMf AP.

### **Results:**

- 19 surgeries searched, 123 patients (age range 0-7yr; average 1yr) identified on PASMf (80 seen in clinic);
- Comorbidities/complications reported: 38% skin, 34% Gastrointestinal, 2% respiratory;
- Previous dietary advice provided by: 60% Paediatrician/Gastroenterologist/Allergist, 35% GP, 5% Paediatric Dietitian;
- After dietetic assessment PASMf advised to be: 41% discontinued, 7% working towards discontinuation, 22% continued, 10% changed/reduced;
- Equivalent cost savings: £61,200/year (£765/ patient);
- Safety issues noted: 44% diets low in essential nutrients, 11% excluding unnecessary foods, 5% continued symptoms as appropriate diet not previously advised, 3% no weight/growth monitored following concerns;
- 14 GPs trained on PASMf AP, other GPs received PASMf AP guidelines;
- Patient Reporting Experience Measurements collected from 14% of patients seen: 91% rated very important/important seeing a Paediatric Dietitian regularly; 82% rated excellent and 18% very good their dietetic appointment;
- GPs' feedback of PASMf AP project benefits: 73% patients' care quality, 64% cost saving, 27% patients' satisfaction and training provided.

**Conclusion:** Dietetic input can help to reduce inappropriate spend on PASMf, improve patients' safety, clinical outcomes and satisfaction. Long term follow up and initiatives are required to continue improvements and ensure that changes in practice are sustained.



**O.15: Study of tolerance and reintroduction of tree nut and peanuts.**

Rebecca Tibbott, Loraine Foley, Yvonne King, Sabita Islam, John Deighton, Pamela Ewan, Andrew Clark  
*Cambridge University Hospital Trust, Cambridge, UK*

Objective - To assess the safety and feasibility of single tree nut oral immunotherapy (OIT) and multi nut OIT.

Methods - Tree nut and peanut allergic children aged 7-15 years (with a positive nut specific IgE +/- relevant component resolved diagnostics) underwent double-blind, placebo controlled food challenges (DBPCFC) to confirm their allergies to one or more nuts (cashew, hazelnut, walnut, Brazil or peanut). 23 children underwent initial screening (clinical history, skin prick tests and nut specific IgE +/- component resolved diagnostics). 17 children underwent DBPCFC. 11 were deemed eligible to commence either single or two nut OIT. (Participants were excluded if they passed the DBPCFC or if they had a severe reaction requiring intramuscular Adrenaline at the DBPCFC starting dose of 5mg nut protein). OIT was administered by dose increments in 2 weekly intervals with a starting dose of 2mg nut protein per nut up to a maximum of 800mg nut protein per nut. Children were reviewed following 6 weeks of maintenance therapy (and at 6 months).

Results - 3 children have successfully completed the immunotherapy programme to date (2 single cashew OIT, 1 single hazelnut OIT) with a further 8 children currently in the up dosing phase (due to complete May 2015). The mean length of time to reach the maintenance dose of OIT (800mg) was 19.3 weeks. No dose reductions were required. Reactions during OIT were mild and included oral itching and nausea. 0/3 children required intramuscular Adrenaline.

Conclusions - We have demonstrated that, to date, single tree nut OIT (including home administration) is feasible and safe. The regime was well-tolerated. Results from our remaining 8 participants will provide further information on the feasibility and safety of multi nut OIT.

# POSTER PRESENTATIONS

## Adult Clinical

### **P.1: Chlorhexidine impregnated catheters: innocent bystanders or culprits?**

Sameer Bahal, Surendra Karanam, Dr Jonathan North, K-L Kong  
*Sandwell and West Birmingham NHS trust, Birmingham, UK*

#### Background

When evaluating perioperative anaphylaxis positive, skin tests and specific IgE results to a suspected culprit are often taken as confirmatory as validation through challenge testing is not feasible. Our case illustrates potential limitations of this interpretation.

#### Case

A 76 year old male received general anaesthesia for a liver resection. He was stable after induction with propofol, fentanyl, ondansetron and atracurium. Shortly after urethral catheterisation he became hypotensive with generalised urticaria and a drop in oxygen saturations. He was treated for anaphylaxis. Evaluation in our clinic showed a positive intradermal test to chlorhexidine at 0.002mg/ml concentration. Specific IgE to chlorhexidine was also positive at 3.12 KuA/L. Skin tests to latex, propofol, fentanyl, atracurium and ondansetron were all negative. We attributed the anaphylaxis to chlorhexidine. 18 months later the patient had a further liver resection. A central venous catheter was placed and during the surgery chlorhexidine skin prep was avoided. The procedure was uneventful. A day later it was realised that the central venous catheter used was impregnated with chlorhexidine. We were contacted for advice and we recommended removal of the catheter as it is not possible to estimate the potential systemic exposure from such an indwelling catheter.

#### Discussion

Anaphylaxis to chlorhexidine from many sources including chlorhexidine impregnated central venous catheters has been reported but unlike pharmaceutical agents there is no defined profile of systemic absorption from these sources. The presumption of systemic exposure and detection of chlorhexidine sensitivity leading to a diagnosis of chlorhexidine anaphylaxis, as illustrated by this case, leads to many unanswered questions.

## **P.2: A systematic review of the impact of birch pollen immunotherapy on pollen food syndrome**

Judith Clayton<sup>1</sup>, Isabel Skypala<sup>2</sup>

<sup>1</sup>Imperial College, London, UK, <sup>2</sup>Royal Brompton & Harefield NHS Foundation Trust, London, UK

**Objective.** This review will critically analyse the evidence for birch pollen immunotherapy to treat pollen food syndrome. Bet v1, the major allergen in birch pollen, cross reacts with homologous allergens of many fresh fruits, vegetables and nuts. Common symptoms are oral tingling, burning, and lip swelling, often mild, but severe reactions can occur.

**Methods.** RCTs and observational studies of oral IT, SCIT and SLIT were included. The primary outcome measure was evidence of desensitization measured by a change in symptoms by questionnaire, or symptoms score on food challenge, or a change in amount of food tolerated on food challenge. The secondary outcome measure was evidence of Immunological change by a decrease in SPT / PPT to plant food allergens.

**Results.** 11 studies were included, and 6 RCTs were included in the meta-analysis. Bias was assessed as moderate or high.

No statistically significant effect of immunotherapy on PFS was detected. The secondary outcome assessed a decrease in SPT or PPT. Data was limited and complicated by differences in the unit of analysis and no statistical comparison was possible. There was a high degree of heterogeneity due to differences in design, immunotherapy type and dose, food challenge dose, and method of assessing response to treatment.

**Conclusions.** Despite evidence for the effectiveness of birch pollen immunotherapy on rhino-conjunctivitis, there is no evidence of improvement in PFS. This may be due to insufficient homology between Bet v 1 and plant food allergens, or significant differences at critical sites for IgG binding which may overlap only in part with the IgE epitope. Future studies could assess binding of birch pollen immunotherapy induced IgG to the IgE epitopes of plant food proteins. Immunotherapy with recombinant Bet v 1 may be effective by reducing side effects, allowing higher doses in treatment.

### **P.3: Thresholds Reactivity And Clinical Evaluation (TRACE) study: background and methodology**

Shelley Dua<sup>1</sup>, Monica Ruiz Garcia<sup>2</sup>, Simon Bond<sup>1</sup>, Robert Boyle<sup>2</sup>, Louise Cross<sup>2</sup>, Stephen Durham<sup>2</sup>, Pamela Ewan<sup>1</sup>, Sabita Islam<sup>1</sup>, Yvonne King<sup>1</sup>, Claire Mills<sup>3</sup>, Isabel Skypala<sup>2</sup>, Paul Turner<sup>2</sup>, Laura Watson<sup>4</sup>, Ruth Willis<sup>1</sup>, Andrew Clark<sup>1</sup>

<sup>1</sup>Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK, <sup>2</sup>Imperial College, London, UK, <sup>3</sup>University of Manchester, Manchester, UK, <sup>4</sup>Food Standards Agency, London, UK

#### **Objective**

Determining individual and population reaction thresholds is essential for assessing risk posed by food allergens. Peanut is widely used in food manufacturing and causes fatal reactions. Both the threshold and severity of allergic reactions can vary between individuals in a population. Within individual variation also occurs and may be explained by extrinsic factors.

The TRACE study aims to measure the impact of two extrinsic factors: sleep deprivation and exercise on the threshold and severity of responses to peanut in a sample of the UK peanut allergic population.

#### **Methods**

This is a multicentre randomised crossover study in progress, with 73/100 peanut allergic adults, 18-45yrs, recruited. After screening, participants undergo DBPCFCs to determine their baseline threshold to peanut. They undergo three further challenges in random order: a repeat baseline and two with extrinsic factors (exercise and sleep deprivation). Incrementally increasing doses of peanut flour (3µg-1g) in dessert matrix are delivered at fixed time intervals and eliciting dose of reaction is recorded. Reaction thresholds are judged on objective symptoms.

#### **Results**

Methods were piloted on 26 participants. Based on pilot data, the PRACTALL criteria to score food challenges have been adapted. Exercise piloting allowed finalisation of the challenge protocol: participants are given peanut doses interspersed with exercise bouts at 85% of their maximum exercise capacity. For the sleep deprivation arm, participants sleep for a maximum of two hours on the night before the challenge. The Psychomotor Vigilance Task is used to objectively assess tiredness. Initial data have guided the development of a new severity score to grade food allergic reactions. Participant and investigator visual analogue scales to assess symptoms during challenges have been developed.

#### **Conclusion**

This study will of major public health importance providing the first UK eliciting dose data and novel information on the impact of extrinsic factors on food allergic reactions.

#### **P.4: The prevalence of aspirin sensitivity and asthma in allergic fungal rhinosinusitis: a national case-control study**

Sally Erskine<sup>1,2</sup>, Carl Philpott<sup>1,2</sup>

<sup>1</sup>University of East Anglia, Norwich, UK, <sup>2</sup>James Paget Hospital, Gorleston, UK

**Objectives:** Chronic rhinosinusitis (CRS) affects 11% of the population and can be associated with significant morbidity. Allergic fungal rhinosinusitis (AFRS) is a subgroup of CRS characterised by high recurrence rates which can be difficult to diagnose and treat. Early recognition may help optimise treatment. Others with severe forms of CRS include patients with asthma who are more likely to have nasal polyps and may have aspirin sensitivity, exacerbating their symptoms. The aim of this analysis is to determine the prevalence of aspirin-sensitivity and asthma in CRS sub-types including AFRS.

**Methods:** Data for this analysis was taken from the UK Chronic Rhinosinusitis Epidemiology Study (CRES) which consists of a study-specific self-reported questionnaire about environmental, medical and socio-economic factors and incorporates the SF-36 and SNOT-22 questionnaires. Subjects were recruited from secondary and tertiary care clinics in Ear, Nose and Throat departments from 30 centres across the UK.

**Results:** A total of 1,470 questionnaires were returned; controls 221, CRS without polyps 553 CRS with polyps 651, AFRS 45. The prevalence of self-reported aspirin sensitivity was 2.26% in controls, 3.25% in CRS without polyps 9.61% in CRS with nasal polyps and 40% in AFRS. The prevalence of asthma was 9.95%, 21.16%, 46.9% and 73.3% respectively. Odds ratio for aspirin sensitivity amongst those with AFRS 28.8 (9.9,83.8)  $p < 0.000$ .

**Conclusions:** Aspirin sensitivity and asthma prevalence are higher amongst those with polypoid disease and may be factors by which these patients can be identified. Aspirin desensitisation and reduction of dietary salicylate may be a therapeutic consideration for such patients. Combined management with ENT, Respiratory Medicine and Allergy specialists may be beneficial for patients with complex disease.

This study has been conducted by and is presented on behalf of the CRES Group.

**P.5: Omalizumab in the treatment of chronic inducible urticaria: subgroup treatment outcomes of a UK observational study**

Clive Grattan<sup>1</sup>, David McKay<sup>2</sup>, Michael Arden-Jones<sup>3</sup>, Frances Percival<sup>4</sup>, Olivier Somenzi<sup>5</sup>

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<sup>3</sup>University Hospital Southampton, Southampton, UK, <sup>4</sup>pH Associates Ltd, Marlow, Bucks., UK,

<sup>5</sup>Novartis Pharmaceuticals UK Ltd, Camberley, Surrey, UK

**Objective:** To evaluate the impact of omalizumab on quality of life (QoL) in patients with chronic inducible urticaria (CIndU).

**Methods:** A retrospective observational study of omalizumab treatment outcomes in chronic urticaria (CU) was conducted in 5 UK NHS hospitals with specialist dermatology or immunology services. Review of medical records of patients treated between October 2009 and February 2014 identified a small subgroup of patients treated for the unlicensed indication of CIndU. Information on treatment history and QoL impact (Dermatology Life Quality Index [DLQI]) was evaluated.

**Results:** Eight patients (7 female) were identified with CIndU only. Median disease duration was 5.3 years (interquartile range 3.4-9.9). Mean age at omalizumab initiation was 36.8 years (SD 18.0). Previous treatment in these patients included ciclosporin (n=2), montelukast (n=2), ciclosporin and montelukast (n=3), unknown (n=1). DLQI was recorded at omalizumab initiation for 5 patients and indicated a large (n=3) or extremely large (n=2) impact of CIndU on QoL (mean score 17.2 [SD 5.0]). DLQI scores were recorded during treatment for 4 patients; mean lowest DLQI score was 1.8 (SD 2.1) with all 4 indicating no or only a small impact of CIndU on QoL. Mean improvement in DLQI score in 4 patients with paired baseline and lowest scores was 16.0 (SD 7.6) points; 1 patient had ≥90% and 2 patients ≥75% improvement in DLQI. Four patients (3 without DLQI) had descriptive assessments by treating clinicians, all indicating almost complete symptom resolution and return to 'normal life'.

**Conclusions:** In this small series of CIndU patients treated with omalizumab, standardised assessment of disease severity or QoL impact at initiation or during treatment was not routine. However, where available, outcomes of omalizumab treatment for this unlicensed indication were good. This difficult to manage disease was well-controlled with omalizumab treatment, with a marked reduction in QoL impairment.

## **P.6: Hyaluronidase – a sting in the tale?**

Elizabeth Griffiths, Leonard Siew, Prathap Pillai, Teresa Tsakok, Rubaiyat Haque  
*Guys and St Thomas' NHS Foundation trust, London, UK*

### **Background**

Hyaluronidase is used in Anaesthetics and Ophthalmology but amongst Allergists it is more commonly known in the context of venom allergy. In our literature search, we identified only a limited number of articles about this drug, predominantly published in Anaesthetic and Ophthalmology rather than Allergy literature.

### **Cases**

A 52 year old gentleman had epidural anaesthesia. He received lidocaine with hyaluronidase, Depomedrone, bupivacaine, Omnipaque and propofol. He previously had this treatment without problems yet in the recovery room, urticarial rash, tightening in his throat and facial angioedema were noted. Skin prick/intradermal tests were negative to propofol, Omnipaque, lidocaine and bupivacaine. Intravenous challenge to Omnipaque was negative. Intradermal testing to hyaluronidase was strongly positive with a 7mm increase in wheal size.

A 55 year old gentleman had uneventful cataract surgery. A few weeks later, he had the same drugs in surgery on his other eye. He was given cyclopentolate, tropicamide and diclofenac eye drops, povidone iodine wash, midazolam and acetazolamide plus a local anaesthetic block using lidocaine and hyaluronidase. Within 30 minutes, he developed facial angioedema without cardiovascular or respiratory compromise. There was a positive response on intradermal testing to hyaluronidase with a wheal increase of 8mm.

### **Discussion**

These cases suggest that sensitisation to hyaluronidase occurred through previous administration. In other cases sensitisation to venom may be a potential route of sensitisation and some authors advise caution in patients with a history of this. However, there is no clear practice standard and indeed Hyaluronidase needs to be reassessed as a relevant allergen in venom allergy in light of recent work regarding carbohydrate cross-reactive determinants.

Also, medical hyaluronidases are currently of bovine, ovine or porcine origin but recent development of a recombinant form might carry a lower risk.

To conclude, allergy to hyaluronidase warrants further attention from the Allergy community.

**P.7: Incidence, triggers and seasonal variations of anaphylaxis in a district general hospital A&E department**

Omar Hameed, Esra Musbahi, Malgorzata Skibinska  
*Basildon University Hospital, Basildon, Essex, UK*

**Objectives:** Anaphylaxis is an uncommon, life-threatening condition lacking a single consensus definition, which makes its epidemiological analysis challenging. There is conflicting data on the incidence of anaphylaxis with the rates ranging from 1.5 to 32 per 100,000 person-years within Europe.<sup>1,2</sup> There is a paucity of data on the seasonal variation of anaphylaxis. The primary aim of our study was to assess the incidence of anaphylaxis presenting to a district general hospital A&E over a 1-year period. The secondary aims were to study the trigger factors and the seasonal variation of anaphylaxis.

**Methods:** The A&E electronic records of patients attending between May 2011 and April 2012 and coded as "anaphylaxis" and "other allergy" were reviewed.

**Results:** Out of 331 records analysed, 42 patients had evidence of anaphylaxis. The incidence was 9.25 per 100,000 (95% CI: 6.71 -12.75). Sixteen (43%) cases were triggered by food and 11 (30%) by medications. Seventy-six percent of anaphylaxis cases presented from December to May. Of the 24% of cases seen in the remaining months, 4 (11% overall) were secondary to insect stings in July.

**Conclusions:** "The incidence of anaphylaxis presenting to our hospital was similar to that previously reported in the UK population.<sup>1</sup>"

The strengths of our study include reviewing all clinical records of cases coded as anaphylaxis and other allergy, over a 1-year period. However, in-patients were not included and anaphylaxis cases were also potentially missed due to the mild nature of certain reactions, not presenting to A&E or incorrect coding. The triggers in our study were similar to those commonly identified.<sup>1</sup> We observed a preponderance of anaphylaxis in the winter and spring months in our region.



## **P.8: Is there a role for intranasal immunotherapy in the management of allergic rhinitis? - A literature review**

Erika Harnik<sup>1,2</sup>

<sup>1</sup>King's College London, London, UK, <sup>2</sup>University of Southampton, Southampton, UK

### **Objectives**

Patients are often interested in non-pharmacological approaches in managing disease, particularly as pharmacotherapy does not always control the symptoms of allergic rhinitis.

The role of intranasal phototherapy in other atopic conditions such as eczema is well documented. Possible mechanisms of action include suppression of the antigen-presenting function of Langerhans cells and induction of apoptosis in infiltrating T cells. As an immunologically mediated process, the theory is that allergic rhinitis might also be treated by phototherapy.

### **Methods**

A literature review was performed by searching through electronic databases (PubMed, Cochrane Library) with the search terms "Phototherapy" AND "Rhinitis".

37 papers were identified - 31 were excluded as they were not randomised controlled trials examining clinical symptoms of allergic rhinitis in humans.

### **Results**

3 papers were randomised double-blind controlled trials, which demonstrated a significant improvement in nasal symptoms in patients who received intranasal phototherapy in comparison to placebo. This was supported with clinical findings on examination. Dryness of the nasal mucosa was reported to be a frequent adverse event, otherwise treatment was well tolerated.

3 papers compared the effect of phototherapy to that of conventional medical treatment: both were found to be efficacious, although phototherapy more so.

All were small studies, with up to 79 patients recruited into each study. The phototherapy treatment regimes, including light wavelength and duration and frequency of treatment, differed vastly from study to study. None of the studies have examined long-term effects of intranasal phototherapy.

### **Conclusions**

There is some evidence in the literature to suggest that intranasal phototherapy may be an effective treatment for allergic rhinitis, however the strength of evidence is low. Further studies are needed to determine the clinical efficacy and long-term effects of intranasal phototherapy.

**P.9: Presumed Mast Cell Activation Syndrome- A single centre cohort review.**

Archana Herwadkar

*Salford Royal Hospital, Greater Manchester, UK*

**Objective**

Mast cell activation syndrome is a multi systemic immunological condition. The objective of the study was to identify patients in a single centre cohort with possible Mast cell activation syndrome, review salient clinical features and highlight important management issues.

**Methods**

A single centre cohort review of patients that have been referred to the Immunology clinics which following investigation have a diagnosis of possible Mast Cell Activation Syndrome will be presented.

**Results**

We reviewed the presenting symptoms, baseline mast cell tryptase levels, management and response to treatment with antihistamines and mast cell stabilisers. The challenges faced in achieving a definitive diagnosis in this cohort will also be addressed.

**Conclusion**

Mast cell activation syndrome is a differential diagnosis to be considered in patients presenting with various clinical symptoms affecting multiple systems, who do not entirely fit the diagnostic criteria of chronic urticaria or idiopathic anaphylaxis.

## **P.10: Implementation of the electronic drug chart and its impact on drug allergy and sensitivity documentation in the UK's first hospital using EPIC Electronic Patient Record.**

Lucinda Kennard, William Griffiths

*Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK*

### Objective

To compare drug allergy and drug sensitivity documentation using traditional paper records against a complete electronic patient record.

### Methods

We conducted an audit one day in January 2014 of all available patients (32 patients) on the Transplant Ward, Addenbrooke's hospital. We collected data regarding documentation of allergies and sensitivities on medical records, drug charts as well as patient wristbands. We also collected data on whether patients agreed with their allergy status or reported having ever seen an allergist. We re-audited all available patients (29 patients) one day in April 2015, a date after the introduction of total electronic patient records at Addenbrooke's hospital.

### Results

All allergy/sensitivity boxes on drug charts were completed in the 2014 and 2015 audits.

In 2015, 100% of electronic drug chart allergy/sensitivity boxes were signed and dated, compared with 91% and 86% respectively in the 2014 paper drug chart audit.

In 2015, 25% of electronic drug charts had drug allergy and sensitivity box errors, versus 33% in the 2014 paper drug chart audit.

In 2015, 15% of patients had errors involving a red wristband compared with 27% in 2014. Red wristband errors included incorrect information and missing red wristbands.

In 2015, 7% of patients disagreed with their drug allergy/sensitivity documentation versus 18% of patients in the 2014 audit.

### Conclusions

E-hospital introduction in 2015 appears to have improved drug allergy/sensitivity documentation on the Transplant ward.

Further Trust wide audit is needed on this topic to compare standards across different settings, including outpatients, acute and elective admissions as this audit was small and limited to one ward only.

E-hospital should be configured to direct print red allergy wristbands automatically based on the electronic drug chart record to prevent discrepancies between red wristbands and the electronic drug chart.

### **P.11: Evaluation of long-term outcomes of icatibant using real-world data from the Icatibant Outcome Survey**

James Laffan<sup>1</sup>, Hilary Longhurst<sup>1</sup>, Teresa Caballero<sup>2</sup>, Werner Aberer<sup>3</sup>, Andrea Zanichelli<sup>4</sup>, Laurence Bouillet<sup>5</sup>, Marcus Maurer<sup>6</sup>, Vincent Fabien<sup>7</sup>, Irmgard Andresen<sup>7</sup>

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**Objective:** To use data from the Icatibant Outcome Survey (IOS) registry to evaluate whether treatment outcomes with icatibant are affected by repeated and frequent administration.

**Methods:** The IOS registry is an ongoing, international, prospective, observational study designed to monitor the safety and effectiveness of icatibant treatment in the real-world setting (NCT01034969). Registry patients from 10 countries were divided into 2 groups based on the number of attacks per year; <5 attacks/year and ≥5 attacks/year. Descriptive retrospective analyses of long-term treatment outcomes (number of attacks, treatment administration, duration of attack, time to resolution of attack, number of injections and time between attack onset and first injection) were performed using data obtained between July 2009 and October 2014.

**Results:** Of 1761 attacks in 234 patients, 920 attacks (n=201; 62.2% female) were in the <5 attacks/year group while 841 attacks (n=33; 60.6% female) were in the ≥5 attacks/year group, with a median (IQR) number of attacks per patient of 3.0 (2.0, 6.0) and 19.0 (12.0, 33.0) respectively. Patients self-administered icatibant in 78.7% of attacks (<5 attacks/year) and 90.1% of attacks (≥5 attacks/year) [P<0.0001]. Median (inter-quartile range) number of injections used was similar 1.11 (0.34) vs 1.12 (0.38) in the <5 and ≥5 attacks/year groups. In 2008, median (interquartile range) time from symptom onset to treatment was 3.9 (2.5, 5.3) and 5.4 (2.7, 8.2) hours in the <5 and ≥5 attacks/year groups; in 2014, this decreased to 0.5 (0.0, 17.6) and 1.3 (0.0, 49.0) hours. Duration of attack and time to resolution from first injection were similar in both groups.

**Conclusions:** Treatment outcomes for patients who used icatibant for ≥5 attacks/ year were similar to those in patients who used icatibant for <5 attacks/ year with no reduction in treatment response. Self-administration was more common in patients with a higher frequency of attacks.

**P.12: Evaluation of angioedema due to acquired C1 esterase inhibitor deficiency; observational data from the Icatibant Outcome Survey**

James Laffan<sup>1</sup>, Hilary Longhurst<sup>1</sup>, Andrea Zanichelli<sup>2</sup>, Teresa Caballero<sup>3</sup>, Laurence Bouillet<sup>4</sup>, Werner Aberer<sup>5</sup>, Vincent Fabien<sup>6</sup>, Marcus Maurer<sup>7</sup>

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**Objective:** To evaluate the off-label use of icatibant in angioedema related to acquired C1 esterase inhibitor (C1I NH) deficiency in the Icatibant Outcome Survey (IOS) database.

**Methods:** The IOS registry is an ongoing, international, prospective, observational study designed to monitor the safety and effectiveness of icatibant treatment in the real-world setting (NCT01034969). Data were collected at clinic visits (July 2009-July 2014). Statistical analyses used a mixed model for repeated measures.

**Results:** Thirteen patients across Europe (female, 38.5%; mean age, 60.9 years) experienced 254 icatibant-treated attacks of angioedema due to acquired C1-INH deficiency. Of 249 attacks with anatomical location data, most affected the abdomen and/or skin (224/249, 90.0%; vs 1667/1682, 99.1%, for hereditary angioedema [HAE] type I/II attacks). Of 218 attacks with severity data, patients with acquired angioedema reported a significantly higher percentage of attacks that were very mild, mild or moderate than patients with HAE type I/II (61.4% vs 38.2%,  $P < 0.001$ ). Median time to symptom resolution was 1.3 hours (N=77 attacks; vs 4.9 hours for HAE type I/II attacks [N=860];  $p = 0.0001$ ). Median attack duration was 3.3 hours (N=58 attacks; vs 7.0 hours for HAE type I/II attacks [N=692];  $p = 0.004$ ). Reinjection was required for 5.3% (13/243) of attacks in patients with acquired angioedema and 10% (166/1657) of attacks in patients with HAE type I/II. Most icatibant injections were self-administered (81.3% in patients with acquired angioedema and HAE type I/II).

