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**ABSTRACTS**

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## ORAL PRESENTATIONS

### Category: Adult Clinical

O.001

#### **Subcutaneous and sublingual grass pollen immunotherapy both reduce seasonal rhinitis symptoms and improve quality of life – a randomised, controlled trial**

Moises Calderon<sup>1</sup>, Guy Scadding<sup>1</sup>, Florentina Dumitru<sup>1</sup>, Aarif Eifan<sup>1</sup>, Kaitie Lawson<sup>5</sup>, Henry Bahnson<sup>5</sup>, Michelle Sever<sup>5</sup>, Audrey Plough<sup>2</sup>, Nadia Tchao<sup>3</sup>, Alkis Togias<sup>4</sup>, Stephen Durham<sup>1</sup>

<sup>1</sup>Allergy and Clinical Immunology, National Heart and Lung Institute, Imperial College, London, UK,

<sup>2</sup>Immune Tolerance Network, Bethesda, Maryland, USA, <sup>3</sup>Immune Tolerance Network, University of California, San Francisco, USA, <sup>4</sup>The National Institute of Allergy and Infectious Diseases, Bethesda, Maryland, USA, <sup>5</sup>Rho Federal Systems Division, Chapel Hill, NC, USA

#### **Objectives**

Randomised, double-blind, controlled trial of subcutaneous (SCIT) and sublingual (SLIT) grass pollen immunotherapy in participants with moderate-severe seasonal allergic rhinitis.

#### **Method**

106 participants randomised to receive active-SCIT + placebo tablets (Alutard SQ® grass, ALK-Abello, Denmark), active-SLIT + placebo injections (GRAZAX®, ALK) or double-placebo. Treatment for two years, plus further assessment at year 3 (1 year after treatment). Primary endpoint: response to nasal challenge (data presented elsewhere). Secondary, unpowered clinical endpoints: weekly visual analogue scores (VAS), rhinitis quality of life (RQLQ) scores, rescue medication use and a global hay fever severity score. Adverse events recorded according to MedDRA and WAO grading.

#### **Results**

SCIT and SLIT gave similar improvements in RQLQ vs. placebo during years 1 (both  $p < 0.05$ ) and 2 (SCIT  $p < 0.05$ ; SLIT  $p = 0.08$ ) with no differences between the two ( $p > 0.6$ ). VAS scores were lower for both during years 1 and 2, but only reached significance for SCIT vs. placebo during year 1 ( $p < 0.03$ ). Rescue medication scores were lower for SLIT vs. placebo and vs. SCIT during year 1 ( $p < 0.01$ ); similar but non-significant trends were observed during years 2 and 3. Global severity scores were reduced in both SCIT ( $p \leq 0.03$ ) and SLIT ( $p < 0.01$ ) during years 1 and 2 with no differences between the two ( $P > 0.6$ ). None of these effects was maintained at year 3. Forty-three systemic reactions to injections were objectively recorded in 17/36 SCIT participants: thirty three grade 1, eight grade 2, two grade 3; adrenaline was given on two occasions. Nineteen mild systemic reactions were subjectively reported in 11/36 participants on SLIT: sixteen grade 1, three grade 2; no acute treatment was required (fourteen of these reactions involved mild transient gastrointestinal symptoms).

#### **Conclusions**

Two years grass pollen SCIT or SLIT show similar efficacy in reducing seasonal allergic rhinoconjunctivitis symptoms as measured by RQLQ scores and retrospective global symptom scores.

## O.002

### **Ykl-40 as a biomarker of severe asthma**

Margarida Cortez E Castro<sup>1,2</sup>, Gabrielle Locket<sup>1</sup>, Laurie Lau<sup>1,3</sup>, Peter Howarth<sup>1,3</sup>, John Holloway<sup>1</sup>  
<sup>1</sup>Allergy and Respiratory Genetics - Human Development and Health Academic Unit, University of Southampton; Southampton; UK., SOUTHAMPTON, UK, <sup>2</sup>CHLN-IMMUNOALLERGY, LISBON, Portugal, <sup>3</sup>Clinical and Experimental Sciences, SOUTHAMPTON, UK

### **Objectives**

Definitions of severe asthma are based on therapy, control, exacerbation frequency and lung function. However, subjects fulfilling these criteria represent a heterogeneous group with differential response to therapies. This has led to approaches to sub-classify severe asthma, and the need for biomarkers for these sub-groups. YKL-40 (chitinase 3-like 1 protein), has been associated with severe asthma. Our aim was to assess the utility of YKL-40 as a biomarker of severe asthma sub-phenotypes.

### **Method**

In 243 patients from the Wessex Severe Asthma Cohort, serum and sputum levels of YKL-40 were determined by ELISA and Spirometry performed. Genotyping (N=201) was undertaken for rs4950928 and rs12141494 in CHI3L1. Subjects were sub-phenotyped using either inflammatory cell subtypes in sputum [Eosinophilic (eosinophils  $\geq 2\%$ , neutrophils  $< 61\%$ ); Paucigranulocytic (eosinophils  $< 2\%$ , neutrophils  $< 61\%$ ); Mixed (eosinophils  $\geq 2\%$ , neutrophils  $\geq 61\%$ ), or Neutrophilic (eosinophils  $< 2\%$ , neutrophils  $\geq 61\%$ )], or clustered according to Severe Asthma Research Program (SARP) definitions.

### **Results**

There was no correlation between serum and sputum YKL-40. Serum but not sputum YKL-40 was associated with rs4950928 ( $p < 0.001$ ). Serum YKL-40 was strongly associated with SARP clusters: ( $p = 0.002$ ), (Cluster1: 86 ng/mL; Cluster2: 96 ng/mL; Cluster3: 133 ng/mL; Cluster4: 126 ng/mL; Cluster5: 131 ng/mL). In contrast sputum YKL-40 was a better biomarker for Inflammatory cell subtypes in asthmatic sputum: ( $p = 0.025$ ) (Eos (mean: 68 ng/mL) vs Neut (mean: 207 ng/mL) vs Mixed (mean: 265 ng/mL) vs Pauci (mean: 122 ng/mL). Sputum YKL-40 was also strongly correlated with absolute count of Neutrophils (Spearman's rho .663;  $p < 0.001$ ) but not correlated with % of neutrophils in sputum.

### **Conclusions**

YKL40 in sputum is a marker of sub-phenotypes of severe asthma with neutrophilic airway inflammation, but it is not a marker of clusters as defined by SARP. In contrast serum YKL-40 is a better biomarker of SARP clusters, especially in differentiating Clusters 1 and 2 from 3, 4 and 5.

**O.003**

**Association between irritable bowel syndrome and seasonal allergic rhinitis**

Armin Laleh, [Isabel Skypala](#)

*Imperial College London, London, UK*

**Objectives**

The increasing prevalence of both irritable bowel syndrome (IBS) and seasonal allergic rhinitis (SAR) are major health concerns, imposing significant burden on families, the healthcare system and the economy. An association has been reported between IBS and SAR, however there has been little attempt to explore the full extent or other potential aspects of this association. The primary objective of the study was to assess the prevalence of SAR among subjects with IBS. A secondary objective was to explore the relationship between the severity of IBS and SAR.

**Method**

Sixty subjects with IBS, who made up the case group, and twenty subjects without gastrointestinal disorders, who made up the control group were included in the study. Diagnosis of IBS and SAR were made using the Rome III criteria, skin prick test and clinical history. The severity of IBS and SAR were assessed by the validated questionnaires.

**Results**

90% of subjects with IBS had SAR compared with 30% of subjects without IBS ( $P < 0.000$ , OR:21, CI:95%, 5.87-75.16). Tree pollen allergy was (81.5%) the predominant pollen allergy in subjects with IBS. No association was found between the severity of IBS and SAR, however a positive correlation was observed between the severity of IBS and SAR in a subgroup of subjects with moderate to severe IBS and oral allergy syndrome (OAS).

**Conclusions**

The study suggests that there is a remarkably high prevalence of SAR among individuals with IBS, which may indicate a potential link between the two diseases. The relationship between the severity of IBS and SAR in subjects with OAS may suggest a possible role of food allergy and mast cells in the development or exacerbation of IBS symptoms. These findings indicate the necessity of further well-conducted studies to elucidate the potential common pathogenic mechanisms involved in the two disease entities.

## O.004

### **Feasibility and utility of testing for penicillin allergy status in patients attending for elective surgery**

Anoop Mistry<sup>1</sup>, David Maskill<sup>2</sup>, Claire Corps<sup>1</sup>, Sinisa Savic<sup>1</sup>, Louise Savic<sup>3</sup>

<sup>1</sup>St James's University Hospital, Department of Clinical Immunology and Allergy, Leeds, UK,

<sup>2</sup>University of Leeds, Leeds, UK, <sup>3</sup>St James's University Hospital, Department of Anaesthesia, Leeds, UK

#### **Objectives**

A label of penicillin allergy is common, but frequently incorrect. For an individual, the allergy label is associated with higher rates of MRSA carriage and C difficile infections; at societal level the widespread use of alternatives contributes to microbial resistance. We wanted to examine the rate of reported penicillin allergy in patients attending for elective surgery and to determine if there were specific features in their history, which might allow simplification of the current testing pathway.

#### **Method**

Incidence of a penicillin allergy history in patients attending surgical pre-assessment clinics was identified, noting clinical features of the reaction and the age when it occurred. We also retrospectively reviewed the clinical features of patients who had attended for penicillin allergy testing, and compared allergic and non-allergic groups for possible predictive features.

#### **Results**

The penicillin allergy status of 600 patients attending surgical pre-assessment clinic was recorded (representing an annual population of >50 000). Of these, 502 reported no allergy; 97 (17%) reported allergy. Of the allergic group, 65% described mild reactions (rash or nausea), > 20 years ago. Half the allergic group required a penicillin alternative for surgical prophylaxis.

A population of 125 patients labelled penicillin allergic underwent testing (skin and oral challenge); 96 (76.8%) were non allergic. Features predictive of non-allergic status were: >20 years elapsed since reaction; childhood reaction; macular rash as the only feature.

#### **Conclusions**

Incidence of reported penicillin allergy was higher than previously described. Patients with history of reaction >20 years ago, or of uncharacterised childhood reactions could potentially undergo abbreviated oral challenge testing, without prior skin testing. The cost benefit per patient is small, since the commonest alternative surgical prophylaxis (teicoplanin) is only £7/dose. However incorrect diagnoses of penicillin allergy are major contributor to poor antimicrobial stewardship, to the long-term detriment of both patients and the NHS.

## O.005

### **Use of healthcare resources and loss of productivity in refractory Chronic Urticaria (CU) patients from the UK: Data from the AWARE study**

Sinisa Savic<sup>1</sup>, Claire Bethune<sup>2</sup>, Tariq El-Shanawan<sup>3</sup>, Robert Ellis<sup>4</sup>, Susana Marinho<sup>5</sup>, Shyamal Wahie<sup>6</sup>, Ravishankar Sargur<sup>7</sup>, Anthony Bewley<sup>8</sup>, John Lear<sup>9</sup>, Alla Nakonechna<sup>10</sup>, Pavels Gordins<sup>11</sup>, Olivier Somenzi<sup>12</sup>, Alexander Marsland<sup>13</sup>

<sup>1</sup>St James's University Hospital, Leeds, UK, <sup>2</sup>Plymouth Hospitals NHS Trust, Plymouth, UK, <sup>3</sup>Department of Immunology, University Hospital of Wales, Cardiff, UK, <sup>4</sup>James Cook University Hospital, Middlesbrough and Newcastle University, Newcastle, UK, <sup>5</sup>University Hospital of South Manchester NHS Foundation Trust, Manchester, UK, <sup>6</sup>University Hospital North Durham, North Durham, UK, <sup>7</sup>Sheffield Teaching Hospitals NHS FT, Sheffield, UK, <sup>8</sup>Whipps Cross University Hospital & Royal London Hospital, London, UK, <sup>9</sup>Manchester Academic Health Science Centre, Manchester Royal Infirmary, Manchester, UK, <sup>10</sup>Royal Liverpool and Broadgreen University Hospitals NHS Trust, Liverpool, UK, <sup>11</sup>Hull and East Yorkshire Hospitals NHS Trust, Hull, UK, <sup>12</sup>Novartis Pharmaceuticals UK Ltd, Camberley, UK, <sup>13</sup>Salford Royal NHS Foundation Trust, University of Manchester, Manchester Academic Health Science Centre, Manchester, UK

#### **Objectives**

To evaluate the impact of CU on healthcare utilisation in a cohort of UK patients refractory to H<sub>1</sub>-anti-histamines.

#### **Method**

A prospective non-interventional study, designed to assess the disease burden of CU patients is currently underway in 20 UK NHS hospitals. Patient-reported impact of treatments used in daily clinical-practice on symptoms, quality-of-life and work productivity will be collected over a two-year period. Here we present data collected at baseline including Emergency Departments (ED) visits, overnight stays in hospital, visits to GPs and sick leave, and retrospectively covering the period between their last visit and baseline. Patients were either diagnosed with Chronic Spontaneous Urticaria (CSU)-only (group 1) or with CSU overlapping with Chronic Inducible Urticaria (group 2). Patient numbers varied depending on the reported outcome.

#### **Results**

The proportion of patients who visited ED since their last visit was 31.6% (43/136) in group 1 and 46.7% (21/45) in group 2. The mean number of ED visits was 2.7 (SD 2.5) and 4.2 (SD 5.9) for group 1 and group 2, respectively. Overall, 11.8% (16/136) of group 1 and 17.8% (8/45) of group 2 had an overnight stay in hospital during the observed period. A mean of 2.5 (SD 2.8) and 3.6 (SD 3.8) overnight stays were reported from group 1 and group 2, respectively. Visits to GPs were reported by 87.5% (119/136) of patients in group 1 and 80.0% (36/45) of patients in group 2. An average of 6.5 (SD 9.7) and 12.8 (SD 20.5) visits to the GP was reported for patients from group 1 and group 2, respectively. Sick leave due to urticaria was taken by 34.3% (58/169) in group 1 and 37.5% (21/56) patients in group 2.

#### **Conclusions**

Chronic Urticaria may lead to considerable burden on healthcare resources and cause absence from work in over a third of patients.

## Category: Paediatric Clinical

O.006

### Prescription of Adrenaline autoinjectors in UK children

Lavanya Diwakar<sup>1</sup>, Ronan Ryan<sup>1</sup>, Carole Cummins<sup>1</sup>, Tom Marshall<sup>1</sup>, Richard Lilford<sup>2</sup>, Tracy Roberts<sup>1</sup>  
<sup>1</sup>University of Birmingham, Birmingham, UK, <sup>2</sup>University of Warwick, Coventry, UK

### Objectives

To estimate the prescription rates for adrenaline autoinjectors (AAI) in primary care amongst children in the UK.

### Method

Using data from practices contributing to the Health Information Network (THIN) database, we identified individuals aged 0-17 years registered between 2000 and 2012 in practices contributing to THIN. Using detailed therapy records, we extracted data on the numbers of AAI devices prescribed, the type of device issued (junior or adult device), year of prescription and the age of the child. Rates were estimated by dividing the number of prescriptions (or devices) per year by the total number of children (0-17 yrs) included in the THIN database for that year. Analysis was carried out using Stata 12® and Microsoft Excel 2010®.

### Results

There has been a 355% increase in the proportion of children issued with AAI devices and a 506% increase in the proportion of AAI devices prescribed in the community between the years 2000 and 2012 (both trends have  $p < 0.0001$ ). The total number of devices prescribed per year per child at risk of anaphylaxis varied considerably, ranging between 0-40. On an average, 1.81 prescriptions (95% CI: 1.795- 1.822) are issued per child at risk per year to obtain 3.86 (95% CI: 3.83-3.89) AAI devices. A quarter of all children with AAI devices receive more than 5 prescriptions in a year. Over 2% of these receive more than 10 devices per year. There has also been a significant increase in the number of children under age 2 receiving prescriptions for AAI.

### Conclusions

There has been a significant increase in AAI device prescription in the UK. There needs to be clear guidance regarding the indications for AAI prescriptions for children in the UK and also discussions regarding the optimal number of devices that can be prescribed per child.

**O.007**

**Nasal influenza immunisation with LAIV is not associated with increased wheeze in children - results from the SNIFFLE studies**

Heather Hanna<sup>1</sup>

<sup>1</sup>Imperial College, London, UK, <sup>2</sup>Public Health England, London, UK, <sup>3</sup>University Hospitals Southampton NHS Foundation Trust, Southampton, UK

**Objectives**

Live Attenuated Influenza Vaccine (LAIV; FluMist®, Fluenz®) is an intranasal vaccine now incorporated into the UK National Immunisation Schedule for children. However, in many countries, its use is restricted in those with asthma, due to concerns that it may result in wheezing post immunisation, particularly in younger children.

**Method**

We assessed changes in asthma control (by validated questionnaire: Asthma Control Test) pre- and 4 weeks post LAIV administration in children with a physician diagnosis of asthma or recurrent wheezing. Local ethical and regulatory approval was granted, and full informed consent was obtained. ClinicalTrials.gov Identifier: NCT02111512 and NCT02549365.

**Results**

454 children with asthma were included in this analysis (median 6.8yrs, IQR 4.3-10.7yrs). 75% were using preventer therapy (Step 2+, British Thoracic Society (BTS) classification) while 30% also received additional preventer therapy (BTS Step 3+) and 8% on BTS Step 4+ therapy. There was a small but statistically significant improvement in asthma control in the four weeks post LAIV compared to pre vaccine ( $p < 0.0001$ , Wilcoxon signed-rank test). In a further analysis, there was no change in asthma control in children aged 2-5 years, and a small improvement in those aged 6-11 and 12+ years ( $p < 0.0001$ ).

**Conclusions**

LAIV appears to be safe for use in children with a diagnosis of asthma or recurrent wheeze, in whom symptoms are well-controlled.

**O.008**

**Do children with peanut allergy need to avoid medicines containing soya?**

Nandinee Patel, Marta Vazquez-Ortiz, Sarah Lindsley, Paul Turner  
*Section of Paediatrics, Imperial College London, London, UK*

**Objectives**

Although peanut and soya are both legumes, clinical allergy to soya in peanut-allergic individuals is considered to be uncommon. However, only limited published data are available to substantiate this, and the European Medicines Agency (EMA) require any medication containing soya-based products (including soya oil) to state that the product is contra-indicated in peanut-allergic individuals. We sought to determine the rate of soya allergy in children with challenge-proven peanut allergy.

**Method**

We undertook open food challenges to soya (total 4.4g protein) in children with peanut allergy proven through double-blind placebo-controlled food challenge (DBPCFC). Where a child experienced symptoms during the soya challenge, DBPCFC was undertaken to exclude placebo reactors. All challenges were conducted according to PRACTALL consensus criteria. Local ethical and regulatory approval was granted, and informed consent was obtained. ClinicalTrials.gov Identifier: NCT02149719.

**Results**

29 children (median age 13.2 years, range 8-16 years, M:F 1:1.4) had peanut allergy confirmed through DBPCFC. 52% had experienced previous anaphylaxis to peanut, and 24% developed anaphylaxis during food challenge. Skin prick test to peanut extract ranged from 5-22mm (median 10mm), with a median peanut-specific IgE of 72kU/L. All 29 subjects tolerated the open challenge to soya.

**Conclusions**

There was no evidence of soya allergy in this cohort of peanut-allergic children at challenge. These data suggest that the EMA requirement for labelling is unjustified, and that medicines with low level or even no soya protein should not be labelled as contraindicated in peanut-allergic individuals.

O.009

### **Children and young adults with filaggrin-related eczema may have different healthcare needs than filaggrin-unrelated eczema**

Patricia Soares<sup>1</sup>, Katy Fidler<sup>1</sup>, Jessie Felton<sup>2</sup>, Roger Tavendale<sup>3</sup>, Stephen Bremner<sup>4</sup>, Colin Palmer<sup>3</sup>, Somnath Mukhopadhyay<sup>1</sup>

<sup>1</sup>Academic Department of Paediatrics, Brighton & Sussex Medical School, Royal Alexandra Children's Hospital, Brighton, UK, <sup>2</sup>Royal Alexandra Children's Hospital, Brighton, UK, <sup>3</sup>Division of Cardiovascular and Diabetes Medicine, University of Dundee, Ninewells Hospital and Medical School, Dundee, UK, <sup>4</sup>Mayfield House, Brighton and Sussex Medical School, Brighton, UK

#### **Objectives**

Eczema is characterised by chronic skin inflammation, cutaneous dryness and IgE mediated sensitization to food and environmental allergens. More than 50% of individuals with eczema will develop asthma and/or other allergic diseases. Several loss-of-function mutations of the filaggrin gene, which encodes a protein in epidermal differentiation, have been identified in patients with eczema. Yet, the role of these mutations on healthcare utilization is unknown. The main aim of this study is to determine whether filaggrin gene defects are associated with increased prescribing for eczema.

#### **Method**

In order to explore this hypothesis, we have undertaken a secondary analysis of BREATHE, a cohort study of gene-environment associations with asthma severity. BREATHE data were collected on 1100 participants with asthma, aged 3-22 years, between 2003 and 2005, in Tayside and Fife, Scotland. Through collaboration with the Health Informatics Centre in Dundee, BREATHE was linked to several databases including Accident & Emergency, community prescribing and Scottish Morbidity Records (hospital admissions). This linkage allows exploration of associations between genetic variation and prescribing. The data were analysed, over 9 years, using generalised linear models with random effects for the repeated measures on participants.

#### **Results**

A significant but weak association was found between FLG mutations and prescribing for mild and moderate eczema, bacterial skin infections, asthma reliever medicine and eczema- and asthma-related hospital admission. A strong association was found between FLG mutations and prescribing of moisturisers (Incidence Rate Ratio (IRR): 2.36, 95% Confidence Interval (CI): 1.44-3.57), treatment for severe eczema (IRR: 2.27, 95% CI: 1.31-3.93) and a combination of long-acting  $\beta$ 2-agonist and corticosteroids (IRR: 3.33, 95% CI: 1.74-6.37).

#### **Conclusions**

The presence of filaggrin mutations, in this cohort, is associated with differences in prescribing for eczema and asthma. Defining subgroups of individuals who may require more prescriptions could help predict treatment costs and develop targeted management strategies.

## O.010

### **Fungal sensitisation is more prevalent in children with severe asthma compared to mild to moderate disease**

Kathryn Welsh, Catherine Pashley, Jack Satchwell, Andrew Wardlaw, Erol Gaillard  
*University of Leicester, Institute of Lung Health, NIHR Biomedical Research Unit, Leicester, UK*

#### **Objectives**

Asthma is the most common chronic condition of childhood and adolescence. Although most children with asthma are well controlled with modest amounts of medication, an important number have uncontrolled asthma despite treatment at step 4-5 of the British Thoracic Society (BTS) guidelines. Fungal sensitisation has been associated with worse lung function in both adults and children with asthma. The prevalence of fungal sensitisation in children, has not however, been compared with different severities of disease and with healthy controls.

#### **Method**

Children aged 5-17 years with asthma who attended Leicester Royal Infirmary were invited to take part in the study. Skin prick test response and specific IgE to five fungal allergens was measured, including *Aspergillus fumigatus*, *Penicillium chrysogenum*, *Alternaria alternata* *Cladosporium herbarum* and *Candida albicans*. Fungal sensitisation was classified as positive if either skin prick test >3 mm or specific IgE > 0.35 kU/L.

#### **Results**

Results were available on 137 children, including 74 with mild-moderate asthma (BTS step 1-3), 45 with severe asthma (BTS step 4-5) and 28 without asthma. Fungal sensitisation was absent in non-asthmatics. Sensitisation to at least one fungal species was more frequent in children with asthma treated at BTS step 4-5 compared to asthma treated with BTS step 1-3 (53.3% v. 33.8%,  $p=0.036$ ). This remained significant for *Aspergillus fumigatus*, *Alternaria alternata* and *Cladosporium herbarum* when individual fungi were analysed ( $p=0.006$ , 0.018 and 0.007 respectively). In contrast, we found no difference between sensitisation to common allergens (including grass pollen, house dust mite and animal dander) between the asthma groups.

#### **Conclusions**

Fungal sensitisation is common in children with asthma. Children with severe asthma (BTS 4-5) have significantly greater sensitisation compared to mild to moderate asthma (BTS step 1-3). It appears to be uncommon in children without asthma.

## Category: Basic Science

O.011

### **Improved laboratory confirmation of drug-induced allergic reactions by determination tryptase and carboxypeptidase A3 levels in serum and saliva**

Rana Abadalkareem<sup>1</sup>, Laurie C. Lau<sup>1</sup>, Ahmed Abadalkareem<sup>1,2</sup>, Efrem Eren<sup>2</sup>, Xiaoying Zhou<sup>1</sup>, Andrew F. Walls<sup>1</sup>

<sup>1</sup>University of Southampton, Southampton, UK, <sup>2</sup>University Hospital Southampton NHS Foundation Trust, Southampton, UK

#### **Objectives**

Drug-induced allergic reactions involve the explosive release of inflammatory mediators from mast cells including the proteases tryptase and carboxypeptidase A3 (CPA3). Their measurement in serum has been found helpful in confirmation of certain cases of anaphylaxis, but the value in less severe forms of allergic reaction has been little investigated. Our aim was to investigate changes in tryptase and CPA3 levels in serum and saliva during minor allergic reactions provoked by drugs.

#### **Method**

We have recruited patients attending the asthma and allergy clinic for diagnostic drug challenge testing. Serum and saliva samples were collected before and two hours after the challenge. The drugs investigated included antibiotics, local and general anaesthetics, neuromuscular blocking drugs, NSAIDs, iodine contrast agents and opioids. Levels of mast cell tryptase and CPA3 were evaluated using sensitive enzyme linked immunosorbent assays (ELISA) that we have developed.

#### **Results**

We have found that serum and saliva concentrations of tryptase and CPA3 were increased on drug challenge. There were significant correlations between levels of tryptase and CPA3 in both body fluids, though there were cases in which only one of these markers was increased. The greatest changes in mediator levels were found with antibiotic challenge. No significant increases in tryptase or CPA3 concentrations were observed in cases for which symptoms were not provoked.

#### **Conclusions**

Tryptase and CPA3 levels are increased in both serum and saliva samples following provocation of relatively minor drug reactions.

## O.012

### **IL-6 signalling in the nasal mucosa following allergen challenge discriminates allergic and non-allergic subjects**

Louisa James<sup>1</sup>, Guy Scadding<sup>2</sup>, Hannah Gould<sup>1</sup>, Steve Durham<sup>2</sup>

<sup>1</sup>King's College London, London, UK, <sup>2</sup>Imperial College London, London, UK

#### **Objectives**

In individuals with allergy, exposure to allergen at mucosal surfaces results in a localized pro-inflammatory response. We aimed to identify the signature pathways of the mucosal immune response that may be important for driving local inflammation in allergic rhinitis.

#### **Method**

Six subjects with seasonal allergic rhinitis and six non-allergic controls were challenged intra-nasally with Timothy grass pollen. Peak nasal inspiratory flow (PNIF) was assessed at regular intervals over eight hours following nasal challenge, at which point nasal biopsy samples were obtained. Nasal biopsies were mechanically homogenized and total RNA was isolated. Digital mRNA expression profiling of 594 immune-related genes was performed using a commercially available Codeset (Human\_Immunology\_v2) on the Nanostring nCounter© system.

#### **Results**

Nasal allergen challenge resulted in a rapid and sustained reduction in PNIF in allergic ( $\Delta$ PNIF -147.5±16.1) but not in non-allergic ( $\Delta$ PNIF -9.2±15.6) subjects ( $p=0.002$ ). The magnitude of the reduction in PNIF correlated with the expression of IL-6 ( $R=-0.60$ ,  $p=0.038$ ) and a number of other genes. We identified a panel of pro-inflammatory and pro-allergic markers, as well as genes involved in antigen presentation and cell migration that were differentially expressed in the nasal mucosa of allergic compared to non-allergic subjects. These included several genes involved in the IL-6 signalling pathway (IL-6R;fold-change=1.59  $p=0.04$ , STAT3;fold-change=1.29  $p=0.02$ , JAK1;fold-change=1.15  $p=0.03$ ) and others critical for the activation and expansion of B-cells (IL-4R;fold-change=1.42  $p=0.02$ , BCL6;fold-change=1.39  $p=0.03$ ).

#### **Conclusions**

We have identified a pattern of differential gene expression that correlates with the clinical response to nasal allergen challenge. These results suggest that in allergic individuals, the IL-6 signalling pathway may play a key role in driving a pro-inflammatory immune response *in situ* following exposure to allergen. IL-6 has multiple effects on B-cells including regulation of RAG-1 and RAG-2 expression and plasma cell differentiation, which may be important for local development and differentiation of B-cells in the nasal mucosa.

## O.013

### **The lung fungal microbiome in patients with asthma**

Eva-Maria Rick, Andrew Wardlaw, Catherine Pashley

*Institute for Lung Health, Department of Infection, Immunity and Inflammation, University of Leicester and Department of Respiratory Medicine, Glenfield Hospital, Leicester, UK*

#### **Objectives**

Sensitisation to *Aspergillus fumigatus*, and isolation of filamentous fungi from sputa of asthmatics by culture, have been associated with reduced lung function. The lung fungal microbiome (mycobiome) may be underestimated due to the inherent insensitivity of culture. The objective of this study was to use amplicon-based high-throughput sequencing (HTS) to determine the lung mycobiome in patients with asthma and healthy controls.

#### **Method**

Patients with asthma were classified into three groups: (1) IgE-sensitised to *A. Fumigatus*, (2) IgE-sensitised to non-*A. Fumigatus* fungi, and (3) not fungal sensitised. A fourth group comprised healthy controls. All subjects provided sputum and a subset underwent bronchoscopy. DNA was extracted and the internal transcribed spacer region 2 of the fungal nuclear ribosomal operon amplified and subjected to paired-end sequencing on the Illumina MiSeq platform. Bioinformatic analysis was performed using QIIME.

#### **Results**

Preliminary data from 61 sputa and 14 bronchoscopy samples revealed > 350 species from > 200 fungal genera. Fourteen species were present in > 50% of sputum samples, dominated by *A. fumigatus*, *A. niger*, *Candida albicans* and *Cladosporium* spp. The number of species detected per individual was highly variable (4 to 93 species) with a trend towards greater diversity from sensitised asthmatics (median diversity group 1 to 4 respectively; 33.5, 34.0, 23.0 and 23.0). *Candida dubliniensis* and *Hyphodontia radula* were among the fungi detected that were more prevalent and at greater relative sequence abundance in patients with asthma compared to healthy controls. The top five prevalent species were consistent between sputum, bronchial wash, bronchial brushings and bronchial lavage.

#### **Conclusions**

HTS is a sensitive method to assess the lung mycobiome. The main fungal species detected were comparable between different patient groups and between different sample types, however, fungal diversity appeared to be higher amongst patients sensitised to fungi.

## O.014

### Identification of allergens from *Aspergillus ochraceus* via immuno-proteomic approach

S Roy<sup>1</sup>, N Pandey<sup>2</sup>, S Gupta Bhattacharya<sup>1</sup>

<sup>1</sup>Bose Institute, Kolkata, West Bengal, India, <sup>2</sup>Belle vue Clinic, Kolkata, West Bengal, India

#### Objectives

An aero-mycological study was performed at Barrackpore (22.76°N, 88.37°E), a well-known industrial town of West Bengal, India, aiming for identification and quantification of airborne fungi, by viable and non-viable sampling and also to identify allergenic components of *Aspergillus ochraceus*, one of the most occurring fungus, through immuno-biochemical and proteomic tools.

#### Method

Airborne fungi were biomonitoring by nonviable and viable sampling. Meteorological and Hospitalization data were recorded simultaneously. Allergenicity of dominant fungi were confirmed by collaborating physicians after performing SPT. A written consent was taken from each patient prior to skin test and sera collection. ELISA was performed to estimate antigen specific IgE antibody in SPT-positive patient sera. Total protein of *Aspergillus ochraceus* was resolved in 12% SDS-PAGE and 2D Electrophoresis. Allergens were detected by 1D and 2D IgE Immunoblotting with SPT positive patient sera, which were identified further by Mass spectrometry. Periodic Acid Schiff staining of total protein profile resolved in 12% SDS-PAGE and Deglycosylation assay was performed to detect presence of glycoproteins and to analyze chemical nature of immunoreactive proteins.

#### Results

From biomonitoring at sampling site, fungi belongs to Ascomycota phylum gives higher airborne percentage amidst observed nonviable fungi and among viable fungi, *Aspergillus sp.* exerts peak concentration throughout sampling period. Hospitalization data were found significantly correlated with aero-spore concentration. Patients with positive responses in SPT were found to have elevated specific IgE titer against *A.ochraceus* extract in ELISA. Thirteen IgE reactive proteins were screened from total proteome profile of *A.ochraceus*. Dominant allergens were identified as Subtilisin-like serine protease pepC (37.89KDa) and Mitochondrial presequence protease (74.31 KDa) by Mass-spectrometry. Deglycosylation assay result was found negative for immunoreactive proteins.

#### Conclusions

Subtilisin-like serine protease pepC and Mitochondrial presequence protease are the major allergen found from *A.ochraceus*, which have been reported for the first time in this study.

**Surfactant Protein D (SP-D): A Novel Therapeutic target for suppressing Grass Pollen-induced Th2 and B Responses in Seasonal Allergic Rhinitis.**

Isha Singh<sup>1,2</sup>, Asif S. Qaseem<sup>1,2</sup>, Ansar A. Pathan<sup>1</sup>, Stephen R. Durham<sup>2,3</sup>, Uday Kishore<sup>1</sup>, Mohamed H. Shamji<sup>2,3</sup>

<sup>1</sup>*Biosciences, College of Health and Life Sciences, Heinz Wolff Building, Brunel University, Uxbridge, UB8 3PH, London,, UK,* <sup>2</sup>*Allergy and Clinical Immunology, Inflammation, Repair and Development, National Heart and Lung Institute, Imperial College London, part of the Medical Research Council and Asthma UK Centre for Allergy, London SW7 2AZ, UK,* <sup>3</sup>*Immune Modulation and Tolerance Group, Allergy and Clinical Immunology, Repair and Development, National Heart and Lung Institute, Imperial College London, part of the Medical Research Council and As, London SW7 2AZ, UK*

**Case Presentation**

**Background**

Human surfactant protein-D (SP-D) suppresses house dust mite and *Aspergillus fumigatus* induced allergic inflammation in murine models. We hypothesised that SP-D binds to grass pollen allergen, interacts with IgE and prevent allergen-IgE complex formation, which would inhibit CD23-mediated IgE-facilitated allergen binding (FAB) and presentation (FAP) by B cells to CD4<sup>+</sup>CRTH2<sup>+</sup> T cells. We further hypothesised that SP-D inhibits IgE production by B cells obtained from grass allergic individuals.

**Case Presentation**

Recombinant fragment of human SP-D was expressed in *Escherichia coli* BL21 ( $\lambda$ DE3). PBMCs and sera were obtained from grass pollen allergic individuals (n=12). Binding of SP-D to *Phleum pratense* extract was examined by indirect ELISA and Western blot. The effect of SP-D (5 $\mu$ g/mL) on co-operative allergen-IgE binding to B cells and FAP was assessed by flow cytometry. IL-4, IL-5 and IL-13 levels were measured in cell culture supernatants by Luminex MagPix assay. The effect of SP-D on IgE production by B cells when stimulated CD40L, IL-4 and IL-21 was also assessed.

**Discussion**

SP-D was shown to bind *Phleum pratense* in a dose-dependent manner. This binding was calcium-dependent and was inhibited in the presence of 5mM EDTA (p=0.0012). The binding of allergen-IgE complexes to B cells was reduced by 50% (p=0.002) when B cells were pre-treated with SP-D. This decrease in allergen-IgE binding to B cells was associated with reduction in CD23 expression on B cells (p<0.001). SP-D suppressed allergen-driven CD27<sup>+</sup>CD4<sup>+</sup>CRTH2<sup>+</sup> T cell proliferation (p<0.01). IL-4, IL-5, IL-13 levels were suppressed (all p<0.01). Moreover, SP-D inhibited CD40/IL-4 and IL-21 mediated IgE production (77.12%; p=0.02) by B cells.

**Conclusions**

For the first time, we show that SP-D interferes with the co-operative binding of allergen-IgE complexes to B cells and suppresses facilitated allergen presentation and Th2 cytokines. Our findings suggest that therapeutic strategies that augment SP-D may be effective in downregulating Th2 responses in allergic disease.

## Category: Allied Health & Primary Care

O.016

### **When is it safe to recommend home nut/seed introduction for children who are allergic to at least one nut/seed?**

Rosalynd E Gourgey<sup>1</sup>, Richard Cleaver<sup>1</sup>, Helen Fisher<sup>1</sup>, Patricia Kane<sup>1</sup>, Una O'Dwyer-Leeson<sup>1</sup>, Suzana Radulovic<sup>1,2</sup>, Rahi Jahan<sup>2</sup>, Gideon Lack<sup>2,1</sup>, Helen A Brough<sup>2,1</sup>  
<sup>1</sup>King's College London, London, UK, <sup>2</sup>Guy's & St Thomas' NHS Foundation Trust, London, UK

#### **Objectives**

Advice for selective nut/seed introduction rather than a blanket ban on eating nuts is gaining momentum for children with nut/seed allergy. Safe nut/seed introduction often requires oral food challenge in a hospital setting, which is costly. This abstract analyses data from nut/seed allergic children in the Pronuts study with the objective to provide evidence for safe thresholds of selective home nut/seed introduction.

#### **Method**

Skin prick test (SPT) and sIgE results for 11 nuts/seeds were analysed in 50 participants (6 months to 16 years) who were assessed for allergy/tolerance. Oral food challenges were used to determine allergy/tolerance to nuts/seeds, unless the child already consumed or had a recent allergic reaction. SPT=0mm and sIgE<0.1 kUA/l were the criteria used for home-based introduction (HBI) of nuts/seeds.

#### **Results**

Out of 546 potential outcomes, 90 cases (16.5%) met the HBI criteria. All 90 cases were tolerant to the 11 nuts/seeds. Based on SPT=0mm only, 217 cases fulfilled the criteria. Seven (3%) allergic reactions were reported; two to both walnut and pecan and one to macadamia, cashew and pistachio. Three cases were attributed to one child. Management of the allergic reactions included one to three doses of antihistamine; no adrenalin auto-injector was used. No allergic cases were reported for almond, brazil, hazelnut, pine, peanut and sesame. Based on sIgE<0.1 kUA/l only, all 142 cases met the criteria.

#### **Conclusions**

These data support the use of criteria SPT=0 and sIgE<0.1 kUA/l for HBI of nuts/seeds. This is current protocol at Guy's & St Thomas' paediatric allergy service in children without asthma or with well controlled asthma and no history of anaphylaxis to nuts/seeds. Based on SPT=0 results, there is greater risk of allergic reaction and the risk/benefit ratio requires careful assessment before making recommendations for HBI.

## O.017

### **Get the creams and get creaming? Access to eczema care and prescriptions in primary care – A survey of patients/families with eczema.**

Konstantinos Kakleas, Gurdeep Jagdev, Antony Aston, Claudia Gore  
*Paediatric Allergy Department, St Mary's Hospital, Imperial College Healthcare NHS Trust, London, UK*

#### **Objectives**

Eczema is the commonest paediatric skin disorder (20-25% children in UK) and can impact on a child's quality of life. Education and appropriate quantities of emollients/other medications is the cornerstone of eczema control. General practitioners (GPs) have pivotal role in patients accessing these medications. We aimed to assess patients' experiences around accessing information/education on eczema and explore any barriers they encountered obtaining medication.

#### **Method**

Prospective survey of parents whose children attended Paediatric Allergy or Dermatology clinics and ambulatory care services with eczema during January-April 2016. A questionnaire was devised incorporating qualitative feedback from patients' experiences and input from multi-disciplinary staff members exploring access to information/education and medications in the primary care setting. Patient Oriented Eczema Measure (POEM) questionnaire was included for severity assessment.

#### **Results**

104 questionnaires were completed (mean patient age: 6.4 ±5.1 years, mean age of eczema diagnosis: 1.5±0.5 years). Based on the POEM questionnaire 54.8% (57/104) of children suffered from moderate to severe eczema. In addition 30.8% (32/104) had previously been admitted to hospital with eczema.

Treatment access: 60/104 [58%] of patients reported difficulties in obtaining emollients, 64/104 [62.5%] topical corticosteroids and/or 70/104 [67%] topical calcineurin inhibitors; 23/104 [22.1 %] had monthly appointments for repeat emollient prescription.

Eczema information access: 39/104 [37.5%] recalled receiving information on eczema development/causes; 47/104 [45%] on trigger factors and 60/104 [56%] on emollients application. One in three patients (37/104 [36%]) felt they had experienced difficulty getting referred to an eczema specialist.

#### **Conclusions**

Patients/families report difficulties in accessing information on eczema and in obtaining sufficient amounts of medication. These barriers are likely to contribute to suboptimal eczema treatment and decrease quality of life. Raising awareness in primary care, improving ease-of-access to patient education materials and training on eczema treatment could improve care and patient experience.

## **O.018**

### **Establishing the content and design of anaphylaxis management plans available in seven English speaking countries**

RD Mercer, CJ Jones, HE Smith

*Brighton & Sussex Medical School, Brighton, UK*

#### **Objectives**

Guidelines recommend that any patient at risk of anaphylaxis is provided with an anaphylaxis management plan (AMP) that provides advice on symptom recognition and emergency actions. Templates of these plans are published by organisations across the world. This study aims to identify AMPs and assess their design and content.

#### **Method**

A systematic internet search was undertaken to identify management plans not appearing in peer reviewed literature. AMPs were eligible if they were from English speaking nations with developed healthcare systems. AMPs identified were examined and the symptoms mentioned, actions to take and general design features were recorded.

#### **Results**

284 websites were examined by a reviewer having met the inclusion criteria from the systematic search. This yielded 41 plans from 29 publishers. A total of 121 individual characteristics were identified within plans by the reviewers. The majority of plans identified were personalised management plans for individuals rather than generic plans for organisations. Most had differing pathways for mild/moderate and severe reactions. The mean number of symptoms per plan was 19 (95% CI 17-20) with plans generally showing good concordance as to what constituted a mild or a severe symptom. Despite nearly all plans recommending the administration of an adrenaline auto injector (AAI), only 55% contained instructions on how to do this.

#### **Conclusions**

There are a wide variety of AMPs available to healthcare professionals and patients. No single plan included all elements recommended in a previous consensus finding study. There were many differences in individual symptoms mentioned within plans, though there was agreement between the symptoms considered serious or minor. Previous studies have called for a randomised control trial into the efficacy of AMPs. This data and the discussion arising from this research will inform the design of a formal evaluation of AMPs.

O.019

**Enhancing the analysis of online health information regarding hay fever found via Google: statistical analysis reveals patterns of relationships between website classification and information quality.**

Shao An Isaac Tay, Christina Jones, Helen Smith  
*Brighton and Sussex Medical School, Brighton, UK*

**Objectives**

Increased accessibility to online information has influenced modern healthcare - inevitably shaping patient's opinions, hence impacting the shared responsibility for treatment practised in today's medicine. This study assessed the quality of online healthcare information for hay fever to determine the different aspects of information available and their reliability.

**Method**

A Google search for "hay fever cure" was carried out, and the first 200 results were analysed for (1) class of website; (2) type and number of interventions; (3) reliability using JAMA (The Journal of the American Medical Association) criteria and (4) the DISCERN instrument; and (5) readability. Statistical methods including cluster analysis were used to identify associations between these variables and the information available.

**Results**

Commercial (27%), health portal/blog (27%), and journalism websites (26%) were the commonest websites, with a median of two intervention types each. Alternative therapy and approved drugs were the most commonly mentioned intervention types (both 24%) followed closely by food and food supplements (21%), and lifestyle (20%). JAMA and DISCERN scores were weakly positively correlated (PMCC=0.288,  $p=0.01$ ). Commercial websites scored the lowest median in both JAMA (1) and DISCERN (45%). Journalism and non-profit websites had the highest JAMA medians (3) whereas professional websites had the highest DISCERN median (67%). Professional websites were the most difficult to read (median SMOG score=18.05). Cluster analysis showed that alternative therapy featured more often than approved drugs in commercial websites and vice versa in professional websites. Interestingly, the first ten search results over-represented approved drugs and under-represented commercial websites.

**Conclusions**

Healthcare professionals should guide hay fever patients towards professional websites as these often recommend approved drugs and have the most reliable information. Further studies are needed to develop a means of online healthcare information verification that can be utilised by patients and search engines for the betterment of public health.