**Conclusions:** In IOS, symptom onset generally occurred later in life in patients with acquired angioedema than those with HAE. Anatomical distribution of attacks in patients with acquired angioedema was similar to that of patients with HAE, but severity was generally more moderate.

Icatibant-treated attacks of angioedema due to acquired C1-INH deficiency were shorter than HAE type I/II attacks.

### **P.13: Drug allergy - time to take notice**

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**Objective:** Drug allergies are unpredictable, can be life threatening and often display multiple clinical presentations, making them difficult to diagnose. Once an allergy label is applied it is likely to lead to alterations in future drug therapy, increased cost of treatment and prolonged hospitalisation. This study investigated the prevalence of self-reported drug allergy in inpatients at University College Hospital, London, UK.

**Methods:** 440 adult inpatients' medication charts were reviewed for presence, symptoms and severity of drug allergy, between November 2014 and February 2015.

**Results:** 44% of inpatients (194) reported at least one drug allergy (141 females) and 16% reported allergy to two or more medications. 57% of reported allergies were to antibiotics. Penicillin constituted both the most commonly reported drug allergy (37%) and the most commonly reported antibiotic allergy (76%). 20% reported allergy to more than one class of antibiotics. Analgesics were the second most commonly reported allergy (35%), followed by antiemetic (25%). Cutaneous reactions were the commonest presentation (42%) followed by gastrointestinal symptoms (18%). Severe systemic drug reaction such as: anaphylaxis or cardiac arrest, were reported by 11% of inpatients. Drug allergy was more common in older age groups with 69% occurring in patients over the age of 55. 10% of the reactions were likely to represent adverse drug effects other than allergies.

**Conclusions:** High prevalence of reported drug allergy poses a significant burden on the NHS inpatient care. In our study, antibiotics were the most common culprit reported. Female sex and older age were associated with an increased proportion of self-reported drug allergy. Skin manifestations were the most commonly reported symptoms.

This audit highlights the prevalence of reported drug allergy in hospitalised patients and underscores the importance of provision of Drug Allergy Services throughout the NHS.

**P.14: Adequacy of chronic spontaneous urticaria monitoring using validated scoring tools or clinicians' clinical observations: UK retrospective observational studies of omalizumab and ciclosporin treatment**

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**Objective:** To evaluate monitoring of patients with chronic spontaneous urticaria (CSU) in the UK using validated measures (Urticaria Activity Score over 7 days [UAS7] for disease severity and Dermatology Life Quality Index [DLQI] for quality of life [QoL]).

**Methods:** We conducted two parallel retrospective studies of CSU patients treated with either omalizumab (in 5 UK NHS hospitals with specialist dermatology or immunology services) or ciclosporin (in 3 of these hospitals). Patients' medical records were reviewed for results of routinely documented validated measures of disease severity and QoL, and clinician comments at treatment initiation (baseline).

**Results:** Of 46 omalizumab-treated patients with CSU, 14 (30%) had no UAS7 or DLQI recorded at baseline. Clinicians' comments in patients without UAS7 or DLQI mentioned symptom severity in 9, symptom frequency in 4, extent of symptoms in 4 and QoL impact in 2 patients. No omalizumab-treated patients had comments on all four aspects of CSU and 3 had no comments on any aspects. Of 72 ciclosporin-treated patients, 52 (72%) had no UAS7 or DLQI at baseline. Clinicians' comments in patients without UAS7 or DLQI mentioned symptom severity in 27, symptom frequency in 26, extent of symptoms in 12 and QoL impact in 11 patients. Only one ciclosporin-treated patient had comments on all four aspects of CSU and 8 had no comments on any aspects.

**Conclusions:** Recommended validated measures of CSU disease severity and impact on QoL are not currently used routinely in the UK to assess patients starting third-line treatments. Clinicians' documented observations rarely cover all the aspects needed to fully describe baseline disease status. Without baseline use of validated measures such as DLQI or UAS7, as recommended in recent international consensus guidelines<sup>1</sup>, it is difficult to monitor the impact of CSU treatments on patients' well-being.

1. Zuberbier T et al. Allergy 2014;69:868-887.

### **P.15: Penicillin allergy test outcomes: single center two years' experience**

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**Background:** Penicillin allergy (PA) "label" is associated with increased antibiotic resistance and healthcare costs. PA is reported by 10% of general population. Studies suggest that only 10 - 20% of patients with self-reported PA are confirmed to be allergic.

**Methods:** We retrospectively reviewed outcomes of PA testing in patients referred to Drug Allergy Unit at University College London Hospital, between March 2013 and June 2015.

**Results:** Out of 89 patients referred, 5 presented with a history of severe delayed cutaneous reactions and did not undergo further testing. 22.6% (19/84) were diagnosed with penicillin allergy. In vitro sIgE to Penicillin V, Penicillin G or Amoxicillin was positive in 18.8% (3/16). 84.2% (16/19) skin-tested positive to at least one agent: Amoxicillin 52.6% (10/19), PPL 26.3% (5/19), MDM 26.3% (5/19), Benzylpenicillin 21.1% (4/19) and Flucloxacillin 15.8% (3/19). 10.5% (2/19) with negative skin tests developed symptoms of IgE-mediated allergy during oral Amoxicillin challenge. 7.1% (6/84) skin tested positive to Clavulanic acid. Of those 1 tested positive to both Clavulanic acid and Amoxicillin, the remaining 5 patients tolerated Amoxicillin challenge. Additionally 17.6% (3/17) penicillin allergic patients tested positive to Cefuroxime. Contributing factors analysis showed the time interval since index reaction to be significantly shorter in the allergic group ( $p=0.001$ ); gender, age and atopy had no effect on the outcome. Recollection of the culprit drug was higher in the allergic group ( $p=0.034$ ). Within the PA group, history of anaphylaxis (24%), urticaria and /or angioedema (64%) were more common, whereas in non-PA group, unspecified skin rash (40.7%) and nonspecific symptoms (24.6%) dominated.

**Conclusions:** In our cohort 22.6% of patients referred with PA label were confirmed to be penicillin allergic. Recent allergic reaction, clinically presenting as anaphylaxis, urticarial and/or angioedema and recollection of the name of the culprit drug suggest increased probability of PA.



## **P.16: Improving control and preventing deaths in asthma: are we doing enough?**

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### **Objectives**

Guidelines from the British Thoracic Society (BTS) and recommendations from the National Review of Asthma Deaths (NRAD) highlight the importance of structured clinical reviews in asthma management. Thorough consultations may help to improve individual asthma control and reduce asthma-related emergency visits. This audit aimed to assess the quality and content of routine care delivered at a tertiary asthma clinic, looking in particular at the inclusion of inhaler technique assessment and personal asthma action plans (PAAPs).

### **Methods**

A standardised questionnaire, containing two sections, was given to patients attending a tertiary asthma clinic at Guy's Hospital. Section A asked questions regarding inhaler type and frequency, asthma symptoms, and use of additional medical services. Section B considered the content of the clinic review. It assessed the level of discussion surrounding inhaler technique and PAAPs within each consultation. Data was collected from 50 participants over an 8-week period.

### **Results**

This tertiary clinic dealt with chronic and severe cases of asthma. With 80% of patients reporting daytime asthma symptoms in the past month, and 52% attending A&E due to asthma in the past year, thorough reviews are clearly essential. Of the 45 patients who answered section B, 51% reported someone talking through inhaler technique in the clinic that day, whereas only 27% said someone actually demonstrated correct inhaler use. A further 27% reported demonstrating their inhaler technique during the clinic review. With regards to PAAPs, just 58% of patients reported having a written plan. 48% stated that their plan was discussed in clinic that day, however, 17% reported having never had any form of discussion.

### **Conclusions**

This audit highlighted urgent areas of attention. National guidelines are yet to be fully implemented and improvements to the content and quality of routine asthma reviews remain essential. Audits are an important tool in monitoring and enabling this.

**P.17: A retrospective study to determine if de-labelling penicillin allergy leads to respective changes in primary care records.**

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**Objective:** In an era where we should be promoting antibiotic 'stewardship' unverified penicillin allergy is becoming an increasing health concern. While self-reported penicillin allergy is common, only a fraction of these patients demonstrate true hypersensitivity. Guidance exists on investigating such patients but literature on the impact of de-labeling a penicillin allergy is sparse. Consequently, our objectives were to determine the outcomes of patients investigated for penicillin allergy and whether this led to a respective change in their primary care records.

**Method:** All patients who attended for skin prick tests (SPTs) to penicillin-based antibiotics over a 30 month period were identified from a departmental diary. Their clinic letters were interrogated and data was collected on laboratory investigations; SPTs, intradermal tests and drug challenges. The conclusions from these studies and advice to the General Practitioner (GP) was noted. We collated information from their primary care records to determine if their allergy status was consistent with the advice relayed.

**Results:** 153 patients had SPTs between January 2010 and June 2012. 97 (63.4%) showed no evidence of penicillin sensitivity/allergy. 28 (18.3%) were advised to avoid penicillin-based drugs. The remaining patients included patients who were discharged with advice to the referring team on how to complete a challenge test, patients who were lost to follow up and patients who required further assessment (e.g. patch tests).

Of the 97 patients who showed no evidence of penicillin allergy 82 had accessible GP records. 33 (40.25%) of these records still reflected an allergy to penicillin, a further 7 (7.22%) had "Allergy NOS" or a similar entry recorded.

**Conclusions:** Our data suggests that negative investigative work up for penicillin allergy does not always lead to a corresponding change in primary care records. Inevitably, such patients are unlikely to receive penicillin when it may be the most appropriate antimicrobial.

**P.18: Chronic spontaneous urticaria-impact of the diagnostic delay on healthcare resources.**

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**Objective:** Chronic spontaneous urticaria (CSU) is frequently misdiagnosed leading to incorrect treatment and delay in referral to specialist care when necessary. Our objectives were to determine how effectively health care resources were utilised in the diagnosis and management of CSU and whether this could be optimized if best practice guidelines were applied. These guidelines assumed that patients are referred to secondary care when they have failed optimal antihistamine therapy.

**Method:** Patients diagnosed with CSU were identified in primary and secondary care. Their medical records were interrogated to determine the number of contacts with healthcare professionals; time to diagnosis and the overall cost and length of their pathway, from initial presentation with urticarial symptoms to definitive diagnosis.

**Results:** Seventy-five CSU patients were identified (10 from primary care, 65 from secondary care). Notably, there was inconsistent coding for CSU in primary care. The mean diagnostic delay was 4 years with patients averaging 13 GP visits before diagnosis. 49% of patients had presented as an emergency at least once. Cases were frequently misdiagnosed as allergy (52%) or other skin disorders (29%), 19% had no initial diagnosis.

For patients where full costing's of the pathway were calculated, GP appointments accounted for 73% of the overall contacts and 53% of the journey cost. The mean cost was £1,534 per patient (range £851-£2,213), if guidelines had been followed this figure would have been reduced to £564; additionally the mean length of the patient journey would have been reduced by 16.5 months.

**Conclusions:** There is a clear correlation between sub-optimal management in primary care, length of pathway journey, and utilisation of resources. Our data suggests that applying best practice guidelines would result in a marked reduction in costs and time to diagnosis, ultimately, leading to more effective patient care.

### **P.19: Reviewing penicillin allergy label is good for patients' health and for hospitals' bank balance**

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**Objective:** Penicillin is one of the most commonly reported drug allergies. Once applied (often in early childhood or adolescence), a penicillin allergy label becomes difficult to remove. This can lead to increase in: use of broad spectrum antibiotics, incidence of antibiotic resistance, emergence of clostridium difficile, Vancomycin resistant enterococcus, Methicillin resistant Staphylococcus aureus and healthcare costs.

**Methods:** Between November 2014 and February 2015 we reviewed 440 inpatient medication charts for the presence of penicillin allergy. Hospital records of the patients with penicillin allergy were reviewed for antibiotic prescription patterns and admission rates in the previous 5 years.

**Results:** We identified 74 patients (17%) with the penicillin allergy label (female 68%). For those requiring antibiotics during this admission, Ciprofloxacin (17%) was the most commonly prescribed, followed by Clarithromycin (11%), Teicoplanin (8%) and Clindamycin (5%). Over 73% of patients with penicillin allergy label were admitted more than once in the last 2 years and over 95% in the last 5 years. Mean rate of admission for penicillin allergic patients was 6.9 and 9.2 over 2 and 5 years respectively.

**Conclusions:** Withholding first line treatment compromises patients' care, has financial implications in terms of non- $\beta$ -lactam antibiotic cost, and lengthens hospital stay. In our hospital, Quinolones, Macrolides, Glycopeptide and Lincosamide antibiotics are the most commonly prescribed classes in those with a presumed Penicillin allergy. These drugs can be: more expensive, less effective and have more side effects than  $\beta$ -lactams. Previous studies have calculated that significant savings can be achieved in patients who are tested and subsequently able to receive penicillin. These calculations were based on a single hospital admission. Our study shows that over 73% of penicillin allergic patients are admitted more than once over a 2-year period and hence the savings for the Trust are likely to multiply with most readmissions.

## **P.20: Economic and humanistic burden of refractory chronic spontaneous urticaria: UK sub-analysis of ASSURE-CSU**

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**Objective** ASSURE-CSU is the first non-interventional, multinational study describing the burden of chronic spontaneous urticaria (CSU) refractory to H1-antihistamines. UK findings on health related quality of life (HRQoL) and economic burden to the healthcare system and society are summarised.

**Methods** ASSURE-CSU includes medical record abstraction of disease history and resource utilisation, alongside patient reported outcomes (PROs) including Urticaria Activity Score over 7 days (UAS7), Dermatology Life Quality Index (DLQI), Chronic Urticaria Quality of Life Questionnaire (CU-Q2oL) and Work Productivity and Activity Index (WPAI). Patients with CSU symptomatic despite H1-antihistamines, aged  $\geq 18$  years, with disease persisting  $\geq 12$  months were included. Data were analysed using descriptive statistics. Direct costs were estimated based on health care utilisation using NHS tariffs and indirect costs assuming 160 hours worked/month\*hourly average wage of 12.97 GBP.

**Results** Medical record data was obtained for 83 eligible patients. 79/74 patients completed surveys/diaries, respectively. 79.5% were female. At enrolment mean age was 49.7 years, mean disease duration since CSU diagnosed was 57.3 months. Mean UAS7 was 20.3 (SD = 9.93), mean DLQI was 10.6 (SD = 7.19) and mean CU-Q2oL was 40.1 (SD = 20.93). During the previous 12 months patients had required a mean of 3.6 routine HCP visits due to CSU, with 7.2% requiring emergency visits. Total mean annual direct healthcare costs were estimated at £734. Among the 51.4% full-and part-time employed patients, mean absenteeism was 9.9% of work time, mean presenteeism 33.1% and overall work impairment (computation of absenteeism and presenteeism) 35.3% due to CSU in the previous 7 days. Total mean indirect monthly costs of work impairment per employed patient were estimated at £733. **Conclusions** CSU in patients symptomatic despite H1-antihistamine treatment have a significant impact both on patients' lives and cost to the healthcare system; impact on work represents a considerable societal burden.

## **P.21: Angina bullosa haemorrhagica - an unusual mimic of angioedema**

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### Background

Acute hypersensitivity reactions may mimic other medical conditions. We describe a patient who presented with suspected anaphylaxis to peppers but actually had angina bullosa haemorrhagica.

### Case Presentation

A 48 year-old lady was referred with seven episodes of swelling at the back of her mouth over two years. The worst one happened before referral. She had just eaten a mouthful of a bread roll with Heinz sandwich spread when she felt something squashy on the roof of her mouth. It spread it sideways and backwards when she pressed it. Swallowing became difficult. She took chlorphenamine and called the paramedics because she was scared. The paramedic noted a blood blister and took her to the local A&E in case it obstructed her throat. She was prescribed prednisolone for 3 days. The blood blister burst. She had used a beclometasone dipropionate inhaler for asthma for about five years. A full blood count, erythrocyte sedimentation rate, coagulation screen, skin autoantibodies, IgE, ImmunoCAP screen to foods, inhalants, nuts and pepper were normal.

### Discussion

Angina haemorrhagica bullosa is mostly referenced in the dental literature. It is characterised by formation of blood filled blisters in the oral mucosa. The aetiology is unclear. In our case we propose that the oral mucosa was friable due to her long term steroid inhaler use for asthma and trauma from eating triggered the event. Inhaled corticosteroids have been shown to cause skin thinning and purpura through systemic absorption, which supports our theory. A prospective study done in a dental department in England demonstrated a strong association between ABH and the use of steroid inhalers for longer than 5 years.

ABH may present with a choking sensation, which is alarming for patients. Clinicians should recognize this condition in the differential diagnosis of allergic reactions of the oropharynx.

## **P.22: Evaluation of the ability to use a self-administered epinephrine injector.**

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### Background:

Because anaphylaxis is unpredictable, epinephrine auto-injectors are intended for immediate self-administration as emergency supportive therapy and their correct management is quite necessary. The aim of this study was to evaluate the ability and knowledge about using a self-administered epinephrine injector in case of allergic emergencies.

### Methods:

77 patients, who had suffered from anaphylaxis, were evaluated about the steps involved in using the self-administered epinephrine injector with a trainer one after the first clinic visit in 2014. They were asked to simulate a potentially life-threatening allergic reaction and their behavior was carefully studied. They aged 1-72 years, average 32.23 years. Only 10 patients were less than 14 years old (in these case, their parents were evaluated). 32 were male and 45 female.

### Results:

41 of them (53,24%) had food allergy, 17 patients had anaphylaxis due to hymenoptera allergy (22%). the majority of patients had suffered from one anaphylactic reaction. Only six of them had more than 2 episodes. 19.40% had pollen allergy. When they were asked to show the steps involved in using a self-administered trainer injector, 81,81% of them were able to hold the device. 59.74% % could remove the tap. 67,53 could place and press the injector tip against the outer thigh. 32,46% could hold the needle for 10 seconds. 51,94% knew what to do after the injection. They were also asked if they had been aware of the expiration date and 36 patients (46,75%) had checked it.

### Conclusion:

Unfortunately the patients and their parents are no sufficiently skilled in the use of the self-administered epinephrine injector- In our opinion, it would be necessary to evaluate the ability of its use to improve performance after the first clinic visit and the follow-up ones using a trainer auto-injector.

### **P.23: Allergy masquerading as acute cardiac pathology**

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**Background** Epidemiological data suggest an increase in the incidence of chlorhexidine (CHX) allergy. Mild reactions are often unnoticed but anaphylaxis can develop on subsequent exposure. The diagnosis is 'easy to miss'.

**Case presentation** A 73 year old male underwent transurethral resection of the prostate with intrathecal bupivacaine, gentamycin *iv* and *Instillagel* (lidocaine/chlorhexidine). Within 5' he became anxious and requested sedation. Diaphoresis and atropine-resistant bradycardia developed followed by cardiac arrest. CPR, multiple doses of adrenaline and intubation were required. ECHO was unremarkable. Because of widespread urticaria chlorphenamine/hydrocortisone were given. Acute serum tryptase was 62.3 (50'), 47 (4 hr) [normal baseline 8 ug/ml]. Allergy referral mentioned a **previous, less severe episode after cystoscopy when MI was suspected** (cardiac investigations normal) but ignored the use of *Instillagel* on this occasion. Investigations: neg SPT/IDT to bupivacaine, gentamycin; pos SPT to CHX (7 mm); **chlorhexidine sIgE 13.1 ku/l**.

**Discussion** CHX is commonly used in surgery/dentistry/medicine in mouthwashes, skin prep, impregnated peripheral/central lines but also in everyday products. Hypersensitivity reactions to CHX can be severe, with protracted hypotension/collapse and death. The majority occur during a urological procedure probably due to increased mucosal absorption/prolonged exposure to CHX when compared to skin disinfection (poor absorption) and larger volume used compared to dentistry. CHX is responsible for 5% of cases of intraoperative anaphylaxis in the UK and 10% in Denmark. Japan banned CHX use on mucosal surfaces in 1984. US FDA warning followed in 1998 and a UK Medical Device Alert in 2012. However a complete ban of CHX is not the solution. Instead a multi-tiered approach is needed: multidisciplinary hospital protocols and 'free from CHX' packs with non-CHX lubricants, CVC and antiseptics to allow for safe surgery; education of the medical/surgical community to raise awareness.



**P.24: Importance of investigation of allergy to MRI contrast media in a patient with life threatening anaphylaxis to gadolinium**

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**Background:** Gadolinium is considered a safe contrast media for magnetic resonance imaging (MRI). This is the first UK case of anaphylaxis to gadobutrol.

**Case presentation:** Sixty-five year old gentleman underwent MRI angiography prior to AF ablation. Immediately following intravenous Gadovist (gadobutrol) he felt unwell, developed tongue and facial angioedema and became severely hypotensive (blood pressure unrecordable). The cardiac arrest team were called, and he required 2 doses of 0.5mg of IM adrenaline, followed by 4 doses of 0.1mg of IV adrenaline, 500ml of gelofusin, 1 litre of normal saline, 200mg IV hydrocortisone and high flow oxygen. Tryptase levels at 2, 4 and 24 hours post reaction were raised at 69.1, 48.7 and 16.5ng/ml, with a baseline of 13.8 ng/ml (NR 2-14ng/ml). In our clinic 2 months later, skin prick and intradermal tests were carried out to Gadovist, Magnevist, Omnipaque 300 and Niopam 300. The skin prick test to Gadovist was negative but intradermal strongly positive (weal diameter 20mm with pseudopodia and flare >30mm). Skin tests to other contrast media were negative. The diagnosis was severe anaphylaxis to gadobutrol.

**Discussion:** Gadolinium based contrast agents (GBCA) became available in 1988 and are now used in 25-30% of all MRI scans. The incidence of anaphylaxis to GBCA range between 0.004-0.01%, lower than radiocontrast media. Javaloyes reported 3 patients with gadobutrol anaphylaxis confirmed by skin prick and intradermal tests and basophil activation. Two of these had positive intradermal tests to other GBCA. Montalvo reported one case of anaphylaxis to gadobutrol. This patient subsequently had anaphylaxis to gadoterate meglumine, Our patient had negative skin tests to gadopentetic acid. This is the first case of severe anaphylaxis to gadobutrol in the UK.

## **P.25: Assessment of cardiac changes during peanut allergic reactions**

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### **Objective**

The physiological events which occur during acute, IgE-mediated allergic reactions to food are poorly understood. We evaluated the electrocardiographic (ECG) changes occurring during acute allergic reactions to peanut, and their relationship to reaction severity.

### **Methods**

Holter monitor recordings from 25 peanut-allergic adults undergoing double-blind placebo-controlled challenges as part of the TRACE study were analysed in 10-minute epochs using MARS and Kubios software (GE Systems).

### **Results**

On reactive compared to non-reactive days, we found significant increases in heart rate (mean 10.8bpm, 95% CI 5.73 to 15.88) and QTc interval (mean 14.92ms, 95% CI 7.34 to 22.50) but not in PR or QRS intervals. On reactive days, mean heart rate and QTc interval peaked at 79.28bpm and 432.22ms, respectively. We also found changes in heart rate variability with increased dfa1 (P=0.047) and decreased sampen (P=0.0017), indicative of increased sympathetic drive. These changes did not differ significantly between anaphylactic and non-anaphylactic peanut allergic reactions.

### **Conclusion**

Cardiac changes consistent with sympathetic activation and decreased heart rate variability were demonstrated in this study. These changes may contribute to cardiac arrhythmias reported in some cases of food allergic reactions.

**P.26: Assessment of the relationship between skin prick test reactivity, and severity and threshold of peanut allergic reaction in human volunteers**

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**Background**

Food allergy is the commonest cause of anaphylaxis. Severity and threshold vary widely between affected people. It would be useful to be able to predict how individuals will react so that advice could be tailored to the individual. We evaluated whether titrated skin prick testing (SPT) could predict threshold and/or severity of peanut allergic reactions.

**Methods**

We performed duplicate, titrated SPT immediately prior to double-blind placebo-controlled food challenge in 27 peanut-allergic adults. We evaluated SPT wheal size at 20 minutes (P<sub>MAX</sub>), time taken for this wheal to reduce to 6mm (P<sub>T6</sub>) and 3mm (P<sub>T3</sub>), and the concentration of peanut needed to elicit a 3mm (P<sub>C3</sub>) or 6mm (P<sub>C6</sub>) wheal. We assessed the relationship between these measures, and threshold dose (cumulative dose of peanut protein ingested before reaction), and measures of reaction severity (Ewan and Clark score and requirement for intramuscular adrenaline).

**Results**

We found a significant relationship between P<sub>MAX</sub> and the Ewan and Clark score (P=0.03) and a significant association between P<sub>T3</sub> and adrenaline use (P=0.03).

**Conclusions**

These preliminary findings suggest some relationships between SPT reactivity, threshold and severity of allergic reactions to peanut. However these exploratory findings need confirmation in a second cohort, and at present they do not appear strong enough to influence clinical decision making.

## **P.27: Anaphylaxis to Clavulanic Acid - more common than you might think.**

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### Background

Clavulanic acid (CA), commonly used in combination with Amoxicillin in order to overcome antibiotic resistance to beta lactamase, is considered a rare cause of anaphylaxis. We present two cases of selective CA anaphylaxis during general anaesthesia.

### Case Presentation

#### Case 1

46 year old female developed tachycardia, profound hypotension and bronchospasm following induction with: Fentanyl, Rocuronium, Midazolam, Propofol and Co-amoxiclav. Surgery was abandoned and the patient was transferred to ITU.

She was skin tested with induction agents (SPT & ID) including penicillin allergy determinants as well as CA. She tested positive to CA (20mg/ml) intradermally. Patient tolerated oral challenge with Amoxicillin and was able to proceed with surgery several months later.

#### Case 2

44 year old female developed hypotension and tachycardia following induction with : Propofol, Fentanyl and Vecuronium and Co-amoxiclav.

She was skin tested with the above agents including CA (20mg/ml ID). She tested negative to all of the above. However, three hours following the test she developed a delayed skin reaction to CA, suggesting selective CA allergy. She tolerated oral challenge with Amoxicillin.

### Discussion

IgE mediated reactions to CA are considered to be infrequent, none the less, with increased use of Co-amoxiclav a selective hypersensitivity to CA should be considered. CA should be skin tested separately from Amoxicillin as the required concentration of CA often renders Co-amoxiclav dilution irritant. CA skin testing may require delayed surveillance.

**P.28: Allergy to nut free curry in peanut allergic individuals: are chefs to be blamed for contamination or is there another cause in some?**

Prashantha Vaitla

*Nottingham University Hospitals NHS Trust, Nottingham, UK*

Background: Nuts are widely used in the preparation of Indian meals but not all curries contain nuts. Yet, we hear reports of peanut allergic individuals experiencing allergic reactions following consumption of allegedly nut-free curries.