## **O.020**

### **Defining nursing roles in a tertiary allergy clinic.**

Christine Wilkes-Holmes, Nikki Lancaster

*University Southampton Hospitals Trust, Southampton, UK*

#### **Objectives**

Nursing roles in Allergy clinics are not always clearly defined I can include a broad range of activities from skin prick testing to allergy consultations. The lack of guidelines and disparity across roles nationally led to a review of the nursing tasks and competencies in Southampton Regional paediatric Allergy Clinic

We sought to provide standardised job descriptions, bandings and competencies to enable nurses to function effectively and safely within the resources of the available service.

#### **Method**

A critical analysis of practice was undertaken which incorporated examination of the available evidence, current roles and responsibilities, user survey and benchmarking with other centres. A review of all current job descriptions and focus group within our regional allergy network enabled mapping current skills, required competencies with the needs of the children, young people and families using our service.

#### **Results**

A lack of standardisation exists in the scope of the roles of allergy nurses across the region. Although competencies are available for key tasks, these were outdated with no clarity in associated education required or how to confirm achievement. Decisions relating to the roles nurses perform appeared to be based on opinion rather than being competency based. However, nursing roles are valued by service users. In addition certain tasks may not warrant the skills of a trained allergy nurse and untrained nursing support may enhance the services offered to children, young people and their families with allergic disease.

#### **Conclusions**

There is a need for national, standardised guidelines and competencies for nursing roles in the allergy clinic. This would better allow provision of more focused education and career pathway. There appears value in the role of the untrained nurse in allergy clinic, to support the trained nursing team with education and SPT. Children, young people and parents value the nurse led services for addressing the holistic elements of allergic disease.

## POSTER PRESENTATIONS

### Category: Adult Clinical

P.021

#### Overcoming barriers to penicillin allergy un-labelling

Nada Al Bahrani<sup>1</sup>, David Thursfield<sup>1</sup>, Harsha Kariywasam<sup>1</sup>, Joanna Lukawska<sup>1,3</sup>

<sup>1</sup>University College of London Hospital, London, UK, <sup>2</sup>Unniversity of Dammam, Dammam, Saudi Arabia, <sup>3</sup>King's College London, London, UK

#### Objectives

Penicillin is one of the most commonly reported drug allergies. Penicillin allergy (PA) carries the risk of increased morbidity, prolonged hospitalization, antibiotic resistant infections, and increased medical care costs. Once applied a PA label becomes difficult to remove, studies have shown that up to 41% of patients testing negative for PA continue to avoid it. We sought to determine if: counselling the patient, provision of contact telephone/email, immediate written information issued to the patient and their GP at the end of the clinic, a follow up phone call 72 hours as well as changing hospital electronic records can improve this statistic.

#### Method

35 consecutive patients with negative PA results to drug allergy work up (DAWU) were contacted between 1 to 2 years following their clinic attendance. Patients were asked if they have used penicillin since. Patients who had no need for penicillin were asked how confident they felt about negative DAWU result and if they would be prepared to use penicillin when appropriate.

#### Results

35 patients completed telephone follow up survey, 34 (97%) correctly identified the results of their penicillin allergy testing as negative. Two patients (5.7 %) reported avoidance of penicillin due to personal concerns. 11 (31.4 %) have used penicillin based antibiotics since their DAWU with no problems except for one who felt non-specifically unwell, remaining 22 (62.8 %) confirmed they would feel confident to use penicillin if appropriate.

#### Conclusions

There are undeniable benefits to un-labelling PA patients; however, these can only have positive impact on the patient and the healthcare system if the allergist's recommendations are followed. Counselling the patient, immediate clinic outcome letter to the patient and the GP, 72 hour telephone review, provision of contact details as well as changing hospital ER significantly improve the process and enable the patients to confidently use penicillin.

## P.022

### **Vasoactive amine intolerance: fact or fad? A case report.**

Nada AlBahrani<sup>1</sup>, Gavin Sewell<sup>4</sup>, Amy Foggitt<sup>1</sup>, Joanna Lukawska<sup>1,3</sup>

<sup>1</sup>UCLH, London, UK, <sup>2</sup>University of Dammam, Dammam, Saudi Arabia, <sup>3</sup>King's College London, London, UK, <sup>4</sup>Charing Cross Hospital, London, UK

### **Case Presentation**

#### **Background:**

Food intolerance, unlike food allergy, is an adverse reaction which does not involve the immune system. Dietary components can provoke dose-dependent 'pharmacological' reactions, which may involve the skin, gastrointestinal, respiratory and central nervous systems. Culprits include the biogenic amines such as histamine. Here we discuss a patient who presented for investigation of food 'allergy', and was ultimately diagnosed with probable biogenic amine intolerance.

#### **Case Presentation:**

A 46-year-old non atopic female presented with urticaria, flushing, facial swelling, headache and diarrhoea following ingestion of certain food. These included fish, cheese, strawberries or undercooked egg stored overnight.

Specific IgE to fish, milk, strawberries and egg were negative. Skin-prick testing to blue cheese was also negative, which was followed by oral challenge. Chewing and application of blue cheese via 'lip rub' were tolerated. 10 minutes following ingestion of 0.5g cheese she developed generalised flushing, conjunctival injection, abdominal pain and diarrhoea, consistent with a histaminergic response. Observations of vital signs were stable. Serum tryptase was negative. The challenge was terminated and her symptoms settled with oral antihistamines. A diet low in histamine-rich foods was advised.

#### **Discussion:**

Clinical features of histamine intolerance (HI) such as flushing and urticaria can be difficult to distinguish from IgE-mediated food allergy.

HI arises from an imbalance between histamine bioavailability and breakdown by diamine oxidase and histamine-N-methyltransferase enzymes, which in turn is likely to be influenced by genetic variation. HI is under recognised, as little as 75 mg of pure liquid oral histamine (dose found in normal meals) can provoke immediate or delayed symptoms in 50% of healthy subjects.

#### **Conclusions**

This case highlights the need to consider vasoactive amine intolerance in non-atopic patients who present with symptoms of food allergy in adulthood; and the importance of careful history taking, appropriate investigations, exclusion of IgE-mediated allergy and mastocytosis in establishing the diagnosis.

**P.023**

**Second reported case of Buffalo Milk Protein Allergy without Cross reactivity to Cow's milk**  
Sameer Bahal, Rhea Bansal, Alex Nicholas, Vasantha Nagendran, Brian Ford, Amolak Bansal  
*St Helier Hospital, Surrey, UK*

### **Case Presentation**

#### **Background**

Mozzarella is a soft cheese from Southern Italy made with buffalo milk. We present a case of IgE mediated buffalo milk allergy in a patient without clinical or skin test sensitivity to cow's milk.

#### **Case Presentation**

A 34 year old female presented with lip and tongue swelling occurring within five minutes of consuming mozzarella or ricotta cheese. On one occasion she described lip swelling after kissing her husband who had just eaten a pizza. The patient was able to tolerate cow's milk and yogurt. Her routine investigations including full blood count, autoantibody Screen and complement C3 and C4 were normal. Specific IgE tests to Egg White, Cheddar cheese, soya bean, goat's milk and sheep milk were negative. However, skin prick testing result to fresh mozzarella cheese was highly positive at 7mm. Inhibition experiments were conducted to show the specificity of the Buffalo Milk sensitivity. Our patient has buffalo milk allergy and her reactions to pizzas were the result of her allergy to the mozzarella cheese. She was advised to avoid mozzarella completely and keep antihistamines with her, especially if she was eating out at Italian restaurants.

#### **Discussion**

IgE Mediated cow's milk protein allergy involves a rapid IgE immune response to proteins in the casein and whey fractions. There is frequent cross reactivity between these proteins and those from different animals such as goat and sheep. As far as we know this is only the second case described of an allergy solely to Buffalo milk protein.

The first case was described by Broekaert et al in 2008 and involved a 70 year old German gentleman who experienced two allergic reactions to Mozzarella Cheese.

#### **Conclusions**

This case is important as it describes a relatively novel allergy which may well become more common with the increasing popularity of Mozzarella Cheese.

## P.024

### **An audit to assess knowledge of anaphylaxis management in junior doctors.**

William H Bermingham<sup>2</sup>, Sameer Bahal<sup>1</sup>, Amolak Bansal<sup>1</sup>, Grant Hayman<sup>1</sup>

<sup>1</sup>Epsom and St Helier University Hospitals, London, UK, <sup>2</sup>St George's University Hospitals NHS Foundation Trust, London, UK

#### **Objectives**

Anaphylaxis is an important medical emergency. An audit was undertaken to assess the knowledge of anaphylaxis management in hospital doctors. The audit standard was set that all doctors should manage anaphylaxis in concordance with NICE and EAACI guidelines.

#### **Method**

An online survey was designed to cover key aspects of UK and European guidelines. Questions assessed the clinician's recognition of anaphylaxis, acute management and discharge planning after treatment.

#### **Results**

The study population comprised 61 responders, of which 56% were ST1/ST2 doctors and 44% Foundation Program doctors.

**Recognition of anaphylaxis:** Understanding of anaphylaxis presentation was good as 88.5% selected <2 hours as the most common period for onset of symptoms. However, recognition of anaphylaxis co-factors was variable, with fever/acute infection and concomitant NSAID use identified by 75% and 68.3% respectively, but only 28.3% of responders selected pre-menstrual state.

**Management:** First line interventions of a resuscitation 'ABCDE' approach and administration of intramuscular adrenaline were correctly identified by 94.6% and 67.9%, respectively. 89.3% of participants also selected the correct adult dose of intramuscular adrenaline. The prioritization of second and third line interventions was less consistent with appropriate posture classed as second line by only 41.1%. Least well understood was the timing of mast cell tryptase sampling, which only 30.4% identified correctly.

**Discharge:** 51.8% correctly choose 12 hours as the appropriate observation period for patients presenting with anaphylaxis associated with hypotension. 83.9% thought that adrenaline auto-injector should be provided at discharge, but 17% selected on follow-up with an allergy specialist or GP.

#### **Conclusions**

Questions relating to immediate management and adrenaline dosing were the most correctly answered. There was a poorer understanding of anaphylaxis co-factors, mast cell tryptase sampling and appropriate discharge planning. This study suggests that better education is needed to improve junior doctors' management of anaphylaxis.

## **P.025**

### **Does further routine immunological testing of patients with very low IgE assist in the early diagnosis of antibody deficiency?**

Lisa Campisi<sup>1</sup>, Tamara Forster<sup>2</sup>, Yousuf Karim<sup>1,2</sup>

<sup>1</sup>Frimley Park Hospital, Frimley, UK, <sup>2</sup>St Peter's Hospital, Chertsey, UK

#### **Objectives**

Clues from routine laboratory testing can raise suspicion of immunodeficiency. For example, we previously reported that very low serum immunoglobulin E (IgE) (<2kU/l) may be a marker for diagnosing unsuspected hypogammaglobulinaemia, and hence assist in its early identification (McVicker & Karim, 2014). Early diagnosis of antibody deficiency is important as it can reduce morbidity and mortality. The aim of this audit was to assess the clinical utility of reflex testing of immunoglobulins in patients with serum IgE <2kU/l.

#### **Method**

Following our preliminary IgE audit conducted May 2011-April 2012, Surrey Pathology Services' practice changed to reflexly add serum protein electrophoresis and immunoglobulin quantification when a serum IgE result <2kU/l was identified. These additional tests were initially added by laboratory staff, or by the Immunologist during result authorisation, but subsequently this has been automated since September 2014. We retrospectively looked through 11268 samples submitted for serum IgE measurement over a 2.5 year period (January 2014 - June 2016).

#### **Results**

We identified 336/11268 (2.98%) samples with serum IgE result <2 kU/l; of these 286/336 (85%) also had results for serum immunoglobulins and serum protein electrophoresis. We identified 33/286 samples as duplicates, and therefore corrected for this during further analysis. Results of 25/253 (9.88%) tests were found to have low levels of IgG, though not all had clinical immunodeficiency. The characteristics of the hypogammaglobulinaemic patients will be presented in detail.

#### **Conclusions**

The implementation of reflex testing with immunoglobulin quantification and serum protein electrophoresis following a very low IgE result was followed in 85% of cases. This reflex testing protocol does allow the pick-up of patients with hypogammaglobulinaemia, which included new primary diagnoses as well as some known patients with haematological malignancy. There is a balance between cost of additional testing compared with potential for improved outcome in patients identified with primary or secondary antibody deficiency.

P.026

**Successful use of omalizumab for prevention of anaphylaxis in a patient with non-clonal mast cell activation and postural tachycardia syndrome**

Sharon Chan<sup>1</sup>, Sarah Denman<sup>2</sup>, Sinisa Savic<sup>1</sup>

<sup>1</sup>Leeds General Infirmary, Children's Hospital, Leeds, UK, <sup>2</sup>St James's University Hospital, Department of Clinical Immunology and Allergy, Leeds, UK

**Case Presentation**

**Background**

Non-clonal mast cell activation (ncMCA) syndrome is characterised by seemingly unprovoked episodes of mast cell degranulation resulting in multitude of symptoms including severe anaphylaxis. A proportion of patients with ndMCA also have postural tachycardia syndrome (POTS). Here we describe successful use of omalizumab to treat symptoms associated with ncMCA but not POTS.

**Case Presentation**

This 19 year old male presented at age of 10 years with unexplained anaphylaxis, episodic flushing, profuse sweating, hives and wheeziness. Subsequently he developed additional symptoms including diarrhoea, severe dizziness associated with hypotension and tachycardia and loss of consciousness. Investigations showed no evidence of allergic disorder. Serum mast cell tryptase (MCT) levels were periodically elevated ranging between 10-20 ng/ml. Bone marrow biopsy showed no clonal mast cell expansion and no mutation of cKIT. Investigated performed by cardiologists demonstrated significant postural hypotension using a tilt test. Numerous treatments were tried including high dose H1 non-sedating antihistamines, H2 antihistamines, montelukast and sodium chromoglycate. Subsequently he was treated with imatinib which was largely effective, but had to be discontinued due to side-effects. Omalizumab was initially commenced at a dose of 300mg sc 4 weekly, but later increased to 3 weekly due mild breakthrough symptoms. The treatment has been effective for most symptoms associated with ncMCA apart for postural hypotension and tachycardia. Since commencing omalizumab (1 year) the patient has not had any further episodes of anaphylaxis or LOC.

**Discussion**

Omalizumab has been used successfully in a small number of patients with clonal and ncMCA. Omalizumab has also been shown to have mast cell stabilizing effect, although the precise mechanism underlying this pharmacological effect is still not fully elucidated. This case report adds to the body of literature supporting the use of omalizumab in patients with ncMCA refractory to standard treatments.

**Conclusions**

Omalizumab is effective treatment option for patients with ncMCA syndrome

**P.027**

**Effective use of omalizumab for treatment of cold induced urticaria**

Sharon Chan<sup>1</sup>, Sarah Denman<sup>2</sup>, Sinisa Savic<sup>2</sup>

<sup>1</sup>Leeds Teaching Hospitals NHS Trust, Leeds, UK, <sup>2</sup>Department of Clinical Immunology and Allergy, St James's University Hospital, Leeds, UK

**Case Presentation**

**Background**

Cold induced urticaria (CiU) is a form of chronic inducible (physical) urticaria characterized by pruritic wheals with or without angioedema occurring within minutes after exposure to a cold contact. This can be debilitating condition and not all patients respond to the conventional therapy. Here we present 3 CiU patients who had excellent response to omalizumab.

**Case Presentation**

Patient 1 (P1) and P2 are females aged 38 and 42 years respectively. P3 is 44 years old male. They all have long-standing history of CiU, P1 >20 years, P2 > 9 years and P3 >25 years. All three experienced debilitating symptoms including several episodes of anaphylaxis. P1 and P3 lost consciousness as a result of anaphylaxis during a swim in a sea. All patients received high dose H1 non-sedating antihistamines in combination with ranitidine 150mg twice daily. P1 had additional sodium chromoglycate, and montelukast. P3 received hydroxychloroquine. In all cases the symptoms were refractory to the conventional therapy. They were all started on omalizumab 300mg every 4 weeks. All patients achieved excellent control of their symptoms within first 8 weeks of treatment. P1 and P3 have stopped all other medications.

**Discussion**

A proportion of patients with CiU continue to have debilitating symptoms despite conventional treatment and avoidance of triggers. Omalizumab is currently licensed for the treatment of chronic spontaneous urticaria but not CiU. Although randomised control trials are lacking to support the use of omalizumab in CiU there are growing number of case reports including this one, which describe excellent response to omalizumab in this condition.

**Conclusions**

Omalizumab appears to be a very effective treatment for patients with CiU who have failed the conventional therapy.

## **P.028**

### **Omalizumab for chronic spontaneous urticaria: a single UK centre experience**

Sarah Denman, Claire Corps, Kate Ford, John Toolan, Anoop Mistry, Gururaj Arumugakani, Sapna Srivastavana, Philip Wood, Sinisa Savic  
*The Leeds Teaching Hospitals NHS Trust, Leeds, UK*

#### **Objectives**

Omalizumab is licensed as add-on treatment for chronic spontaneous urticaria (CSU) in patients aged over 12 years. We report on one UK centres experience.

#### **Method**

The medical notes and pharmacy records for all patients who received omalizumab for CSU from August 2010 to March 2016 were reviewed.

#### **Results**

A total of 1626 doses of Omalizumab were administered to 108 patients (Females=75, Males=33; age range 13-76; dose range = 150mg to 600mg every 4-8 weeks). 87 patients have on-going treatment, with the longest treatment period being 67 months. Of the 21 patients that stopped treatment 6 were due to CSU remission, 10 due to ineffectiveness, 2 due to potential adverse reactions, 1 due to pregnancy, 1 patient transferred and 1 was lost to follow-up. The number of 6-month courses in patients in remission ranged from 1 to >4 (1 - n=1, 2 - n=1, 3 - n=2, 4 - n=1, >4 - n=1). Of the 87 current patients, 70% have had more than one treatment course (1 - n=26, 2 - n=22, 3 - n=17, 4 - n=9, >4 - n=13). The interval in between injections has been extended or dose reduced in 14 patients on multiple courses. Home treatment has been initiated in 53 patients (61%). The longest duration of home treatment is 15 months (average 5 months; median 4 months). The number of doses administered in hospital prior to home treatment ranges from 2 to 45 (average 13; median 11). None of the patients on home therapy have reported any adverse reactions.

#### **Conclusions**

Omalizumab is a safe and effective therapy for CSU but often requires multiple courses. In such patients, increasing the interval in between doses and/or reducing the dose and home treatment could reduce treatment burden.

## **P.030**

### **Comparison of the performance of skin-prick, ImmunoCAP and ISAC tests in the diagnosis of patients with allergy**

Rebecca Griffiths, Tariq El-Shanawany, Stephen Jolles, Clive Selwood, Adrian Heaps, Emily Carne, Paul Williams

*University Hospital of Wales, Cardiff, UK*

#### **Objectives**

We investigated the utility of skin-prick tests (SPT), conventional ImmunoCAP tests for serum allergen-specific IgE antibodies and the Immuno-Solid phase Allergen Chip (ISAC) test in a group of patients presenting diagnostic difficulty in our allergy service

#### **Method**

We retrospectively examined the letters, case notes and laboratory results to evaluate the most appropriate use of SPT, ImmunoCAP and ISAC testing strategies in complex patients in heterogeneous clinical categories. We evaluated the performance of these tests in 118 selected patients attending the secondary and tertiary adult allergy service at the University Hospital of Wales, Cardiff who presented diagnostic difficulty.

#### **Results**

In all patients without a clinical diagnosis of salicylate or drug-induced symptoms, allergy detection rates for SPTs (53%) and ISAC (59%) were similar with a higher detection rate for ImmunoCAP testing (66%). In patients with nut allergy, the detection rates of SPTs (56%) and ISAC (65%) were lower than those of ImmunoCAP tests (71%). The detection rates of different combinations of tests in the different patient diagnostic groups were broadly similar. ImmunoCAP test results identified all 9 patients who were diagnosed with anaphylaxis due to wheat allergy (100%), whereas the ISAC test was positive in only 6 of these 9 patients (63%).

#### **Conclusions**

Unlike previous studies, we evaluated the use of three tests in a 'real life' clinical service setting with heterogeneous categories of patient referrals presenting diagnostic difficulty, as would be encountered in a specialist allergy service. In this difficult diagnostic group the ImmunoCAP test was the most frequently used single test for possible allergy to nuts, wheat and other specific foods, and anaphylaxis of any cause, and in these conditions SPT and ISAC tests gave comparable results. The most useful single test for Oral Allergy Syndrome was the ISAC test.

**P.031**

**A generalised reaction to a diclofenac intradermal test in an out patients drug allergy clinic**

Andrew Williams, Rubaiyat Haque

*Guys & St Thomas' Hospitals NHS Foundation Trust, London, UK*

**Case Presentation**

**Background**

We report a systemic allergic reaction following an intradermal skin test with diclofenac.

A 57 year old male attended drug allergy clinic after he had had a "reaction" during general anaesthesia.

**Case Presentation**

In November 2015 he underwent spinal surgery. The anaesthetic records showed that on induction he received fentanyl, propofol, rocuronium, ondansetron, dexamethasone, cefuroxime, tranexamic acid and was started on a remifentanyl infusion. There was no immediate reaction ruling out any allergy to these drugs. Forty five minutes later he was commenced on a diclofenac infusion and within 15 minutes developed severe hypotension, tachycardia, bronchospasm, oxygen desaturation to 50% and generalised flushing. The reaction was treated with ephedrine, a bolus of adrenaline followed by adrenaline infusion.

The timing of the allergic reaction suggests allergy to diclofenac. Also he had previously taken diclofenac orally at home in 2012. Soon after the tablet was taken he developed intense itching and flushing. When he spoke to his wife on the telephone she noticed that his speech was slurred and he subsequently "collapsed". He avoided all non-steroidal anti-inflammatory drugs until given diclofenac during surgery.

Intradermal tests performed with diclofenac 1:10 concentration (7.5mg/ml) and undiluted (25mg/ml) led to significant wheal expansion from 5 to 10 mm with extensive erythematous flare. He rapidly developed a more generalised erythematous and intensely pruritic response to the skin tests involving his arms and face requiring treatment with cetirizine 20mg and prednisolone 25mg. His oxygen saturations and breathing remained normal. He was kept under observation for two hours as the symptoms resolved.

**Discussion**

This evidence suggests immediate allergy to diclofenac. He was counselled regarding avoiding non-steroidal anti-inflammatory medicines and wearing a medic alert badge.

**Conclusions**

Generalised reactions to intradermal drug tests are rare but clinics should be ready to recognise & treat them.

**P.032**

**Anaphylaxis to ethylene oxide (EO) during cardiac catheter insertion.**

Konstantinos Kakleas, Mark Kenny, Sophie Farooque

*Drug Allergy Clinic, St Mary's Hospital, Imperial College Healthcare NHS Trust, London, UK*

**Case Presentation**

**Background**

Anaphylactic reactions during general anaesthesia are reported to have an incidence of between 1:3500 and 1:35000, and can be potentially life-threatening. Common causes include antibiotics, neuromuscular blocking agents and non-steroidal anti-inflammatory drugs. Prompt identification of the causative agent is crucial to avoid recurrence, but in a small number of cases no cause can be found.

**Case presentation**

A 49 year old female was referred following suspected anaphylaxis during ablation for atrial fibrillation. She had negative skin tests to Midazolam, Fentanyl, Propofol, Latex, Atracurium, and radiocontrast medium (Visipaque). She underwent a challenge with radiocontrast medium as anaphylaxis occurred 2 minutes after receiving Visipaque. This was negative. A few months later, she underwent repeat ablation without general anaesthesia. Following skin preparation with Chlorhexidin, her groin was infiltrated with Lignocaine and the cardiac catheter was advanced. She rapidly developed hypotension, urticaria and desaturated and was treated for anaphylaxis. Following negative skin tests, she had negative challenges to Lignocaine and Chlorhexidine. Her specific IgE to ethylene oxide (EO) was therefore requested and returned as elevated (1.0ku/L) confirming the diagnosis.

**Discussion**

EO is a highly reactive gas used to sterilize heat-sensitive medical devices, such as cannulas, catheters and butterfly needles. It is an extremely rare cause of peri-operative anaphylaxis. Historically allergy to EO was reported in haemodialysis patients. Cases reports of anaphylaxis to EO during interventional cardiology exist in literature. Investigation is difficult as apart from specific IgE to EO no other test is available.

**Conclusions**

When evaluating unexplained peri-operative anaphylaxis, if patients have had significant intravascular exposure to EO, then anaphylaxis to EO should be investigated. If there is a strong clinical suspicion of allergy to EO, then for future procedures, devices sterilised with irradiation should be used preferentially and any other equipment sterilised using EO washed in saline prior to use.

## **P.033**

### **Indication and outcome of open food challenges in adolescents and adults**

Lucinda Kennard<sup>1</sup>, Priya Sellaturay<sup>1</sup>, Krzysztof Rutkowski<sup>2</sup>, Annette Wagner<sup>1</sup>

<sup>1</sup>Addenbrooke's Hospital NHS Foundation Trust, Cambridge, UK, <sup>2</sup>Guy's and St. Thomas' NHS Foundation Trust, London, UK

#### **Objectives**

Double blind, placebo controlled food challenges are the diagnostic gold standard in food allergy. They are however time consuming and carry a risk of severe allergic reactions. The majority of patients are therefore diagnosed by a combination of recent history and skin prick tests (SPT) and/or Immunocap to confirm the presence of specific IgE. While in most patients this gives a degree of certainty of diagnosis that is acceptable to both patient and clinician, there remains a minority of patients where this is not the case and a food challenge is deemed necessary. We report findings in 97 adolescent and adult patients who underwent open food challenges in the allergy department over a 3 year period.

#### **Method**

The median age of patients was 19 years (range 12 – 69). The most frequently tested foods were nuts (73%, 71 patients). Diagnostic uncertainty arose from the absence of, or equivocal history of, a reaction in the presence of positive SPT and/or Immunocap or the belief of a patient to be tolerant in the face of SPT and Immunocap being highly predictive of allergy.

#### **Results**

Patients median specific IgE was 1.62 (range 0 – 95.6 Kua/l). SPT wheal size ranged from 0 – 20 mm (median 4). Patients' predictive outcome scores were 1 for 47 patients, 2 for 39 patients, 3 for 9 patients and 4 for only 1 patient, indicating a low risk of a severe reaction during challenge for the majority. 69 patients (71%) passed the challenge, 24 (25%) failed.

#### **Conclusions**

Diagnostic certainty was established in 93 patients, with only 4 patients (4%) remaining uncertain of their diagnosis, due to a refusal to complete the challenge. Severe reactions requiring adrenaline were rare and only occurred in 3 patients. Patient satisfaction was high, even if challenge failed.

P.034

**Patients that change our practice: two cases of severe allergic reaction to grass sublingual immunotherapy (Grazax)**

Jia Li Liao, Alexandra Croom

*University Hospital Leicester NHS Trust, Leicester, UK*

**Case Presentation**

**Background**

Allergic Rhinitis affects more than 20% of the population in the UK. Allergen specific immunotherapy (ASIT), subcutaneous (SCIT) or sublingual, (SLIT) has been shown to reduce clinical symptoms and medication use. There is indirect evidence that SCIT is superior in terms of symptom control but the preferred safety profile of SLIT has led to its increasing use. Mild adverse reactions to SLIT are common but severe reactions are rare with no cases identified in a recent Cochrane review.

**Case Presentations**

We report 2 patients who had severe allergic reaction following the first dose of grass pollen SLIT (GRAZAX 75,000 SQ-T oral lyophilisate). The first developed marked stridor within 10 minutes and required IM adrenaline. The second developed generalised urticaria, angioedema and a reduced PEF. Adrenaline was not given. Both recovered without sequelae.

**Discussion**

Severe adverse reactions to SLIT are rare. Most are associated with unconventional dose, rush protocols, mixed allergen administration, treatment during high pollen counts or history of severe reactions to SCIT. Both our patients received licensed dose single allergen SLIT (GRAZAX 75,000 SQ-T oral lyophilisate) during winter months and were ASIT naïve.

Both have severe symptoms. What should we do next? Continuing use of triple medical therapy alone is likely to result in poor symptom control and impaired QoL. Would future treatment with SLIT using a variable dose regimen be safe? Is anti-IgE an unlicensed and expensive option?

**Conclusions**

Severe allergic reactions to grass pollen SLIT are rare. The two we describe show the importance of prompt recognition and treatment and highlight the need to perform ASIT in specialist centres.

Patients with adverse reactions to ASIT remain a therapeutic challenge; a SLIT regimen with lower starting dose maybe an option.

The reactions have changed our practice: written rather than verbal consent is obtained from all with more emphasis on risk of severe allergic reaction.

## P.035

### **Patient selection for venom immunotherapy improves after introduction of a clinical checklist**

Jasper Mogg<sup>1,2</sup>, Catherine Stroud<sup>2</sup>

<sup>1</sup>Newcastle University Medical School, Newcastle-Upon-Tyne, UK, <sup>2</sup>Royal Victoria Infirmary, Newcastle-Upon-Tyne Hospitals Trust, Newcastle-Upon-Tyne, UK

#### **Objectives**

Venom immunotherapy (VIT) is used to reduce risk of severe allergic reactions to bee or wasp stings in susceptible individuals. Inappropriate patient selection procedures lead to risk, poorly-informed decisions and unnecessary expense.

In March 2015, an audit was conducted on patients scheduled to attend VIT at the Newcastle Royal Victoria Infirmary during 2014 and 2015 (n = 29). Shortcomings were noted in adrenaline autoinjector provision (90%) and checking of baseline tryptase (55%), as well as in documentation of patient history (93%) and contraindications (83%).

With the objective of improving performance, a clinical checklist was developed and implemented.

#### **Method**

To assess the impact of the clinical checklist, re-audit was performed in March 2016. The pro forma developed for the original audit was used for retrospective case note review of patients scheduled for VIT since checklist implementation (n = 8). A note was made of whether the clinical checklist had been used.

#### **Results**

Results are presented as follows:

Criterion - [performance when checklist used (n = 4)] v [performance when checklist not used (n = 4)] v [original audit performance (n = 29)]

Autoinjector provided and patient trained? - 100% v 100% v 90%

Baseline tryptase checked? - 100% v 0% v 55%

Patient history documented? - 100% v 25% v 93%

Contraindications documented? - 100% v 25% v 83%

#### **Conclusions**

The results support the idea that a clinical checklist improves adherence to guidelines in the patient selection process for VIT. However, the sample size is small and further data collection will be required to improve the validity of this conclusion.

It was noted that of the five doctors involved, two did not use the checklist. Further work will determine whether performance improvement was due to the checklist or simply a stronger adherence to guidelines by particular doctors.

## P.036

### **Evaluation of ST and QTc segment changes during continuous ECG monitoring of adults undergoing acute allergic reactions to peanut**

Shalinee Patel, Ashna Lakhani

*Imperial College London, London, UK*

#### **Objectives**

The physiology of food allergic reactions is poorly understood. Some mast cell mediators such as histamine can cause cardiac conduction abnormalities, and acute stress can cause abnormalities of repolarisation, leading to cardiac arrhythmias in susceptible individuals. We undertook a clinical trial to investigate whether food allergy is associated with changes in repolarisation detected as changes in the ST segment or QT interval on ECG. The effects of adrenaline and anaphylaxis on these changes were also explored.

#### **Method**

ECG Holter monitor data was retrieved, using the MARS programme, from 56 peanut-allergic patients undergoing a DBPCFC as part of the on-going TRACE study. The ST segment change measurements in lead V2, were made manually at three different measurement points: J point, 40ms and 60ms. Unadjusted statistical analysis was performed on the data.

#### **Results**

On active days compared to placebo days, there were no significant ST segment changes during reaction at 40ms ( $P=0.13$ ) or 60ms ( $P=0.15$ ). A significant decrease was seen on active days at the J point ( $P=0.02$ ). There was a significant increase at the time of reaction on the active day and between the active day and placebo day in QTc ( $p<0.0001$ ). There were no significant ST segment changes in those who required intramuscular adrenaline and those with anaphylaxis, at all three measurement points. A significant increase was seen in QTc ( $p=0.014$ ) in those administered adrenaline.

#### **Conclusions**

This evaluation of ST segment changes during IgE-mediated peanut allergic reactions does not show evidence of Brugada syndrome or related events. The presence of anaphylaxis or administration of intramuscular adrenaline did not appear to be associated with ST elevation but was associated with a significantly increased QTc, possibly due to anxiety experienced by participants during reactions. These data provide reassurance that Brugada-like electrical events are not a common feature of peanut allergic reactions or their treatment.

P.037

**"DLQI seems to be 'Action', and Skindex-29 seems to be 'Emotion' ": Patients' evaluation of dermatology-specific quality of life measures**

Priya Paudyal<sup>1</sup>, Sana Siddiqui<sup>1</sup>, Christina Jones<sup>1</sup>, Christian Apfelbacher<sup>1</sup>, Aisha El-Turki<sup>1</sup>, Claudia DeGiovanni<sup>2</sup>, Helen Smith<sup>1</sup>

<sup>1</sup>Brighton and Sussex Medical School, Brighton, UK, <sup>2</sup>Dermatology Outpatient Department, Brighton General Hospital, Brighton, UK

**Objectives**

Patient involvement is generally encouraged when developing Quality of life (QoL) questionnaires, however the involvement appears to be limited to early methodological work around item generation. There is a paucity of research determining whether the final developed questionnaire is comprehensible and captures the lived experience of illness. This study explored patients' views on two widely used dermatology-specific QoL questionnaires.

**Method**

Twenty-eight adult patients with a diagnosis of eczema or psoriasis were recruited from local dermatology outpatient clinics. Participants were asked to complete the Dermatology Life Quality Index (DLQI) and the Skindex-29 before being interviewed to reflect on important aspects of their skin disease and the relevance of these questionnaires in the context of living with a skin condition. Interviews were recorded, transcribed and analysed using thematic content analysis.

**Results**

The majority of the patients perceived the layout and format of the questionnaires to be appropriate. Patients spoke about a wide range of questionnaire aspects: ambiguous question items, repetitive content, irrelevant questions, insufficient recall period, missing items, and suggested a number of amendments. The majority of the patients favoured the Skindex-29 as it was perceived to be easier to understand, used a longer recall period (4 weeks) and better captured a variety of emotions and experiences. The DLQI was perceived to deal more with physical discomfort than QoL.

**Conclusions**

This study highlights the strengths and the limitations of two widely used dermatology-specific QoL questionnaires. Our findings suggest that the content of these questionnaires needs to be revised to better capture the lived experience of people with skin conditions. The Skindex-29 emerged as the preferred questionnaire. Further research should elicit patients' views in a diverse sample and a varied setting.

## P.038

### **Management of adult eosinophilic oesophagitis (EoE) in a UK cohort: a service evaluation**

Kristina Pupinyte<sup>1</sup>, Hannah Hunter<sup>2</sup>, Terry Wong<sup>2,3</sup>, Jason Dunn<sup>2,3</sup>, Evelyn Toner<sup>3</sup>, Stephen Till<sup>1</sup>, Miranda Lomer<sup>1,2</sup>

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

<sup>3</sup>The London Bridge Hospital, London, UK

#### **Objectives**

Eosinophilic oesophagitis (EoE) is a presumed antigen-driven disorder characterised by oesophageal eosinophilia and dysfunction. Medical management consists of proton pump inhibitors (PPIs) or topical steroids. In adults, dietary interventions are based on either allergy-tests or the empirical six-food elimination diet (SFED). Outcomes from these interventions have not been reported in a UK population and we therefore undertook a service evaluation.

#### **Method**

Patients were identified from clinicians' lists and histology reports. Adults ( $\geq 16$  years), with biopsy confirmed EoE ( $\geq 15$  eos/hpf) seen in the last two years were included. Data was collected retrospectively from medical records. Treatment episodes were analysed in patients who had both pre- and post-intervention biopsies.

#### **Results**

Seventy-eight patients were included (median 35 years; 79% male; 69% Caucasian) of whom 59% (n=46) underwent allergy-testing. Sensitisation to food allergens (excluding almond and hazelnut) and aeroallergens was seen in 70 and 75% of patients, respectively. Thirty-six patients (51 treatment episodes) had pre- and post-intervention biopsies. The median peak eosinophil count was significantly reduced after SFED (n=13; p=0.036) and allergy-test-directed (n=6; p=0.043) interventions but not steroids (n=12; p=0.117), PPIs (n=13; p=0.784) or other treatments (n=7; p=0.437). Histological response ( $< 15$  eos/hpf or  $\geq 50\%$  reduction in peak count) was achieved in SFED: 69%, allergy-test-directed: 67%, PPIs: 38%, steroids: 42% and other treatments 43%, with no significant differences in efficacy between treatment groups. Of four patients sensitised to raw milk in the allergy-test-directed group, all responded to milk exclusion.

#### **Conclusions**

Baseline characteristics were comparable to other described cohorts with a high proportion of males, Caucasians and a high rate of atopy. There was a non-significant trend to higher response rates for dietary compared to medical interventions. Limitations include small sample size and retrospective design. Larger prospective studies would be valuable to compare treatment responses and explore the role of allergy testing, particularly for milk.

**P.039**

**Hereditary Angioedema Type II with Estrogen Sensitivity: A Case Report**

Majdy Qutub, Emad Koshak, Moufag Tayeb, Mohammed Alrabea, Lujain Qutub  
*King Abdulaziz University, Jeddah, Saudi Arabia*

**Case Presentation**

**Background**

Hereditary angioedema (HAE) is a rare autosomal condition due to inherited deficiency of C1 esterase inhibitor (C1INH). Estrogen reduces the concentration of C1INH and trigger angioedema, however the estrogen sensitivity pattern is variable in HAE. Proper diagnosis and management is essential as this condition sometimes becoming life-threatening due to potential airway obstruction.

**Case presentation**

We reported A 27-year old woman experienced recurrent episodes of lips and face swellings over the last 4 years. These were non-pruritic, asymmetric, not painful; and triggered by respiratory tract infections, menstruation, pregnancy and analgesics intake. Patient has a positive family history and partial response to antihistamines and steroids.

**Discussion**

Laboratory findings revealed normal C3, C4, C1q, C1INH quantity. However C1INH function decreased 36%. Subsequent visits revealed the intake of oral contraceptive pills (OCP) and improvement of symptoms after discontinuation.

**Conclusions**

To our knowledge, this is the first case report of HAE type II with estrogen sensitive pattern in a Saudi female improved after cessation of OCP.

## **P.040**

### **Use of Quality Of Life (QOL) scores to assess allergen immunotherapy outcomes in a real-life setting**

Tasneem Rahman<sup>2,1</sup>, Bijal Gandhi<sup>1</sup>, Cynthia Morrison<sup>1</sup>, Angela Msonthi<sup>1</sup>, Fawzia Runa Ali<sup>1</sup>

<sup>1</sup>*St Bartholomew Hospital, London, UK, <sup>2</sup>Royal London Hospital, London, UK*

#### **Objectives**

Allergic Rhinitis is a common systemic condition which sees significant morbidity and effect on quality of life. Failure to respond to maximal medical therapy can warrant a decision for patients to commence specific Immunotherapy (SIT) with specialist guidance and consideration for patient preference. Patient questionnaires are used as tools in research to monitor efficacy of immunotherapy. OBJECTIVE: To use quality of life scores (QOL) in the clinic setting to measure effectiveness of immunotherapy over consecutive years of treatment.

#### **Method**

53 patients completed the standardised Rhinoconjunctivitis Quality of Life questionnaire (RQLQ) as standard protocol at pre-treatment and the end of each year of therapy. Of the 53 patients, 25 had completed immunotherapy, 17 had completed 2 years of therapy, and 11 had completed 1 year. This questionnaire looks specifically at the effect of patients' symptoms with regards to daily activity, sleep, nose/eye symptoms, non-nose/eye symptoms, practical problems and emotion. The RQLQ scores of our patient cohort from pre-treatment to current treatment were analysed.

#### **Results**

94% (50/53) of our patients found an overall improvement in their quality of life from pre-treatment scores to their current score. For 60%, this was an improvement in symptoms over consecutive years. 62% (33/53) of our patients noted improvement in activity participation, 64% (34/53) in sleep, 64% (34/53) non-nose/eye symptoms, 64% (34/53) in practical problems, 62% (33/53) in nasal symptoms, 53% (28/53) in eye symptoms and 55% (29/53) in emotion, with improving scores for every year of therapy. 42% (22/53) of our patients experienced an improvement in all symptom domains over consecutive years.

#### **Conclusions**

Immunotherapy can result in a better quality of life even before completion of treatment. Using RQLQ scores as a tool can be implemented in clinical settings to help monitor treatment and response, and further guide both patients and commissioning bodies in optimisation of therapy.

## P.041

### **Baseline characteristics of refractory CSU patients from the UK: data from A World-wide Antihistamine-Refractory chronic urticaria patient Evaluation study (AWARE)**

Sinisa Savic<sup>1</sup>, Claire Bethune<sup>2</sup>, Tariq El-Shanawany<sup>3</sup>, Robert Ellis<sup>4</sup>, Susana Marinho<sup>5</sup>, Shyamal Wahie<sup>6</sup>, Ravishankar Sargur<sup>7</sup>, Anthony Bewley<sup>8</sup>, John Lear<sup>9</sup>, Alla Nakonechna<sup>10</sup>, Pavels Gordins<sup>11</sup>, Olivier Somenzi<sup>12</sup>, Alexander Marsland<sup>13</sup>

<sup>1</sup>St James's University Hospital, Leeds, UK, <sup>2</sup>Plymouth Hospitals NHS Trust, Plymouth, UK, <sup>3</sup>Department of Immunology, University Hospital of Wales, Cardiff, UK, <sup>4</sup>James Cook University Hospital, Middlesbrough and Newcastle University, Newcastle, UK, <sup>5</sup>University Hospital of South Manchester NHS Foundation Trust, Manchester, UK, <sup>6</sup>University Hospital North Durham, North Durham, UK, <sup>7</sup>Sheffield Teaching Hospitals NHS FT, Sheffield, UK, <sup>8</sup>Whipps Cross University Hospital & Royal London Hospital, London, UK, <sup>9</sup>Manchester Academic Health Science Centre, Manchester Royal Infirmary, Manchester, UK, <sup>10</sup>Royal Liverpool and Broadgreen University Hospitals NHS Trust, Liverpool, UK, <sup>11</sup>Hull and East Yorkshire Hospitals NHS Trust, Hull, UK, <sup>12</sup>Novartis Pharmaceuticals UK Ltd, Camberley, UK, <sup>13</sup>Salford Royal NHS Foundation Trust, University of Manchester, Manchester Academic Health Science Centre, Manchester, UK

#### **Objectives**

To describe the baseline characteristics of a cohort of UK Chronic Spontaneous Urticaria (CSU) patients refractory to H<sub>1</sub>-antihistamines.

#### **Method**

A prospective non-interventional study, assessing the disease burden of CSU patients is currently underway in 20 UK NHS hospitals. Patient-reported impact of treatments used in daily clinical-practice on symptoms, quality-of-life and work productivity will be collected over a two-year period. Here we present the baseline characteristics data.

#### **Results**

The study included 176 refractory patients with CSU [75.6% (133/176) female] with mean age of 45.6 years (SD 15.3). The BMI was reported for 112 patients and the mean was 29.3 (SD 6.1). 4.8% (8/168) patients had a family history of CSU. The proportion of patients with co-morbidities such as asthma, allergic rhinitis and atopic dermatitis was 19.3%, 10.8% and 6.3%, respectively. 59.1% (101/171) of CSU patients reported experiencing angioedema in the previous 6 months. On average, the number of angioedema-affected days was 57.9 (SD 101.4) during the observed period. The intensity of angioedema, when reported, was mild in 20.2% (19/94), moderate in 53.2% (50/94) and severe in 26.6% (25/94) of these patients. A total of 115 patients had a weekly Urticaria Activity Score (UAS7) at baseline with a mean score of 19.0 (SD 12.9). Of those, 30.4% (35/115) had highly active disease (UAS7 ranging 28-42) and 27.8% (32/115) had moderately active disease (UAS7 ranging 16-27).

#### **Conclusions**

In a snapshot of patients attending specialist clinics for treatment of their CSU, one third had a highly active disease and more than a half reported symptoms of angioedema with moderate-to-severe intensity in almost 80% of cases. Of interest, many patients were found to have an increased body mass index. A small proportion of CSU patients reported history of atopy. This data indicates that patients attending specialist services are often severely affected by their disease.