Case presentation: A 22 yr old lady presented with history of immediate allergic reactions to Indian foods. She was allergic to peanuts from age 3. At age 15, she developed lupin allergy. From age 16, she had allergic reactions on consuming nut free Indian foods. Skin prick testing with commercial solution of curry mix was strongly positive. Of the spices in the curry mix, she tolerates coriander, turmeric, mustard, cumin, pepper, garlic, poppy seeds and celery. She suspected fenugreek to be the culprit as it was present in foods that caused reactions. She was unsure about fennel which she hasn't previously come across. Specific IgE (sIgE) was strongly positive (>100 kU/L) to fenugreek and she was labelled allergic to fenugreek.

Discussion: This is an interesting case of progressive development of allergy to various legumes over the years. Although fenugreek belongs to the legume family, its main use is as a spice. It is also used in artificial maple syrup, confectionery and baked goods. However, fenugreek is not on the food standards agency regulatory list and may not always be listed making it a hidden allergen. Published literature on fenugreek allergy is limited, with majority of cases identified through the Norwegian Food Allergy Register. Potential fenugreek allergens (Tri f1, Tri f3, Tri f2 and Tri f4) are homologous to peanut allergens Arah 1, Arah 2, Arah 3, Arah4, Arah 6, Arah 7 and Arah 8 with potential for high risk of cross reactivity. This case illustrates the need to suspect fenugreek allergy in peanut allergic individuals experiencing reactions despite avoiding peanuts, especially if having reactions to Indian foods.

**P.29: Preseasonal subcutaneous grass pollen immunotherapy with attenuated allergen (Pollinex) is safe and effective in adult patients with seasonal asthma**

*Annette Wagner, Lucinda Kennard, Jennifer Whisken, Sarah Harrison, K Rutkowski  
Cambridge University Hospital Addenbrookes, Cambridge, UK*

12 patients ( 6 male, 6 female) with severe grass pollen allergy and seasonal asthma were treated with preseasonal subcutaneous grasspollen immunotherapy with attenuated allergen extract (Pollinex). Treatment resulted in a significant improvement in total symptom scores from an average of 25 (maximum33) pre treatment to 14 after 1 year of treatment, with chest specific symptom scores improving from an average of 6.8 ( maximum 12) to 3.5.

Total treatment scores during the pollen season prior to immunotherapy were 16 reducing to 7.3 after 1 year of immunotherapy. Reduction in use of oral or parenteral steroids was particularly significant with 7 patients receiving either prior to immunotherapy and only 2 after year 1. Even in those 2 patients steroid use was reduced by half.

Treatment was well tolerated . Adverse reactions occurred in 8 patients during up dosing but were mild, consisting of large local reactions in 5 patients, facial erythema in one patient and conjunctivitis in 2 patients. Symptoms responded well to oral antihistamines.

There was no correlation of grasspollen specific IgE levels with symptom scores pretreatment or response to treatment. 7 out of 12 patients were sensitised to other aero allergens. This did not seem to be associated with a less favourable response to treatment.

**P.30: Anaphylaxis in adulthood: exploring the psychological experience and patient-centred care**

Elaine Walklet<sup>1</sup>, Charlotte Taylor<sup>1</sup>, Berenice Mahoney<sup>1</sup>, Eleanor Bradley<sup>1</sup>, Laura Scurlock-Evans<sup>1</sup>, Steve O'Hickey<sup>1,2</sup>

<sup>1</sup>University of Worcester, Worcester, UK, <sup>2</sup>Worcester Royal Hospital, Worcester, UK

**Objective:** Research is urgently required to understand the in-depth psychological experience of anaphylaxis in adulthood. The following study aimed to explore the psychological impact of anaphylaxis first experienced in adulthood from across the 'triangle of care' (patient, family and staff members). Additionally, the study sought to identify strategies to facilitate discussion between staff, adults with anaphylaxis and their families about the psychological impact of adult-onset anaphylaxis.

**Methods:** A qualitative, multi-perspective interview design was utilised. Adult patients (aged 18+) with a diagnosis of anaphylaxis or idiopathic anaphylaxis were recruited via the Allergy Clinic at a West Midlands Hospital. In-depth, participant-led interviews were conducted with patients, family members and allergy clinic staff to enable multiple perspectives on the phenomenon of adult-onset anaphylaxis. Interpretative Phenomenological Analysis (IPA) was utilised as the method of analysis as this approach is particularly useful for uncovering lived experiences and providing in-depth understandings of the meaning and experience of illness.

**Results:** A number of emerging themes have been identified through the interviews and analysis including loss of control, changing identities, barriers to psychological support and challenges in anaphylaxis self-management. Analysis is being conducted iteratively and final themes will be explored in relation to contemporary health psychological theory during this presentation.

**Conclusions:** The study has provided patients, family members and staff with an opportunity to consider the psychological impact of adult-onset anaphylaxis, with an assessment of how psychological needs are currently met in routine hospital practice. Recommendations will be drawn to support services in the provision of psychological support for this group and to enhance patient-centred care.

## Allied Health

### **P.31: Implementing the New Food-Label Legislation (2014) : the unforeseen challenges**

Tushar Banerjee<sup>1</sup>, Isabel Skypala<sup>2</sup>, Jill A Warner<sup>3</sup>, Louise Michaelis<sup>4</sup>, Ken Ross<sup>5</sup>

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#### **Objective**

Food allergy is a significant public health problem. At present prevention is the only method for reducing the health risk. New food-label legislation(2014) is one step forward for successful prevention. This study will explore gaps of knowledge, practice and perception of allergy in the food-handlers (FH) following new food-label legislation implementation to identify future education and training need.

#### **Methods**

In this study, the internally validated structured questionnaires were followed by a focus-group discussion. The questionnaires were administered to hospital restaurants and take-away FH. The data was presented using descriptive statistics. Qualitative analysis of the findings were subsequently undertaken in the focus-group meeting to find themes behind identified problems.

#### **Results**

47 food-handlers participated in this project. (Hospital/take-away; n=18/29). Only 22.22% of hospital and 10.34% take-away FH received allergy focussed training; however, 83.3% of hospital and 72.41% of take-away FH received mandatory safe food handling training. 88.89% of hospital and 93.1% of take-away FH were unaware of the allergy specific pathway in their establishment. 94.4% of hospital and 86.21% take-away FH feel that prevention of food allergy is a joint responsibility with the consumers. In the take-away FH group there was no knowledge of 'allergen alert' or 'advice to customer' in the menu card regarding food allergy compared to hospital group (55.56%). Most of the food-handlers were unaware of new food allergy legislation. (77.78% vs 86.21%; Hospital vs. take-away). The cross contamination was perceived as bacterial and not from an allergen point of view in both the groups. Lack of structured allergy focussed training and failure to implement food safety regulations in imported food ingredients were major themes identified in the focus group meeting.

#### **Conclusion**

This study highlights the urgent need for an allergy focussed training to generate food allergy awareness necessary for the successful implementation of new food allergy legislation.



### **P.32: Ten years of grass pollen counting at The Ipswich Hospital**

J Bartle

*The Ipswich Hospital NHS Trust, Ipswich, UK*

**Objective:** To review data gathered over ten years of grass pollen counting at the Ipswich Hospital Pollen Monitoring Site. To identify trends and variations that can be associated with increased prevalence of seasonal allergic rhinitis.

**Methodology:** In 2005 a Burkard pollen trap was situated on a roof top of the Ipswich Hospital and monitoring commenced. In the first five years grass pollen was the only taxon counted but now all taxa is observed for and counted. For each day of monitoring from March to September a glass slide is prepared and viewed under a microscope. The pollen identified is counted and calculated as the daily average grains for each taxon/m<sup>3</sup> of air. This figure is sent to the Met Office to compile the UK pollen forecast.

The ten years of grass pollen data collected at Ipswich has been reviewed along with weather conditions during the peak period of pollen dispersal in June and July. Observation in the changes of pollen dispersal timing has been related to trends in hayfever symptoms noted through increased patient consultations at GP surgeries.

**Results:** The annual pollen counts show a repeated pattern of grass pollen dispersal despite weather conditions. Grass pollen levels peak early June falling toward the end of the month and have two smaller peaks in early July before levelling off. The start of grass pollen dispersal has increased by about two weeks over ten years and moderate levels extend for longer later in the season before trailing off.

**Conclusion:** This review demonstrates the lengthening of the grass pollen dispersal period and the longer exposure times of the population to this highly allergenic allergen. A possible reason for noted increases in symptoms of pollen allergy.

This awareness of pollen dispersal timing assists in patient education and improved management of seasonal allergic rhinitis symptoms.

**P.33: Working towards revalidation. A reflective case study of a paediatric allergy patient with poor inhaler technique.**

Rebecca Batt

*The Harley Street Clinic, London, UK*

Background

By 2016, nurses are required to undertake revalidation in order to reflect on how well their practice has adhered to the values set out in their professional code of conduct. There are various components of revalidation. One of them is to describe, through reflection, how an example from daily practice aligns to one of the four themes of the Code: prioritise people, practise effectively, preserve safety and promote professionalism (NMC, 2015). A paediatric allergy patient with poor inhaler technique has provided an opportunity to reflect on nursing practice and implement an education programme for this common problem. Optimal care was achieved by working with the best available evidence, communicating clearly, working cooperatively and sharing skills, knowledge and experience for the benefit of patients.

Case presentation

Eve (10) has multiple food allergies, rhinitis and asthma. Inhaler technique was checked as part of the routine nursing assessment and education in out-patients. The family had never been shown correct inhaler delivery despite numerous admissions to HDU. Eve was still using a yellow aerochamber with mask with very poor technique.

Discussion

Poor inhaler technique is a very common cause of failure to achieve asthma control (Corrigan, 2010). Up to 59% of patients do not know how to use their inhaler correctly (ADMIT 2009). Baverstock et al (Thorax 2010) identified 93% of clinicians could not demonstrate the recognised steps in the correct administration of a pMDI. Parents and children should be educated on the 'how', 'why' and 'when' to use their asthma medications and know how to seek emergency help (NRAD 2014). Using Rolfe's reflection model (2001), a common problem was identified, out-patient nurses' knowledge and skills were audited and an inhaler device training programme was implemented. This illustrates that reflective practice can help improve clinicians' knowledge and patient care.

### **P.34: Reviewing the need for a Dietitian in a paediatric allergy clinic**

Rachel Blyton, Nicola Jay

*Sheffield Children's NHS Foundation Trust, Sheffield, UK*

#### Objective

To review the number of patients requiring dietetic input in a paediatric primary care based allergy clinic and explore the benefit of this input.

#### Method

Data was collected over six months from the Itchy Sneezzy Wheezy clinic, a paediatric allergy clinic delivered by Sheffield Children's Hospital Allergy service at a primary care location. A Paediatric Allergy Dietitian was present in the majority of clinics allowing advice to be given to patients on the same day. Data collected highlighted the number of patients requiring dietetic advice and the possible benefits of this input.

#### Results

130 patients attended the clinic. Of those, 82 had food allergies and 37 received dietetic input, mostly centred around milk avoidance (n=30) either alone or in combination with other dietetic advice. 12 patients required an appropriate milk substitute on prescription, with 18 patients advised on non-prescription milk substitutes. The financial cost of a Dietitian attending this clinic and the potential savings to primary care, with regards to milk substitute prescriptions, were also considered.

#### Conclusion

The management of food allergy is by strict dietary elimination of the suspected allergen which can lead to specific nutrient deficiencies. Milk is one of the most bioavailable sources of calcium and vitamin D, therefore milk elimination without suitable alternatives will lead to deficiency.

The estimated prescription cost of milk substitutes for the patients under 1 year of age (n=11), assuming adequate volume to meet calcium requirements, over the 6 months equated to £9569.28. Without Dietary input, patients are often prescribed unnecessary amino acid formulas. The estimated prescription cost, assuming the patients under 1 year (n=16) were all prescribed an amino acid formula at the same volumes, would equate to £22,364.16. The cost of a Specialist Paediatric Allergy Dietitian attending the clinic for the 6 month period is approximately £1,849, therefore showing the cost benefit of dietetic input in a paediatric allergy clinic.

### **P.35: Health related quality of life in food allergic teenagers from the West of Scotland**

Marian Cunningham<sup>1,2</sup>, Judith Holloway<sup>2</sup>, Malcolm Shepherd<sup>1,3</sup>

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#### **Objective**

To measure the impact of food allergy on health related quality of life (HRQL) in teenagers in the West of Scotland and to assess the utility of the Food Allergy Quality of Life Questionnaire-Teenager Form (FAQLQ-TF).

#### **Methods**

This was a cross sectional study. Participants were recruited from a secondary care, adult severe allergy clinic in the West of Scotland, receiving referrals from an area representing approximately 60% of the Scottish population. 60 patients with proven IgE mediated food allergy aged 13-18yrs, identified retrospectively from clinic records, were invited to complete the self-administered FAQLQ-TF and Food Allergy Independent Measure (FAIM). The performance of the questionnaire was evaluated for construct validity and internal consistency. HRQL scores and the influence of demography, allergy and management were assessed.

#### **Results**

26 (43% of invitees) teenagers aged 14-18 years completed the questionnaire with 1 incomplete questionnaire excluded from the analysis. 13 participants were female; 21 (84%) were allergic to peanuts and 21 (84%) had been prescribed an adrenaline autoinjector. The FAQLQ-TF showed strong correlation with the FAIM (Spearman rho=0.64, p=0.001) and had excellent internal consistency (Cronbach alpha 0.94). Increasing age, frequency of checking labels and frequency of avoiding products with trace warnings were all moderately associated with a poorer HRQL. Carrying adrenaline and being restricted in product choice was troublesome to most participants independent of their overall HRQL score.

#### **Conclusions**

The questionnaire performed well in this population. Some aspects of allergic history and management strategy influenced HRQL scores although no single characteristic predicted HRQL. This successful pilot project has provided the basis for a larger study, currently in the planning stages.

**P.36: Practical cookery course on 'free from' alternatives improves the knowledge and confidence of Dietitians when advising allergic families.**

Rachel DeBoer

*Guy's and St Thomas' NHS Foundation Trust, London, UK*

**Objective:**

To measure knowledge and confidence of Dietitians attending the "KCL Allergy Academy's Kitchen Day" using a pre-course quiz and confidence tool (CT) on arrival and at course completion to see if knowledge and confidence improved. The authors plan to ask delegates to repeat the quiz and CT 3 at 3 months after the course to demonstrate knowledge retention.

**Method:**

The "KCL Allergy Academy Kitchen" is a practical, Dietitian led, one day course for Dietitians which focuses on allergen-free cooking, recipe adaptation using easily available replacements and free-from products. Delegates were asked to complete an anonymised quiz about product substitutes and allergy free cooking and CT designed to assess their current knowledge of this area. Attendees also rated their confidence on a likert scale of 1-10 at being able to recommend product substitutes for various dairy, egg and wheat containing foods and how confident they felt on advising on taste. The same quiz and CT were then repeated at the end of the course.

**Results:**

12 attendees completed the pre and post course quiz and CT. Quiz results are being analysed. Improvements in CT score were seen with every question. Improvement varied from 0.8-5.2 likert points per question. The biggest improvement was in participants confidence in advising families how to cook with wheat free grains.

**Conclusion:**

A practical "learn, cook and eat" session improved the knowledge of Dietitians working in allergy. This demonstrates the need for practical education sessions for other healthcare professionals and families.

### **P.37: BSACI Nurses in Allergy national skin prick test safety evaluation**

Roisin Fitzsimons<sup>1</sup>, Deb Marriage<sup>2</sup>, Janette Bartle<sup>3</sup>, Kathryn Powrie<sup>4</sup>, Andrew Williams<sup>5</sup>, Brenda De Witt<sup>6</sup>, Jennifer Whisken<sup>7</sup>

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#### **Objective**

An evaluation was performed to examine the safety of Skin Prick Testing (SPT). SPT is a quick, safe and inexpensive tool used in the outpatient setting, in conjunction with clinical history, to diagnose allergic disease.

Two standard operating procedures have been produced by the BSACI (SPT in children) and GA<sup>2</sup>LEN to enhance standardisation of SPT procedure. SPT should be performed in a setting equipped to manage anaphylaxis, by appropriately trained health care professionals.

There are relatively few reports of systemic reactions to SPT, however the literature is outdated. A prospective study of over 5,000 children across 11 centres in Scandinavia performed fifteen years ago, demonstrated the safety of SPT, in addition identified risk factors for those children at risk of a generalised allergic response or systemic reaction (table 1).

Risk factors for systemic reactions associated with SPT

Very young children (<1 year)

Widespread active eczema

Symptomatic Asthma

Excessive number of SPT (n=unspecified)

Table 1. Risk factors for a systemic reaction during SPT

#### **Methods**

A national evaluation took place in early 2015 across the UK, to assess the safety of SPT in adult and paediatric populations.

#### **Results**

285 patients underwent SPT in three centres. There were no fatalities or anaphylaxis to SPT in any of the centres participating in the audit. 14% of patients experienced a mild, localised reaction, with 46% (n=19) of these patients receiving topical treatment.

19 (7%) children fell into the very young risk factor. 25 (9%) had eczema of unknown severity, none had active asthma.

#### **Conclusions**

This preliminary evaluation suggests SPT is a safe procedure, even in those falling into 'at risk' categories. Further data is required to make the results generalisable. There have been anecdotal reports of anaphylaxis following SPT and it may be useful to set up a national reporting system.

### **P.38: An audit of baked milk challenges in Southampton Children's Hospital**

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#### Background

The prevalence of milk allergy in infants is 2-3% accounts for a majority of referrals to the paediatric allergy dietetic service. Most children will have resolved milk allergy by school age. In our service, baked milk challenges are performed on the day ward.

#### Aims/ objectives

We sought to review all baked milk challenges in children with IgE milk allergy over an 18-month period, and to compare patients against the BSACI guidelines criteria for home reintroduction of baked milk (published in 2014).

#### Methods

A retrospective case note review was performed on all patients who underwent a resolution challenge to baked milk between January 2013 and September 2014. Patients were identified from the local paediatric food challenge database.

#### Results

A total of 44 patients were referred for a resolution challenge to baked milk. Of the 37 patients who completed their challenges, 8 (21.6%) were positive, 29 (78.4%) were negative and 1 (2.7%) was inconclusive. Of the positive challenges, one resulted in anaphylaxis and the patient was treated with intramuscular adrenaline. The 7 remaining patients either had their challenges cancelled or are awaiting their challenge.

All patients with positive outcomes would not have met the BSACI criteria for home reintroduction of baked milk.

#### Conclusion

The results demonstrate that in our cohort of patients, baked milk reintroduction would be safe in the home setting in those with negative outcomes. The criteria for selecting patients (BSACI guidelines 2014) must be strictly adhered to.

**P.39: Do children who are allergic to at least one nut/seed consume other nuts/seeds regularly in their diet?**

Rosalynd E. Gourgey<sup>1</sup>, Muhsinah Adam<sup>1</sup>, Freda Adjei<sup>2</sup>, Joanna Gambell<sup>2</sup>, Patricia Kane<sup>1</sup>, Una O'Dwyer-Leeson<sup>1</sup>, Suzana Radulovic<sup>2</sup>, Gideon Lack<sup>1,2</sup>, Helen A. Brough<sup>1,2</sup>

<sup>1</sup>King's College London, London, UK, <sup>2</sup>Guy's & St Thomas' NHS Foundation Trust, London, UK

**Objectives:** Nuts are a rich source of unsaturated fats, protein, fibre, vitamins, minerals and phytosterols and are considered to be beneficial in reducing the risk of coronary heart disease. When a child is diagnosed with a nut/seed allergy they are commonly advised to avoid the culprit nuts/seeds and are given a blanket ban on other nuts/seeds. This abstract describes the current practice of consumption of tolerant nuts/seeds, in a group of nut/seed allergic children prior to their entry into the Pronuts study. The primary aim of the Pronuts study is to determine the true rate of co-existent peanut, tree nut, pine nut and sesame seed allergy.

**Methods:** The details of children's nut/seed consumption over the month prior to participation in the study were collected at the screening visit.

**Results:** Forty-five participants aged 6 months to 16 years were assessed; 58% were  $\leq 6$  years old. The majority of participants were allergic to peanut only. Thirty eight percent were avoiding 11 nuts/seeds, 27% ate one nut/seed, 16% ate two nuts/seeds and 20% ate  $\geq 3$  nuts/seeds. One participant ate 8 nuts/seeds. Seeds were more commonly eaten than nuts (44% sesame and 27% pine nut). When evaluated for peanut and tree nuts consumption only, 64% were avoiding all 9 nuts, 13% ate one nut, 9% ate two nuts and 13% ate  $\geq 3$  nuts.

**Conclusions:** Nut/seed allergic children avoid many nuts/seeds which they may tolerate, cutting out an important food group from their diet. Children diagnosed with peanut or tree nut allergy are more likely to eat sesame and pine nut than any other tree nut or peanut. This data highlights the importance of determining whether introducing nuts/seeds to which the child is tolerant is feasible, safe and whether this improves quality of life.



#### **P.40: Paediatric allergy dietitian telephone clinic for Allergy UK, a pilot project**

Maureen Jenkins<sup>1</sup>, Rachel DeBoer<sup>2</sup>

<sup>1</sup>Allergy UK, Sidcup, Kent, UK, <sup>2</sup>Independent Allergy Dietitian, London, UK

*Objectives* A pilot paediatric allergy dietitian telephone clinic to provide dietary advice and reassurance to parents of infants/children with suspected food allergy and feeding difficulties who contact the Allergy UK helpline; to facilitate appropriate allergen avoidance and adequate nutrient provision while they await assessment by a paediatrician, allergist or specialist dietitian.

*Methods* The Allergy UK Helpline team allocated appointments to the telephone clinic where callers met inclusion criteria for the project. Paediatric allergy dietitians provided four 20 minute consultations per clinic, each patient received a single dietetic appointment. A report was sent to the child's GP and parents including details of an interim dietary plan, recommended onward referrals to appropriate healthcare providers and written information sheets. An approved list of information sheets was agreed by Allergy UK and the dietitians. Allergy UK provided administrative support to the clinic and made follow up telephone calls two weeks after each dietetic appointment to assess the impact of the clinic. Clinics were conducted with financial assistance from Nutricia Ltd.

*Results* 48 appointments were conducted. 93% of parents found the consultation 'quite useful' or 'very useful'. They reported feeling reassured (25%), more knowledgeable (61%) and more confident about what to feed their child (64%). All families reported that the post appointment letter helped them to get additional NHS support. A longer call was suggested by 25%, no other improvements were recommended.

*Testimonial* "Amazing service. (Mum) has had a battle.... finally something has happened.... Baby much happier, eating and sleeping now. Can't thank you enough".

*Conclusions* Parents found the interim telephone advice from a paediatric allergy dietitian useful; it increased their knowledge and confidence, and improved onward referral to appropriate healthcare services.

**P.41: Knowledge of the causes and management of food allergy is poor in children and adolescents with and without food allergy**

Rebecca Knibb<sup>1</sup>, Steve Croker<sup>2</sup>, Carol Stalker<sup>3</sup>

<sup>1</sup>Aston University, Birmingham, UK, <sup>2</sup>Illinois State University, Illinois, USA, <sup>3</sup>Derby University, Derby, UK

**Objective:** Food allergy (FA) requires constant vigilance to prevent accidental ingestion of allergens and unpleasant or even life threatening symptoms. A good understanding of FA is essential for successful self-management, however little is known about children's and adolescents' understanding. This study aimed to explore knowledge and understanding of food allergy in both allergic and non-allergic children and adolescents.

**Methods:** Participants aged 6-17 years (61 with FA; 102 without) recruited from allergy clinics and local schools took part in structured interviews to assess knowledge and understanding of FA.

**Results:** The majority of children and adolescents with FA (93.75%) and those without (86.06%) had heard of FA but those with FA could only think of a mean of 3.3 foods and 3.65 symptoms involved; those without FA reported a mean of 2.4 foods and 2.28 symptoms. Peanuts, nuts and dairy foods were most often mentioned as causing an allergic reaction but 6-8 year olds also mentioned 'bad foods' such as chocolate or fatty foods. Only 15% of participants mentioned the immune system as being involved in FA (all in the 12-17 year age group). Those aged 6-11 years were more likely to say it is something your body doesn't like or rejects. Most participants knew food avoidance prevented a reaction but less than 20% mentioned checking food labels and nearly 20% said they would take medication to avoid a reaction.

**Conclusions:** Although most children and adolescents with and without FA have heard of it and can describe some foods and symptoms involved, why people are allergic to food and how to effectively manage it is not very well understood, especially in the younger age group. Clear, age-related information about FA and how it should be managed is needed, to avoid misunderstanding and aid awareness and better self-management of the condition.

#### **P.42: Dietary vitamin D intervention and lung function after the winter months**

Samih Kokandi, Helen Lightowler

*Oxford Brookes University, Oxford, UK*

Vitamin D deficiency is a common problem, especially after the winter months in high latitude countries such as the United Kingdom. It has been reported that lower vitamin D levels are associated with lower lung function and lung capacity.

Objectives: (1) to estimate the dietary vitamin D intake and serum 25-hydroxy vitamin D (25OHD) levels among healthy adults in the UK; (2) to investigate the relationship between vitamin D and lung function in healthy UK adults; (3) to investigate the effect of a dietary intervention on serum 25OHD levels and lung functions in healthy UK adults.

Methods: Healthy adult participants were recruited from Oxford Brookes University after winter and randomly allocated to either a control group (CG) or intervention group (IG). The intervention was consumption of 15 µg/day vitamin D through food items for three weeks. Serum 25OHD, forced expiratory volume (FEV1%), and forced vital capacity (FVC%) were measured. Dietary vitamin D intake was estimated using food frequency questionnaire (FFQ).

Results: Forty-three participants, mean age 29±6.5 years, 21 CG and 22 IG, completed the study. At baseline for all participants, mean serum 25OHD was 15±13 ng/ml, 84% had vitamin D insufficiency (<25 ng/ml) and mean dietary vitamin D intake was 4.2±3.2 µg/D. In the IG, after 3 weeks of diet intervention, 25OHD increased significantly by 3.1 ng/ml (P=0.001) and lung function improved, although changes were not significant: FEV1% was 85%±17 at baseline compared to 91%±9 after 3 weeks; FVC% was 111%±17 at baseline compared to 112%±14 after 3 weeks. No differences were found in CG.

Conclusion: Vitamin D deficiency prevalence is high after winter among healthy adults in the UK. Dietary intake may not be adequate to maintain 25OHD levels, thus a dietary intervention may be necessary to improve serum vitamin D levels and improve lung function.

### **P.43: BSACI Nurses in allergy national skin prick testing audit**

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#### **Objective**

An audit was performed to examine the procedure of Skin Prick Testing (SPT). SPT is a tool used to demonstrate the production of IgE in the presence of an allergen and is used in the outpatient setting, in combination with a clinical history, to aid diagnosis of allergic disease<sup>(1)</sup>.