## P.042

### **UAS7 scores at baseline and Patient Satisfaction with Current Therapy in refractory Chronic Spontaneous Urticaria (CSU) patients from the UK: Data from the AWARE study**

Sinisa Savic<sup>1</sup>, Tariq El-Shanawany<sup>2</sup>, Robert Ellis<sup>3</sup>, Susana Marinho<sup>4</sup>, Shyamal Wahie<sup>5</sup>, Ravishankar Sargur<sup>6</sup>, Anthony Bewley<sup>7</sup>, John Lear<sup>8</sup>, Alla Nakonechna<sup>9</sup>, Pavels Gordins<sup>10</sup>, Olivier Somenzi<sup>11</sup>, Alexander Marsland<sup>12</sup>

<sup>1</sup>St James's University Hospital, Leeds, UK, <sup>2</sup>Department of Immunology, University Hospital of Wales, Cardiff, UK, <sup>3</sup>James Cook University Hospital, Middlesbrough and Newcastle University, Newcastle, UK, <sup>4</sup>University Hospital of South Manchester NHS Foundation Trust, Manchester, UK, <sup>5</sup>University Hospital North Durham, Durham, UK, <sup>6</sup>Sheffield Teaching Hospitals NHS FT, South Yorkshire, UK, <sup>7</sup>Whipps Cross University Hospital & Royal London Hospital, London, UK, <sup>8</sup>Manchester Academic Health Science Centre, Manchester Royal Infirmary, Manchester, UK, <sup>9</sup>Royal Liverpool and Broadgreen University Hospitals NHS Trust, Liverpool, UK, <sup>10</sup>Hull and East Yorkshire Hospitals NHS Trust, Hull, UK, <sup>11</sup>Novartis Pharmaceuticals UK Ltd, Camberley, UK, <sup>12</sup>Salford Royal NHS Foundation Trust, University of Manchester, Manchester Academic Health Science Centre, Manchester, UK

#### **Objectives**

To evaluate weekly Urticaria Activity Score (UAS7) at baseline and Patient Satisfaction with Current Treatment in a cohort of UK CSU patients, refractory to H1-anti-histamines (H1AH).

#### **Method**

A prospective non-interventional study, designed to assess the disease burden of CSU patients is currently underway in 20 UK NHS hospitals. Here we present the weekly Urticaria Activity Score (UAS7, range 0-42: the higher the score, the higher the itch and the number of hives) and the Patient Satisfaction with Current Therapy (visual analog scale (VAS), range 0-10: the higher the score, the higher the patient satisfaction), both collected at baseline. Patients' treatments at baseline were: H1AH and/or Leukotriene receptor antagonist (LTRA) (group 1), or H1AH/LTRA in combination with: ciclosporin (group 2) or oral corticosteroids (group 3) or omalizumab (group 4). Some patients were untreated (group 5).

#### **Results**

Out of 145 patients who completed UAS7 at baseline, 79.3% (115/145) were CSU-only patients and 20.7% (30/145) had a primary diagnosis of CSU with overlapping chronic inducible urticaria (CIIndU). Patient-reported UAS7 scores had a mean of 19.8 (SD 11.6) in group 1 (n=57), 26.8 (SD 18.2) in group 2 (n=4), 16.4 (SD 10.5) in group 3 (n=5), 10.6 (SD 13.1) in group 4 (n=30) and 19.7 (SD 13.1) in group 5 (n=47). Of 219 patients who completed the Patient Satisfaction with Current Therapy (based on VAS) at baseline, 74.9% (164/219) were CSU-only patients and 25.11% (55/219) had a primary diagnosis of CSU with overlapping CIIndU. The mean Patient Satisfaction with Current Therapy was 6.6 (SD 2.7) for group 1 (n=103), 5.7 (SD 3.3) for group 2 (n=7), 5.7 (SD 2.0) for group 3 (n=5), 8.5 (SD 2.4) for group 4 (n=34) and 6.0 (SD 3.6) for group 5 (n=67).

#### **Conclusions**

UAS7 scores and patient satisfaction scores varied between groups receiving various treatments for CSU.

## P.043

### **Grass pollen subcutaneous and sublingual immunotherapy inhibit allergen-induced nasal and skin responses: a randomised controlled trial**

Guy Scadding<sup>1</sup>, Moises Calderon<sup>1</sup>, Mohamed Shamji<sup>1</sup>, Martin Penagos<sup>1</sup>, Aarif Eifan<sup>1</sup>, Peter Alder Wurtzen<sup>2</sup>, Michele Sever<sup>3</sup>, Henry Bahnson<sup>3</sup>, Kaitie Lawson<sup>3</sup>, Kristina Harris<sup>4</sup>, Tielin Qin<sup>4</sup>, Noha Lim<sup>4</sup>, Audrey Plough<sup>4</sup>, Nadia Tchao<sup>5</sup>, Alkis Togias<sup>6</sup>, Stephen Durham<sup>1</sup>

<sup>1</sup>Allergy and Clinical Immunology, National Heart and Lung Institute, Imperial College, London, UK, <sup>2</sup>ALK-Abello, Horsholm, Denmark, <sup>3</sup>Rho Federal Systems Division, Chapel Hill, NC, USA, <sup>4</sup>Immune Tolerance Network, Bethesda, Maryland, USA, <sup>5</sup>Immune Tolerance Network, University of California, San Francisco, USA, <sup>6</sup>The National Institute of Allergy and Infectious Diseases, Bethesda, Maryland, USA

#### **Objectives**

A randomised, double-blind, placebo-controlled trial of subcutaneous and sublingual grass pollen immunotherapy: two years SLIT (GRAZAX® ALK, Denmark, daily tablets and monthly placebo injections) compared to SCIT (Alutard SQ® *Phleum Pratense* ALK monthly injections and daily placebo tablets) and double-placebo.

#### **Method**

Nasal challenge with grass pollen extract performed in 106 participants before randomisation, after 1 and 2 years treatment, and one year following discontinuation of treatment (year 3). Responses assessed by total nasal symptom score (TNSS, scale: 0-12) and peak nasal inspiratory flow (PNIF, L/minute). Nasal fluid collected and analysed by immunoassay. Cutaneous response to intradermal allergen recorded at the same time points.

#### **Results**

SCIT inhibited TNSS at 1 year compared to placebo ( $p<0.01$ ); both treatments reduced TNSS at 2 years versus placebo (SCIT  $p<0.01$ ; SLIT  $p=0.02$ ), with no difference between the two ( $p=0.20$ ). Both treatments improved PNIF at years 1 and 2 versus placebo (SCIT  $p<0.01$ ,  $p<0.01$ ; SLIT  $p=0.02$ ,  $p=0.01$ ). Nasal fluid interleukin 2 (IL-2), IL-4, IL-5, and IL-13 were equally reduced by both treatments (all  $p<0.05$ ); there was no effect on IFN- $\gamma$ , IL-10, IL-12p70, tryptase or ECP. Inhibition of clinical and local immunological response to nasal challenge was not maintained at year 3. Early skin responses ( $p<0.01$ ) and late responses ( $p<0.001$ ) were lower for both SLIT and SCIT at years 1, 2, and 3 compared to placebo. Inhibition of the early response was greater for SCIT compared to SLIT at years 1 and 2 ( $p<0.02$ ), but not year 3 ( $p=0.94$ ). Inhibition of the late response was greater for SCIT compared to SLIT at years 1, 2 and 3 ( $p<0.001$ ).

#### **Conclusions**

Two years SCIT or SLIT is effective in suppressing allergen challenge-induced nasal responses and local Th2 cytokines, but these effects are not maintained one year off treatment. Conversely, suppression of skin responses persists for at least one year following treatment discontinuation.

## **P.044**

### **Role of skin testing in the diagnosis of insulin allergy**

Priya Sellaturay, Annette Wagner, Shuaib Nasser  
*Addenbrooke's Hospital, Cambridge, UK*

#### **Objectives**

Insulin allergy has become rare since the introduction of purified human non-recombinant insulin and recombinant insulin analogues. However insulin allergy still occurs in a minority of patients (<1%) and complicates management of these patients. We describe 3 cases of insulin allergy and demonstrate the usefulness of skin prick and intradermal testing in making the diagnosis and identifying safe alternative treatments.

#### **Method**

Three patients with type 2 diabetes, managed with a combination of oral glucose lowering drugs and insulin presented with adverse reactions to subcutaneous insulin injections and were referred to our department for investigation. All three patients developed urticarial wheals at the site of injection, with two patients also developing systemic symptoms. The patients had a history of symptoms to up to 4 different types of insulin. Skin prick and intradermal testing was undertaken using human non-recombinant and recombinant insulins (insulin analogues), porcine and bovine insulins. Specific serum IgE to human, bovine and porcine insulin was measured by immunocap. Insulins resulting in a negative skin test were advised as a safe alternative; and patients were contacted months later to follow up on their progress.

#### **Results**

Skin prick tests were negative in all 3 patients. However intradermal tests confirmed IgE-mediated reactions to all the culprit insulins reported by the patients. Skin tests were also positive to some, but not all alternative insulins, which had never been used. Specific IgE to human insulin, bovine and porcine were positive in all patients. Safe alternatives were identified in all 3 patients. One of the three patients is currently treated with the alternative insulin with no adverse reaction.

#### **Conclusions**

Skin prick and intradermal testing allows identification of IgE mediated allergy. Negative skin tests appear useful as a predictor of safe alternatives. However a larger study of insulin allergy would be needed to confirm these results.

## **P.045**

### **Anaphylaxis after topical application of chlorhexidine (ChloraPrep® 3ml)**

Samriti Sharma, Sameer Bahal, Vasantha Nagendran  
*St Helier Hospital, Surrey, UK*

#### **Case Presentation**

##### **Background**

Chlorhexidine is an effective antiseptic agent used in hospitals. Although anaphylaxis to chlorhexidine is probably increasing, diagnosis is difficult as it is not a prescribed drug, and chlorhexidine coatings on medical devices may be overlooked.

##### **Case Presentation**

A 54 year old man with an extensive cardiac history and end stage renal failure attended hospital for a routine dialysis session. The plaster covering his Tesio line was removed and the area around the insertion point on the chest was scrubbed with a ChloraPrep® 3ml Applicator. Within seconds, the patient developed widespread intense itching, and an urticarial rash. He experienced shortness of breath and dizziness before becoming less responsive, and his blood pressure dropped to 70/40. Treatment for anaphylaxis was initiated with Intramuscular Adrenaline along with Intravenous Hydrocortisone and Chlorphenamine. His symptoms settled over the next 30 minutes, the blood pressure improved and he was observed in hospital for 3 days.

The serum tryptase level was raised. Skin prick testing was positive to two preparations of Chlorhexidine. Strict avoidance of Chlorhexidine containing products was advised and an Adrenaline Autoinjector was issued.

##### **Discussion**

Anaphylaxis to topical chlorhexidine preparations is difficult to detect because systemic absorption rates can be unpredictable. The rapid onset of symptoms in our patient suggests that absorption probably occurred via the raw skin where the Tesio line entered the body. It is noteworthy that previous repeated exposure to the same chlorhexidine product had not elicited any reaction. Case reports of anaphylaxis soon after multiple applications of chlorhexidine on skin and mucous membrane are described in the literature, but we found no reports of anaphylaxis soon after a single application of Chloaprep® 3ml topical applicator.

##### **Conclusions**

Chlorhexidine is widely used in hospital practice without serious problems. However, healthcare workers must be aware that anaphylaxis can occur in patients who become sensitised after repeated exposure.

**P.046**

**A case of reversible cerebral vasoconstriction syndrome following a type 1 hypersensitivity reaction to honey bee venom.**

Laura Talbot, Lucy Leeman, Stuart Weatherby  
*Plymouth Hospitals NHS Trust, Plymouth, UK*

**Case Presentation**

**Background**

Reversible cerebral vasoconstriction syndrome (RCVS) typically manifests as recurrent thunderclap headaches with reversible segmental multifocal cerebral artery vasoconstriction. Multiple causes are recognised; commonly medications such as serotonergic and sympathomimetic drugs, and pregnancy. Isolated cases of cerebral infarction following hymenoptera stings have been reported, with a vasoconstrictive mechanism postulated.

**Case presentation**

A 54 year old pest control officer with no significant past medical history or headaches was stung by over sixty honeybees in a single occasion. Immediately he felt unwell. Over the course of an hour he developed rash and swelling at sting sites, diarrhoea and vomiting. There was no angioedema or breathing difficulties. A blood pressure drop of over 30mmHg was recorded. Intramuscular chlorphenamine and oral cetirizine and ranitidine were administered; he was not treated with adrenaline. Subsequently he developed recurrent daily thunderclap headaches lasting thirty minutes to an hour. Specific IgE to honeybee venom was weakly positive (0.65KUA/l). MRI angiography at nine weeks demonstrated areas of irregularity representing probable cerebral vasospasm. This resolved on imaging six months later. He was treated with nimodipine with good effect.

**Discussion**

The symptoms following venom exposure are likely to represent a type 1 hypersensitivity reaction. It seems reasonable to consider this a case of RCVS secondary to an anaphylactic event. Type 1 hypersensitivity reactions lead to release of vasoactive mediators such as histamine and endogenous adrenaline, with consequences for vascular tone systemically and locally. As far as we are aware this is the first reported such case.

**Conclusions**

Although recognition of RCVS is increasing it remains an uncommon and likely under recognised condition which is not always benign. The case reported here raises the possibility that the systemic response to type 1 hypersensitivity may in turn play a role in the pathophysiology of RCVS.

**P.047**

**Adjuvant use of Omalizumab in penicillin desensitisation**

David Thursfield<sup>1</sup>, Juan Meng<sup>1,2</sup>, Giuseppina Rotiroti<sup>1,4</sup>, Joanna Lukawska<sup>2,3</sup>

<sup>1</sup>UCLH, London, UK, <sup>2</sup>West China Hospital, Chengdu, China, <sup>3</sup>King's College London, London, UK,

<sup>4</sup>Royal Free Hospital, London, UK

**Case Presentation**

**Background**

Omalizumab is a humanized monoclonal anti-IgE antibody with established efficacy for allergic asthma, allergic rhinitis and chronic spontaneous urticaria. Omalizumab reduces free IgE, increases total IgE, and down regulates the expression of IgE receptors (FcεRI) on mast cells and basophils. Omalizumab has been shown to prevent anaphylaxis in high-risk desensitisations, in venom immunotherapy, ragweed rush immunotherapy, milk and oxaliplatin desensitisation. Here we present a case of a 43 year old female with history of penicillin anaphylaxis and multiple comorbidities who was desensitised to Pivmecillinam (penicillin) aided by adjuvant Omalizumab.

**Case Presentation**

43 year old female with recurrent UTIs (sensitive to Meropenem, Pivmecillinam) and previous history of anaphylaxis following administration of non-further specified penicillin, was referred for consideration of treatment with Meropenem. She was skin tested with penicillin allergy determinant; tested positive to PPL (8/23mm) and Amoxicillin (35/138mm). Patient developed generalised itching and nausea during her skin testing. Skin testing and challenge to Meropenem were negative. Patient initially tolerated and benefited from Meropenem. However, within 2 months she developed Meropenem related liver pathology. An MDT (Allergy/Microbiology) decision was made to desensitise her to Pivmecillinam. Considering her multiple comorbidities Omalizumab was recommended as adjuvant therapy.

**Discussion**

Omalizumab 300mg was administered 48 hours prior to the desensitisation. Repeat PPL SPT 24 hours post Omalizumab was positive. A rapid 20 step oral Pivmecillinam desensitisation was tolerated. Patient developed central chest pain and mild tachycardia at step 16 (no ECG changes). She was managed with oral Ranitidine 150mg. Patient achieved cumulative dose of 508mg of Pivmecillinam and has been treated with daily Pivmecillinam 100mg TDS since (12 months). Omalizumab treatment was not repeated.

**Conclusions**

Drug desensitisation may be considered in cases where there are no other suitable drug alternatives or when potential alternatives have inferior efficacy. Omalizumab is an effective adjuvant treatment in high-risk desensitisations.

**P.048**

### **Sugammadex – a rare cause of intraoperative anaphylaxis**

Kok Loong Ue, Krzysztof Rutkowski

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

#### **Case Presentation**

##### **Background**

The aetiological diagnosis of intraoperative anaphylaxis can be challenging. Neuromuscular blocking agents (NMBA), and antibiotics are the most common triggers. Sugammadex, a  $\gamma$ -cyclodextrin used to reverse NMBA, can also cause life-threatening reactions, usually towards the end of anaesthesia.

##### **Case Presentations**

###### **Case 1**

A 50-year old male underwent ureteric stent replacement. At induction, propofol, fentanyl, rocuronium, ondansetron, dexamethasone, paracetamol, morphine, gentamicin, chlorhexidine and iohexol were used. Latex urinary catheter was inserted. The procedure was uneventful. 5 minutes after 200mg sugammadex administration (Bridion, Merck UK), patient developed hypotension (SBP 45mmHg), tachycardia (106bpm), desaturation (81%) and generalised urticaria. He responded to adrenaline, hydrocortisone and chlorphenamine. Acute serum tryptase (AcST) level was raised at 81 $\mu$ g/L (baseline: 9 $\mu$ g/L). Skin prick test (SPT) with undiluted sugammadex was positive (5mm). Intradermal test (IDT) 1:100 showed a 5mm increase in weal diameter; 1:1000 showed 3mm weal increase. All other agents were negative on SPT/IDT.

###### **Case 2**

62-year old male underwent gingival lesion removal. At induction, propofol, fentanyl, rocuronium, ondansetron, paracetamol and co-amoxiclav were used. The procedure was uneventful. Within 5 minutes of 400mg sugammadex administration, there was hypotension (SBP 60mmHg), diaphoresis and unresponsiveness (GCS 3/15). Patient responded to adrenaline, hydrocortisone and chlorphenamine. AcST was raised at 141 $\mu$ g/L (baseline: 7 $\mu$ g/L). SPT with undiluted sugammadex was positive (7mm). IDT 1:100 showed 4mm weal increase; 1:1000 showed 3mm weal increase. All other agents were negative on SPT/IDT.

##### **Discussion**

The chronology of both reactions with raised AcST and positive SPT/IDT confirmed sugammadex anaphylaxis. Recent systematic review on hypersensitivity associated with sugammadex identified 15 cases worldwide with only 11 met WAO criteria for anaphylaxis.

##### **Conclusions**

Although sugammadex is safe and licensed in many countries, severe hypersensitivity reactions can occur. All allergists and anaesthetists should be aware of this uncommon cause of life-threatening intraoperative anaphylaxis even in patients with no prior exposure to this drug.

**P.049**

**Referral and Follow-up of Perioperative Anaphylaxis in Adults at a Tertiary Referral Centre with Limited Access to Specialist Immunology and Allergy Services**

Don Walsh<sup>1,2</sup>, Pdraig Mahon<sup>1,2</sup>, Paula O'Leary<sup>2,1</sup>

<sup>1</sup>*Cork University Hospital, Cork, Ireland,* <sup>2</sup>*University College Cork, Cork, Ireland*

**Objectives**

A prospective audit of referral by anaesthetists of perioperative anaphylactic and allergic reactions (AARs) (1) to a single-handed Immunologist based at a regional medical center in Ireland is presented.

**Method**

A prospective audit of all referrals and referral information patterns by anaesthetists of suspected AARs commenced in September 2014. Approximately 25,000 anaesthetic procedures are undertaken annually at this center. Outcome and patient follow up data were also reviewed. Hospital anaesthetists were advised to report AARs to a nominated anaesthetist. Management and referral for specialist evaluation was recommended, but not directed. Concurrently, referrals to the immunologist of possible AARs were reviewed.

**Results**

17 patients were reported as suspected AAR to the nominated anaesthetist. However, only 10 were referred to an immunologist for assessment. All patients referred to the lead anaesthetist had recognised AAR symptoms. Five of these patients have now been formally investigated and causative agents identified. One patient underwent a second procedure in the interval between index reaction and immunological evaluation. The remaining 5 patients currently await specialist evaluation.

**Conclusions**

No formal referral process exists at our institution or in our hospital region for suspected AAR referral to an immunologist. Currently referral patterns are erratic and can also be directed to non-specialist services. The absence of a formal referral system for anaesthetists or a structured specialist Immunology / Allergy service (single-handed Immunologist without supported clinical service provisions locally) can limit referred numbers, quality of referral and timely follow up of this important patient group. The data obtained in this audit will be used to formulate a hospital / regional guideline on referral, based on international guidelines (2) and to advocate for optimization of specialist service provision required to assess and inform affected patients and anaesthetic services in a structured manner.

## P.050

### **Efficacy of omalizumab in atopic asthmatic patients with total IgE levels greater than 700 IU/ml: a retrospective Study.**

Timothy Watts<sup>1</sup>, Sophia Watts<sup>2</sup>

<sup>1</sup>Guy's and St Thomas' Hospital, London, UK, <sup>2</sup>East Surrey Hospital, Redhill, UK

#### **Objectives**

Omalizumab is a monoclonal anti-IgE antibody approved for use in patients with severe atopic asthma that is poorly controlled, and with a total IgE between 30 and 700 IU/ml. Omalizumab is frequently used in patients with a total IgE of over 700 IU/ml; however there is limited data on its clinical effectiveness at these high levels. The objective of this study was to investigate the efficacy of omalizumab in atopic asthmatic patients with total IgE levels greater than 700 IU/ml.

#### **Method**

This retrospective case control study evaluated 14 severe atopic asthmatic patients treated with omalizumab for at least 6 months. The patients were divided equally into two groups based on total IgE levels (Group 1 IgE > 700 IU/ml and Group 2 IgE 30-700 IU/ml) and matched by age, gender, asthma duration, and measured severity. Change in Forced Expiratory Volume in 1 second (FEV1), exacerbation rate (over 6 months) and Asthma Control Test (ACT) scores before and after 6 months treatment were analysed.

#### **Results**

The exacerbation rates before and after treatment were significantly reduced for both group 1 and 2 (mean rate 2.29 vs. 1.0 [ $P= 0.01$ ] and 2.43 vs. 0.57 [ $P<0.001$ ], respectively). FEV1 (% predicted) before and after treatment were significantly increased for both group 1 and 2 (mean FEV1 49.14% vs. 65.71% [ $P<0.001$ ] and 56.71% vs. 73.14% [ $P<0.001$ ], respectively). Finally, asthma control (measured by ACT score) before and after treatment was also significantly increased for both group 1 and 2 (mean ACT score 9.71 vs. 15.86 [ $P<0.001$ ] and 9.86 vs. 17.86 [ $P<0.001$ ], respectively). There were no significant differences between the groups.

#### **Conclusions**

Omalizumab was as clinically efficacious in improving asthma control, FEV1 and in reducing exacerbation rates in patients with IgE levels greater than 700 IU/ml, as in patients with IgE levels 30 - 700 IU/ml.