A previous survey by the Global Allergy and Asthma European Network (GA<sup>2</sup>LEN) found significant differences in SPT technique across a number of European centres <sup>(1)</sup>. Sub-optimal technique may result in false positive or negative reactions, subsequently impacting on patient care. In addition poor technique can affect the tolerability and safety of the test for patients. In response to these findings GA<sup>2</sup>LEN produced a standard operating procedure to enhance standardisation of SPT <sup>(2)</sup>. The BSACI Nurses in Allergy Group subsequently produced an allergy nurse competency document, specifying the knowledge and skills required to safely and effectively perform SPT <sup>(3)</sup>.

#### **Methods**

In 2015 a national audit took place in six UK centres, to examine who performs SPT in adult and paediatric populations and whether they have completed the BSACI Nurses in Allergy competency document.

#### **Results**

Not all staff undertaking SPT have completed the competency document. It is therefore possible that standardisation of SPT is not yet being achieved.

#### **Conclusion**

The Allergy Nurse competency document has not yet been fully utilised within allergy centres to support and inform nursing practice. We would encourage all nurses working in allergy to use the document as part of their appraisal process to demonstrate their competence and specialism.

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**P.44: The use of a one day competency based training course on cow's milk allergy to improve dietitians' knowledge and confidence regarding effective dietary management.**

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#### Objective

NICE guidelines (2011) and RCPCH care pathway (2011) on food allergy recommend that nutritional advice should be provided by dietitians with appropriate competencies. Suitable allergy training is necessary for dietitians to achieve these competencies to effectively diagnose and manage cow's milk allergy.

Following feedback and updating of a pilot training package comprising presentations and case studies, a further one day course was delivered and evaluated to determine whether it would improve dietitians' knowledge and confidence regarding effective dietary management.

#### Methods

A further one day course was delivered. Dietitians' knowledge was assessed pre-course via multiple choice case-based questionnaire. This was followed by pre-course reading and the one-day course itself. Retention of knowledge was assessed one month post course.

#### Results

Twenty five dietitians attended the course and 23 completed both pre- and post-course assessments. Delegates included dietitians working in all healthcare settings, with the majority covering outpatients. Dietitians worked over a range of different grades and had adult, paediatric or mixed caseloads. A significant improvement in assessment scores was seen between pre- and post-course assessments of 11.83% ( $p < 0.001$ ).

Post-course assessment showed the number of delegates who rated their knowledge of cow's milk allergy as high increased from 8 (34.8%) to 16 (69.6 %) ( $p < 0.001$ ) and those delegates who rated their level of confidence in managing children with cow's milk allergy as high increased from 2 (8.7 %) to 11 (47.8%) ( $p < 0.001$ ). All delegates rated their satisfaction with the course as extremely high.

#### Conclusion

A competency based course for dietitians can improve level and retention of knowledge and level of confidence regarding the diagnosis and dietary management of cow's milk allergy in children.

## **P:45 Anaphylaxis in the community: a questionnaire survey of members of the UK Anaphylaxis Campaign**

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### **Objective**

To examine the circumstances, features and management of anaphylaxis in children and adults.

### **Methods**

We analysed data from self-completed questionnaires collected over a 12-year period i.e. 2001-13, available to people by phone and, since 2012, for online completion through the Anaphylaxis Campaign. . The age of participants ranged from 0-72 years.

### **Results**

A total of 356 questionnaires were submitted, 54 did not meet the criteria for anaphylaxis. The remaining 302 anaphylactic reactions originated from 243 individuals. One hundred and ninety three (64%) of these reactions were in children. Approximately half of all reactions occurred at home (n=148; 49%). 61% (n=193) of reactions occurred in those reporting a history of asthma; many (n=76; 41%) of these individuals had asthma that they classified as being severe. In 57% (n=173) cases, the respondent reacted to a known allergen. Self-injectable adrenaline (epinephrine) was available in 79% of the cases, it was only used in 38% of episodes. The usage of self-injected adrenaline was lower in children (30%) than in adults (54%), even though 82% of children had adrenaline available at the time of the reaction compared to 74% of adults.

### **Conclusions**

These data suggest that the majority of anaphylaxis reactions are triggered by exposure to known food allergens and that approximately half of these reactions occur at home. Access to self-injectable adrenaline was sub-optimal and when available it was only used in a minority of cases. Avoiding triggers, access to self-injectable adrenaline and its prompt use in the context of reactions need to be reinforced.

## **P.46: Development of a procedure for Threshold Doses to Peanuts in Adults Diagnosed with Peanut Allergy In Newcastle Upon Tyne.**

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<sup>1</sup>Newcastle Upon Tyne Hospitals NHS Foundation Trust, Newcastle Upon Tyne NHS, UK, <sup>2</sup>Allergy Therapeutics, Worthing, UK

### **Objective**

To identify in the Newcastle Upon Tyne adult population a threshold dose to peanuts in individuals who were diagnosed with Peanut allergy as a child or that had not and an allergic reaction since childhood.

### **Method**

A low dose open peanut challenge was developed using peanut flour added to 100 mls of a low fat smoothie. The individual attended a challenge on 4 separate occasions. The 1st challenge dose was 10mg, the 2nd challenge dose was 100mg and the 3rd challenge dose 1000mg of peanut flour. If the individual completed the 3rd challenge being asymptomatic they returned again to eat actual peanuts. The challenge doses were separated into 7 stages 1%, 4%, 5%, 5%, 10%, 15% and 20% of the total dose for each challenge. Blood pressure, pulse, respiratory rate, PEF, temp, O<sub>2</sub>sats, observations for signs of erythema or urticaria along with gastrointestinal symptoms & any other signs of allergic symptoms were noted.

### **Results**

Only 10 individuals have completed the procedure since 2010 of which 6 have completed the challenge to 1000mg of peanut flour only 3 individuals have been asymptomatic after eating 3-10 grams of actual peanuts and 3 individuals have tolerated 1-2g of peanuts. 4 individuals did not complete the challenges, the dose of peanut flour tolerated ranged from 40mg-800mg of peanut flour 20mg-400mg peanut protein. 2 individuals tolerated 10 grams of actual peanuts one had a positive Ara h 2 and Ara h 9 and the other was negative to all the Ara h profiles.

### **Conclusion**

Threshold doses in peanut allergic individuals maybe as low as 20 mg peanut protein. This procedure can now be used to carry out a larger number of challenges to gain information on threshold doses in the adult population.

**P.47: Extending The Clinical Role of Nursing Assistants In The Children's Allergy Service at GSTT: A Case Study**

Patricia Taylor, E.Rodger, R. Fitzsimons  
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**Background:**

The role of the Nursing Assistant is expanding throughout the NHS. Our tertiary Children's Allergy Service is no exception. This role could be developed and become a fully integrated part of any Allergy Service across the UK.

**Case Presentation:**

Our Senior Nurse Assistant (SNA) has been part of our Children's Allergy Service for seven years. During which, her role has transformed. Initially it was a position that focused on providing environmental and practical support with limited clinical duties.

Utilising available resources from BSACI including their Standard Operational Procedure for Paediatric Skin Prick Testing (SPT) and Allergy Nurse Competencies the role has evolved to incorporate SPT, Lung-Function Testing and education to families, such as administration of Nasal sprays, Adrenaline Auto-Injectors and Inhalers.

**Discussion:**

There have been some concerns regarding unqualified staff undertaking clinical procedures such as SPT. These arise from concerns a SNA would be unable to respond if a systemic reaction occurred to SPT.

Our SNA works within the context of a multi-disciplinary team, in a tertiary allergy service, where a qualified member of staff and resuscitation equipment are always readily available. Our SNA fully comprehends the contraindications and risks of SPT; she is trained in Basic Life Support, and recognises the signs of systemic/anaphylactic reaction.

The role of the SNA within our service remains predominately task-orientated and our SNA does not interpret SPT results. She works within the scope of practice and fully recognises her limitations seeking support when needed.

Advantages to extending our SNA's role include improved patient experience, personal and professional development, and advocates effective multidisciplinary working.

**Conclusion:**

Within a supported environment, the role of Nursing Assistants can be extended to enhance patient experience. There are many tools available from the BSACI to support role development.



## Basic Science

### **P.48: Impact of aero-allergens on human health and mining allergenic proteins using immuno-proteomic tools**

Sayantana Adhikary, Nandini Ghosh, Swati Gupta Bhattacharya  
*Bose Institute, Kolkata, India*

**Objective:** Pollen grains are major cause of inhalative allergy. 20-30% of world population suffers from pollen allergy, with India being not an exception. The aim of the present study is to measure aero-pollen load of different sampling sites of West Bengal (India), their impact on human health and immuno-proteomic studies on a selected pollen grain.

**Methodology:** A continuous air sampling was conducted in different sampling stations of Kolkata and Raiganj during the period of August 2012 to August 2014, using a seven-day Burkard automatic volumetric sampler to record concentration of air-borne pollen grains. Prevalence of pollen allergy was investigated among the patients admitted to nearest hospitals with pulmonary diseases using a questionnaire. Aeropollen load and hospitalization data were statistically correlated. The most potent aero-allergen was selected for immuno-proteomic studies. Its allergenic potential was investigated by SPT, ELISA, histamine assay and immunoblotting (1D and 2D). IgE reactive spots were excised from a 2D electrophoresis gel and subjected to mass spectrometry.

**Results:** During summer (April- June) sunflower pollen grains were found to be most important aero-allergen in the study area. 21% patients were found to suffer from sunflower allergy with higher percentage of sufferers among female patients. Patients of age group 11-30 were most susceptible. 1D and 2D immunoblot using allergenic patient sera against *Helianthus* pollen protein revealed the presence of seven major allergens of which four spots were identified by MALDI TOF TOF and three spots by LC-ESI MS/MS. Three major allergenic proteins were identified as two non-isoformic pectate lyases and a cystein protease.

**Conclusion:** The present study reports the impact of allergy causing pollen grains on human health. Novelty of this report is the identification of a panel of seven sunflower pollen allergens for the first time at immuno-proteomic level, which substantiated the clinical evidence of sunflower allergy.

**P.49: Effects of engineered nanoparticles (NPs) and house dust mite (HDM) allergens on human bronchial epithelial cells.**

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*Abstract withdrawn*

### **P.50: Pathophysiology of asthma: from endotype to phenotype**

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Background: Many single nucleotide polymorphisms could affect the outcome of asthma severity namely: in MPO promoter region of the gene, -463G>A (rs2333227) ; angiotensin converting enzyme (ACE) insertion/deletion (I/D) polymorphism (287 base pairs, on chromosome 17q23, intron 16(rs1799752)); type 1 Angiotensin II receptor AGTR1 1166A/C (rs5186); iNOS intron 20 (IVS20 + 524 G>A-rs944722); beta-2 adrenergic receptor gene (ADRB2) Arg16Gly (rs1042713) and Gln27Glu (rs1042714).

Methods: Asthmatics were compared with controls ; polymorphisms analyzed by PCR and PCR-RFLP .Control of asthma assessed by (ACQ7 and PAQLQ). Statistical analysis was performed with P ASW 18, establishing a significance level of  $p < 0.05$ . Asthmatics (n= 138) and control group (n=213) for MPO; Asthmatics (n=99) and control group (n=201) for ACE; Asthmatics (n=98 ) and control group (n = 50) for AGTR1; Asthmatics (n= 151) and control group (n=171)for iNOS; Asthmatics (n= 49) no control group has been studied for beta2 adrenergic receptor gene (ADRB2).

Results:For MPO promoter region of the gene, -463G>A the genotypes carrying allele A are more frequent among asthmatics and genotypes carrying allele G among controls( $p < 0.05$ ) .For ACE intron 16 (I/D) polymorphism, II genotype is more prevalent in asthmatics compared to controls( $p < 0.05$ ). There is not a significant evidence, that AGTR1 gene A1166C polymorphism could be a genetic marker for asthma( $p > 0.05$ ).For iNOS polymorphism, it could be a risk factor for asthma, being allele G and GG genotype more prevalent in asthmatics( $p < 0.05$ ). For ADRB2 -

Arg16Gly and Gln27Glu gene polymorphisms there is no relationship with asthma severity( $p > 0,05$ ); in Arg16Gly polymorphism the genotype carrying allele G is more frequent among males ( $p < 0.05$ ) .

Conclusions: These SNPs lead to different genotype-specific response to therapy and different endotypes/phenotypes among asthmatic patients.

### **P.51: The role of GSTM1 and GSTT1 gene polymorphisms in bronchial asthma**

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**Background:** An increasing risk for asthmatic disease and an increase in individual susceptibility to pro-allergy effects associated with xenobiotics have been demonstrated to be linked to functional polymorphisms of GST enzymes, in particular, *GSTM1* and *GSTT1* null polymorphisms. One of these genes, *GSTM1*, encodes for a class m GST isoenzyme involved in polycyclic aromatic hydrocarbons (PAHs) detoxification. Another polymorphic gene of the same family is *GSTT1* which encodes for a class q GST that catalyzes the conjugation of halomethanes in human erythrocytes

**Material and Methods:** For *GSTM1* we analyzed a group of: asthmatic patients (n= 60) compared with a control group (n=82); the polymorphisms were analyzed by Multiplex-PCR (Multiplex Polymerase chain reaction). For *GSTT1* we analyzed a group of: asthmatic patients (n= 60) compared with a control group (n=82); the polymorphisms were analyzed by Multiplex-PCR (Multiplex-Polymerase chain reaction). Control of asthma assessed by validated instrument (ACQ7 and PAQLQ). Statistical analysis was performed with PASW version 18 establishing a significance level of  $p < 0.05$ .

**Results:** In asthmatics the genotype frequencies of *GSTM1\*0* were : 30(50%) and *GSTM1+* were : 30(50%); in the control group the genotype frequencies of *GSTM1\*0* were : 45 (55%) and *GSTM1+* were : 37(45%). There are no differences in the frequencies of genotypes between asthmatics and controls( $p > 0.05$ ).

In asthmatics the genotype frequencies of *GSTT1\*0* were : 28(47%) and *GSTT1+* were : 32(53%); in the control group the genotype frequencies of *GSTT1\*0* were : 26 (32%) and *GSTT1+* were : 56(68%). There are no differences in the frequencies of genotypes between asthmatics and controls( $p > 0.05$ ).

**Conclusion:** Although we didn't find any statistical differences between groups we think that it might be related with sample size limitations.

### **P.52: The role of myeloperoxidase gene promoter region polymorphism in asthma**

Margarida Cortez e Castro<sup>1</sup>, Andreia Matos<sup>2</sup>, Ridhi Prabhudas<sup>2</sup>, Joana Ferreira<sup>2</sup>, Angela Gil<sup>2</sup>, Manuel Bicho<sup>2</sup>

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Aim of the study:

The purpose of this study is to analyze the association between SNPs in the MPO promoter region of the gene, -463G>A (rs2333227) with asthma severity when compared with a control group of healthy blood donors and its relation with MPO levels (determined by ELISA kit). Material and Methods: Asthmatics (n= 90) were compared with controls group (n=65); the polymorphisms were analyzed by PCR-RFLP. MPO levels determined by ELISA kit. Control of asthma assessed by ACQ7 and PAQLQ. Statistical analysis was performed with PASW version 18 establishing a significance level of  $p < 0.05$ . Results: We analyzed MPO gene polymorphisms and levels in 90 patients and 65 controls. There is statistical differences between these groups ( $p=0.000$ ); being allele A more frequent in asthmatics and Allele G in controls. Genotypes in asthmatics were statistical different from controls ( $p=0.000$ ). The mean MPO levels were no different in asthmatics ( $17,6 \pm 2,8$  ng/mL) when compared with control group ( $18,19 \pm 4,21$  ng/mL) ( $p=0.526$ ). When associated, the levels of MPO, to each genotype (GG,AG, AA), we didn't find differences between controls and asthmatics ( $p > 0.05$ ).

There are differences in MPO levels by genotypes ( $p=0.000$ ) in the asthmatics: GG:  $36,03 \pm 11,82$  ng/mL; AG:  $14,45 \pm 1,85$  ng/mL; AA:  $17,86 \pm 4,08$  ng/mL. We also find differences when we compare MPO levels between (GG:  $36,03 \pm 11,82$  ng/mL) vs AG+AA ( $14,95 \pm 1,71$  ng/mL)

There are no differences in MPO levels by genotypes ( $p=0.393$ ) in the control group.

There are differences in MPO levels by gender in asthmatics ( $p=0.038$ ) and in control group ( $p=0.000$ ), having the women in controls (Females:  $33,56 \pm 5,72$  ng/mL; Males:  $13,00 \pm 5,72$  ng/mL) higher levels and in the asthmatics (Females:  $12,85 \pm 4,45$  ng/mL; Males:  $19,30 \pm 3,45$  ng/mL) lower levels.

Conclusion: The frequencies of polymorphism in the MPO promoter region of the gene, -463G>A were statistical different between asthmatics and controls. We also concluded that in asthma, GG genotype has higher levels of MPO and that levels of MPO are also associated with gender.

### **P.53: Novel gene polymorphisms in the pathophysiology of asthma : mechanistic approach**

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Background: Many SNPs could affect asthma : MPO -463G>A (rs2333227) ;

iNOS intron 20 (IVS20 + 524 G>A; rs944722); iNOS exon 16: + 14C> T (Ex16+14C>T; rs 2297518).

Material and Methods: Asthmatics were compared with controls ; polymorphisms analyzed by PCR-RFLP . Control of asthma assessed by ACQ7 and PAQLQ. Statistical analysis was performed with PASW 18, and p< 0.05.

Asthmatics (n= 150) and controls (n=213) for MPO; Asthmatics( n=151) and controls (n=171) for iNOS intron 20 ; Asthmatics (n=100) and controls (n = 80) for iNOS: exon 16 . Results: For iNOS: exon 16 in allele and genotype frequencies (p<0.05) being the genotypes carrying allele T more frequent among asthmatics .

Genotypes (CT+TT vs CC; p = 0.003), the genotypes who express allele T were more frequent in the asthma group. The risk (OR) associated is 3.051 (CI 95% [1.451 - 6.386], (p =0.004). For iNOS intron 20 in allele and genotype frequencies (p<0.05) being the genotypes carrying allele G more frequent among asthmatics . Genotypes (GG vs GA+AA; p = 0.000), genotype GG was more frequent in the asthmatics. The risk associated (OR) is 5.034 (CI 95% [2.321 - 10.919], (p <0.001). For MPO-463G>A in allele and genotype frequencies (p<0.05) being the genotypes carrying allele A more frequent among asthmatics. Genotypes (AA +GA vs GG; p = 0.000), genotypes who express allele A were more frequent in the asthmatics . The risk associated (OR) is 4.541 (CI 95% [2.792 - 7.384], (p =0.000). MPO (GA + AA) + Intron20 (GG) when compared with MPO (GG) + Intron 20 (GA +AA) :OR 24.107; CI95% (7.561 - 76.861) ;p<0.001. MPO (GA + AA) + Exon 16 (CT + TT) when compared with MPO (GG) + Exon 16 (CC): OR 9.643;CI95% (3.247 - 28.640);p<0.001.

Conclusions: These SNPs seem to potentiate their causal relationship with asthma.

**P.54: The role of methylenetetrahydrofolate reductase polymorphism in asthmatic patients**

Margarida Cortez e Castro<sup>1</sup>, Martyna Wesslering<sup>2</sup>, Andreia Matos<sup>2</sup>, Angela Gil<sup>2</sup>, Joana Ferreira<sup>2</sup>, Manuel Bicho<sup>2</sup>

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Background: The Methylene tetrahydrofolate reductase MTHFR: C677T (rs1801133) polymorphism was reported to induce hypomethylation in asthma.

The purpose of the present study was to investigate a hypothesized association between the MTHFR 677C>T polymorphism and the severity of asthma.

Material and Methods: Asthmatic patients (n= 139) were compared with a control group (n=34); the polymorphisms were analyzed by PCR-RFLP (Polymerase chain reaction- restriction fragment length polymorphism). Control of asthma assessed by validated instrument (ACQ7 and PAQLQ). Statistical analysis was performed with PASW version 18 establishing a significance level of  $p < 0.05$ .

Results: We analyze MTHFR: C677T (rs1801133) gene polymorphism 139 patients and 34 controls. In the asthmatics there are 90 females and 49 males; in the controls there are 12 females and 22 males . The mean age of the asthmatics was  $38.04 \pm 18.94$  years (7 - 86 years). The mean age of the individuals in the control group was  $42.21 \pm 12.11$  years (20 - 64 years).

In asthmatics the frequencies of allele C were 69% and allele T: 31%. In control group, the frequencies of allele C were 65% and for allele T : 35% . There is no statistical differences between these groups ( $p > 0.05$ ). Genotypes in asthmatics were: CC: 48.9%; CT:39.6 %; TT: 11.5% and for control group: CC: 47.1%; CT: 35.3%; TT: 17.6%. There is no statistical difference between these groups ( $p > 0.05$ ).

When we associate CT+TTvsCC( $p > 0.05$ ) and CC+CTvsTT( $p > 0.05$ ) in asthmatics vs controls

there are no statistical differences between these groups .

There are no differences in the frequencies of genotypes in the asthmatic-group, by being allergic/non-allergic; controlled/uncontrolled asthma; gender and by age-group( $p > 0.05$ ).

Conclusion: Although we didn't find any statistical differences between groups we think that it might be related with sample size limitations, and that the susceptibility to high or low methylation state must be evaluated before asthma therapy.

### **P.55: The role of Lelp-1 polymorphism in asthmatic patients**

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Background: The chromosomal region 1q21 has been linked to allergy and atopic dermatitis in previous studies, with a peak linkage overlying the epidermal differentiation complex (EDC) this gene encodes a late cornified envelope-like prolin-rich protein and the (SNP) rs7534334, a intron variant on gene of LELP1 might be related with atopic disease.

Material and Methods: Asthmatics (n= 131) were compared with controls (n=102); the polymorphisms were analyzed by PCR. Control of asthma assessed by ACQ7 and PAQLQ. Statistical analysis was performed with PASW version 18 establishing a significance level of  $p < 0.05$ .

Results: We analyze LELP1 gene polymorphisms in 131 patients and 102 controls. In the asthmatics there are 84 females and 47 males; in the controls there are 34 females and 68 males . In asthmatics the frequencies of allele C were 67% and allele T: 33%. In control group, the frequencies of allele C were 62% and for allele T : 38% . There is no statistical differences between these groups ( $p > 0.05$ ). Genotypes in asthmatics were: CC: 45.8%; CT:42 %; TT: 12.2% and for control group: CC: 39.2%; CT: 46.1%; TT: 14.7%. There is no statistical difference between these groups ( $p > 0.05$ ).

When we associate CT+TTvsCC(  $p=0.382$ ) and CC+CTvsTT( $p=0.718$ ) in asthmatics vs controls there are no statistical differences between these groups ( $p > 0.05$ ).

There are no differences in the frequencies of genotypes in the asthmatic-group, by being allergic/non-allergic;

controlled/uncontrolled asthma; gender and by age-group( $p > 0.05$ ).

Conclusion:There is not a significant evidence, that LELP1 polymorphism (rs7534334) could be a genetic marker for atopic asthma ( $p > 0.05$ ) in this hospital-based population.



**P.56: Transforming Growth Factor- $\beta$  may regulate allergic inflammation in allergic rhinitis but not remodeling.**

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**Background:** Transforming growth factor-beta (TGF-beta) is believed to be a powerful regulator of both tissue repair and inflammatory responses and has been implicated in the pathogenesis of severe asthma. Previously, we reported that there is no structural remodeling in the nasal mucosa in allergic rhinitis.

**Objectives:** We sought to determine the role and signalling of the TGF-beta superfamily members in the regulation of upper airway inflammation and remodeling in severe persistent allergic rhinitis (PAR) patients.

**Methods:** Specific immunohistochemical staining was performed on inferior turbinate biopsy specimens to measure the expression of TGF-beta<sub>1</sub>, Activin-A and its receptor ALK-4, and phosphorylated SMAD<sub>2</sub> (TGF-beta superfamily activation signalling) in subjects with severe persistent AR (n=46) and healthy controls (n=19).

**Results:** TGF-beta<sub>1</sub> and pSMAD<sub>2</sub> expression was significantly lower in the nasal sub-mucosa of allergic rhinitis compared to healthy controls (Median/mm<sup>2</sup> [IQR: 25:75%]: 4.2 [1:12] vs 10 [4:20] and 0 vs 0.4 [0:1.6]; p=0.02 and p=0.03, respectively). Numbers of epithelial TGF-beta<sub>1</sub> expressing cells was similar between the groups (0 vs 0 [0:11.8], p=0.23). To further confirm the lower expression of TGF-beta signaling, we found the number of Activin-A positive cells tend to be lower (6 [0:14] vs 10.5 [5.7:23], p=0.11) while its selective type 1 receptor ALK-4 expression was higher in allergic rhinitis compared to healthy controls (2.8 [0:7.7] vs 0 [0:2.3], p=0.01).

**Conclusion:** Our data suggest that TGF-beta does not contribute to tissue remodeling in moderate-severe persistent allergic rhinitis. In contrast it may play a protective in preventing inflammation nasal mucosa.

### **P.57: Development of IgE microarray assays for classification of allergic individuals**

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Allergic reactions are pathological immune reactions against common, harmless environmental proteins (allergens). IgE antibodies play critical role in the immediate phase reaction of allergic immune responses. Cross linking of allergen-specific IgE to its receptors on effector cells leads to signal pathway activation and release of inflammatory mediators that may cause local or systemic symptoms within minutes.

The aim of this research was to build an antibody and protein “allergen” microarray platform that can be used as a diagnostic tool for atopic diseases. Here we outlined the development of high throughput IgE microarray assays for the diagnosis and prognosis of allergic patients. This multi-allergen microarray assays were developed containing allergens used for skin prick testing (SPT), printed onto coated glass slides and screened simultaneously with serum samples from allergic patients and healthy controls. Several printing and blocking buffers were developed in-house to maintain protein shape, minimise background noise and increase signal intensity.

This new diagnostic platform was validated by set of quality controls on large-scale applications to reveal the presence of low concentrations of human total IgE antibodies. It also allows simultaneously measurement of allergen-specific IgE reactivity profiles against many SPT-allergens in a single step, thus requiring small volume of serum and reducing costs. In addition, other allergen-specific Ig isotypes (IgG1, IgG2, IgG3, IgG4, IgA1, IgA2) were measured to provide a comprehensive screen of patient serum.

Thus this high throughput multi-allergen microarray assay can work as a diagnostic tool for monitoring the development of the allergic diseases, predict allergic reactions particularly for poly-sensitized patients, evaluate patient response to treatments and eventually allow classification of allergic individuals.

In conclusion, we have developed a high throughput multi-allergen assay that will improve the future of allergy diagnosis.

**P.58: Hydrolysed formula and risk of allergic or autoimmune outcomes: a systematic review and meta-analysis**

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**Objective:** Hydrolysed formula is recommended by EAACI for allergy prevention in high risk infants, if formula milk is introduced in the first 4 months. We evaluated the evidence for use of hydrolysed formula during infancy to prevent allergic or autoimmune disease, as part of a systematic review commissioned to inform revised UK Department of Health feeding guidance.