## Category: Paediatric Clinical

P.051

### High levels of antenatal stress and interventional delivery in children with food allergy

Imran Ali<sup>1</sup>, Cherry Alviani<sup>1</sup>, Nicola Braithwaite<sup>2</sup>, Sue Leech<sup>2</sup>

<sup>1</sup>Faculty of Life Sciences and Medicine, Kings College London, London, UK, <sup>2</sup>Paediatric Allergy Service, Department of Child Health, Kings College Hospital, Denmark Hill, London SE5 9RS, London, UK

#### Objectives

Anecdotally, parents of children attending allergy clinics report high levels of stress during pregnancy, birth and first year of life. Stress may play a role in the development of food allergy through the effects of corticotrophin releasing hormone, catecholamines and corticosteroids. Gut microbiota and colonisation at birth is involved in the development of food allergy. We aim to establish whether there was evidence for this amongst our paediatric allergy clinic population.

#### Method

126 consecutive new patients attending the paediatric allergy clinic from December 2014 to September 2015 were identified from the clinic database. Correspondence and electronic patient records were reviewed retrospectively. Stressful events reported during pregnancy, delivery and the child's first year of life were recorded. Stressful events included: Antenatal complications, interventional delivery and medical/surgical problems during first year. Stressful events in children with food allergy (n=75) and without food allergy (n=51) were compared.

#### Results

63% of mothers reported a stressful event (12% antenatal, 34% intrapartum, 16% during first month and 11% during first year of life). Stressful events were more common in children with food allergy than without food allergy (68% vs. 54%, p=0.03), particularly antenatally (15% vs. 8%) and intrapartum (38% vs. 26%). Stress in the first month was more common in children without food allergy (21% vs. 13%).

Children with food allergy had high rates of interventional delivery (forceps, Ventouse, Induction, caesarean section). Caesarean section rates were high in children with food allergy, 40% vs. 18% of children with no food allergy. The local Caesarean section rate is 28%. Children born via C-section, were 3.1 (CI: 1.323 – 7.318) times more likely to develop food allergy.

#### Conclusions

There are high levels of antenatal stress and interventional delivery in children attending Paediatric allergy clinics, particularly in children with food allergy. Caesarean section rates are high in children with food allergy.

## **P.052**

### **Sesame allergy-a single centre experience**

Luul Ali, Rosalynd Gourgey, Nandaki Keshavan, [Frances Ling](#), Lee Noimark, Shanmugapriya Palanivelu  
*Barts Health NHS Trust, London, UK*

#### **Objectives**

To determine the reliability of modified skin prick testing (SPT) to tahini as compared to the standard laboratory sesame extract.

To determine whether SPT testing in children for sesame correlates with peanuts and tree nut sensitisation.

#### **Method**

We prospectively recruited children in our allergy clinic from Jan 2016- June 2016 who had SPT to food allergens based on clinical history. We performed tahini and sesame extract SPT in all of these children regardless of whether they had a history of suspected sesame allergy. We used 100% Meridian brand Tahini for modified SPT. The extract was obtained from Allergopharma. SPT was performed by experienced clinicians with consistent SPT technique. Positive SPT was defined as  $\geq 3$ mm. Correlation was assessed using the  $\chi^2$  test.

#### **Results**

68 children were recruited to the study. 54% were male. Mean age 5.1y (1y-15y). All 68 had SPT to peanuts or at least one tree nut (almond, hazelnut, brazil, walnut, cashew). 39% were SPT positive for sesame, 49% were SPT positive for at least 1 tree nut and 45% positive for peanut.

There was extremely significant correlation between SPT positivity for tahini and sesame extract implying that the two are comparable. We show that there is a significant correlation between SPT positivity for sesame extract and peanut extract ( $P= 0.0047$ ) and tree nut extract ( $P= 0.0001$ ).

#### **Conclusions**

Sesame extract SPT and tahini showed similar results and there was good correlation in the outcomes showing the presence of sensitisation. The prevalence of sesame sensitisation in our cohort seems to be higher than reported in the literature. Peanut and tree nut sensitisation was also found in a significant percentage of patients with sesame sensitisation. Further larger studies are needed to show if this is indeed the case. Children who are screened positive for peanuts/tree nuts should be considered for sesame skin prick testing.

**P.053**

**Stevens-Johnson Syndrome induced by flucloxacillin hypersensitivity reaction**

Joana Alves Gato, Dinkar Bakshi

*Nottingham Children's Hospital, Nottingham, UK*

**Case Presentation**

**Background**

Stevens-Johnson Syndrome (SJS) is an uncommon, potentially life threatening entity, usually triggered by hypersensitivity to drugs or mycoplasma infection. Severe cases may progress to Toxic Epidermal Necrolysis (TEN). Beta-lactam antibiotics are some of the most common drugs responsible for this syndrome.

**Case presentation**

We report a case of a 3 year old girl from Portugal, who presented to hospital with painful blisters on the lips. She was clinically diagnosed as herpes stomatitis, and treated with coamoxiclav for suspected bacterial superinfection. The symptoms progressively worsened on coamoxiclav for six days on the ward. Intravenous fluids were needed to maintain hydration and oral intake was markedly reduced. A detailed history with the help of a Portuguese interpreter revealed that the child had been on flucloxacillin for 3 days prior to admission. Physical examination showed involvement of the mucosa of both the buccal cavity and genitalia, and a clinical diagnosis of Stevens-Johnson syndrome was made. Within a few hours of stopping coamoxiclav, the patient improved dramatically with regression of lesions on the lips, gradually reestablishing oral intake.

**Discussion**

Antibiotics can cause severe hypersensitivity reactions, with florid lesions and ulcers. Coinfection of the lesions is not uncommon. Their use must be reviewed if the clinical picture is worsening. SJS is treated by withdrawal of the offending drug and maintaining adequate hydration. Steroids may be used to reduce inflammation in severe cases.

**Conclusions**

This case highlights the need for a detailed history with the services of a health advocate, especially if English is not the first language of the family.

## **P.054**

### **A review of paediatric anaphylaxis management at Croydon University Hospital: review of management and focus for improvement.**

Cherry Alviani, Rachel Folwell, Soonie Patel  
*Croydon University Hospital NHS Trust, London, UK*

#### **Objectives**

Anaphylaxis incidence is rising leading to increased clinician exposure to this life-threatening condition. Clear identification and management algorithms are available. We reviewed the management of paediatric anaphylaxis presenting to a busy district general hospital, to identify areas for improvement in care.

#### **Method**

All paediatric presentations to the emergency department (ED) between April 2014- March 2016, whose discharge diagnosis was "Anaphylaxis" or "Anaphylactic Reaction", were identified via electronic patient records. The records were evaluated to identify whether true anaphylaxis had occurred and whether the management algorithm was followed.

#### **Results**

Thirty-five cases were identified. Median patient age 7 years (2 months-15 years). Two-thirds of cases known to have food allergies. The most common presenting symptoms were: angioedema (77%), urticarial rash (60%) and airway compromise (57%). Blood pressure not documented in 23% of cases. True anaphylaxis judged to have occurred in 31 (88%) cases; 97% (30/31) received antihistamines, 94% (29/31) IM adrenaline, 71% corticosteroids. The dose of IM adrenaline was incorrect (too low) in 20% (4/20) of documented cases. In 10 cases adrenaline had to be manually drawn up, as auto-injector devices are not available in ED. The median time to administer adrenaline in these cases was 30 minutes. 42% (13/31) of patients discharged from ED, four of these were observed for less than three hours. 18 patients were admitted for overnight observation. Only 1/3 were discharged with a clear allergy action plan. Management errors were made in 18/31 cases (58%). Notably in 10 cases further doses of IM adrenaline were withheld despite on-going respiratory compromise, with a preference given to nebulized bronchodilators.

#### **Conclusions**

Anaphylaxis management was suboptimal in over half of cases. In particular a reluctance to administer IM adrenaline was identified. Local availability of adrenaline auto-injectors would also be beneficial, as delays were recorded in administering drawn-up adrenaline.

**P.055**

**An audit assessing the management of anaphylaxis in a paediatric population over a 10 year period at a small District General Hospital**

Priscilla Ariyaratnam, Tom Dawson

*Redditch Hospital, West Midlands, UK*

**Objectives**

To examine A&E practice when a child presents with allergic symptoms/anaphylaxis, specifically looking at the management and follow-up plans. The standards were based on the APLS management of anaphylaxis

**Method**

All anaphylactic patients aged 18 or under were identified using the computer system Patient First based on A&E coding in a small District General Hospital. Retrospective case data was collected over a ten year period 2006-2016. Anaphylactic patients were classified into four subsets using the Melville Criteria. The management of these patients were compared to the standard as set out by the Resuscitation council UK guidelines for anaphylaxis.

**Results**

Features of the acute reaction and preceding events were well documented with likely triggers identified in 82% of cases, 66% implicated a food allergy. The correct treatment was administered in all the cases of true anaphylaxis, but only 83% of children had their BP documented. MCT levels were sent in (4%) cases, and all of these were in inpatients admitted to the ward. Of the patients admitted to the ward 77% were discharged with follow-up organized with a consultant with a specialist interest in allergy. However of the patients discharged straight from A&E only 40% had follow-up organized.

**Conclusions**

The results revealed opportunities for improvement. There is a good standard of history taking, examination, with thorough documentation and we are managing true cases of anaphylaxis well. Adrenaline was given when necessary, although we are not always documenting BP. We need to improve the use of MCT levels in the cases of allergy. As per the guidelines this remains the definitive test used to help diagnose anaphylaxis and serial measurements should be used to aid management.

Improvement is needed in A&E in arranging follow-up when patients are discharged, to identify the triggering allergen and to facilitate education about the condition in an outpatient setting.

## **P.056**

### **Behavioural interventions to improve adherence to preventer medications in children and adolescents with asthma: a systematic review**

C.M. Arthur<sup>1</sup>, A.J. Frew<sup>2</sup>, C.J. Jones<sup>1</sup>

<sup>1</sup>Brighton & Sussex Medical School, Brighton, UK, <sup>2</sup>Brighton & Sussex University Hospitals NHS Trust, Brighton, UK

#### **Objectives**

Approximately 1 in 11 children in the UK has asthma, making it the most common chronic medical condition in childhood. As with other chronic conditions, non-adherence is a common problem and remains a major barrier to achieving good disease control in many patients. This systematic review examines the characteristics and effectiveness of behavioural interventions for promoting adherence to preventer medications in children and adolescents with asthma.

#### **Method**

A systematic search of six electronic databases was conducted to identify peer-reviewed, randomised control trials (RCTs) of interventions to enhance adherence in children (<18 years) with asthma. Eligible studies comprised of an intervention that was behavioural in nature and included adherence to preventer medications as an outcome measure. The reference section of each article was manually searched to identify other relevant publications. Data describing study participants, intervention characteristics and outcomes were collected and compared. Due to the heterogeneity of the outcomes used to measure medication adherence, a meta-analysis was not conducted.

#### **Results**

14 RCTs met the inclusion criteria for this review. A variety of behavioural approaches to enhancing adherence were described. These included electronic reminders, web-based interventions, interactive sessions regarding self-management skills, and objective monitoring of adherence with feedback to the participant. Use of reminders and objective adherence monitoring with feedback demonstrated beneficial effects on adherence during the intervention period.

#### **Conclusions**

A range of behavioural interventions to improve adherence to asthma preventer medications have been evaluated in RCTs. Promising approaches include electronic reminder systems, and objective adherence monitoring with feedback.

**P.057**

**Quantifying Undetected Allergic Conditions in Kids (QUACK) - prevalence of allergic diseases among the inpatient population of a general paediatric ward**

Antony Aston, Teriola Naiyeju, Claudia Gore  
*Imperial College NHS Trust, London, UK*

**Objectives**

Allergic diseases are among the most common UK chronic childhood conditions but there is limited awareness and health service provision for them. We surveyed the in-patient population of a general paediatric ward to establish prevalence of allergic conditions.

**Method**

A history taking aid was developed (refined from a previous 2010 tool; incorporating validated questionnaire-items for various allergic co-morbidities, constipation standards and reported extra-intestinal manifestations of food allergy) to capture basic information about wheeze/asthma, eczema, rhino-conjunctivitis, food allergy, gastrointestinal complaints and their impact on sleep. A prospective survey of inpatients was undertaken at random times during each week over a 10-month period (May 2015 - March 2016). Further data was available from the medical records if required.

**Results**

A total of 100 patients (median age 5.2 years, range 0.5 - 17.3 years) were included; 65/100 (65%) reported a history of allergic disease and for 20/65 (31%) an allergic condition was the primary reason for admission (3 eczema, 17 wheeze/asthma).

Allergic co-morbidities were varied: 30/65 (46%) asthma/wheeze, 25/65 (39%) rhino-conjunctivitis, 42/65 (65%) eczema, 19/65 (29%) food allergies. Half the patients had more than one allergic condition (17/65 (26%) two conditions, 17/65 (26%) reported  $\geq 3$  conditions).

Gastroenterological symptoms were reported by 27/65 (42%). Sleep disturbance due to allergic symptoms was common (30/65 [46%]) and over half experienced difficulty > 1 night per week in past month (17/30 [57%]).

National standards of care (via parental recall) were not met for the management of wheeze/asthma (20/30 [67%]) and eczema (25/42 [60%]) at time of admission.

**Conclusions**

Allergic conditions are very common and often undertreated among patients being admitted to a general paediatric ward. Secondary diagnoses can remain un-addressed within the busy ward environment, potentially worsening outcomes. The in-patient admission should be considered an opportunity to diagnose and improve allergic disease management/education for patients/families.

## **P.058**

### **Effect of a targeted educational package on standards of care for paediatric wheeze in a general paediatrics ward**

Antony Aston, Bethan Tomsett, Sharon Hall, Ariel Tsai  
*Imperial College NHS Trust, London, UK*

#### **Objectives**

Wheeze/asthma exacerbation is a common admission to hospital particularly in winter. The British Thoracic Society and the London Standards for the care of Asthma have specific requirements around care for these patients. Our aim was to measure the impact of a targeted educational package on achieving these standards.

#### **Method**

The asthma/wheeze care pathway documentation and patient information was revised and a targeted multidisciplinary education package developed for staff. A baseline audit was conducted (September 2015) and 20 sessions were delivered between December 2015 - February 2016. A retrospective notes and electronic discharge summary survey was conducted (January - February 2016 general paediatric admissions) examining documentation related to standards of care.

#### **Results**

51 patients notes and discharge summaries (> 1 year old, admitted with wheeze/asthma exacerbation were included, age range - 1y 2m - 14y 7m, median 3y 7m, IQR 2y 2m - 6y 1m) were reviewed. 25/51 (49%) had had their inhaler technique assessed (vs. 6/41 (15%) previously), 41/51 (80%) were documented as receiving a salbutamol weaning plan (vs. 22/41 (54%) previously), 18/51 (35%) were documented as receiving a wheeze home management plan (vs. 1/41 (2%) previously), 15/51 (29%) had the correct advice regarding seeking GP review in 2 working days (vs. 0/41 previously). Additionally 29/51 (57%) had had possible triggers discussed and 4/9 (44%) of patients aged 7y+ had a peak flow measurement during the admission.

#### **Conclusions**

The targeted educational package was introduced to support the revised asthma/wheeze pathway following evidence of poor compliance with the London Asthma Standards. The intervention resulted in substantial improvement, but still not meeting the required standards. This intervention shows promise but training for all staff, along with ongoing monitoring and feedback are essential for embedding the asthma/wheeze pathway.

## **P.059**

### **Health professional confidence assessment following a targeted educational package around standards of care for wheeze/asthma paediatric inpatients**

Antony Aston, Bethan Tomsett, Sharon Hall, Ariel Tsai  
*Imperial College NHS Trust, London, UK*

#### **Objectives**

To establish the current confidence level of health professionals managing paediatric wheezy/asthmatic inpatients on a medical ward, conforming to accepted standards of care and assess the effectiveness of a new educational package in improving this.

#### **Method**

Scenario-based training was delivered (small groups/individuals) around practice standards, basic knowledge and documentation. Anonymous confidence questionnaires regarding inhaler technique, patient education and documentation were completed pre- and post- teaching, consisting of 17 questions, to be rated 0 (not confident) - 10 (very confident), with open prompts for personalised comments. Educational materials were also provided on the ward.

#### **Results**

48 participants (10 A&E junior doctors, 2 paediatric A&E nurses, 2 paediatric site practitioners (senior co-ordinating nurses), 11 paediatric junior doctors and 25 paediatric nurses/healthcare assistants) were taught in groups in 20 sessions lasting between 35-45 minutes. Overall mean baseline confidence - 93/170 (55%, SD 32) and subdivided into: inhaler technique 24/50 (48%, SD 9), patient education 48/80 (60%, SD 17) and documentation 21/40 (53%, SD 9). 29 staff provided pre- and post- teaching questionnaires. Mean overall confidence went from 90/170 (SD = 35) to 142/170 (SD =32) an increase of 31%. Inhaler technique 24/50 (SD = 10) rose by 38% to 43/50 (SD = 10), patient education 47/80 (SD = 19) increased to 67/80 (SD = 15) a rise of 25% and documentation 19/40 (SD = 10) to 32/40 (SD= 9) a 33% improvement. Microsoft Excel paired t-test: overall p value < 0.01 (mean difference 52, SD 25, CI 95% 0 - 106). 21/48 participants requested further teaching in a variety of topics.

#### **Conclusions**

Staff had some confidence prior to teaching. The educational package improved confidence in all areas by around 30% and there was a desire for additional teaching. The impact on patient outcomes needs assessment.

## **P.060**

### **IgM deficiency associated with raised IgG4 level in a young girl**

Sameer Bahal, William Bermingham, Grant Hayman, Amolak Bansal  
*St Helier Hospital, Surrey, UK*

#### **Case Presentation**

##### **Background**

While serum IgM levels can be low in the elderly, isolated IgM deficiency is rare in the young. We report a case of IgM deficiency in a young girl associated with an inexplicably raised IgG4.

##### **Case Presentation**

An 11 year old girl was reviewed with a four year history of recurrent episodes of tonsillitis characterised by fever, fatigue and sore throat. She had previously suffered a single episode of impetigo. There was no history of other infections. The patient had eczema but not hay-fever or asthma. There was no clinical indication of IgG4 fibro-proliferative disease. Her immunoglobulins showed a normal IgG (10.8 g/L) and IgA (2.61 g/L), but a very low IgM (0.145 g/L) The IgG4 level was increased at 3.94g/L (normal 0.1 to 1.3g/L). The other subclasses were normal. Lymphocyte subsets and an autoimmune screen were normal. The HIB Functional antibody tests showed appropriate titres.

##### **Discussion**

The aetiology of selective IgM deficiency has yet to be elucidated. It may represent impaired production of IgM B Cells or abnormally increased activity of T Regulatory Cells. The combination of very low IgM and an elevated IgG4 is very unusual. Ideura et al found 22 cases of IgM deficiency in medical literature between 1970 and 2004. One aged 9 reported by Conrad et al in 1991 had bronchitis with rhinitis in association with a raised IgG4. Most patients suffered recurrent infection, especially involving the urinary tract. Yamasaki et al showed patients with IgM deficiency frequently had elevated IgE levels and developed atopic dermatitis as well as Staphylococcal infections of the skin.

##### **Conclusions**

Selective IgM deficiency is rare and the relationship with raised Immunoglobulin Classes and Subclasses is unclear. Our patient may develop recurrent infections and monitoring would be required. More work should be carried out to discover the mechanism of this condition.

## P.061

### **Experience from a new model of multidisciplinary allergy clinic in a District General Hospital (DGH): an efficient framework of care delivery within paediatric allergy services.**

Tushar Banerjee, John Furness

*County Durham and Darlington Foundation Trust, Darlington, County Durham, UK*

#### **Objectives**

- To improve the quality of care and experience for children with complex multi-systemic allergy.
- To reduce the cost and streamline allergy services at DGH level.

#### **Method**

This pilot clinic was designed as 'one-stop shop' to deliver multi-level clinical care at a single point of patient contact. Twenty children with complex multi-systemic presentation requiring allergy, gastroenterology, respiratory, dermatology, clinical psychology and dietician input were identified. The professional team included general paediatricians with allergy, gastroenterology & respiratory experience, paediatric dermatologist, allergy & dermatology specialist nurses, dietician and clinical psychologist. The team was led by a paediatrician with allergy interest and patient selection was done by the participating professionals keeping patient benefit as first priority. There was 10 minutes of pre-clinic strategic discussion to identify the key areas of clinical input and 30-40 minutes of patient/parent-led interdisciplinary clinical consultation. The family had the opportunity to discuss the targeted care plan with the multidisciplinary team in a non-overwhelming clinical environment.

#### **Results**

- 1 clinic/3 months (4 clinics/year) without additional allocated funding.
- 19/20 patients (1 DNA) were seen over 12 months.
- The average (Av) duration of each clinic was 250 minutes.
- 1 pilot clinic visit/patient = 7 standard clinic visits/patient.
- 50 minutes/patient in pilot clinic (Av) = 165minutes/patient (total) in standard clinics (Av).
- Efficient clinic space utilisation.
- Reduced administrative & secretarial time.
- Reduced out-patient waiting time.
- More cost-effective.
- High level of patient satisfaction: The patient satisfaction rating was 5 star (n=17) & 4 star (n=2).
- Reduced risk of interdisciplinary miscommunication.
- Enhanced shared learning experience for professionals.

#### **Conclusions**

The multidisciplinary 'one-stop clinic' providing joint care at single point of contact at DGH level for complex paediatric allergy is more efficient, cost effective with better patient and parental satisfaction compared to current fragmented model of care delivery for children with complex allergy requiring multi-disciplinary input.

## **P.062**

### **Safety of paediatric supervised feeds at UCLH**

Jas Bansal<sup>1,2</sup>, Natasha G<sup>1,2</sup>, Ranu Malhi<sup>1,2</sup>, Sophia Kallis<sup>2</sup>, Tracey Bridges<sup>2</sup>, Leanne Goh<sup>2</sup>, Jonathan Cohen<sup>2,1</sup>

<sup>1</sup>University College London, London, UK, <sup>2</sup>University College London Hospital, London, UK

#### **Objectives**

To evaluate the safety of a new supervised feed service (10/6/2015–4/4/2016) at a large London teaching hospital.