**Methods:** We searched Medline, The Cochrane Library, Embase, Web of Science and LILACS to April 2015, selected studies and extracted data in duplicate, and assessed risk of bias using the Cochrane Risk of Bias tool. We included intervention trials of partially or extensively hydrolysed cow's milk formula compared to human milk, another HF type or non-hydrolysed formula.

**Results:** Thirty-seven intervention trials including over 19,000 participants were included. There was high or unclear risk of attrition or selection bias, and conflict of interest, in most studies of allergic outcomes. We found evidence of publication bias in analyses of the outcomes eczema and recurrent wheeze. We overall found no evidence that partially or extensively hydrolysed formula can reduce risk of eczema, wheeze, allergic rhinitis, food allergy including cow's milk allergy, allergic sensitisation or type 1 diabetes. For example meta-analysis of randomised controlled trials of partially hydrolysed formula and eczema at age 0-4 found OR 0.95 95% CI 0.79, 1.13;  $I^2=7\%$ .

**Conclusion:** The available data do not suggest that partially or extensively hydrolysed formula can reduce risk of allergic or autoimmune disease. The evidence base for allergic outcomes carries a significant risk of bias.

### **P.59: The Big Data challenge of producing allergenic pollen maps for health studies**

Rachel McInnes, Philip Bentley, Deborah Hemming, Yolanda Clewlow

*Met Office, Exeter, UK*

The challenge of using increasingly large volumes of data - so-called Big Data - is not unique to health, climate or environmental science research, but it presents a grand opportunity for connecting diverse data and provision of targeted information. In order to make the most of Big Data, which is becoming ever more prominent, existing analysis techniques and scientific computing must evolve. In this National Institute for Health Research Health Protection Research Unit (NIHR HPRU) project we combine large environmental and meteorological datasets to produce species-specific allergenic pollen vegetation maps for use in health studies. With many people allergic to one or a few specific plants only, detailed species-specific pollen maps will facilitate research into the impacts of these species on asthma and allergic rhinitis.

#### **Objective**

To develop a methodology to combine multiple high-resolution land-use and tree datasets to produce allergenic pollen maps.

#### **Methods**

We describe our work to manage large UK land use, and vegetation datasets. Combining these provides a real computational and processing challenge as many of these datasets have billions of points. For example, the CEH Land Cover Map is a UK-wide dataset at 25-metre resolution, and the Bluesky National Tree Map contains over 280 million trees.

#### **Results**

We present UK species location maps for grass and allergenic trees, and outline techniques used to create these from large datasets.

#### **Conclusions**

The challenge of Big Data will only increase in the future as datasets continue to grow in size. To realise the potential of these, researchers will need to develop capability in data analysis and software engineering. By sharing what we have learnt we hope to encourage other researchers to engage with Big Data. Through the detailed pollen maps produced by these techniques we demonstrate the potential for improved understanding of pollen allergies and supporting effectively targeted healthcare.

## **P.60: Primary mast cell dysfunction causing extensive food intolerance.**

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### Background

Severe intolerance to multiple foods is fortunately uncommon, but can severely impact on quality of life and is often difficult to manage. Causes include food allergies and intolerances, coeliac disease, eosinophilic enteropathy, mast cell and motility disorders, and psychological causes.

### Case Presentation

We present a four year old girl who has remained intolerant to almost all foods since early infancy. She has a strong family history of similar but less extensive food intolerances affecting her siblings, parents and grandparents generations. She not only suffers from vomiting, diarrhoea, PR bleeding and abdominal pain lasting a number of days after eating most foods, but these episodes are associated with flushing of her skin, pallor and faintness. Her diet is limited to breast milk, limited amounts of Neocate LCP. Extra calories are provided using oral Vamin, Seravit and Polycal. Formal food challenges performed in hospital over a period of three weeks confirmed these multiple food intolerances, even to classically low allergen foods such as potato, lamb and carrot. Upper and lower endoscopies were normal. Mast cell tryptase levels remain consistently raised. Her symptoms are relatively resistant to treatment with high dose H1 and H2 antihistamines, mast cell stabilisers, oral prednisolone, cyclosporin, omalizumab, infliximab and imatinib. Histology of bone marrow trephine and c-kit gene mutation screening are reported as normal, but flow cytometry demonstrated features of abnormal mast cell activity. Analysis by whole genome sequencing has so far failed to reveal a specific gene mutation.

### Discussion

This case provides evidence for food intolerances caused by a novel type of primary mast cell dysfunction, which is missed on standard bone marrow testing. Unconventional approaches to nutritional support with "oral TPN" are also discussed in this extreme immune-mediated food "allergy".

**P.61: Induction of Circulating T follicular Regulatory (Tfr) cells following Grass Pollen Immunotherapy in Patients with severe Seasonal Allergic Rhinitis**

Hjh Hanisah Hj Awg Sharif, Constance Ito, Guy W Scadding, Stephen R Durham, Mohamed H Shamji  
*Imperial College London, London, UK*

**BACKGROUND:** Circulating T follicular regulatory (Tfr) cells are a newly identified subset of CD4<sup>+</sup> T cells with regulatory properties. Tfr cells are defined by the expression of CXCR5, PD-1, ICOS, CTLA-4 and the transcriptional regulator of T regulatory cell lineage, FoxP3. We hypothesised that Tfr cells are dysregulated in patients with severe seasonal allergic rhinitis (SAR) compared to non-atopic controls (NA). Furthermore, grass pollen allergen immunotherapy (AIT) administered either subcutaneously (SCIT) or sublingually (SLIT), is associated with the induction of Tfr cells, which play an important role in tolerance induction.

**METHODS:** In a prospective controlled cross-sectional study of AIT, PBMCs were isolated from SCIT (n=12), SLIT (n=6), SAR (n=13) and NA (n=13) individuals. Circulating peripheral CD4<sup>+</sup>CXCR5<sup>+</sup>PD-1<sup>+</sup>FoxP3<sup>+</sup> and CTLA-4<sup>+</sup>Tfr cells were quantified by using 8-colour flow cytometry. Furthermore, CD4<sup>+</sup>CD25<sup>+</sup>CD127<sup>lo</sup>FoxP3<sup>+</sup>Tregs were enumerated in all groups.

**RESULTS:** Global total nasal symptoms were lower in SCIT- (p<0.05) and SLIT- treated groups (p<0.05) compared with SAR. NA group did not exhibit any symptoms. A flow cytometry method for quantifying Tfr cells in peripheral blood was optimised and validated. The frequency of circulating CD4<sup>+</sup>CXCR5<sup>+</sup>PD-1<sup>+</sup>FoxP3<sup>+</sup>Tfr cells were lower in SAR compared to NA (p<0.05). Tfr cells were elevated in SCIT (p<0.05) and SLIT-treated subjects (p<0.001) compared to SAR. Tfr cells have been shown to exert their regulatory function via CTLA-4. CTLA-4<sup>+</sup>Tfr cells were lower in SAR (p<0.001) compared to NA. SCIT and SLIT-treated subjects had elevated number of CTLA-4<sup>+</sup>Tfr cells compared to SAR (p<0.001; p<0.05). In the same study, FoxP3<sup>+</sup>Tregs were elevated in SCIT (p<0.001) and SLIT (p<0.01) compared to SAR.

**CONCLUSION:** Tfr cells and CTLA-4<sup>+</sup>Tfr cells are dysregulated in SAR compared to NA. SCIT and SLIT induces Tfr cells in peripheral blood and these cells may potentially be associated with the induction of tolerance observed after AIT.

## **P.62: In vitro IgE gene targeting using the CRISPR-Cas9 RNA-guided nuclease system**

A.C. Stephens, V. Turcanu

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### Objective

The recent discovery of the CRISPR (classes of regularly interspaced palindromic repeats)-Cas9 (CRISPR-associated) system opened the perspective of being able to specifically target individual genes in order to inhibit or alter their expression. Recent applications of CRISPR/Cas nucleases showed that it can eradicate latent HIV integrated into the host genome and can permanently alter gene expression such as liver PCSK9 in vivo. In the case of allergies, targeting the IgE gene using CRISPR-Cas9 would not affect other antibody subclasses, unlike other non-specific immunosuppressive treatments and would not interfere with other antigen-specific responses.

### Methods

The RNA-guided Cas9 recognizes and cleaves the target DNA just upstream of an NGG protospacer-adjacent motif (PAM). Therefore we selected a region of the IgE gene that contains this PAM and is located at the 5' end of the third exon of the heavy chain constant region. Mutations of this region, could lead to a stop codon (so no IgE would consequently be produced) or a significant loss of affinity for FcεR1. We incubated this double stranded geneblock with the complementary single guide RNA and Cas9 in vitro. We determined the efficacy of double strand break induction by real-time quantitative PCR with the primers located at each end of the sequence and separated by the PAM.

### Results

We found that the RNA-guided Cas9 cleaved the target region of the IgE gene, leading to a complete loss of signal at 50 qPCR cycles. Conversely, in the absence of the single guide RNA or Cas9, no gene break was observed.

### Conclusions

This proof-of-concept work represents, to our best knowledge, the first application of the CRISPR-Cas9 system in the field of allergy. It provides evidence that RNA-guided nucleases can target the IgE gene and opens the perspective of permanently eradicating IgE production, for example in long-lived plasma cells.

## Paediatric Clinical

### **P.63: Anaphylaxis in children - the UCLH experience**

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*University College London Hospital, London, UK*

Objectives: Firstly to evaluate the quality of care received by children presenting with food-induced anaphylaxis (FIA) to the Emergency Department (ED) at our central London teaching hospital. Secondly, to assess staff experience, knowledge and attitudes to anaphylaxis and food allergy.

Method: We retrospectively reviewed case-notes of children aged 4months-16 years whose ED presentation was coded as anaphylaxis/allergy, between June-December 2014. The management of those with FIA was assessed against NICE standards. Paediatric and Emergency department staff (medical/nursing) volunteered to complete a 15-question professionals' survey developed by consultants within the allergy team.

Results: 45 patients were coded as having anaphylaxis/allergic reactions, of which 5 met the criteria of FIA. 20% of were discharged without an Adrenaline auto-injector (AAI) [SW1] and only 1 patient received appropriate information prior to discharge. 1 patient without anaphylaxis had Adrenaline administered by the GP prior to arrival at the ED. 32 professionals completed the survey. 38% had never witnessed anaphylaxis in a child. 94% correctly identified Adrenaline as the first-line management, however 2 nurses thought this was antihistamines. 17% were not aware of any professional guidelines. 56% would not administer Adrenaline for dizziness/fainting. 30% of responders lacked confidence to teach AAI technique and 37.5% thought there were contraindications to Adrenaline. 81% and 28% respectively failed to recognise that teenagers and asthmatics were at greater risk. 17% perceived food allergy as having only moderate or little impact on quality of life.

Conclusion: Children with FIA were sub-optimally managed in our ED. We identified inexperience, deficiencies in knowledge and attitudes to food allergies and anaphylaxis of hospital and primary care staff, which is likely to contribute. We plan to re-evaluate following implementation of an education programme involving regular simulation training, and improved sign-posting to patient resources.



**P64: Outcome of home food challenges conducted by parents under the guidance of the Paediatric Allergy Service at the Royal Manchester Children's Hospital**

Rachel Barton, Lynn Burney, Vibha Sharma  
*Royal Manchester Children's Hospital, Manchester, UK*

**Objective**

Avoidance of foods has negative impact on growth of children. Introducing foods which are tolerated into the diet has been shown to be beneficial in maintaining tolerance. Open challenges are helpful in normalising diet for a large number of those thought to have food allergy. Our allergy service has a long waiting list for open challenges, worsened by children being unfit due to illness or non-attendance when fit arising from parental commitments elsewhere. Our aim was to evaluate safety and efficacy of home food challenges in patients who have low anticipated risk of an allergic reaction to the challenge food.

**Methods**

Between March 2012 and April 2013, children attending our allergy service who required open challenge were prospectively identified. Only those patients who were considered to be at low risk for allergic reaction to the challenge food were identified as suitable candidates. Following parental consent, verbal and written advice on performing a food challenge and an allergy management plan was provided along with a contact number for the team. Our paediatric allergy dietician then contacted parents to record outcome.

**Results**

98 patients were included, 162 food challenges were advised. 84 (52%) challenges were performed. Of these, 72 (86%) patients passed the challenge while 12 (14%) failed with a mild allergic reaction. No patients had an anaphylactic reaction.

**Conclusions**

In patients with low anticipated risk of allergic reaction, home food challenge can be safely conducted by parents. Clear communication of the procedure and an allergy management plan should be provided. Home food challenge is beneficial both to the patient, by limiting effects of unnecessary dietary restrictions, and to the allergy service, by reducing waiting lists for open challenges.

### **P.65: The nutty question on Paediatric Wards: to be or 'Nut' to be?**

Supriyo Basu, Jenny Hallet, Jyothi Srinivas

*Milton Keynes University Hospital NHS Foundation Trust, Milton Keynes, UK*

#### **Objective:**

Allergy to peanut & tree nuts is the most common food allergy in children. Peanut allergy has doubled in last 5 years in Europe and USA but the causes remain unclear.

Many nurseries and schools are now becoming 'nut-free zones'. Should hospitals in general and paediatric wards in particular head the same way?

Our aim was to survey all hospitals in our deanery regarding their 'nut-free zone' practices and their opinions.

#### **Method:**

We contacted dieticians (paediatric) in all the 6 hospitals in Oxford deanery by telephone.

#### **Results:**

All dieticians from all the 6 hospitals confirmed that their hospital menus were nut-free specifically kids menus. However, they agreed that food might contain traces of nuts. 5 hospitals did not have 'nut-free' zones in their hospital. Only one hospital had a 'peanut and tree nut free' paediatric ward and out-patient department where parents or visitors were not allowed to bring in any food containing nuts. The main concern with 'nut-free' menu from dieticians was the possibility of reduced protein intake in vegetarians during their stay on the ward.

The reasons cited for not having a 'nut-free ward' were difficulty in implementation and lack of data to support introduction including lack of documented anaphylactic reactions to nuts on paediatric wards.

Most dieticians (4) were unsure if they would support 'nut-free zones' in their hospitals in the future.

One was strongly opposed to the idea and the dietician working on the hospital that already has 'nut free zones' thought this should be implemented in all hospitals.

#### **Conclusions:**

Our small survey reflects that despite increasing incidence of nut allergy, hospitals with nut-free zones are uncommon. It appears that most hospitals are providing nut-free meals to patients.

We plan to extend this survey to all hospitals in UK in near future.

## **P.66: Promoting engagement of children and young people in allergy clinic via real time feedback tools and social media**

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<sup>1</sup>James Paget University Hospital, Great Yarmouth, UK, <sup>2</sup>Norfolk and Norwich University Hospital, Norwich, UK

### Objective

Research shows that patients consider their overall experience of care to be of equal importance in quality, alongside clinical effectiveness and safety. The difficulty of hearing the voices and opinions of children and young people as users of NHS services is widely acknowledged, and finding better ways to collect feedback from children and developing the use of IT in feedback have been identified as key priorities in service development.

We aimed to improve the collection of patient feedback in our district general hospital allergy clinic to promote engagement of children, young people and families with the service.

### Methods

All children, young people and families attending a district general hospital 'one stop' multidisciplinary children's allergy clinic were invited to submit real time feedback using a 'business card' feedback tool. Participants were encouraged to submit brief one or two word feedback, lengthy questionnaires were deliberately avoided. Responses were then summarised using a 'word cloud' and were made freely available on social media via twitter and facebook as well as being displayed weekly in allergy clinic. Patients and families are also invited to submit feedback via twitter if they wish.

### Results

The real time feedback tool has now been running for 2 years. Seasonal themed word clouds are generated to capture the attention of children and young people. The feedback has been used to make changes to the service eg developing pre clinic information.

### Conclusion

Collection of real time feedback using a business card tool and displaying via a word cloud on social media is a novel, feasible and popular method of collecting patient feedback in a paediatric allergy clinic which has led to service improvement and aligns with NHS priorities for engagement with children and young people.

### **P.67: Audit of home introduction of egg in the low risk egg allergic patient.**

Susan Brown<sup>1</sup>, Jurgen Schwarze<sup>2,1</sup>, Janet Purves<sup>1</sup>, Helen Rhodes<sup>1</sup>, David Cordiner<sup>1</sup>

<sup>1</sup>NHS Lothian, Edinburgh, UK, <sup>2</sup>Edinburgh University, Edinburgh, UK

#### Objective

To evaluate patient acceptance and success of home introduction of egg into the diet for patients at low risk of anaphylaxis.

#### Methods

Based on the BSACI guidelines for the management of egg allergy (2010) our clinical practice was changed. Egg allergic patients at low risk of anaphylaxis who had not had any recent allergic reactions to egg were identified. They were given written guidance on home egg reintroduction in 2 stages, initially with well baked and then lightly cooked egg. During this process families were provided with a contact number for support as required.

During the year 2014 children were either reassessed at allergy clinics or by telephone to assess their progress.

#### Results

In 2014 only 8 hospital supervised egg challenges were performed as compared to 32 in 2012 before we changed clinical practice. 18 patients to whom home egg re-introduction had been recommended were reassessed. 15 had fully reintroduced egg into their diet, and 3 had only been able to introduce well baked egg. Only 2 children experienced minor urticarial reactions which were treated with antihistamines at home. All parents found the instructions clear and easy to follow. They liked that they could introduce egg at the child's pace and hide it in other foods if required, the opportunity to obtain additional telephone advice from a named person, and that they avoided losing additional time off from work and school.

#### Conclusions

For egg allergic patients with low anaphylaxis risk home introduction of egg, supported by telephone advice if required is a successful, safe, convenient and family friendly intervention.

**P.68: Management of Paediatric Anaphylaxis, in Sunderland's Paediatric Accident and Emergency Department, based on compliance with NICE Guidelines CG134 Dec2011**

*Elizabeth Campy, Emily Ryan, Shazia Majeed, Prashant Kumar  
Sunderland Royal Hospital, Sunderland, UK*

**Objective**

To assess if Sunderland's Paediatric A&E, manages cases of anaphylaxis in accordance with NICE guidelines CG134 (Dec 2011). We explored compliance, and reasons for non-compliance.

**Methods**

We obtained electronic records of 304 patients who presented to PED with an allergic reaction or anaphylaxis, between 1/1/13 - 31/12/14. 'Rash', 'Urticaria' and 'Allergy' were also reviewed to ensure no patients with anaphylaxis (but incorrect documented diagnosis) were missed from analysis.

13 patients who experienced true anaphylaxis, were explored using a proforma to assess initial assessment, management in hospital and follow up.

**Results**

Of the 13 cases, only 4 were correctly coded as anaphylaxis.

All but one patient were admitted to the ward, given an EpiPen at discharge, provided with training and referred to allergy services. The case missed wasn't recorded as anaphylaxis highlighting the need for education.

One patient, already known to the allergy service, accounted for 5 events, therefore referral was not necessary.

There was 100% compliance with regards to documentation of events prior to reaction and acute symptoms. There was poor documentation of 'time of onset of reaction' and 'allergen avoidance & anaphylaxis information' given to parents. No patient received patient support group information which may be a reflection of poor documentation rather than poor practice.

**Conclusions**

Compliance was generally good, although larger sample sizes would've been preferable.

Areas needing improvement, such as providing information to parents and documentation of time of onset may highlight the need for more thorough documentation.

Providing education and specific advice to healthcare professionals in PED guidelines about the identification and management of anaphylaxis, should reduce misdiagnosis of anaphylaxis. An anaphylaxis proforma checklist for the notes is also being considered.

BSACI Allergy Action Plan with printed information about patients support groups on the back, to be given to all parents of presenting children.

## **P.69: The impact of food allergy on asthma outcomes from birth to adolescence**

Adrian Chan, Hassan Arshad

*University Hospital Of Southampton, Southampton, UK*

### Objective:

Food allergy has been reported to be associated with asthma development in early childhood. It is however, not established how food allergy impacts upon asthma progression from childhood into adolescence. We investigated whether sensitisation to common food allergens and/or clinical food allergy in early childhood (assessed at age 4 years) increases the risk of future development of asthma at 10 and 18 years.

### Methods:

The study population consisted of consecutive births from the Isle Of Wight between January 1989 and February 1990. The population was reviewed at ages 4, 10 and 18 years. Data analysis was performed using SPSS Statistics 22 software.

### Results:

At 4 years of age, 1217 children were seen, of whom 61 (5%) were diagnosed with food allergy. Skin prick tests were performed in 980 patients, in which 31 (2.0%) had positive results to food allergens. Sensitivity and specificity of food allergy for asthma at 10 years was 11.0% and 95.8% respectively, with a positive predictive value (PPV) of 31.7%; its sensitivity, specificity and PPV for asthma at 18 years was 12.0%, 96.1% and 38.6% respectively. There was a significant association between food allergy and asthma at 10 years ( $p < 0.001$ ) and 18 years ( $p < 0.001$ ) compared with non-food allergic individuals. Sensitivity and specificity of food sensitisation for asthma at 10 years was 10.3% and 98.2% respectively, with a PPV of 51.7%; its sensitivity, specificity and PPV for asthma at 18 years was 8.9%, 98.4% and 53.8% respectively. Similarly, food sensitisation at 4 years was associated with increased asthma manifestation at 10 years ( $p < 0.001$ ) and 18 years ( $p < 0.001$ ).

### Conclusion:

Both early food sensitisation and clinical food allergy are risk factors for asthma presentation at 10 and 18 years. Attention should be paid to respiratory symptoms in food allergic/ sensitised children as they grow up.

## **P.70: The impact of food allergy on rhinitis outcomes from childhood to adolescence**

Adrian Chan, Hassan Arshad

*University Hospital Southampton, Southampton, UK*

### Objective

Food allergy has been reported to be associated with rhinitis development in early childhood. It is however, not established how food allergy impacts upon rhinitis progression from childhood into adolescence. We investigated whether sensitisation to common food allergens and/or clinical food allergy in early childhood (assessed at age 4 years) increases the risk of future manifestation of rhinitis at 10 and 18 years.

### Methods

The study population consisted of consecutive births from the Isle Of Wight between January 1989 and February 1990. The population was reviewed at ages 4, 10 and 18 years. Data analysis was performed using SPSS Statistics 22 software.

### Results

At 4 years of age, 1217 children were seen, of whom 61 (5.0%) were diagnosed with food allergy. Skin prick tests were performed in 980 patients, in which 31 (2.0%) had positive results to food allergens. Rhinitis was present in 205 (15.1%) and 468 (35.8%) patients at 10 and 18 years old respectively. There was no significant association between food allergy and rhinitis presentation at 10 years (odds ratio (OR) 1.50, 95% confidence interval (CI): 0.76 - 2.98,  $p = 0.240$ ) and at 18 years (OR 1.02, 95% CI: 0.56 - 1.84,  $p = 0.961$ ) compared with non-food allergic individuals. Food sensitisation at 4 years was also not associated with increased rhinitis presentation at 10 years (OR 0.92, 95% CI: 0.32 - 2.73,  $p = 0.894$ ) nor at 18 years (OR 0.65, 95% CI: 0.27 - 1.57,  $p = 0.330$ ) compared with non-food sensitised individuals.

### Conclusion

Although early food sensitisation food allergy does not predict rhinitis in late childhood and adolescence, given that the prevalence of rhinitis more than doubled from ages 10 to 18 years old in our cohort, other risk factors should be evaluated to account for this rise.

## **P.71: Comparability of skin prick testing using milk extract and fresh milk - are successful challenges predictable?**

Hazel Collis, Nicola Jay

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### Objectives / Method

Use of fresh milk alongside extract adds an extra SPT in clinic, causing distress for some children. We undertook a retrospective review of notes for cow's milk challenges in a tertiary allergy centre to review characteristics for successful challenges, considering SPT to fresh milk and extract. We had previously introduced fresh milk due to unpredictability of the milk extract we were using.

### Results

24 children underwent challenge: 67% were boys and 58% under 3 years; range 11 months-13 years. 50% had  $\geq 1$  other food allergy, 12%  $\geq 3$ . 79% had eczema, 17% asthma, 13% hayfever. All children had pre-challenge SPT to milk extract and RAST, 22 had SPT to fresh milk.

75% passed their challenges, successfully re-introducing milk. 89% of children with SPT extract  $< 2 \times 2$  and 85% with  $\leq 3 \times 3$  passed their challenge. 93% of children with SPT fresh milk  $\leq 5 \times 5$  passed their challenge. Other predictors of successful challenge included SPT fresh milk = 0 (100%), SPT extract = 0 (92%). 10 children had previously higher SPT to extract. 1 child with change in SPT to extract failed ( $6 \times 3 \rightarrow 2 \times 2$ mm.) The average drop in SPT to extract in successful challenges was  $17 \text{mm}^2$ . 13 children had a previously higher SPT to fresh milk, only 1 failed ( $11 \times 6 \rightarrow 5 \times 5$ .) Average drop in successful challenges to fresh milk was  $45.4 \text{mm}^2$ , 4 children went from having a positive SPT to fresh milk to having no reaction, all passed.

### Conclusions

SPT to extract and fresh milk appear comparable, albeit with different sizes associated with success. The difference in size predicting successful challenge may confuse inexperienced staff, potentially leading to longer wait before challenge and unnecessarily restricted diets. We have therefore changed departmental practice to using only extract combined with RAST. We will review challenge success in 1 year, to ensure best practice continues.



**P.72: Duck egg tolerance in children allergic to hen's egg – does the introduction of duck egg affect hen's egg reactivity? The QUACK pilot study**

Stephanie Cross<sup>1,2</sup>, Mich Erlewyn-Lajeunesse<sup>1,2</sup>, Jane Lucas<sup>2</sup>, Judith Holloway<sup>2</sup>

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**Objective:** Allergy to egg is common in children. Baked egg consumption promotes oral tolerance to less-well cooked egg, but some children react to baked egg. Anecdotal evidence suggests that some children can eat duck egg but not hen's egg. We hypothesised that duck egg might provide a safe alternative source of egg for oral immunotherapy to promote development of oral tolerance to hen's egg. The aim of this study was to establish whether children with hen's egg allergy are able to tolerate duck egg, and if the introduction of duck egg has any effect on hen's egg reactivity.

**Method:** A pilot study involving children with hen's egg allergy recruited from Southampton Hospital Children's Allergy Clinic. Children underwent skin prick testing and blood tests. Children with signs of discordant egg allergy on skin prick testing underwent oral food challenge and were invited to introduce duck egg into their diet. Children completed clinical, dietary and quality of life questionnaires at enrolment, 3 months and 1 year.

**Results:** 17 egg allergic children were recruited into the study. 23.5% (3/17) showed signs of discordant egg allergy on skin prick testing and food challenge, and were able to introduce duck egg into their diet. Skin prick tests and specific IgE to hen's egg white and ovomucoid were significantly reduced after 1 year in those eating duck egg (SPT mean reduction 52.6% compared to 4.6% increase in controls). These children were able to liberalise their diet and expressed an improvement in quality of life.

**Conclusions:** A small proportion of children with hen's egg allergy are able to eat duck egg without reaction. This suggests that ingestion of duck egg may promote the development of oral tolerance to hen's egg. This is only a very small pilot study and further research is needed in this area.

### **P.73: Is banana an emerging food allergen? A case series of UK children**

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#### Objective

To describe the clinical features of banana allergy in children, and to describe the rates of presentation over time.

#### Methods

Since 2003, 41 children presented to the Southampton children's allergy clinic with a clinical diagnosis of banana allergy based on allergic symptoms and positive banana IgE or prick to prick test. For those who consented to be included, clinical information was extracted from patient notes. Research ethical approval was granted by the University of Southampton (ERGO ID 12514).

#### Results

56% (23/41) of families responded to be included in the case series. The period of 2012-14 accounted for 65% of the reports of banana allergy. Most children, 65% (15/23) presented at aged 4 years and under. Both localised and generalised reactions were reported and there was one case of anaphylaxis to banana. Only 13% (3/23) were associated with latex allergy.

#### Conclusions

Although, banana allergy is well documented in the adult literature, this is the first UK report of banana allergy in children. The recent increase in cases suggests that banana allergy is becoming more common amongst preschool children, and that this is not related to cross reactive latex sensitisation. The report of anaphylaxis to banana, although rare, suggests that banana allergy should be treated with vigilance.

## **P.74: Food allergy labels: who reads them? who understands them?**

Emily Derrick<sup>1</sup>, Neha Khanna<sup>1</sup>, Luul Ali<sup>1</sup>, Felicity Fletcher<sup>2</sup>, Frances Ling<sup>1</sup>, Lee Noimark<sup>1</sup>

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### Objectives

Allergy food labelling should be easy to access and interpret. However, research shows precautionary advisory labels cause confusion for consumers and health professionals. Data on general interpretation of food allergy labelling is limited. In this study we conducted a choice experiment based on allergy food labelling to explore parental behaviour and interpretation.

### Methods

89 parents interviewed in the paediatric outpatients of a London hospital. Information on parent characteristics and food allergy in their children collected. Parents asked to choose which of 3 packets of biscuits with differing milk contents, were suitable for a milk allergic child. Experiment repeated with 3 different packets of biscuits, with different precautionary advisory labelling, for a nut allergic child. Factors predicting correct interpretation of labelling assessed using binary logistic regression analysis; Chi-squared testing used to compare differences.

### Results

Milk experiment: 29/89 did not read the labels (12 parents of food allergic children). Factors predicting the correct interpretation of labelling: age >40 ( $p=0.015$ , OR 9.22, CI 1.59-54.2); multiple food allergies, including milk ( $p=0.06$ , OR 5.83, CI 1.66-20.44); single food allergy, not milk ( $p=0.039$ , OR 4.55, CI 1.07-19.22). Factors predicting incorrect interpretation: no food allergy ( $p=0.006$ , OR 0.24, CI 0.89–0.665); black African ethnicity, ( $p=0.032$ , OR 0.138, CI 0.023-0.843). Non-significant factors: gender, food shopping, nationality, severity of allergy.

Nut experiment: 28/89 did not read the labels (2 parents of nut allergic children). Reading labels did not result in significant differences in parental choices. Similar findings in parents of nut allergic children, exception of biscuits stating "not suitable...due to manufacturing methods" chosen less ( $p=0.019$ ).

### Conclusion

2/3 of parents looked at food allergy labelling. Having a child with food allergy, particularly multiple foods, predicts correct interpretation of labels. Age and cultural factors may be relevant. Reading of labels did not differentiate between selection of biscuits with precautionary labelling.

### **P.75: Case series: unusual presentations of cow's milk protein allergy**

Amrit Dhesi, Charlotte Braniff, Ribena Akhter, Tom Dawson

*Alexandra Hospital, Redditch, UK*

**Background:** Cow's milk protein allergy (CMPA) is the most common food allergy during infancy. We describe 3 infants who presented with unusual clinical pictures, which all resolved after eliminating cow's milk.

**Cases:** The first case was a 7 week old boy with symptoms of vomiting after feeds since birth. Investigations showed elevated transaminases and conjugated hyperbilirubinaemia. He was started on Aptamil Pepti 1 and had an immediate response with cessation of vomiting. At follow-up, liver function tests had normalised. The second case was a 17 day old baby presenting with a 24 hour history of watery diarrhoea. He was clinically dehydrated and acidotic, with a pH of 6.84. Investigations showed deranged liver function tests, neutrophilia and raised C-reactive protein. Abdominal x-ray showed dilated loops of colon. The formula milk was changed from Aptamil to Neocate with subsequent resolution of symptoms. The third case was a preterm baby born at 25+2/40 gestation who developed an unexplained metabolic acidosis on day 27 of life with a pH of 7.06. He had thrombocytosis with thickened bowel loops on abdominal X-Ray. He improved slowly following a period of being nil by mouth and then being restarted onto expressed breast milk without fortifier.

**Discussion:** The first two cases had elevated transaminases which have been reported in literature but to our knowledge there have been no reports of CMPA causing conjugated hyperbilirubinaemia observed in the first case. The last 2 cases are more typical of food protein-induced enterocolitis syndrome (FPIES) for which the most common trigger is cow's milk. There have been few reports of FPIES in such preterm neonates as in the last case. Affected infants are commonly misdiagnosed as having gastrointestinal illness, sepsis or a metabolic condition. These cases highlight that CMPA is an important differential to consider particularly in infants presenting acutely unwell.

## **P.76: Home measurement of sleep disturbances in multisystem allergic disease**

James DiPasquale<sup>1,2</sup>, Robin Gore<sup>3</sup>, Eliana Leitao<sup>1</sup>, Claudia Gore<sup>1,2</sup>

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### **OBJECTIVE**

Allergic conditions such as eczema, asthma and rhinitis are associated with poor sleep-quality. Patients often report nocturnal coughing, wheezing and scratching but these signs are never quantified because conventional methods of sleep measurement cannot detect them (e.g., polysomnography). Night-to-night variability remains undescribed.

Our investigational device (Sonomat, *Sonomedical*, Australia) is a thin mattress overlay with built-in vibration sensors. It records breathing sounds and body movement and has been validated for detecting snoring and apnoea. It also captures wheeze, coughs and scratching. It has no attached sensors and is suitable for long-term recording at home.

### **METHODS**

A 14-year old girl with severe allergic disease (eczema, asthma, perennial/seasonal allergic rhinitis, food allergies) was assessed for one week at home, in the pollen season. Day 1 and Day 7 included physical examination, SCORAD index and disease-specific quality-of-life measures for eczema, asthma and rhinitis. Sleep-related events were recorded on six consecutive nights using the investigational device.

### **RESULTS**

All overnight parameters showed night-to-night variability. Scratching was detected on all nights and ranged from 1% to 5% of analysed time. Snoring occurred every night (range: 5-35% of time), wheezing and coughing were detected on most nights. All pathological events were associated with sleep-disruption; body movement time was persistently elevated (range: 8-14% of time). Overall, objective measures did not reveal significant changes between Day 1 and Day 7. Despite this, subjective reports suggest improvement for all conditions (CDQLI, ACT, FDLQI, VAS). Improvement was also noted on clinical examination (SCORAD: 58 to 31).

### **CONCLUSION**

Home-based monitoring revealed night-to-night variability in nocturnal pathological events. Objectively-measured sleep disturbances can persist despite subjective improvements. Monitoring respiratory and movement signs over multiple nights at home could assist the management of allergic diseases and help unravel the link(s) between these conditions and poor sleep-quality.

## **P.77: Support for the introduction of generic adrenaline auto-injector devices into UK schools and early-year environments: a national survey**

Mandy East<sup>2</sup>, Gary Stiefel<sup>4</sup>, Maureen Jenkins<sup>3</sup>, Dawn Hoy<sup>3</sup>, Kerry Fletcher<sup>3</sup>, Paul Turner<sup>1</sup>

<sup>1</sup>Imperial College London, London, UK, <sup>2</sup>Anaphylaxis Campaign, Farnborough, UK, <sup>3</sup>Allergy UK, Kent, UK, <sup>4</sup>University Hospitals of Leicester NHS Trust, Leicester, UK

### **Objective**

The USA and Australia have legislation allowing generic adrenaline auto-injectors (AAI) in educational establishments, for use in allergic emergencies. We sought to determine the need and support for such a measure in the UK.

### **Methods**

Parents of school-aged children with food allergies, healthcare professionals (HCPs) and teachers were invited to participate in an online survey, through email invites and social media coordinated by the Anaphylaxis Campaign and Allergy UK, in April/May 2015.

### **Results**

Responses were received from 1609 parents; 519 HCPs (50% school nurses) and 821 teachers. There was representation from every region across the UK.

#### ***How common are AAIs in schools?***

- 93% of teachers reported working in a school where at least one child had been prescribed an AAI.
- 83% of parents reported their child had been prescribed 1+ AAI for school.
- The majority of children were prescribed 2 AAIs, although 18% were prescribed a single device and 10% were prescribed 3+ devices.

#### ***Are there situations when AAIs may not be administered / correctly administered?***

- 84% of HCPs, 65% parents and 46% teachers knew of at least one occasion when a child had forgotten to bring the AAI with them to school.
- 70% of HCPs, 51% parents and 30% teachers had encountered an out-of-date AAI device.
- 20% of HCPs, 10% parents and 6% teachers were aware of a situation where the AAI had misfired.

The overwhelming proportion of respondents supported our campaign for the introduction of generic AAIs, including over 96% of teachers and 99% of other respondents.

### **Conclusion**

It is very common for AAIs to be held on school premises. Misfiring of AAI, expired devices and failure to bring AAI to school are frequent, all of which can place allergic children at significant risk. Finally there was overwhelming support for the introduction of generic AAIs into schools and other educational settings.

**P.78: Multi-system allergy (MSA) of cystic fibrosis: Our institutional experience.**

Jessica Hawley, Chris O'Brien, Matthew Thomas, Malcolm Brodlie, Louise Michaelis  
*Newcastle University, Newcastle, UK*

**Background:**

Within the UK, the incidence of MSA in children is increasing. Within the cystic fibrosis (CF) population, developing sensitivities could exacerbate respiratory problems and complicate treatment. One concern is the development of drug allergy to the antibiotics they are increasingly reliant on as their disease progresses. We assessed the incidence of allergic disease in the NE England paediatric CF service.

**Methods:**

From July to November 2014, questionnaire based data was gathered from outpatient clinics at the Great North Children's Hospital. 88 children and their families were interviewed regarding MSA. This was combined with hospital records to ascertain the co-incidence of common infections within the population.

**Results:**

59% (52) of the children had at least one reported form of atopy. Results showed rhinitis accounted for 71%, eczema 44%, drug allergy 11%, food allergy 9% and asthma 5%.

Furthermore, 22.7% (20) of children suffered MSA, the commonest combination being eczema and rhinitis (12.5%).

When infection was looked at, 83% of those suffering from drug allergy (6 children) had cultured either aspergillus or pseudomonas infections with a median age of onset of 8. Type 4 drug hypersensitivity is uncommon, but there is a suggestion allergy may occur with allergic bronchopulmonary aspergilliosis (ABPA).

**Conclusion:**

These results represent only a proportion of the Newcastle cohort and show evidence suggestive of sensitisation via allergen barriers. One hypothesis for this high incidence could be that reduced mucosal integrity in the nose due to rhinitis could cause sensitisation. Pulmonary mucosal breaches could be mediated by microbes commonly cultured in CF patients – pseudomonas and aspergillus. Better understanding of the association between allergy and infection could open up the potential for immunotherapy to prevent rhinitis and ABPA.

## **P.79: Cow's milk protein allergy weaning groups: an effective and efficient way to deliver dietetic support**

Elizabeth Ingham, Emma Mansfield, [Alex Brightwell](#)  
*Norfolk and Norwich University Hospital, Norwich, UK*

### Objective

Cow's milk protein allergy is one of the most common food allergies in the UK. Input of a paediatric dietician is crucial to maintain optimal nutrition. Our experience suggests that dietetic support is of particular importance around the time of introduction of complementary foods with weaning advice taking up a large amount of dietetic time within our service. We therefore aimed to deliver cow's milk free weaning advice in a group setting to increase the efficiency of our service.

### Methods

We designed, delivered and evaluated a one hour group information session for parents of infants less than one year old with a diagnosis of IgE or non IgE mediated cow's milk protein allergy.

A detailed curriculum was designed with learning resources mapped to the learning objectives. Feedback was collected from each session and subsequent sessions modified accordingly. Two one hour sessions were run in parallel on a monthly basis with up to ten families attending each group.

### Results

Over a 12 month period, 19 weaning groups were held. A total of 100 families attended, all of whom would have been previously offered an individual dietetic consultation of 40 minutes therefore saving 47 hours of individual dietician time.

Families were asked to rate their confidence in various aspects of managing a cow's milk protein free diet using a Likert scale. The response rate was 94%. 100% of the families who completed the evaluation form felt confident in managing the cow's milk free diet and 100% were satisfied with the session.

### Conclusion

A cow's milk protein free weaning group is an effective way of delivering dietetic care to families of infants with cow's milk protein allergy. This increases efficiency and is popular with families. This approach could be extended to other allergens and patient groups eg young people.



**P.80: A retrospective audit of the management of chronic urticaria in a paediatric population.**

Aradhana Ingley<sup>1</sup>, Aideen Byrne<sup>2</sup>

<sup>1</sup>Glan Clwyd Hospital, Rhyl, UK, <sup>2</sup>Our Lady's Children's Hospital, Crumlin and The National Children's Hospital, Dublin, UK

**Aim:** The aim of this study is to audit the management of chronic urticaria (CU) in the paediatric allergy service in our hospital, over the period 2009-2011, against current national and European clinical guidelines.

**Objectives:** The objectives were to define the annual referral numbers of children with chronic urticaria, to examine the investigations undertaken, to examine the treatment choices made, to define the length of time to resolution of symptoms and discharge and to establish recommendations.

**Method:** This was a retrospective case note audit for children referred to and treated as CU by the paediatric allergy service between the time period January 2009 to December 2011.

**Results:** 36 children were diagnosed with CU over a 3 year period. 21 (58%) children had laboratory investigations. The most commonly performed were specific IgEs to food and aero- allergens (62%), thyroid auto-antibodies (50%) and complement levels/C1 inhibitor assay (33%). At the time of the first assessment, 16 (44%) children were taking first generation and 7 children were taking second generation non-sedating antihistamine. The duration of use of any antihistamine before being seen at the allergy clinic varied between 2-12 months (mean and median value of 5 months). Of those patients not lost to follow up, symptom resolution was acquired in 79% of patients.

**Conclusions:** CU is a relatively uncommon but consistent cause of referral to our clinic. Lack of awareness regarding guidelines for CU management has led to inappropriate prescribing practices and unnecessary hospital referrals. Prescribing practices within the hospital clinics was overall acceptable. The audit demonstrates a low threshold for hospital physicians performing investigations and thus indicating a poor understanding of CU. Recommendations have been made for improvements based on the data collected.

**P.81: Development of new evidence-based oral food challenge protocols for hospital and home use.**

Ore-Oluwa Jaiyesimi, Sian Ludman, Marta Vazquez-Ortiz, Robert Boyle, Helen Cox, Sharon Hall, John Warner, Abbas Khakoo, Claudia Gore, Chris O'Keefe, Eliana Leitao, Anna Conrad, Fiona Henley, Ferdinand Morales, Paul Turner, Ian Pollock  
*Imperial College, London, UK*

*Objectives:*

To develop updated oral food challenge (OFC) dosing schedules for cow's milk, egg and peanut based on published threshold distribution curves and stakeholder analysis.

*Methods:*

We conducted a PubMed literature search to identify threshold dose distribution curves for populations comparable to a hospital-based paediatric allergy clinic in the UK. We used threshold distribution curves published in the Dutch Study by Blom et al. 2013. We undertook a stakeholder analysis of 12 parents, 2 adolescents and 15 clinical staff with direct experience of OFC, to identify key preferences relating to OFC challenge protocols undertaken at home or under medical supervision. Photo boards for home and hospital challenges were created for protocol adherence and dissemination of practice.

*Results:*

Stakeholder analysis revealed a desire for alignment of dosing schedules with recently published data. There were variations in the optimal number of doses per challenge: parents/adolescents preferred a median of 5 doses (home) or 4.5 doses (hospital), professionals selected a median of 6 doses for both home and hospital challenges.

New dosing schedules for hospital OFC to cow's milk (1ml, 2.5ml, 8ml, 23ml, 120ml), cooked egg (130mg, 900mg, 2.5g, 7g, 30g) and whole peanut (50mg, 160mg, 400mg, 800mg, 12g) were agreed, and home challenge using 6 doses. Dosing was based on even-spacing of the proportion of reactors.

*Conclusions:*

We propose a new dosing schedule for OFC, which take into account eliciting doses using threshold distribution curves, and incorporate the preferences expressed by both patient and staff.

**P.82: An Audit of the Management of Cow's Milk Protein Allergy in Infants in Primary and Secondary Care.**

Noor Kafil-Hussain, Lyn Ventilacion, Nicola Brathwaite, Susan Leech  
*King's College Hospital, London, UK*

Cow's milk protein allergy (CMPA) affects approximately 2% to 3% of infants. NICE guidelines for the management of food allergy in children and young people 2011 recommended timely diagnosis and appropriate management of these patients. In 2013, local guidelines for the management of infants with cow's milk allergy were agreed with the Southwark and Lambeth Clinical Commissioning Group

**Objective:** We audited the primary and secondary care management of infants presenting to Kings with cow's milk allergy.

**Methods:** Infants <1 year old referred by their GP to the Allergy Clinic with cow's milk protein allergy between June 2012 and December 2014 were identified from the Allergy Clinic database. GP referral letters and electronic patient records of allergy clinic visits were reviewed.

**Results:** 30 infants with cow's milk allergy were identified. 27 had co-morbidities (eczema, other food allergies, or gastro-oesophageal reflux). 11 had an allergy-focussed history and 10 were examined in primary care. 16 were advised dietary cow's milk exclusion, and 9 received a cow's milk substitute (5 EHF and 4 soya milk). In Secondary care, all patients had a review of their history and confirmatory allergy testing. 19 had IgE-mediated cow's milk protein allergy. Management included dietician review (73%), and provision of a "Management plan" (56%). 20% were discharged, with the remainder having allergy clinic follow up within 6 months'. 2 patients presenting to the ED with CMPA during this period were not referred to the allergy clinic.

**Conclusion:** This audit identifies that there is still a need for primary care education about the management of infants with cow's milk allergy, and a need for education in the emergency department about indications for referral.

**P.83: Ultrasonic determination of subcutaneous tissue depth (SCTD) overlying thigh muscles in patients with allergy.**

Munish Kumar, Kelly Tonge, Farrukh Sheikh, Kelly Parker, Jan Reiser  
*Lister Hospital, Stevenage, UK*

**Background:** Intramuscular adrenaline delivered by an Adrenaline auto injector (AAI) is the drug of choice for management of anaphylactic reactions. However effective dose delivery depends upon the site of injection and the length of AAI needle. Various types of AAI devices are available in market with different needle lengths.

**Objective:** To determine, whether the type of the AAI prescribed and the site of injection is suitable for our population and can it be based upon weight, height, body mass index (BMI) or Surface area (SA) in our population group.

**Methods:** We determined SCTD at 2 areas over each thigh in children weighing over 30 Kg by ultrasound equipment. Height and weight of each patient were recorded and BMI and SA were calculated

**Results:** We have enrolled 50 children with various allergies who have been prescribed AAI and are more than 30 kg in weight. Data is being collected and analysed. Results will be submitted as soon as possible.

## **P.84: Do Doctors know how to use adrenaline auto-injectors properly?**

Jennifer Lewis<sup>1,2</sup>, Rachel Jenner<sup>2,1</sup>

<sup>1</sup>The University of Manchester, Manchester, UK, <sup>2</sup>The Royal Manchester Children's Hospital, Manchester, UK

### Objective

The Resuscitation Council guidelines for anaphylaxis state intramuscular injection of adrenaline is the recommended treatment in the emergency setting. In order to ensure speed and ease of use a number of adrenaline autoinjectors (AAI) have been designed. Although primarily used in community settings, medical professionals should be comfortable with these devices. A systematic review of the literature was conducted to determine if doctors were able to use AAIs correctly.

### Methods

A Ovid SP search of Medline 1946 to Week 10 2015 was conducted, using the following strategy; *[exp Physicians/OR exp Health Personnel OR exp General Practitioners/OR doctor\$.mp.OR clinician\$.mp.OR health care provider\$.mp.OR GP.mp.] AND [exp Patient Education as Topic/OR exp Health Education/OR exp Teaching/OR educat\$.mp.OR teach\$.mp.OR instruct\$.mp.OR train\$.mp.]AND [exp Epinephrine/OR exp Self Administration OR exp Injections, Intramuscular/OR adrenalin\$.mp. OR autoinjector.mp. OR auto-injector.mp.OR epipen.mp. OR auvi-q.mp.OR jext.mp.OR intramuscular\$.mp.OR anapen.mp.] (English language and humans).*

### Results

425 papers were originally found however only five of these were relevant. All of these were cross sectional descriptive studies with small sample sizes. Each used objective testing of doctors ability to perform a successful adrenaline autoinjection. On average only 23% were successful on first attempt. Educational sessions (conducted in 2 of the papers) were poorly attended but did lead to an increase in confidence and ability. On average 11.6% of doctors accidentally injected into their own thumb.

### Conclusion

Despite the weaknesses of these studies, the findings are consistent throughout. It is clear the majority of doctors are unable to use AAI correctly and are therefore unable to teach patients/parents effectively. The lack of AAI technique teaching in the undergraduate curriculum means many junior doctors lack this key skill. The provision of educational sessions for doctors regardless of specialty or seniority is necessary and has been shown to be beneficial, improving ability, knowledge and confidence.

## **P.85: Do parents of children with allergies know how to use adrenaline auto injectors correctly?**

Jennifer Lewis<sup>1,2</sup>, Rachel Jenner<sup>2,1</sup>

<sup>1</sup>The University of Manchester, Manchester, UK, <sup>2</sup>Manchester Royal Children's Hospital, Manchester, UK

The Resuscitation Council guidelines for anaphylaxis state intramuscular injection of adrenaline is the recommended treatment in the emergency setting. In order to ensure speed and ease of use a number of adrenaline autoinjectors (AAI) have been designed. Parents of children with allergies should be appropriately educated to ensure they are aware of the signs of anaphylaxis and how to use an AAI. A systematic review of the literature was conducted to determine if parents were able to use AAIs correctly.

### Method

A Ovid SP search of Medline 1946 to Week 10 2015 was conducted, using the following strategy;

*((exp patient/)OR(exp parent/)OR(exp caregiver/)OR(parent\$.mp)OR(carer.mp)) AND ((exp Patient Education as Topic/)OR(exp health education/)OR(exp teaching/)OR(educat\$.mp)OR(teach\$.mp)OR(instruct\$.mp)) AND ((exp epinephrine/)OR(exp self, administration/)OR(exp injections, intramuscular/)OR(adrenalin\$.mp)OR(autoinjector.mp)OR(auto-injector.mp)OR(epipen.mp)OR(auvi-q.mp)OR(JEXT.mp)OR(IM.mp)OR(intramuscular\$.mp)) Human, English Language, Children 0–18 years.*

### Results

438 papers were discovered, 9 were relevant. The majority of these were cross-sectional descriptive studies. The papers used a variety of different methods to assess ability – questionnaires and objective testing, mean scores for correct use of an AAI ranged from 39.4% to 5.6%. Three papers found a significant difference between the parents who had been trained by an allergist and those who had no training ( $p < 0.01$  and  $p = 0.007$ ). There was evidence in a number of the papers that parents were unsure when they should use the AAI and many would be fearful to use them before emergency services were present.

### Conclusion

Although the use of AAIs is widely advocated, it appears the majority of parents either do not feel comfortable or are unaware on how to use AAIs. Training for such families is a key component in health management and should be seen as a continuous process, which is repeated at each consultation – this should ensure knowledge is up to date and may ease the understandable apprehension which is associated with these devices.

**P.86: *Filaggrin* loss-of-function mutations are associated with persistent childhood food allergies, and interact with early eczema to influence late food allergy**

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### Objective

Filaggrin is an epidermal structural protein responsible for maintaining the skin barrier. *Filaggrin* loss-of-function mutations (*FLG*-LOF) are associated with eczema and peanut allergy, as well as all-cause food allergy (FA) in adolescence, but not in early childhood. We hypothesised that *FLG*-LOF may be related to persistent but not transient food allergies. Here we investigated the relationship of *FLG*-LOF to FA trajectory over the first 18 years of life using the Isle of Wight 1989 birth cohort.

### Methods

We undertook log binomial regression analyses of this unselected, longitudinal birth cohort, controlling for sex. *FLG*-LOF status was determined from the three most common polymorphisms (R501X, S3247X, 2282del4). Early FA was defined as occurring at ages 1, 2, 4 or 10 years, whilst late FA only at age 18. Persistent FA was present both early and late.

### Results

*FLG*-LOF occurred in 10.3% (111/1074) of subjects. *FLG*-LOF significantly increased the risk of persistent FA (RR=4.08, 95%CI 1.28-13.01,  $p=0.017$ ) (30.8%, 4/13) relative to never FA. There was no significant effect on risk of early FA (13.3%, 15/113) or late FA (14.3%, 4/28). Among subjects with eczema in the first two years of life, *FLG*-LOF was associated with late FA (RR=8.21, 95%CI 1.44-46.92,  $p=0.018$ ) and persistent FA (RR=9.19, 95%CI 1.66-51.07,  $p=0.011$ ), but not early FA.

### Conclusions

*FLG*-LOF was significantly associated with persistent FA. Persistent FA may require both the inflammatory milieu of infant eczema to permit allergic sensitisation and a disrupted skin barrier for FA to persist. That early eczema interacts with *FLG*-LOF to influence late and persistent FA suggests that in early eczematous children with barrier defects, allergic sensitisation to food occurs early in life, but allergy may not manifest until oral exposure in adolescence.

Our results support the hypothesis that *FLG*-LOF is associated with persistent food allergies.

### **P.87: Why every school needs to stock undesignated adrenaline auto injectors (AAI).**

Joanna Lukawska<sup>1,2</sup>, David Thursfield<sup>1</sup>, Magdalena Dziadzio<sup>1,4</sup>, Jonathan Cohen<sup>1,3</sup>, Leanne Goh<sup>1</sup>, Penny Salt<sup>1</sup>, Giuseppina Rotiroti<sup>1,4</sup>

<sup>1</sup>University College London Hospital, London, UK, <sup>2</sup>King's College London, London, UK, <sup>3</sup>University College London, London, UK, <sup>4</sup>Royal Free Hospital, London, UK

#### Background:

Adrenaline is the first line treatment of anaphylaxis. Delayed treatment is associated with poor outcomes. Around 8% of school children suffer from food allergy. The first severe allergic reaction occurs *at school* in 20-55% of children. Only 25%-28% of food allergic children have access to their AAI at school. There is no standardised training of school staff in their use. Schools in the UK do not stock their own AAIs. They rely on parents to supply them with individually prescribed devices. Schools keep multiple AAIs on behalf of several children with food allergy, the majority of which are never used, but require replacement due to expiry.