#### **Method**

Retrospective study of referrals and outcomes of supervised feeds (SF) and appropriateness of referrals by audit against guideline (criteria: skin prick test (SPT)  $\leq 3$ mm, specific IgE (SpIgE)  $\leq 1$ kUA/L and in addition for peanut Ara h 2  $\leq 0.2$ kUA/L, no previous anaphylaxis, no poorly controlled asthma).

#### **Results**

70 SF were conducted (median patient age 3years), of which 15 (21%) failed. 44 tests were to nuts (18 peanut, 17 mixed nuts, 10 individual tree nuts). 15 (34%) SF to nuts met the referral criteria guideline, of which 2 (13%) failed. 29 (66%) did not meet referral criteria, of which 6 (21%) failed. 2 (5%) patients had SPT  $>3$ mm; 5 (11%) had SpIgE  $>1$ kUA/L (2 identified as low risk on component testing); 18 (41%) did not have a SpIgE measured. 18% of patients without a measured SpIgE failed. This was not significantly different to where it was measured and was within the criteria (failure rate 21%). There was one case of anaphylaxis responding to single dose adrenaline. This patient met the SPT criteria but had not had SpIgE measured.

#### **Conclusions**

Supervised feeds offer the opportunity to provide less time consuming testing for food allergy than a formal incremental challenges. Practice varies significantly between centres, with some advocating home introduction if SPT  $<3$  in otherwise low risk patients. Adherence to referral criteria (from an established tertiary SF service), particularly the measurement of SpIgE can be improved. However, despite 41% patients not having SpIgE measured, outcomes in this cohort did not significantly differ from the tertiary centre. The additional benefit of measuring SpIgE over SPT for the specific purpose of risk stratification remains unclear. A multicentre study may provide the answer to this question.

## **P.063**

### **Paediatric outpatient audit on the management of atopic eczema in children based on NICE guidelines CG57.**

Tracey Bridges, Saika Mazhar, Penny Salt, Leanne Goh  
*University College London Hospital, London, UK*

#### **Objectives**

To determine current clinical practice as measured against NICE standards for the management of atopic eczema in <12s.

#### **Method**

Retrospective patient-record review using the NICE audit support tool; also reviewing referral practices of patients at high-risk of allergy and the regular use of sedating antihistamines. Patients presenting with a 'skin condition' to general paediatric clinics (June 2015 - October 2015) were identified, excluding patients >12years and without atopic eczema.

#### **Results**

27 patients were identified. Disease severity: 48% mild (13/27); 26% moderate (7/27); and 26% severe (7/27). 100% had emollients. 77% with mild and 100% with moderate-severe eczema had appropriate potency topical corticosteroid (TCS). 1 patient with severe eczema had bandages. No patients had topical calcineurin inhibitors (TCI), phototherapy or systemic treatments. Documentation of quality of life and psychosocial wellbeing (QOLPW) was 44% (12/27). There were 14 dermatology referrals. 75% of patients at risk of food allergy (moderate-severe eczema, <6months) were referred to allergy clinic. 15% had regular sedating antihistamines prescribed.

#### **Conclusions**

Emollients and TCS were prescribed appropriate to severity, however staff may be unfamiliar with bandaging and TCI's which were used infrequently. Patient information particularly on recognising/managing infections was sporadic. The quality of documentation varied, particularly that of QOLPW. Dermatology referrals were in line with NICE guidance, however several missed referral opportunities to allergy were identified. Some patients were still being prescribed regular sedating antihistamines, which conflicts with current NICE recommendations. In response to this audit: a local quick reference guide; improved patient information leaflets; and a nurse-led patient/carer education programme are in development. Pre-appointment POEM scoring is being instituted to enhance our assessment of disease severity. In addition regular staff-teaching is being organised. We will continue to audit the service we provide to identify further improvements.

## P.064

### **A regional audit of adrenaline auto-injector training and carriage**

Alex Brightwell<sup>2</sup>, Daniel Gilbert<sup>2</sup>, Sidrah Chaudhry<sup>3</sup>, Eleanor Minshall<sup>1</sup>

<sup>1</sup>Addenbrooke's Hospital, Cambridge, UK, <sup>2</sup>Norfolk and Norwich University Hospital, Norwich, UK,

<sup>3</sup>Bedford Hospital, Bedford, UK

#### **Objectives**

NICE quality standards indicate that individuals who are prescribed an adrenaline auto-injector (AAI) should be shown how to use it, should be able to practise using a simulator, and should be given information on how and when to use the device. We audited AAI training, carriage and technique in individuals and families prescribed an AAI.

#### **Method**

Individuals (median age 7.5 years; n = 39) and their carers who had already been prescribed an AAI were audited during their outpatient appointments in three regional paediatric allergy clinics.

#### **Results**

Epipen was the most commonly prescribed device (54%) followed by Jext (41%) and Emerade (10%). Two subjects had more than one type of AAI prescribed to them. Over a quarter of devices (28%) were not available in clinic. Most patients and/or carers (65%) were able to demonstrate the correct use of their AAI and 66% were correctly able to identify those symptoms which would necessitate its use. Only 62% had an allergy action plan available. The vast majority of patients and/or carers who had been trained by an allergy doctor were able to demonstrate correct use of the device (82%) compared to those trained by their GP (75%) or allergy nurse (71%). Those trained within the last 6 months were more likely to demonstrate correct use than those who had been trained more than 6 months previously. One in ten of those prescribed an AAI had never received the appropriate training.

#### **Conclusions**

There is a wide variation in AAI training, carriage and competence in the use of prescribed AAIs within our region. This falls short of NICE recommendations. There is a clear need for improved, consistent education for all professionals and urgent strategies are needed to engage young people and families in understanding and minimising the risk of severe allergic reactions.

## **P.065**

### **Identifying true antibiotic allergy in paediatric patients and the role of prick-prick tests prior to drug provocation challenges**

Danielle Britt, Kerrie Kirk, Gary Stiefel, David Luyt  
*University Hospitals of Leicester, Leicester, UK*

#### **Objectives**

Allergy to antibiotics is often misdiagnosed in children as the symptoms of the infection treated are ascribed to the drug. The implications of this are profound both for the individual as it alters future management of infections, and for the community as it potentially increases the risk of antibiotic resistance. We wished to determine the prevalence of confirmed allergy in patients assessed in our service; and whether prick-prick tests prior to challenge were predictive of challenge outcomes.

#### **Method**

In the Leicester Children's Allergy service we assess suspected antibiotic allergy with a prick-prick test followed by a supervised oral challenges administering increasing fractionated doses. We prospectively collected data on all oral drug challenges over the eight year period April 2008 to May 2016 (n=241). The data collected included: drug allergy suspected, drug prick-prick test reaction result, age at time of drug challenge, challenge outcome and concurrent allergies.

#### **Results**

Of a total of 241 cases of suspected drug allergy 169 were for antibiotic allergy (70%). Antibiotics tested were: amoxicillin (52), cephalexin (6), clarithromycin (1), co-amoxiclav (10), doxycycline (1), erythromycin (16), flucloxacillin (13), penicillin V (68) and trimethoprim (2); 143 (85%) therefore from the penicillin family. The 169 cases of suspected antibiotic allergy equated to 148 patients as some were tested for multiple antibiotic allergies. All patients had negative (0mm) prick-prick tests prior to challenge. Twelve (7%) reacted on oral challenge, all with mild allergic symptoms.

#### **Conclusions**

Our review is further evidence that suspected antibiotic allergy in children needs confirmation to prevent over diagnosis and unnecessary avoidance. The value of a prick-prick test prior to challenge is limited as a negative test is not predictive of the challenge outcome. The role of prick testing prior to oral challenge does not appear useful as part of the allergy assessment.

## **P.066**

### **Development of new evidence-based oral food challenge protocols for hospital and home use**

Anna Conrad<sup>1</sup>, Ruth Chalmers<sup>2</sup>, Audrey Inegbedion<sup>1</sup>, Rebecca Bhatt<sup>3</sup>, Kate Swan<sup>2</sup>, Robert Boyle<sup>1</sup>  
<sup>1</sup>Imperial College Healthcare NHS Trust, London, UK, <sup>2</sup>Guys and St Thomas's NHS Trust, London, UK, <sup>3</sup>Harley Street Clinic, London, UK

#### **Objectives**

To develop updated oral food challenge (OFC) dosing schedules for hospital and home use based on published threshold curves for milk, cooked egg and nuts, and PRACTALL consensus report recommendations for other commonly tested foods.

#### **Method**

Threshold distribution curves published in the Dutch Study by Blom et al. 2013 were used to determine hospital challenge doses for milk, cooked egg and peanuts. Tree nut doses were calculated to provide an equivalent amount of protein per dose as peanuts. For other foods, recommendations from the PRACTALL consensus report were modified to determine food challenge doses. The number of doses was set at 5 for hospital challenges, and 6-7 for home challenges, based upon a stakeholder analysis of 12 parents, 2 adolescents and 15 clinical staff with direct experience of OFC. Photo boards for home and hospital challenges were created to optimise protocol adherence and dissemination of practice.

#### **Results**

Dosing schedules for hospital OFC to cow's milk (0.5ml, 2.5ml, 8ml, 25ml, 120ml), cooked egg (150mg, 900mg, 2.5g, 7g, 30g), and whole peanut (50mg, 150mg, 400mg, 1g, 12g) were developed. Tree nut doses provide equivalent protein per dose to peanut. Dosing schedules for other commonly tested foods used modified PRACTALL dosing (20mg, 100mg, 300mg, 1000mg and 3000mg food protein). Similar home challenge schedules were developed using 6-7 doses.

#### **Conclusions**

We propose new dosing schedules for OFC, based on published eliciting doses for milk, cooked egg and nuts, and PRACTALL recommendations for all other foods, incorporating the preferences expressed by both patients and staff.

## P.067

### **A randomised controlled trial of education for adolescents at risk of nut-related anaphylaxis (ERA study) - 3 year follow up.**

Neil Davidson<sup>1,2</sup>, John Vines<sup>1</sup>, Katie Britain<sup>1</sup>, Elaine McColl<sup>1</sup>, Patrick Olivier<sup>1</sup>, Gillian Vance<sup>1,2</sup>

<sup>1</sup>Newcastle University, Newcastle upon Tyne, UK, <sup>2</sup>Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, UK

#### **Objectives**

Food allergic patients rely on effective self-care to minimise anaphylaxis risk. Adolescent patients have particular educational needs, though literature on best means of educational delivery is limited. We carried out a randomised controlled trial of a novel educational package for nut allergic adolescents. Survey data at 36 month follow up are presented.

#### **Method**

The intervention constituted a face-to-face group education session and a smartphone application, both using videos of simulated anaphylaxis scenarios. Controls received standard clinic education. This package's effectiveness is being examined using a mixed methods approach. Questionnaire data with free text responses were gathered at 36 months. Questions included reaction frequency, auto-injector carriage and confidence in management.

#### **Results**

Full survey analysis is pending. To date we have 31/70 (44%) responses (13 interventions, 14 males, 14-19 years, mean 16.4 years). Participants with peanut allergy (32%) or peanut and tree nut allergies (39%) tended to avoid all nuts (77%). Fewer tree nut allergic participants (29%) avoided all nuts (33%,  $p=0.02$ ) and avoided triggering nuts only. Similar numbers had no inadvertent reactions in the previous year (54% interventions, 61% controls,  $p=0.69$ ). Intervention participants reported carrying auto-injectors "always" (69%) or "often" (31%), compared with 44% controls "always" and 17% "occasionally" carrying them. Reasons given for non-carriage included forgetting to take auto-injector or thinking it was not necessary to carry it. More intervention participants were "very confident" in anaphylactic reaction management (31% vs 6% controls,  $p=0.06$ ). Similar numbers felt they had friends who could use an auto-injector for them in the event of a severe reaction (62% interventions, 72% controls,  $p=0.53$ ). P values Chi-squared.

#### **Conclusions**

Pending full data set, novel education targeting adolescents at risk of anaphylaxis has benefits for self-care skills at 3 years. Further qualitative data will help understand the impact of the intervention and how this could be improved.

## **P.068**

### **Do patients need two auto adrenaline injectors with them at all times?**

Melanie Davies, Ashira Simmons, Susan Leech, Nicola Brathwaite  
*Kings College Hospital, London, UK*

#### **Objectives**

To evaluate if patients need two AAI available as emergency treatment during anaphylaxis.

#### **Method**

140 children who attended a paediatric allergy clinic consultation were audited between November 2015 and March 2016 and identified with having an AAI. Data collected included why they had an AAI, if it ever had to be used to treat anaphylaxis and if a second one was required.

#### **Results**

134/140 children audited (96%) had an AAI prescribed for food induced anaphylaxis, whilst 6/140 (4%) were for venom, latex or idiopathic anaphylaxis. 11/140 (8%) of those patients were newly prescribed during clinic, and therefore were excluded from further analysis.

110/129 (85%) patients reported not needing to use their AAI since being prescribed. 19/129 (15%) patients reported needing an AAI once to treat anaphylaxis either in the community or hospital with one patient using it accidentally due to lack of understanding.

2/19 (10%) of patients who had used an AAI, reported needing two or more AAI to manage anaphylaxis.

The 1<sup>st</sup> patient needed to use two AAI at home after accidental exposure to milk, 2 years after AAI first prescribed. The 2<sup>nd</sup> needed two or more AAI to manage anaphylaxis on 3 separate occasions after exposure to latex, although some doses were given in hospital.

#### **Conclusions**

Majority of patients with an AAI reported never using it. Of those who used an AAI, the majority needed a single dose only. For most a single AAI is sufficient for self-administration during a reaction; however this decision should be based on individual clinical risk assessment.

## P.069

### **Impact of in-hospital food challenges on health-related quality of life in children with peanut allergy - are we causing harm?**

Sophie Dawe<sup>1</sup>, Nandinee Patel<sup>2</sup>, Sarah Lindsley<sup>2</sup>, Audrey DunnGalvin<sup>3</sup>, Marta Vazquez-Ortiz<sup>2</sup>, Paul Turner<sup>2</sup>

<sup>1</sup>St George's University of London, London, UK, <sup>2</sup>Imperial College London, London, UK, <sup>3</sup>University of Cork, Cork, UK

#### **Objectives**

Living with a food allergy has a significant adverse impact on health-related quality of life (HRQL) for both children and their parents/carers. Undergoing a food challenge (FC) under medical supervision improves HRQL, even if the reaction is positive. We assessed changes in HRQL in a cohort of peanut-allergic children undergoing FC to peanut, and their parents, to evaluate how the severity of reaction might impact upon this.

#### **Method**

Children taking part in an oral desensitisation trial for peanut allergy (BOPI Study, ClinicalTrials.gov Identifier: NCT02149719) underwent double-blind placebo controlled FC to peanut. Validated questionnaires (FAQLQ, FAIM, Self-Efficacy) prior to, and at least 1 week after FC. Reaction severity was graded using a scoring system based on international PractALL consensus criteria. Local ethical and regulatory approval was granted, and informed consent was obtained.

#### **Results**

Data from 30 children (age range: 8-16yrs) and their parents were included in the analysis. Children reported improved HRQL measures and self-efficacy ( $p < 0.05$ ) while parents reported improved HRQL in themselves (FAQLQ-PB) ( $p < 0.05$ ) but not in their assessment of their child. There was a trend towards improved HRQL measures with severity of reaction, but this did not reach statistical significance. Of note, there was significant discordance between changes in HRQL measures reported by children compared to their parents.

#### **Conclusions**

FC in general resulted in improved HRQL measures, but there was significant discordance between these measures as reported by the young person themselves compared to their parent. Reassuringly, there was no evidence to suggest that HRQL is adversely affected by those experiencing more severe reactions.

## **P.070**

### **Survey on the management of severe allergic rhinitis in paediatric allergy clinics in the United Kingdom**

Daniela Diacono

*Royal Manchester Children's Hospital, Manchester, UK*

#### **Objectives**

Allergic rhinitis (AR) affects 18% of children in the United Kingdom. Several guidelines exist that describe the different treatment options available. However, there is limited guidance on how these medications should be combined for the best clinical benefit. Immunotherapy is recommended when insufficient control is achieved.

This aim of this survey was to explore prescribing preferences, and prescribers' thresholds for commencement of immunotherapy in paediatric allergy clinics in the United Kingdom.

#### **Method**

Paediatric allergists, general paediatricians with an interest in allergy, trainees in paediatric allergy and allergy specialist nurses were contacted via email and asked to complete a questionnaire on their prescribing practice.

#### **Results**

Sixty two professionals submitted a completed questionnaire. 50% worked in a centre that offered immunotherapy. The two most common first line medications for treatment of AR were an oral antihistamine and/or a nasal steroid spray. 21% chose montelukast as their next add-on medication. 27.4% would switch medications rather than add on a third. 30.6% would offer immunotherapy if control is not achieved with two medications. 41.9% would add a third medication if symptom control was not achieved. 14.5% would commence a fourth medication before considering immunotherapy. Nasal saline douching is prescribed only in a minority of cases. Centres not offering immunotherapy reported difficulty with funding immunotherapy and accessibility to centres that offer immunotherapy.

#### **Conclusions**

The results of this survey demonstrate that there is a wide variation in prescribing practices for AR in paediatric allergy clinics in the United Kingdom. National guidelines should include recommendations for an evidence-based approach to combination treatments as this would maximise benefit from conventional treatments, and standardise criteria for commencement of immunotherapy.

**P.071**

**Estimation and recording of reported drug allergy information in a specialist children's hospital and primary care**

Maria Digby<sup>2</sup>, Bethany Mitchell<sup>2</sup>, Nicola Jay<sup>1</sup>

<sup>1</sup>Sheffield Children's Hospital, Sheffield, UK, <sup>2</sup>University of Sheffield Medical School, Sheffield, UK

**Objectives**

Paediatric patients commonly receive drugs whilst in hospital and it is known that being labelled with a drug allergy can prolong stay and increase morbidity and mortality. We aimed to evaluate how many children were said to have a drug allergy during their stay in a specialist children's hospital and whether the information was appropriately recorded in the notes and by the primary care team after discharge.

**Method**

A two-week period was chosen to investigate the above question. Proforma's were placed on all wards for the data collection. All staff were informed weekly before and during the data collection exercise via the staff communications bulletin as well as daily visits to the wards during the two-week collection period. A month post discharge, we wrote to the GP's asking them if they had prior knowledge of the DA or had recorded it since the last admission.

**Results**

24 children were reported to have a DA of which the majority were antibiotic related (10), opiate (4), NSAID (2) or immunosuppressant's (2). We managed to evaluate 16 sets of notes after discharge of which only 3 had a medic alert sticker and an alert chart in the front of the notes. The remaining 13 had neither. Only one patient had suitable alternative drugs suggested on the alert chart. We received information from 18 GP's (75%) of whom 5 had prior knowledge of the DA.

**Conclusions**

Reported DA is not uncommon, however it is poorly recorded in the notes and there is infrequent clarification of alternative antibiotics to use. Only one child was known to the allergy service. Transfer of the information to primary care was poor.

## P.072

### **Home measurement of sleep disturbances in children with multisystem allergic disease**

James DiPasquale<sup>2,1</sup>, Robin Gore<sup>3</sup>, Colin Sullivan<sup>3</sup>, Parviz Habibi<sup>2,1</sup>, Claudia Gore<sup>2,1</sup>

<sup>1</sup>Imperial College Healthcare NHS Trust, London, UK, <sup>2</sup>Imperial College, London, UK, <sup>3</sup>University of Sydney, Sydney, Australia, <sup>4</sup>Addenbrookes Hospital, Cambridge, UK

#### **Objectives**

Allergic conditions such as eczema, asthma and rhinitis are associated with poor sleep-quality/unrefreshing sleep. Patients often report nocturnal coughing, wheezing and scratching but these signs are never quantified because conventional methods of sleep measurement are unable to detect them (e.g., polysomnography).

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.

#### **Method**

Three children with severe allergic disease (eczema, asthma, perennial allergic rhinoconjunctivitis with seasonal exacerbation, food allergies) were assessed for one week at home. Day 1 and Day 7 included physical examinations and disease-specific quality-of-life measures for eczema, asthma, rhinitis and SCORAD index. Sleep-related events were recorded on up to seven consecutive nights using the investigational device.

#### **Results**

All overnight parameters showed night-to-night variability. Scratching was detected in all children, on all nights, and ranged from 2% to 9% of analysed time. The number of scratch-episodes ranged from 43 to 121 episodes per night (average 60/night).

Snoring occurred on almost all nights and persisted for up to 28% of time. Previously-undiagnosed Obstructive Sleep Apnoea was detected in one child. Wheezing and coughing were detected in two children, and occurred on most nights.

All pathological events were associated with sleep-disruption; body movement time was persistently elevated (range: 10-23% of time).

Subjective reports did not consistently correlate with sleep-study findings.

#### **Conclusions**

Home-based monitoring demonstrates night-to-night variability in nocturnal pathological events.

Objectively-measured sleep disturbances are frequent, and exceed subjectively reported events.

Monitoring respiratory and movement signs over multiple nights at home can reveal the presence of obstructive sleep apnoea, problem snoring and wheeze, which may otherwise go undetected.

## P.073

### **Parent experiences of paediatric allergy pathways in the West Midlands region of the United Kingdom: a qualitative study**

Lavanya Diwakar<sup>1</sup>, Carole Cummins<sup>1</sup>, Lynette Williams<sup>2</sup>, Helen Sansom<sup>3</sup>, Caroline Kerrigan<sup>3</sup>, Martyn Rees<sup>2</sup>, Scott Hackett<sup>3</sup>, Richard Lilford<sup>4</sup>, Tracy Roberts<sup>1</sup>

<sup>1</sup>University of Birmingham, Birmingham, UK, <sup>2</sup>Royal Shrewsbury and Telford hospitals NHS Trust, Shrewsbury, UK, <sup>3</sup>Heartlands Hospital NHS Trust, Birmingham, UK, <sup>4</sup>University of Warwick, Coventry, UK

#### **Objectives**

To understand parent experiences with accessing paediatric allergy services for their children in the West Midlands.

#### **Method**

We are carrying out in-depth, semi-structured interviews of parents purposively selected from two separate NHS Paediatric allergy clinics. All interviews are being audio-taped and fully-transcribed. Analysis is by framework approach facilitated by the NVivo software. Themes are being identified and alternate theories for findings will be sought using peer panels and literature searches. Interviews will be carried out until data saturation is achieved.

#### **Results**

Preliminary analysis of 14 completed interviews has revealed a few emerging themes. Access to primary care services was variable with some parents expressing frustration at delays in obtaining appointments. Some of the parents felt aggrieved that their 'gut reactions' regarding the wellbeing of their child were often disregarded by GPs. This made the parents feel frustrated and often helpless with regards to accessing care.