#### Methods:

We surveyed school nurses and teachers regarding accessibility of AAIs at school, their ability to recognise and treat anaphylaxis and whether they would be prepared to administer another child's AAI to the child in anaphylaxis.

#### Results:

We received 120 responses. 91% of school nurses and teachers were aware of children with food allergy in their schools. 68% of AAIs were kept within easy reach. 56% of the respondents were confident they would be able to recognise signs and symptoms of anaphylaxis. 53% were confident that they would be able to administer an AAI. However, only 23% would be prepared to treat a child experiencing anaphylaxis using an AAI device that had been prescribed for a different child.

#### Conclusions:

Anaphylaxis can have rapid onset and quick and effective administration of AAI is essential. In case of anaphylaxis at school, teachers and nurses, under highly stressful, time-sensitive conditions must recognize and treat the patient. Having to make a decision whether to use another's AAI could lead to no treatment or delay in treatment. This survey underscores the need for better anaphylaxis training for school staff and for schools to stock undesignated AAIs.



**P.88: Please Sir, which is the best school allergy care plan?**

Jennifer Mack

*Children's Hospital for Wales, Cardiff, UK*

**Objective:** Multidisciplinary allergy school care plans are important to manage children with allergies, focusing on allergen avoidance and treatment of reactions. We compared users' perceptions of 2 careplans: 1)Cardiff allergy service with the 2)BSACI.

**Methods:** A questionnaire was devised auditing clarity and effectiveness. Using RCPCH Anaphylaxis Care Pathway and NICE Anaphylaxis (2011) guidelines we explored 9 components: Child identity, Contact details, Allergy type, Mild allergy information, Severe allergy information, How to use Epipen, What to do after using Epipen, Consent & Overall Preference. Potential users were asked: parents, teachers (non-healthcare professionals), and school nurses. Data was analysed by Chi Squared analysis ( $P < 0.05$  taken as significant).

**Results:** There were 111 participants (31 teachers, 40 parents and 40 school nurses). Parent and teachers' data (non-healthcare professionals) was compared to school nurses.

Overall 56.3% parents/teachers preferred the BSACI plan ( $p=0.0067$ ) and 65% school nurses the Cardiff plan ( $p=0.0001$ ). Parents and teachers preferred the Cardiff plan for documentation of contact details (56.3% $p=0.0012$ ), consent (85.9% $P=0.0001$ ), and description of what to do after giving an epipen (47.9% $p=0.0049$ ). They preferred the BSACI for description of epipen useage (49.3% $p=0.0015$ ). No difference between documentation of allergy type or mild/severe allergy information.

School nurses preferred the Cardiff plan for documentation of child's identity (60% $p=0.0013$ ) and consent (97.5% $p=0.0001$ ), and epipen useage information (60% $p=0.0002$ ). No difference for the other categories.

**Conclusions:**

Overall, parents and teachers preferred the BSACI plan whereas school nurses preferred the Cardiff one. Specifically, the BSACI's action plan's strengths were: its succinct format and epipen usage explanation. The Cardiff action plan's strengths were: its clearer documentation of identity details, contact details & parental consent and post Epipen advice. We suggest a minor revision of the BSACI national version to include these changes to produce the optimal national careplan.

**P.89: Vitamin D and iron deficiency; suboptimal nutrition, a trigger for chronic idiopathic urticaria (CIU).**

*Janaki Mahadevan, Sibel Sonmez Ajtai, Gillian Vance, Louise Jane Michaelis  
Great North Children's Hospital, Newcastle upon Tyne, UK*

**Objectives:**

- 1.To determine the incidence and prevalence of children presented with chronic urticaria in GNCH.
- 2.To determine if investigations requested and the patients were treated in line with National and International guidelines.
3. To determine if poor diet is relevant to CIU.

**Method:** A retrospective study on children treated at GNCH from January 2013 to June 2014. Data was collected from medical records.

**Results:**

A total of 87 females and 71 males aged between 10 and 16 years were diagnosed with CIU. Symptoms included urticaria 158 (100%), facial angioedema 49 (23%), and swollen hands/feet 4(2%). Co-morbidities included asthma (20%), allergic rhinitis (18%), eczema (17%) and food allergy (14%). 134 children (85%) underwent investigations of which 50% were found to have nutritional deficiency; coeliac disease in 2(1%) and 3(2%) had thyroid disease.

25-hydroxy vitamin D was tested in 92 (69%). 46 (50%) were found to have a low vitamin D level in which 34(37%) had insufficiency and 12(13%) had deficiency. 44 (96%) were treated and on review at 6 months the urticaria resolved in 27 (61%).

Iron and Ferritin level tested in 107(80%). 74 (69%) had a low iron and/or ferritin level. Of these 42(57%) were treated and the symptoms resolved in 33 (79%).

Non-sedative H1-antihistamine was used as first line treatment. Overall 66% of CIU resolved completely of which 32% had iron deficiency, 26% vitamin D deficiency and 14% both. Antihistamines were not required after nutritional replenishment.

**Conclusion:**

Nutritional supplement in select cases might have led to the complete resolution of CIU. Viral infections remain the commonest trigger in infants. Vitamin D and iron status might trigger CIU in young adults and in multisystem allergic diseases. Targeted screening for nutritional deficiency in CIU may benefit in avoiding expensive immunological investigations being undertaken. A prospective randomised control trial is warranted.

## **P.90: Use of Specific IgE Bos d8 (Casein) to aid early introduction of dietary baked milk in children with cows' milk allergy.**

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### **Objective**

To audit the use of casein sIgE in managing children with cows' milk allergy in our UK based population.

75% of children with milk allergy tolerate baked milk in their diet.

### **Methods**

Casein sIgE testing was incorporated into our evaluation of children with cow's milk allergy. Supervised baked milk challenges were performed on selected children using 'malted milk' biscuits.

### **Results**

A total of 98 tests were requested over a period of 7 years. 42 children with confirmed cows' milk allergy were challenged. 29 of them had eczema. Their mean age was 4.7 years, median 3 years (Range 1-16 years). SPT was performed to fresh and cows' milk reagent (Diagenics). 42 children passed, successfully introduced baked milk and remain symptom free with regular exposure. 9 of these children have outgrown their milk allergy and tolerate fresh milk. 1 child failed the challenge with a casein >100iu. He was challenged due to a history of tolerance reported by the parents.

The 41 children who passed the challenge showed a mean fresh cows' milk SPT of 11.25mm (Range 3-33mm), median SPT 10mm, mean cows' milk reagent SPT 3.86, median 3.04mm (Range 0-10.8mm). Mean sIgE to cows' milk was 5.61iu, median 2.80iu (Range 0-37.2). The mean sIgE to casein was 2.20iu, median 0.55iu (Range 0.02-29.8).

The mean sIgE to casein in the 56 children not challenged was higher at 33.6iu, median 15.3iu (Range 0.05->100).

### **Conclusions**

Low levels of casein specific IgE give a good indicator of outcome to challenge and aids early selection of patients for baked milk challenges. This is especially important in clinical settings with no on site intensive care where careful challenge risk stratification is important. Early inclusion of dietary baked milk accelerates the resolution of cows' milk allergy and widens the choice of foods for these children.

**P.91: Compliance to recently enforced allergen labelling regulation under 'Food Information Regulation UK'(FIR UK): Food Allergen labelling awareness audit in Paediatrics at City hospital Sunderland.**

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Objectives.

Food allergen labeling regulation is changed significantly since the new FIR UK has come in force since December 2014 and includes unpackaged food also. Hospital staff involved in serving the food to patients are responsible to provide information about 14 food allergen in the food served in the hospital. Failure to comply is a criminal offence and Trust may be liable to criminal prosecution and individual may be fined.

This audit was done to assess and increase the awareness to this regulation to improve patient safety.

Design and setting.

A survey of the staff involved in serving the food on paediatric ward was done before (audit) and a week after (re-audit) the detailed information about FIR UK was sent to all staff by email in May and June 2015.

Results.

34 staff returned proforma for the first audit and 29 for re-audit.

5 of 29 (17%) staff members in the re-audit, indicated that they did not get a chance to read the information on e-mail and so excluded from the re-audit.

Re-Audit suggested improved awareness about the FIR UK.

All (100%) were aware of the new labelling regulation and that it covers unpackaged in addition to prepackaged food served on the food trolley (76% in initial audit)

Most importantly, 100% replied that they found the information sent to them on e mail useful, felt safer and were aware where to get information regarding food allergens on the 'intranet' in the Re-audit as compared to 50% in the audit.

All (100%) responded in re-audit that it is their responsibility to provide allergen information (88% in the audit before).

Conclusion.

The awareness to the Allergen labelling regulation has improved after the information was provided to all the staff by email. Small group discussions and lecture were arranged to improve this further.

## **P.92: Which bacteria instigate and drive eczema?**

Tom Marrs, Kenneth Bruce, Gideon Lack, Carsten Flohr  
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**OBJECTIVE:** The hygiene hypothesis proposed that transmission of infectious agents alters the likelihood of developing allergic disease. Eczema often presents first in infancy and epidemiological risk factors such as caesarean delivery and being first-born are well known. No systematic reviews have appraised which bacteria, or characteristics therefore, may be driving these associations.

**METHODS:** Medline was searched in December 2014 for studies published after 1999 investigating associations between eczema and objective markers of bacterial exposure. We included all *in vivo* observational studies pertaining to the natural history of eczema, and excluded all *in vitro* work. Differences in study design precluded meta-analysis.

**RESULTS:** 125 (3.9%) of 3181 publications were suitable for inclusion. 13 studies reported prospective data; 11 investigated gut microbiota and suggest that clostridia, *Staphylococcus aureus* (SA), *Bifidobacterium pseudocatenulatum*, and *Escherichia coli* are associated with eczema, whilst enterococci, bifidobacteria, bacteroides, *Lactobacillus paracasei*, and increasing bacterial diversity may be protective. Two prospective studies examined longitudinal SA relationships amongst infants' skin microbiota. The Dutch cohort found that SA nasal carriage at six months predicted moderate - severe eczema (adjusted OR 3.30 (1.68 - 6.47)), although the Danish cohort found no significant relationships. 84 studies cultured cutaneous microbiota, with 13 of 18 case control studies demonstrating significantly increased eczema severity amongst participants colonised by SA. Two studies used next-generation sequencing of bacterial DNA from skin swabs. These both demonstrated that the diversity of cutaneous microbiota drops during eczema flares, with ensuing resolution being associated with recovering microbial diversity and increases in Streptococcus, Propionibacterium and Corynebacterium species.

**CONCLUSION:** Our findings highlight that microbiota diversity and the presence of specific constituents may be influencing the development of eczema. Further key insights into eczema's pathogenesis may best be enabled by using prospective, comprehensive and regular culture-independent assessments of infants' developing microbiota through birth cohorts.

**P.93: Bacterial diversity of infants' faecal microbiota does not vary with storage at room temperature, freezing or differing sequencing platform**

Tom Marrs<sup>1</sup>, Michael Perkin<sup>1,2</sup>, Adam Witney<sup>2</sup>, Damian Rivett<sup>1</sup>, Kirsty Logan<sup>1</sup>, Kenneth Bruce<sup>1</sup>, David Strachan<sup>2</sup>, Gideon Lack<sup>1</sup>, Carsten Flohr<sup>1</sup>

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**OBJECTIVE:** As part of a project investigating allergy outcomes and gut microbiota, we ascertained if sequencing data were altered by faecal sample processing. In particular, we aimed to determine whether the bacterial diversity of infants' faecal microbiota varied according to sample storage or sequencing platform.

**METHODS:** Nine EAT Study participants submitted faecal samples within 24 hours of passing at three or 12 months of age. Three aliquots were taken from each sample and DNA extraction undertaken on receipt of sample (Group A), after two days of storage at room temperature (Group B) and after subsequent freezing (Group C). All extracts underwent Roche 454 FLEX 16S amplicon sequencing, with Group A aliquots additionally undergoing duplicate Illumina Miseq interrogation.

**RESULTS:** This validation study included four faecal samples from participants attending at three months of age and five samples from those at 12 months of age. 454 sequencing yielded 604,304 reads from 27 extracts, whilst the Illumina platform produced 1,092,558 sequences from nine extracts. After rarefying, both platforms identified bacteria at a similar rate. Samples from 12 month of participants were more diverse than those collected at three months (mean Shannon index 5.34 vs 2.62,  $p = 0.0002$ ). However, there was no significant difference in Shannon diversity between matched extracts from Groups A and C according to being stored for two days at room temperature or then subsequent freezing ( $p = 0.26$ ,  $p = 0.86$  respectively by Wilcoxon test), or indeed by comparing all storage groups (Kendall's co-efficient 0.89,  $p = 0.007$ ).

**CONCLUSION:** Microbiota diversity does not significantly change when samples are left for two days at room temperature, even after subsequent freezing. This has important implications for how samples are collected amongst clinical studies, offering the potential for greater flexibility in collection methods, without compromising data quality.

**P.94: Do infants consuming a cows' milk exclusion diet have a healthier dietary pattern than infants consuming an unrestricted diet?**

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**Objective:** Research suggests infants fed a Cows' Milk Exclusion (CME) diet for cows' milk allergy may have dietary intakes that are nutritionally inadequate. This study aimed to compare the dietary pattern of infants consuming a CME diet to a control group of infants.

**Method:** Two groups of infants were recruited from the Isle of Wight, UK. Infants consuming a CME diet were recruited during a routine allergy clinic. A control group of infants consuming an unrestricted diet was recruited from health visitor clinics. Parents completed a validated age-appropriate food frequency questionnaire. Demographic, allergy and feeding information was collected. Descriptive statistics and Mann Whitney U tests were calculated.

**Results:** 126 participants were recruited (60 control and 66 CME). The median age was 13.0 months (range 8-27). Infants in the CME group had commenced the exclusion diet at a median age of 9.5 weeks, consumed the diet for a median duration of 41 weeks and had a median of 3 allergy dietitian contacts (range 1-18).

The CME group had a significantly less varied intake of both food and drinks, than the control group ( $p < 0.01$ ). The CME group consumed sweet foods, baby juice and tea significantly less frequently ( $p < 0.05$ ), but consumed readymade baby foods more frequently ( $p < 0.01$ ). There was no difference in the frequency of consumption of fruit, vegetables, fish, meat or cereals between groups. Parents of the CME group were more concerned with healthy eating than the control group ( $p < 0.01$ ).

**Conclusion:** Parents of infants fed a CME diet are greatly concerned with healthy eating. Dietetic input received by the CME group may lead to a lower consumption of certain food and drinks that are typically discouraged in infants. The more frequent use of readymade baby food in the CME group needs further investigation.

**P.95: Environmental peanut levels in a Clinical Trials Unit performing peanut food challenges**

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**Objective:** We aimed to determine the levels of peanut protein at the environment within our busy Clinical Trial Unit (CTU) where approximately 1700 peanut diagnostic food challenges have been performed.

**Methods:** Environmental peanut protein was quantified in clinical and food preparation areas at our CTU. Dust samples were collected from the bed mattress and pillow.

Wipe samples were collected from the children's play table, TV stand, toy stand, bed-rails and arms of the parent's chair in the clinical area and from the taps, microwave, sink drainage area and table tops (n=3) in the food preparation area.

The Veratox peanut ELISA was used to quantify peanut protein in extracted dust and wipes samples. The lower limit of quantification (LLQ) for the ELISA was 0.5 µg of peanut protein/g dust (µg/g) and 0.2 µg/wipe.

**Results:** Peanut protein level in the dust sample from a patient's bed pillow was 4.74 µg/g of dust; 9.48 times higher than the LLQ. Dust from the bed mattress was insufficient for the analysis.

The median peanut protein level detected in wipe samples from clinical area was 0.18 µg/wipe (IQR (0.11- 0.30)), with maximum of 0.49 µg/wipe, 2.45 times higher than LLQ (TV stand) and minimum 0.10µg/wipe (bed rail).

The median level measured in the food preparation area was 0.21 µg/wipe (IQR (0.08- 0.44)); maximum 0.76 µg/wipe, 3.8 times higher than LLQ (microwave), minimum 0.03 µg/wipe (sink).

**Conclusions:** Despite strict precautionary measures and regular cleaning within challenge areas, contamination of the environment can occur, Measured levels were higher than levels in the average England's households for both, pillow dust (median 2.40 µg/g) and wipe samples (median 0.0 µg/wipe) and several folds above the LLQ. Environmental peanut levels were much lower than the amount of protein considered sufficient to elicit the reaction (2.8 mg peanut protein)



**P.96: A case of anaphylaxis to egusi seeds**

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**Background:**

Egusi seeds are an example of an unusual allergen imported into the UK and eaten by particular ethnic groups (West Africans). The seeds are ground up and used as a thickener in a traditional soup usually containing palm oils, spinach, meats and fish or shellfish.

**Case presentation:**

A 1 year old boy from a British Nigerian family presented twice over the space of a few weeks with anaphylaxis (urticaria, angioedema, stridor and collapse) following the ingestion of what was described as a Nigerian seafood soup. On the first occasion the soup was thought to have also contained peanuts but on the second occasion it was clear that peanuts were not present. He required intramuscular adrenaline at both presentations in addition to intravenous steroids and antihistamines.

The boy had a history of severe eczema but no other past medical history of note. Skin prick tests performed between the 2 anaphylaxis episodes were negative to fish and shrimp but positive to peanuts, hazelnut and almond. Egusi was only recognised as being the common allergen after the second episode and skin prick tests confirmed the diagnosis.

**Discussion:**

Egusi most often refers to *Citrullus lanatus* (water melon) and related cucurbit species including plants such as squashes, melons and other members of the gourd family. Following an extensive literature search we were unable to identify any previously published cases of Egusi anaphylaxis. However, we were able to obtain anecdotal accounts of Egusi seed allergy from Nigerian colleagues and identified one adult with a reported Egusi allergy who has no known cross-reactivity with other members of the gourd family.

This case highlights the need for vigilance in the appreciation of novel allergens, especially with increasing globalisation and importation of food stuffs commonly eaten by different ethnic communities residing in the UK.

**P.97: An evaluation of lip dose open food challenges: a prospective trial.**

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**Background**

Open food challenges (OFC) are undertaken as a day case and the majority of food challenges fail at the lip dose stage of the challenge and the procedure then has to be abandoned, resulting in waste of professional time.

**Objective:**

We sought to determine whether undertaking lip dose challenges reduces waiting time and whether the results of OFC correlate with outcomes of lip dose challenges.

**Methods:**

We started a trial of lip dose tests for open food challenges in children in batches of 8-10 per sitting. Children who failed at the lip dose stage of the OFC needed no further evaluation and those who passed the lip dose stage were called on another day to complete a formal open food challenge.

**Results:**

We carried out total of 52 lip dose food challenges. Out of these, 34 children passed the lip dose stage and 18 failed. Of the ones who passed the lip dose stage, 24 children so far have had the formal food challenges. 23 of these children passed the full challenge and so far 18 wasted slots were saved.

**Conclusions:**

Before carrying out lip dose challenges, our average waiting time for OFC was 14-16 weeks. After carrying out lip dose food challenges, in small batches of children, we have definitely saved valuable professional time and have brought our waiting time down to 8-9 weeks. Moreover, the majority of children who passed the lip dose challenge also passed the formal food challenge.

**P.98: Predictive values of serum specific IgE and skin prick test wheal size in children with peanut, egg and milk allergy in a secondary care population**

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**Background:** The double blind placebo-controlled food challenge (DBPCFC) is the gold standard for diagnosing food allergy but is resource intensive. Predictive values for specific IgE (splgE) and skin prick test (SPT) can inform the need for food challenge, but are population-dependent.

**Objective:** To determine predictive values of splgE & SPT for peanut, egg and cow's milk in British children in secondary care.

**Methods:** Medical records of 211 children attending for Open food challenges (OFC) between January 2006 and December 2012 were accessed. The splgE and/or SPT of the foods at the consultation prior to the OFC and the outcome were determined. Their predictive ability for determining a positive OFC result were examined using receiver operating characteristic (ROC) curves.

**Results:**

71 cow's milk, 93 egg and 47 peanut OFC's.

Performance characteristics of SPT & splgE:

Allergy Test Cut-off Values	AUC (95% CI)	Sensitivity	Specificity	PPV	NPV
Peanut SPT (n=17), 4mm	0.92 (0.77 – 1.0)	0.88	1.00	100%	90%
Peanut SplgE (n=42), 0.76kuA/L	0.78 (0.62 – 0.93)	0.71	0.86	71%	86%
Egg SPT (n=51), 3mm	0.67 (0.52 – 0.82)	0.73	0.55	55%	73%
Egg SplgE (n=69), 0.95kuA/L	0.72 (0.60 – 0.84)	0.63	0.77	68%	73%
Milk SPT (n=41), 1mm	0.63 (0.46 – 0.79)	0.58	0.68	61%	65%
Milk SplgE (n=58), 0.79kuA/L	0.69 (0.55 – 0.84)	0.70	0.71	62%	78%

AUC=Area under the curve; PPV=Positive Predictive Value; NPV=Negative Predictive Value.

A 4mm peanut SPT gives a sensitivity of 0.88 and specificity of 1.00 suggesting a particularly good predictive value.

**Conclusion:** Predictive values for SPT and splgE were established for peanut, egg & milk in a secondary care population. A holistic approach remains paramount in decision making especially for foods with poorer PPV's. This information is valuable for the child, parents and carers and has substantial resource implications for secondary care services performing OFC's.

## **P.99: Evaluation of transitional care needs of food allergic young people in a regional paediatric allergy clinic**

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<sup>1</sup>The Great North Children's Hospital, Newcastle upon Tyne, UK, <sup>2</sup>Leeds Children's Hospital, Leeds, UK

### **Objective**

To produce condition-specific transitional care recommendations based on patient needs.

### **Methods**

Patients aged  $\geq 11$  attending clinic over 24 weeks were prospectively surveyed using (1) a UK-validated HRQL scale ('You and Your Food Allergy') and (2) Readiness for Transfer (RfT) scale designed by selecting 17 relevant items from 'Moving on Well' Young Person's Self Assessment.

### **Results**

Survey response rate was 70%. The demographic and clinical characteristics of responders and non-responders were similar. Half of responders (49.2%) were male and 52.5% were aged  $\geq 14$ . Nut allergy was most common (88.5%) and 42.6% had multiple food allergies. A fifth (21.3%) had past anaphylaxis, 54.1% had asthma and 80.3% carried an adrenaline autoinjector.

The total HRQL score was 75 (out of 100). In keeping with other published literature, the lowest scoring areas were "Support" (69.5) and "Day-to-Day" (59.3). In contrast with published evidence, HRQL scores of our population were not influenced by their demographic or clinical characteristics.

The total RfT score was 68.8 (out of 100), with complete independence (score 100) reported in "Dietary Avoidance" and least independence reported in "Management of Acute Reactions" (70) and "Ability to Engage and Interact with Health Care Providers" (48.2).

Patients aged  $\geq 14$  and those carrying an adrenaline autoinjector had significantly higher total RfT scores ( $p < 0.05$ ). We postulate that this difference may be due to increasing maturity but also higher number of visits focusing on self-management education, particularly targeting those carrying adrenaline autoinjectors.

There was no correlation between the HRQL and RfT scores.

### **Conclusions**

Based on our findings, we recommend the following: (1) Routine food allergy-specific HRQL enquiry to establish disease burden, (2) Increasing patient education opportunities (with focus on active problem self-management) and making them equally accessible to patients with and without adrenaline autoinjectors.

## **P.100: Supervised feeds versus oral food challenges in the Paediatric Allergy Department at St Thomas' Hospital, London – analysis of investigations and outcomes**

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### **Objective**

Oral food challenges (OFC) are the gold standard for the diagnosis of food allergy. At St Thomas', Supervised feeds (SF) are used for low risk patients to increase capacity. This audit aimed to compare OFC versus SF with regard to SPT, SptIgE levels and rate of reactions and to compare positive and negative outcomes with regard to SPT sizes and SptIgE values.

### **Methods**

The departmental challenge database was searched to obtain SPT sizes, SptIgE levels and outcomes for peanut, wheat, legumes, soya, sesame, baked egg, baked milk, fresh milk and cooked egg for patients having SF or OFC in 2014.

### **Results**

For the above allergens, there were 186 OFC and 134 SF in 2014. 36% of OFC reacted and 14% SF ( $p < 0.001$ ). When analysed by allergen, only peanuts ( $p < 0.001$ ) and legumes ( $p = 0.01$ ) showed a significant difference in the rate of reactions. Patients selected for OFC had higher SptIgE with peanut ( $P < 0.05$ ), sesame ( $p = 0.04$ ), wheat ( $p = 0.001$ ), legumes ( $p = 0.02$ ) and baked milk ( $p < 0.0001$ ). Larger SPT sizes for patients having OFC were only seen for peanut ( $p < 0.001$ ) and wheat ( $p = 0.01$ ). In reacting patients, larger SPT size was only demonstrated for peanut ( $p < 0.01$ ) and baked egg ( $p = 0.009$  for raw egg) and higher levels of SptIgE for cooked egg ( $p = 0.03$ ).

### **Conclusion**

Overall, reaction frequency is higher in OFCs, confirming allocation of lower-risk patients to SF. Peanut OFC patients are the only group to have higher SPT *and* SptIgE levels compared to SF with significantly more reactions. This local data does not demonstrate clear cut-off values to predict positive reactions due to significant overlap, between negative and positive challenges, of SPT and SptIgE values. Revision of selection criteria for OFC or SF, with education updates for clinicians, would help significantly increase reaction frequency, SPT and SptIgE in OFC versus SF for every allergen.

## **P.101: Identifying the service gaps in the management of paediatric anaphylaxis**

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**Background:** Anaphylaxis is a potentially life-threatening condition. We question whether there is a paucity of clarity on the appropriate and required management of anaphylaxis amongst children in the emergency setting.

**Objective:** To assess the number of paediatric patients with signs/symptoms of anaphylaxis that received optimal treatment and further management as per Resuscitation Council and NICE guidelines. Our study aims to highlight areas for improvement in current management in our own emergency department.

**Methods:** A retrospective review was carried out of all children presenting with signs/symptoms of anaphylaxis to the Princess Royal Hospital Emergency Department between October 2012- March 2015. Only patients with true anaphylaxis were included, but some data has shown patients can be miscoded. A proforma including up-to-date guidance on treatment and management was used to assess each patient against.

**Results:** After checking all paediatric admissions coded for 'allergy', 'rash' and 'anaphylaxis' - only 6 results complied with the definition of true anaphylaxis. Of these patients aged between 1-16 years, we recorded various demographics and symptoms suffered. Regarding management, we found correct procedure was not followed in the majority of cases. None of the patients had any recommended investigations including a mast cell tryptase. Although all the patients were treated with an adrenaline auto injector (AAI) and oral steroids, only 5/6 had antihistamines and they rarely received guideline-standard patient education or referral for further follow-up.

**Conclusion:** Our results, although skewed by a small sample size, show clear areas for improvement and the need for definition of the steps to be taken in managing paediatric anaphylaxis under current guidelines. Larger numbers are required to confirm this data, which we will achieve by including data from other King's College Hospital NHS Trust emergency departments.

## **P.102: Implementation of a clinical protocol for measuring early morning salivary cortisol and cortisone, as a screening test for asthmatics at high risk of adrenal crisis.**

Ruth Trinick<sup>1</sup>, [Chris Doyle](#)<sup>1</sup>, Paul McNamara<sup>1,2</sup>, Daniel Hawcutt<sup>1,2</sup>, Elaine Kelly<sup>1</sup>, Vicky Worrall<sup>1</sup>, Jo Blair<sup>1</sup>

<sup>1</sup>*Alder Hey Children's NHS Foundation Trust, Liverpool, UK*, <sup>2</sup>*Institute of Translational Medicine (Child Health), University of Liverpool, Liverpool, UK*

### **Objective**

To implement a clinical protocol for testing early morning salivary cortisol (EMSC) and cortisone (EMSCn) in children  $\geq 5$  years of age with asthma and maintain a database of results and clinical management.

### **Methods**

Patients were tested if they were: 1) *on high dose steroids (>800 mcg beclomethasone or >500 mcg fluticasone for >6 months) or lower doses + intranasal/topical corticosteroid or >3 courses prednisolone*, or 2) *symptomatic of adrenal insufficiency*. 'Salivette testing kits' and information leaflets were provided and saliva (2ml) was collected 30 minutes after waking, on three mornings. EMSC and EMSCn were measured by competitive immunoassay and chemiluminescent immunoassay, respectively. A mean EMSC value  $>6$ nmol/L and a minimum EMSCn  $>12.5$  nmol/L was classified as 'normal' (Blair *et al*, Clin Endocrinol 2014). Any patient not fulfilling these criteria underwent a low dose short synacthen test (LDSST). An adequate LDSST response was defined as peak serum cortisol  $>500$ nmol/L (any timepoint), suboptimal response 350-500nmol/L and inadequate  $<350$ nmol/L.

### **Results**

Thirteen subjects were tested (June 2014-Jan 2015). 1/13 (7%) sample sets were inadequate. Median EMSC and EMSCn were 8.7 nmol/L (range 1.7-615) and 34.4 nmol/L (range 11.9-64.5), respectively. Two of twelve patients had abnormal results and 5/12 had borderline results (6/7 LDSST results available). One patient with abnormal screening had an undetectable response on LDSST (on fluticasone 200 mcg/day + alternate day prednisolone) and was commenced on daily hydrocortisone. The second patient (on beclomethasone 400mcg/day + symptomatic) had a suboptimal response and was commenced on 'sick day' hydrocortisone. Of the four patients with borderline results, two had adequate LDSST responses and two suboptimal responses (requiring sick day hydrocortisone).

### **Conclusions**

We have successfully implemented a salivary screening protocol to detect children with asthma at high risk of adrenal crisis. Further audit is required to monitor results/outcomes and ascertain any need for protocol refinement.

### **P.103: Tolerance to extensively-heated allergen in children with IgE-mediated allergy to egg and cow's milk is unlikely to be related to the dose of allergen**

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#### **Objective**

Up to 70% of children with IgE-mediated allergy to egg and cow's milk are able to tolerate the allergen in baked foods (e.g. cakes/biscuits). This may be related to heat-induced modification of the allergen, consumption in a wheat-based matrix and/or the smaller amount of allergen present in baked products. We sought to assess the latter by comparing allergen threshold data from oral food challenges (OFC) to baked allergen with similar data from OFC to the native allergen.

#### **Methods**

The Children's Hospital at Westmead is a major tertiary paediatric allergy centre in Australia, undertaking 800-1000 OFC p.a. OFC were performed using incremental dosages according to a standardized protocol (and recipe, for baked allergen OFC); stopping criteria were consistent with PRACTALL guidelines. Data were collected prospectively from all positive OFC to egg or cow's milk over a 7 year period (2008-2015).

By assessing the cumulative dose of allergen causing an objective reaction, individual NOAELs (No observed adverse effect level) and LOAELs (Lowest observed adverse effect level) were determined. Statistical dose-distribution models (log-normal, log-logistic, Weibull) were applied to individual NOAELs and LOAELs for egg and cow's milk, both to the native allergen and in the form of a baked muffin.

#### **Results**

Dose-distribution curves for lightly-cooked egg and egg in a baked muffin were not significantly different. ED10s for lightly-cooked egg (n=45) and baked egg (n=124) were 30.1mg (95%CI 11.5,78.5) and 73.6mg (95%CI 49.6,109.3) respectively. A similar pattern was observed when comparing native cow's milk (n=41) to baked milk (n=29).

#### **Conclusions**

The dose-distribution curves for thresholds of reactivity to egg and cow's milk is not altered significantly when the allergen is found in a baked food. This implies that where tolerance to baked allergen exists, it is unlikely to be primarily related to a shift in reaction thresholds.



## **P.104: Managing anaphylaxis in the emergency department - what can be done better?**

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### Objective

The National Institute of Clinical Excellence (NICE) provides clinical guidance for the management of children presenting with anaphylaxis. We evaluated the management of children with anaphylaxis against the guidelines to identify areas of non-adherence in a hospital with on-site tertiary allergy services.

### Methods

12-month retrospective data were collected and evaluated (November 2013 – November 2014). Emergency Department documentation was reviewed for all patients coded with all subcategories of Allergy and Anaphylaxis. Anaphylaxis was defined according to National Institute of Allergy and Infectious Disease/Food Allergy and Anaphylaxis Network (NIAID/FAAN).

### Results

We identified 159 cases with a diagnosed allergic reaction. Median age was 4.0 years. Anaphylaxis cases had a bimodal distribution (median age 6.1 years; peak age at presentation in early primary school (n=21 age <7years) and at time of transition to secondary school (n=10 age >11 years).

33/159 had symptoms of anaphylaxis, 26/33 (79%) had a known food allergy and 14/26 (54%) had an adrenaline auto-injector at home. Prior to arrival to ED 9/14 patients had adrenaline injected by a parent.

Treatment included adrenaline 24/33 (73%), antihistamine 31/33 (94%), steroid 17/33 (51.5%), bronchodilators 13/33 (39%) and fluid 2/33 (6%).

Documentation regarding symptom progression and treatment was clear. There was a lack in documentation regarding information provided prior to discharge, risk of biphasic reaction, allergen avoidance and written information including support groups.

### Conclusions

Acute management of children with anaphylaxis was overall good. Details of information provided at discharge were poorly documented and likely did not meet standards.

Standardized written and verbal advice for patients on discharge needs to be available and documented. Development of a BSACI agreed patient information leaflet and discharge checklist to complement the anaphylaxis management plans is desirable.

## **P.105: Audit of diagnosis and management of hymenoptera venom allergy and implementations made to improve adherence to guidelines.**

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### **Objective**

BSACI published guidelines for the management of hymenoptera venom allergies in 2011. Systemic allergic reactions to hymenoptera venom are rare in children and clinicians working in allergy often have little exposure to these cases. We audited adherence to guidelines between 2010-2014 at Guy's & St. Thomas' Children's Allergy Service and compared results to our previous audit 2006-2010. We then identified areas for improvement and implemented changes.

### **Method**

Patients seen in Outpatient clinic with hymenoptera venom allergy 2010-2014 were identified retrospectively through free-text searches of letters on electronic patient records (EPR) system. Diagnosis and management of venom allergic patients was compared with guidelines and 2006-2010 audit.

### **Results**

Between 2010-2014 there were 30 new venom allergy referrals. Twenty (66.7%) systemic and 10 (33.3%) local reactions to bee/wasp stings. This compares to 26 referrals 2006-2010 (16 (61.5%) systemic, 10 local).

Of the systemic reactions, 11 (55.0%) had a tryptase measured in 2014 and 7 (43.8%) in 2010. In 2014, 12 (60.0%) were thoroughly investigated for evidence of hymenoptera venom allergy (by serum specific IgE, skin prick testing and, where appropriate, intradermal testing) compared to 0% in 2010. Eighteen (90.0%) of children in 2014 and 15 (93%) in 2010 appropriately received an adrenaline autoinjector. Of the children with large local reactions to hymenoptera venom, 33.3% in 2014 and 70% in 2010 were investigated for Hymenoptera venom IgE inappropriately.

### **Conclusions**

Compared to 2006-2010 audit, improvements have been made in most areas of diagnosis and management. Implementations for further improvement:

1. Introducing venom allergy packs in clinic (include information about venom allergy, sting avoidance, medic alert bracelet +/- immunotherapy)
2. Tryptase to be flagged on EPR when requests for bee/venom specific IgE made
3. BSACI guidelines flow charts for hymenoptera venom allergy available in clinic

The effectiveness of these implementations will be measured by reaudit.

## Primary Care

### **P.106: Administration of nasal medications to infants and young children – thematic analysis of parents' experiences in online forum discussions and blogs**

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**Objective:** Forums and blogs are a source of advice for parents of young children. The study explored the experiences of parents administering nasal medications (nasal drops/sprays, bulb syringes, neti pots) to their children.

**Methods:** Simple and advanced searches in Google, Yahoo and Bing identified forums and blogs where parents discussed their experiences administering nasal medications to their children.

**Results:** When administering nasal medication parents resorted to force: 'he screams and fights like I'm killing him', 'I actually have to clamp her screaming, tantruming, flailing body between my knees to even get her nose wiped.' Using a neti pot was seen as **difficult** and **scary**: 'I would be worried that a toddler wouldn't understand not to sniff the water up into their nostrils, and they would choke.' Different tactics were suggested like administering medication while **asleep**, **play** and **team-work**: 'Have one parent sing and play with baby, and grab baby's attention. Then the other parent can at least get the drops in one nostril before the screaming starts', **demonstrating on others**: 'I show him his brothers taking medicine', **distraction**, **sneaking**: 'I used to sneak up on my daughter from behind then grab her head and hold it against me and do it real quickly', and **gentle methods**: 'do not actually SPRAY it,... will make your baby unhappy.... So I learned to gentle tip it up at the front of the nostril, and "drop" a bit into each nostril.' Commonly **all children hated** the treatment initially but with time they **got used to it**.

**Conclusion:** This qualitative research highlights the challenges parents face when administering nasal medication for short-term diseases like colds. More research is needed to understand how best to facilitate the delivery of nasal treatment for allergic rhinitis in order to develop optimal control, and possibly prevent progression to asthma.

**P.107: Primary care management of asthmatic children in today's "i-generation" – Are skype appointments more promising than conventional asthma review appointments?**

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**OBJECTIVE:** This study aimed to compare the effectiveness of Face to Face inhaler review (FFIR) by practice nurse in a GP surgery to Skype online video-conferencing inhaler review (OVIR) on a surgery computer and analysing outcomes of attendance, inhaler technique, compliance and need for step up of inhalers given to children aged 5 to 16 years.

**METHODS:** This was a prospective interventional study comparing effectiveness of online consultation to face to face in the effective usage of inhalers by asthmatic patients aged 5-16. They along with a person of parental responsibility were randomised to attend either practice based FFIR or to have an OVIR. Of the 60 patients, 46 chose to take part in the study. 23 were assigned to FFIR group and 23 to OVIR group. Appointments were twice a year focussing on inhaler technique, compliance and need for step up or step down treatment using an asthma care plan electronic template. First review was conducted in March prior to hay fever season and the second review was carried out in October prior to onset of winter.

**RESULTS:** The two groups were segregated to analyse attendance, technique, compliance and need for step up in steroid inhaler dosage and we found that there was no statistically significant change in compliance and technique, however there was a higher attendance rate in the OVIR group (19/23) compared to 14/23(FFIR) highlighting convenience and ease of access factors.

**CONCLUSIONS:** Online consultations like skype improves ease of access allowing convenient communication with healthcare professional in patient's own surroundings saving time for busy families thereby providing future scope for improving asthma management in the community

## **P.108: An evaluation of allergy education for primary care clinicians**

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### Objective

Although atopic disease is on the increase, it has been acknowledged there is a lack of knowledge within primary care clinicians as how to manage children with allergic conditions. As part of the Integrated Care Service developed by the GSTT Children's Allergy Service in 2013 to improve care for local residents, educational workshops were set up for local health care professionals (HCP).

### Methods

HCP (GPs, Community Nurses and Health Visitors) attending monthly workshops were surveyed to assess the relevance of the workshops and the need for allergy education for community HCP.

### Results

Four workshops were delivered in a six month period between November 2013 and May 2014, which were attended by 50 HCP. The majority of HCP attending were from a nursing background – 56% were Health Visitors (HV), 14% community nurses, 6% GPs and 16% were GP trainees. The catchment area for participants was relatively localised to south London, with Lambeth accounting for the majority of those attending (more than 79%).

90% of respondents believed they required more training in allergy, with 92% feeling the workshops were relevant to their practice. 90% of the respondents believed the workshops were relevant to their professional development needs and would benefit their clinical practice in allergy.

92% of respondents said they would attend a workshop in the future and feedback was given as to what topics would be beneficial to include in future workshops.

### Conclusion

The questionnaires were answered relatively completely by the participants, giving a high degree of confidence in the data obtained. There were several workshops included in the survey and the scoring was consistently high across all of them, suggesting that the format is right for those attending. In addition suggestions of subjects for future workshops suggest that there is longevity in this type of education.

## **P.109: Management of anaphylaxis in the accidents and emergencies unit**

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### **Objectives:**

To evaluate the management of anaphylaxis in children attending the Accidents and Emergencies(A&E) Unit of a large teaching hospital in the UK, and assess compliance compared to the National Institute of Clinical Excellence (NICE) guideline for Anaphylaxis CG134.(1)

### **Methods:**

This is a retrospective audit of management of all children between the age of 1-17 completed years, who presented to A&E at Nottingham Children's Hospital with the first episode of anaphylaxis, between 1st March 2014 and 28th February 2015. A questionnaire based on the audit tool recommended in the NICE guideline for Anaphylaxis CG134, was used to gather data from the case notes.(1)

### **Results:**

The total number of children with first episode of anaphylaxis who presented to A&E was 11 (Median 5 years, Range 1-17 years, 7 boys and 4 girls). There was good documentation in the notes regarding clinical features, time of onset and possible trigger(90-100%). There was no documentation about information regarding the risk of biphasic reactions or the availability of patient support groups(0%). All the children were observed in hospital for at least 6 hours(100%). The data shows that there are deficiencies in adrenaline autoinjector device training before discharge(73%), referral to an allergist in the hospital(83%), and documentation of verbal advice given to the family about emergency management of recurrent anaphylactic reactions(82%).

### **Conclusions:**

The assessment and management of children attending A&E with the first episode of anaphylaxis, was generally compliant with the NICE guidelines for Anaphylaxis. However, there is scope for further improvement, especially in providing information regarding anaphylaxis and training in the use of adrenaline autoinjector devices. This audit highlights the need for continuing education and training of staff in A&E, and the need for a patient information leaflet. A re-audit is planned to ensure implementation of the recommendations.

### **References:**

1. Anaphylaxis: Clinical Audit Tool. Implementing NICE Guideline;2011.<http://guidance.nice.org.uk/CG134/BaselineAssessment/xls/English>

## **P.110: Does primary care need further guidance on implementing guidelines effectively ?**

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### **Background**

There is a perception that Paediatric allergy guidelines aimed at primary care are not serving the purpose due to lack of awareness of these guidelines and problems with accessing them.

### **Objective**

To obtain information from GPs about their awareness of recent MAP guidelines and if a CMPA management template tool integrated into their computer system will be beneficial in primary care.

### **Method**

A questionnaire was devised focusing on the awareness of the MAP guideline and usefulness of a computerised template in primary care. Survey monkey questionnaire was used and nine general practices across Yorkshire and Lancashire were invited to participate in this study.

### **Results**

None of the GPs followed any national guidelines. 90% of them were not aware of MAP guidelines. All of them felt that, in primary care, a guideline template integrated into their system can assist in management of CMPA.

### **Conclusions**

With increasing prevalence of allergic diseases, children presenting with cow's milk protein allergy to GPs, in particular, has increased in the past few decades. In the UK, 2.3% of infants are diagnosed with CMPA<sup>1</sup>. In primary care, there appears to be a significant lack of resources and expertise to appropriately investigate and manage CMPA. In the past few years many guidelines have been introduced but it is felt that the knowledge, uptake and application of these guidelines has been less than expected. Primary care is now under a lot of scrutiny and pressure to deliver more with limited resources and time. Following our study results, we aim to develop a template adapted from national guidelines to manage CMPA that will be introduced in GP surgeries. We will then evaluate its benefits in primary care.

1 Diagnosis and management of non-IgE-mediated CMPA - a UK primary care practical guide. Clinical and Translational Allergy, 3(1)23

### **P.111: Which is the next nut to crack?**

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#### **Objective**

Nut allergy is the most common cause of anaphylaxis in children. With peanut immunotherapy treatment close to clinical practice, tree nuts are now being considered. However, there are many nut types, and there needs to be prioritisation according to prevalence, severity, and patient opinion. It is important to consider how allergy to each nut type impacts nut allergic families. We therefore designed a questionnaire to study this.

#### **Methods**

Patient interviews were used to identify and prioritise domains and questions. The questionnaire was trialed on consultants and medical students. Questionnaires were offered to parents of allergic patients (nut and non-nut allergic) and staff members (medical and non-medical) in the paediatric allergy clinics. Microsoft excel was used for analysis.

#### **Results**

30 parents and 12 staff members completed and returned the questionnaire. Parents deemed takeaways and restaurant food as the most troublesome factor; whilst staff thought poor labelling and unsuspected nut content in food caused the most difficulties. The top tree nuts that were selected by parents to be the next target of immunotherapy were almond (32%) and hazelnut (28%). Staff chose hazelnut (33%), followed by cashew nut (27%). Additionally, the questionnaire revealed that amongst all groups, more than half mistakenly believed that nut allergic patients should also avoid pine nuts (58%) and chestnuts (62%). In all groups, more than 90% felt that tree nut immunotherapy would vastly improve quality of life.

#### **Conclusions**

Parents chose almond and hazelnut due to perceived lifestyle disruption and prevalence in food. Staff selected hazelnut and cashew nut based on allergy prevalence and severity of the allergy. As almond allergy is rare, this study suggests that hazelnut and cashew nut would be the best targets for tree nut immunotherapy.



**P.112: Is the setting up of community paediatric allergy clinics an effective method of improving services within the Lambeth and Southwark area?**

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**Objective:** One of the priorities of the NHS is to bring care closer to home aiming to improve patient satisfaction. The Children's Allergy Service at Guy's and St. Thomas' has set up community clinics in Gracefield Gardens (GG) Community Centre in Lambeth since 2013. As a tertiary and secondary referral hospital it was important to assess the number of local patients who would benefit from this service. We aimed to determine the patient journey for families referred to GG. We also assessed the potential of setting up further community clinics in Southwark.

**Methods:** We gathered information regarding new referrals from the electronic vetting system (EVS). We looked at numbers of referrals received from Southwark and Lambeth borough in 2013-2014 and also from the 6 postcodes within Lambeth, Southwark and Wandsworth boroughs that directly surrounded GG. Additionally, 57 new referrals received over six months from these 6 postcodes were reviewed to obtain more detailed information.

**Results:** Of the total 2816 new outpatient referrals received between 2013-2014, only 326 (11.6%) and 254 (9%) were new patient referrals from Lambeth and Southwark borough respectively and 131 (4.7%) were from the 6 postcodes surrounding GG. There was 1 DNA (1.8%) versus the average new DNA rate at St. Thomas which is 7%. Twenty-four patients (42%) were discharged. Those patients requiring follow up (n=32: 56%) were happy to be followed up at GG.

**Conclusions:** Only a small percentage of patients (4.7%) referred to the Children's Allergy Service were within the geographical location for GG. There was a lower DNA rate at GG and these patients were happy to be followed up at GG. Similar low referral rates from Southwark emphasises the need to evaluate patient demographics and referral patterns prior to considering setting up community clinics.

**P.113: Is the home food introduction programme and leaflet effective in low risk allergic paediatric patients?**

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**Objective:** To assess the effectiveness of the home food introduction (HFI) programme and leaflets issued for the introduction of food substances where following history and allergy testing the child is thought not to be or is no longer allergic to that food.

**Methods:** We retrospectively reviewed clinic records for patients issued HFI packs. Criteria for HFI were SPT=0mm and sIgE<0.1IU/ml, without a history of anaphylaxis, allergic reaction to that food in the last year or poorly controlled asthma. Qualitative data were collected by telephonic survey between Jan-April 2014 for HFI sent in the previous 6 months.

**Results:** Thirty patients were successfully contacted. Twenty-five (83%) children had negative allergy testing to foods for HFI. Seventeen (57%) parents had attempted HFI of which 7/17 (41%) had successfully incorporated the food into their diets. No child experienced anaphylaxis; however, 4/17 (24%) children had mild cutaneous or gastrointestinal allergic reactions to almond, cashew, lentil and baked egg which resolved with antihistamines or self-resolved. Allergy tests in these four children had not been performed or were low level positive (SPT<5mm or sIgE<6IU/ml). Parental anxiety and child refusal to eat were the most common causes for failure to attempt HFI. Other reasons included: foods to be introduced were not a mainstay in the patients' diets and lack of instructions for certain foods (prawns and lentils).

**Conclusions:** Most parents felt that the HFI was clear regarding the instructions on the introduction of food as well managing allergic reactions. However, anxiety still prevented parents from introducing the foods meaning that HFI continued to have poor uptake. In comparison to a previous audit there has been an increase in uptake of HFI (57% cf. 29%); however, there has also been an increase in allergic reactions. This can be explained by non-adherence to HFI criteria and misinterpretation of instructions.

**P.114: How well prepared are Cumbrian schools in managing children with anaphylaxis. delivering training and developing protocols to safely manage allergies in schools. a pilot study.**

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**Objectives**

To develop an effective 'model of care' for allergic children at school and to ensure all staff are familiar with and able to implement it. This model should include an easy to follow protocol on prevention, recognition and treatment of emergencies and be supported by a network of specialists.

**Methods**

A self-completed postal questionnaire was sent to all Cumbrian schools (n=317) to assess three primary areas of concern: 1) existing protocols for anaphylaxis management, 2) training offered by and to schools and 3) preventative strategies.

Subsequently, training on how to deal with anaphylaxis will be offered to 10% of all participating schools (n= 183). A follow-up questionnaire will be sent to measure the preparedness and perceived confidence by staff following the training.

**Results**

47% (95% CI 38-55) of the schools feel completely confident in dealing with anaphylaxis while 55% (95% CI 46-64) feel prepared for allergic reactions in children without a prior history of allergies. Nonetheless, 78% (95% CI 72-84) of the schools feel that further training is needed.

82% (95% CI 76-87) believe that a national school policy in managing anaphylaxis is needed and 86% (95% CI 80-92) agree with the generic provision of adrenalin auto-injectors along with individual anaphylaxis plans to be kept at school.

45% (95% CI 37-53) of the schools have a no-nut policy while 56% (95% CI 52-64) have one on no food sharing. However only 39% (95% CI 31-47) have a no eating-utensil sharing policy and 34% (95% CI 25-43) one on no eating-on-transport to and from school.

**Conclusion**

Adopting a county-wide, age appropriate school protocol including training in anaphylaxis led by the school and supported by all the stakeholders will ensure that all staff can safely manage anaphylaxis ensuring a safer environment and allowing children to develop to their full potential.

## **P.115: Allergy clinics in the community: Patient convenience questionnaire feedback**

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### **Objectives**

The paediatric allergy service has been running community clinics (CC) in Lambeth's Gracefield Gardens Community Centre since 2013. We evaluated the convenience for patients attending these clinics compared to clinics at STH.

### **Methods**

Questionnaires were answered by 100 families following an appointment at either GG (72%) or St. Thomas' Hospital (STH) (27%).

### **Results**

Eighty-four percent of families attending GG lived in Lambeth whereas only 56% attending STH were from local boroughs Lambeth and Southwark. Travel time to GG was under 20 minutes in 59% of patients; no-one reached STH in that time. Travelling to GG cost less than £5 in 91% of patients versus 27% of patients attending STH. The top two reasons for preferring a CC were location and shorter wait and for preferring hospital clinics were perceived better care and competence of staff and location. Fewer parents took time off work to attend GG (32%) compared to STH(56%) and fewer patients miss school for GG(69%) compared to STH(82%). The total time required to travel and attend the appointment was 2 hours for 37% of families attending GG; in contrast 88% needed half a day or more to attend STH. The majority of patients seen at GG preferred to be followed up there (72%) or had no preference (15%). For patients seen at STH, 69% preferred hospital care but 23% preferred a CC.

### **Conclusions**

The community clinic at GG delivers a more expedient service to a local population. Disruption family life is minimised as lengthy waits, time off of school and work and travel costs are reduced. Most patients seen at GG had previously attended STH, but not vice-versa, which is a limitation of this study with regard to direct comparison.

## **P.116: What do doctors know? - lactose intolerance and cow's milk allergy**

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### **Introduction**

It is perceived that there is confusion about the symptomatology and management of lactose intolerance and cow's milk allergy.

### **Objective**

By developing a series of online questions, we aimed to get insight into doctors' interest in this area and their baseline knowledge. The results were then used to develop more specific online learning materials to determine if we could further improve knowledge in this area.

### **Method**

We developed ten multiple choice questions (MCQs) to determine baseline knowledge and identify learning needs. After each question, the correct answers and an explanation were given. The results were used to determine knowledge gaps.

A learning module was then produced consisting of a pre-module assessment of five MCQs followed by a series of case histories with related questions, answers and explanations. A post-module assessment with the same MCQs was then completed. The initial quiz and module were signposted specifically to general practitioners using the website but were available to any member of Doctors.net.uk.

### **Results**

1367 doctors completed the initial quiz between July 2012 and October 2013.

The learning module has been completed by 1658 doctors (1212 GPs, 175 paediatricians). The percentage of correct answers in the pre-module assessment was 65%, increasing to 88% in the post-module assessment.

Notable poor scoring MCQs were wrongly attributing gastroesophageal reflux to lactose intolerance and not recognising constipation as a symptom of food allergy.

### **Conclusion**

The large number of doctors completing the module shows that it is an area of interest.

This study supports the belief that there is confusion among doctors about the presentations of lactose intolerance and cow's milk allergy. It also shows that knowledge can be improved by this approach to e-learning but that more education is still needed.