*"I'd come out sometimes and I'd be so frustrated because I felt like, 'You weren't listening'. They just wouldn't listen to me. It was as if - you know, 'You're just an overreacting mom'." (P6)*

*"....there are times when you come out of there and don't feel any wiser and feel that it was just a waste of time." (P11)*

Many parents faced problems obtaining appointments with GPs, and some parents faced frustrating delays with referral. Most of our interviewees found specialist clinics satisfactory, although some expressed discontentment over the usefulness of the consultation and follow-up processes.

#### **Conclusions**

Parents experience considerable variation with regards to access, knowledge and attitude of GPs in the WM region for children with allergies. Experiences with secondary care were largely favourable. In general, parents greatly valued being listened to and taken seriously by their clinicians.

## P.074

### **Incidence trends for allergic rhinitis, conjunctivitis and food allergy amongst children in the UK**

Lavanya Diwakar<sup>1</sup>, Ronan Ryan<sup>1</sup>, Carole Cummins<sup>1</sup>, Tom Marshall<sup>1</sup>, Richard Lilford<sup>2</sup>, Tracy Roberts<sup>1</sup>  
<sup>1</sup>University of Birmingham, Birmingham, UK, <sup>2</sup>University of Warwick, Coventry, UK

#### **Objectives**

To estimate incidence rates of primary care physician (PCP) diagnosed allergic rhinitis (AR), allergic conjunctivitis (AC) and Food allergy (FA) amongst UK children aged 0-17 years between 2000-2013.

#### **Method**

Using data from practices contributing to the Health Improvement Network (THIN) database, we identified individuals aged 0-17 years registered between 2000 and 2013 in practices contributing to THIN. Using specific Read codes, we identified individuals diagnosed with AR, AC and FA respectively for the first time. Incidence rates (IR) were estimated by dividing the total number of incident cases by the total person-years at risk for each year. Analysis was carried out using Stata 12® and Microsoft Excel 2010®.

#### **Results**

There were a total of 1.06 million registered UK children under the age of 17 between 2000 and 2013 providing 5.8 million person years of follow-up data. A total of 5,669 children were diagnosed with AR; 12,919 children with AC and 5996 children with FA respectively. The overall incidence rates were 0.98 (95% CI 0.95-1.0), 2.24 (95% CI 2.2-2.3), 1.03 (95% CI 1.01-1.06) respectively for AR, AC and FA. There was no significant change in the incidence rates of AR and AC over the study period whereas there was a small decrease in the incidence of food allergy (p value for trend =0.045). Peak incidence for AR and AC were seen in children > 5 years of age whereas FA incidence peaked at age ≤ 2 years. Boys had higher rates of AR, AC and FA under the age of 10 years compared with girls.

#### **Conclusions**

The incidence rates for PCP diagnosed AR, AC and FA have not increased amongst UK children during the period 2000-2013. Age of peak incidence varied for each of these conditions. Boys under age 10 years were more likely to be diagnosed with these allergies compared with girls.

## **P.075**

### **Regional variation of the number of adrenaline auto-injector prescription practice**

Ahmed Elghoudi, Gary Stiefel

*University of Southampton, Southampton, UK*

#### **Objectives**

No consensus exists on numbers of adrenaline auto-injector (AAI) to be carried by children at risk of anaphylaxis at all times. In 2014 MHRA published a document encouraging two AAIs to be carried around at all time. EAACI also provide guidance on prescribing practices.

This study aimed to look at the regional variations in number of AAIs prescribed amongst regional paediatric allergy groups.

#### **Method**

An online questionnaire was emailed to members of 4 regional paediatric allergy groups. Participants were asked if they were aware of the MHRA recommendations and EAACI guidelines, read it and changed their practice

#### **Results**

117 responses were received from clinicians working in working in different regions.

15/20 (75%) of Northern (N) , 13/19 (68%) London (L), 12/22 (55%) Wessex (W) and 14/39 (36%) Midlands (M) clinicians had their practice in line with them (two AAI to be carried at all time). Using Chi-squared there was a significant difference in prescribing practices; MvsN ( $p < 0.05$ ), and MvsL clinicians ( $P < 0.05$ )

20/39 (51%) Midlands, 8/22 (36%) Wessex, 1/19 (5%) London and 1/20 (5%) Northern clinicians read the MHRA document and did not change practice or prescribed one AAI to be carried at all times. A statistical significance was seen between Midlands and Northern and London Clinicians ( $P < 0.01$ ) and between Wessex and Northern and London clinicians ( $P < 0.05$ ).

All 117 clinicians were aware of the MHRA guidance of which 15/117 (13%) did not read it. In contrast 33/117 (71%) were aware and had read the EAACI guidelines. 58/117 (50%) had AAI prescription practices in line with them.

#### **Conclusions**

There are clear inter-regional differences in numbers of AAI prescribed. Intra-regional differences also exist. Further studies are required to explain differences in practice.

There is universal awareness of MHRA guidance and less awareness of EAACI guidance.

## **P.076**

### **Regional variation in adrenaline auto-injector prescriptions practices within the UK**

Ahmed Elghoudi, Gary Stiefel

*University of Southampton, Southampton, UK*

#### **Objectives**

Guidelines on indications for adrenaline auto-injector (AAI) exist. This study aimed to investigate the variation of prescription practices of AAI amongst members of different regional paediatric allergy groups.

#### **Method**

An online questionnaire was emailed to members of four different paediatric allergy groups. Scenarios of absolute and relative indications for AAI prescriptions (EAACI guidelines) were presented to clinicians to determine whether they would prescribe an AAI.

#### **Results**

117 responses from clinicians working in different regions were received (39 Midlands, 22 Wessex, 19 London, 20 Northern, 17 Other).

Intra-regional and inter-regional practices were similar in scenarios where absolute indications for AAI prescriptions were presented. These include anaphylaxis to Peanut/Tree nut (PN/TN) (all 100%), mild reaction (generalised hives and lip swelling) to PN/TN and poorly controlled asthma (range 92-100%), anaphylaxis to egg (range 86-95%), idiopathic anaphylaxis (range 91-100%), exercise induced anaphylaxis (range 86-100%). The only exception was the scenario of a mild reaction to egg and poorly controlled asthma, where there was intra-regional and inter-regional variation in practise.

There were some statistically significant inter-regional differences in prescription practices for scenarios where there was a relative indication for an AAI. For a mild reaction to PN/TN; AAI prescriptions by Wessex clinicians (67%) versus Midlands (31%), London (24%) and Northern (20%) clinicians ( $P < 0.01$ ). For a previous mild reaction to traces of PN/TN Northern clinicians (47%) versus Midlands (78%), Wessex (82%) and London (79%) clinicians ( $P < 0.05$ ). In addition it was more likely to find intra-regional differences in practices in scenarios where AAI prescriptions were relative indications.

#### **Conclusions**

- There appears to be consensus with absolute indications for AAI prescriptions across and within regions.
- There are intra-regional and inter-regional differences in prescribing practices in scenarios where there is a relative indication for an AAI.
- Perhaps better intra- and inter-regional working can further improve consistency across the country.

## **P.077**

### **To describe the prevalence of concomitant peanut and cashew nut allergy in hen egg allergic children.**

Jennifer Elliott<sup>1</sup>, Stephanie Cross<sup>1,2</sup>, Zaraqiza Zolkipli<sup>1,2</sup>, Emma Grainger-Allen<sup>2</sup>, Charles Powell<sup>3</sup>, Michel Erlewyn-Lajeunesse<sup>1,2</sup>

<sup>1</sup>University of Southampton, Southampton, UK, <sup>2</sup>University Hospital Southampton NHS Foundation Trust, Southampton, UK, <sup>3</sup>The Adam Practice, Poole, UK

#### **Objectives**

A combination of peanut allergy, hen egg allergy and eczema is commonly described among atopic children. In addition, concomitant cashew nut allergy is present within our population although the literature is limited. This research aims to describe the prevalence of concomitant peanut and cashew nut sensitisation in hen egg allergic children.

#### **Method**

64 children with a past or current hen egg allergy, with data on both their peanut and cashew nut allergy status, were recruited to the study. Data including documentation of peanut or cashew nut tolerance, peak skin prick test (SPT) and sIgE results, was collected from the patient notes. Peanut and cashew nut sensitisation was defined as SPT 3-5mm, sIgE >0.35kU/L and SPT 3-7mm, sIgE >0.35kU/L respectively. Peanut and cashew nut allergy was defined as SPT ≥6mm and ≥8mm respectively. NRES number: 15/EE/0287.

#### **Results**

Of 64 participants with hens egg allergy: 15 (23.4%) were sensitised to peanut and not cashew, of whom 9 (14.0%) were peanut allergic; 3 (4.7%) were sensitised to cashew nut and not peanut, none were allergic to cashew nut alone; and 25 (39.1%) were sensitised to both peanut and cashew nut of whom 6 (9.4%) were both peanut and cashew nut allergic.

#### **Conclusions**

Cashew nut sensitisation was commonly observed within this sample of egg allergic children, especially in combination with peanut sensitisation. Whilst many were sensitised less met the criteria of peanut and cashew nut allergy. However, current prevention strategies for children at high risk of developing peanut allergy could be similarly applied to cashew nut, and given the high coincidence of sensitisation this should be considered a priority.

## P.078

### **A case series describing hen egg allergic children who are able to tolerate duck egg.**

Jennifer Elliott<sup>1</sup>, Stephanie Cross<sup>1,2</sup>, Zaraqiza Zolkipli<sup>1,2</sup>, Emma Grainger-Allen<sup>2</sup>, Charles Powell<sup>3</sup>, Michel Erlewyn-Lajeunesse<sup>1,2</sup>

<sup>1</sup>University of Southampton, Southampton, UK, <sup>2</sup>University Hospital Southampton NHS Foundation Trust, Southampton, UK, <sup>3</sup>The Adam Practice, Poole, UK

#### **Objectives**

We have observed several children in clinic currently allergic to hen egg (HE) who are tolerant to duck egg (DE). Other studies of discordant egg allergies, an allergy to certain forms of bird eggs but not to others, is limited to case reports. We aimed to compare the frequency and clinical and dietary features of discordant egg allergy.

#### **Method**

We undertook a notes review of children who received SPTs concurrently to both HE and DE in clinic and asked parents to complete a dietary questionnaire several months after their clinic visit, as those with DE SPT <3mm had been asked to introduce DE at home. Children with a history of HE reaction and HE SPT ≥3mm were classified concordant (DE SPT ≥3mm) or discordant (<3mm). Dietary tolerance to HE and DE was categorised according to the egg ladder: avoid egg (0), able to eat baked egg (1), lightly cooked egg (2) and raw egg (3) without reaction. The egg ladder rung was used to calculate a dietary discrepancy score (DDS=[DE rung]–[HE rung]), where DDS>0 indicates discordant tolerance with DE>HE. NRES approval: 15/EE/0287.

#### **Results**

Discordant egg allergy was identified in 6/26 participants (23.1%). DDSs were significantly different between discordant (median 1.0, IQR 1.0) and concordant (0.0, 1.0) egg allergic children (MWU p=0.001). All discordant children were able to tolerate DE in some form with 5/6 being tolerant to lightly cooked DE.

#### **Conclusions**

Nearly a quarter of HE allergic children were tolerant to duck egg. Dietary discrepancy scores show that DE tolerance is not another step on the egg ladder, but occurs separately to HE tolerance, and that DE SPT <3mm can be used as a marker of DE tolerance. Eating DE may liberate the diet of hen egg allergic children and could act as egg immunotherapy. However, further research is required.

## P.079

### **The SCoRING system for the prediction of outcome during food challenge**

Mich Erlewyn-Lajeunesse<sup>1,2</sup>, Emma Grainger-Allen<sup>1</sup>, Lucy Kidman<sup>3</sup>, Jane Lucas<sup>2</sup>, Louise Michaelis<sup>4</sup>, Elle Minshall<sup>5</sup>, Reynella Morenas<sup>3</sup>, Gary Stiefel<sup>6</sup>, Zaraqiza Zolkipli<sup>1,2</sup>, Graham Roberts<sup>1,2</sup>

<sup>1</sup>Southampton Children's Hospital, Southampton, UK, <sup>2</sup>University of Southampton, Southampton, UK,

<sup>3</sup>Royal County Hospital, Winchester, UK, <sup>4</sup>Great North Children's Hospital, Newcastle, UK,

<sup>5</sup>Addenbrooke's Hospital, Cambridge, UK, <sup>6</sup>Leicester Royal Infirmary, Leicester, UK

#### **Objectives**

Food challenges are an important part of clinical practice but there is no validated method for defining outcomes. We developed an outcome score based upon previous published methods, where objective symptoms that predicted severe allergic reaction scored higher than more subjective symptoms. The score was calculated by the presence of signs/symptoms of typical IgE mediated allergic reactions graded as 0-5 across five systems namely Skin, Cardiac, Respiratory, Neurological and Gastrointestinal, with maximum sum score of 25. The SCoRING system has been in use in our clinic for several years and predates PRACTALL guidelines. To assess its utility, we reviewed the SCoRING outcome of challenges from our clinic in the last three years.

#### **Method**

Scores were calculated during the food challenge by the challenge practitioner. Challenge outcomes were decided during multidisciplinary team meeting at least 48 hours after the event.

#### **Results**

We reviewed the SCoRING of 390 challenges. 98/372 were positive and 8 received adrenaline, 18/390 were inconclusive. SCoRING was greater than zero in 9/18 inconclusive challenges, giving a sensitivity of 72.0% and specificity of 50.0%. Where the result was conclusive, SCoRING was greater than zero in all positive and 6/274 (2.2%) negative challenges with sensitivity 100% and specificity 98.5%. The median SCoRING was significantly higher in those that received adrenaline (10, range 1-13 vs 3, 1-13; P<0.001).

#### **Conclusions**

SCoRING has proved an effective tool for summarising food challenge outcomes. Unlike other methods it is easy to administer in clinical practice. Values greater than zero predict positive outcomes and were higher in those with more severe reactions. It is designed to be administered contemporaneously by health care professionals and should not be used to predict allergic reactions in other clinical scenarios or for non IgE mediated allergic reactions.

## **P.081**

### **Adherence to the new National Institute for Clinical Excellence (NICE) quality standards for food allergy.**

Sarita Fenton, Michael Perkin, Sarah Bidgood, Anne Christopher, Sophie Vaughan, Lucy Thomas  
*St. George's Hospital, London, UK*

#### **Objectives**

To consider what challenges are faced in assessing compliance with the new National Institute of Clinical Excellence (NICE) quality standards for food allergy.

#### **Method**

The multi-disciplinary team have been considering how we can assess our compliance with the new NICE quality standards for food allergy.

We were keen to review our current practice and determine how best to improve the allergy service we provide to our children and families.

We have undertaken an initial review of the literature to establish the extent to which other UK units are compliant with the statements.

#### **Results**

For Secondary and Tertiary Centres assessing compliances within food allergy (Statement 1) requires a complete review of compliance as to whether a systematic allergy-focused clinical history was taken.

There are two stages of this process.

- 1) Assessing whether an allergy-focused clinical history has been taken will require a systematic review of a large number of patients' notes by a member of the MDT who has expertise in allergy.
- 2) What we do with the information gained.

We believe that there is a debate to be had regarding Statement 2 as to where the skin prick testing or blood tests should take place. Our experience and that of other Tertiary and Secondary Centres is that the interpretation of these results is often erroneous.

It remains a moot point whether a teaching session at the start of each induction cycle for doctors and nurses new to Accident and Emergency can make up for a lamentable lack of absence of allergy education in undergraduate nursing and medical students training.

#### **Conclusions**

We plan to audit this and investigate a programme of teaching for new doctors and nurses in Accident and Emergency to take an allergy focused history if food allergy is indicated.

## **P.082**

### **Adherence to the new National Institute for Clinical Excellence (NICE) quality standards for Anaphylaxis.**

Sarita Fenton, Michael Perkin, Sarah Bidgood, Anne Christopher, Sophie Vaughan, Lucy Thomas  
*St. George's Hospital, London, UK*

#### **Objectives**

To consider what challenges are faced in assessing compliance with the new National Institute of Clinical Excellence (NICE) quality standards for Anaphylaxis.

#### **Method**

The multi-disciplinary team have been considering how we can assess our compliance with the new NICE quality standards.

We were keen to review our current practice and determine how best to improve the allergy service we provide to our children and families.

The most challenging statement for our team to assess is Statement 4 because the term 'on going' is not defined.

A systematic literature review was undertaken in connection of Statement 4

#### **Results**

We will present the findings of a systematic review of the current literature surrounding the training in auto-injector.

There is lack of good evidence in terms of how to define 'on going', the best method of training, frequency that the training needs to be repeated and who is the most appropriate person to do this training.

Amongst the few pertinent papers that have been published Dr Noimark et al (2011) looked at the use of adrenaline auto-injectors by children and teenagers and concluded that adrenaline is used by only a minority of patients experiencing anaphylaxis in the community. The author concluded that further research is needed to consider how to best encourage the usage of adrenaline when clinically indicated in anaphylaxis.

#### **Conclusions**

The fact that Statement 4 is a placeholder statement indicates that it has been deemed as an area of care that has been prioritised by the Quality Standards Advisory Committee but for which no NICE or NICE-accredited guidance is currently available. It is noteworthy that there is a need for evidence-based guidance to be accredited or developed in this area.

There is much work and research to be done to satisfactorily be able to assess our compliance with the new NICE quality standards for Anaphylaxis.

## P.083

### **Airborne particle exposure in patients' breathing zone at night is consistently and significantly decreased using temperature controlled laminar airflow**

Robin Gore<sup>1,2</sup>, Sarah Lindsley<sup>1</sup>, Claudia Gore<sup>1</sup>

<sup>1</sup>Imperial College, London, UK, <sup>2</sup>Cambridge University Hospitals, Cambridge, UK

#### **Objectives**

Temperature controlled laminar airflow (TLA) improves symptoms in atopic asthmatics and exposure studies in a simulated bedroom environment have confirmed reduction of particles and cat allergen exposure. However, no detailed overnight studies have been done in patients' home environment. We studied overnight particle exposure with/without TLA treatment during patients' sleep in the home environment.

#### **Method**

Twelve children with severe allergic eczema (age 8-15 years) slept under the TLA device (Airsonett, Sweden) for two nights, first with the device OFF, then with the device ON.

Total airborne particles ( $\geq 0.5 - \geq 10 \mu\text{m}$  diameter) were quantified with a laser particle counter (TSI 9306-V2), with continuous sampling from the patients' breathing zone (10-12cm above forehead) for a period of seven hours each night. Presence of major allergens in the bed was confirmed by surface sampling from pillow, duvet and mattress (house dust mite and cat), using immunoassay.

#### **Results**

Cat (fel d1) and mite (der p1) allergen was detected on all bedding.

Geometric mean particle counts/m<sup>3</sup> (95% CI) for each particle size range with the TLA device OFF or ON are:

AED  $> 0.5\mu\text{m}$ , OFF,  $5.9 \times 10^6$  ( $5.3 \times 10^6$ ,  $6.4 \times 10^6$ ); ON, 400 (370, 440);

AED  $> 5\mu\text{m}$ , OFF, 6900 (6400, 7300); ON, 2.6 (2.4, 2.7);

AED  $> 10\mu\text{m}$ , OFF, 82 (74, 90); ON, 1.6 (1.5, 1.8).

There were significant reductions in all particle size categories ( $p < 0.001$ ).

#### **Conclusions**

Temperature-controlled laminar airflow treatment of patients in their home environment results in significant reductions in breathing zone allergenic and non-allergenic particle exposure. These findings may explain the clinical benefits of temperature-controlled laminar airflow.

## P.084

### **Paediatric allergy patients being discharged from tertiary centres are concerned about accessibility to specialist allergy services but have little awareness of local allergy service provision**

Charlotte Goss<sup>1</sup>, Tom Marrs<sup>1</sup>, Kate Swan<sup>1</sup>, Helen Brough<sup>1,2</sup>, Susan Chan<sup>1,2</sup>, Lauri-Ann Van der Poel<sup>1</sup>, Sophie Flammarion<sup>1</sup>, Roisin Fitzsimons<sup>1,2</sup>, Suzana Radulovic<sup>1</sup>

<sup>1</sup>Guys & St Thomas' Hospital, London, UK, <sup>2</sup>King's College London, London, UK

#### **Objectives**

At the Department of Children's Allergy Services at St. Thomas' Hospital patients and their families often request repeated follow-up appointments within tertiary allergy services for their chronic conditions. We conducted a questionnaire to investigate families' concerns at discharge and how much they knew about local allergy service provision.

#### **Method**

A questionnaire was developed to ascertain families' demographics, type of allergic disease(s), perceived disease control, follow-up preferences and awareness of local allergy/asthma services. Questionnaires were distributed to patient's parents/guardians by clinicians after discussing that their child would be discharged from that clinician's care.

#### **Results**

73 questionnaires were analysed. Food allergy (FA; n=51, 69.9%), eczema (n=36, 49.3%), asthma (n=22, 30.1%) and rhinoconjunctivitis (n=20, 27.4%) were the most common allergies. FA patients had the most co-morbid allergy (64%) and visits to clinic (78% had  $\geq 2$  visits). The number of reported allergies did not appear to affect families' satisfaction with treatment outcomes.

On discharge, 56.5% had departmental follow-up within 2-4 years. 52% of families were happy to receive local allergy care but 61% did not know if local services were available. 83% (n=29/35) of their local hospitals did offer local allergy services. At discharge, 67% (n=49/73) of families had no concerns. Of those with concerns, 75% (n=18/24) were food allergic. Leading concerns regarded new GP referrals to allergy services (50%; n=12/24) and future allergen exposure (33.3%; n=8/24).

#### **Conclusions**

FA, eczema, asthma and rhinoconjunctivitis are the major conditions seen in our department. FA patients have more co-morbid allergies, present to clinic more frequently and have the most concern on discharge; thus their needs must be better targeted. There is little awareness of local allergy service provision and we shall target this by providing more information about regional paediatric allergy services in clinic rooms to raise awareness, and will work towards networking between centres to encourage continuity between services.

## **P.085**

### **Do teenagers carry the adrenaline auto-injector (AAI) pen prescribed for them and how confident they are in using the device if needed?**

Demetria Hadjiyiannis, Farrukh Sheikh, Jan Reiser, Kelly Parker, Kelly Tonge, Neha Khanna  
*Lister Hospital, ENH NHS Trust, Stevenage, UK*

#### **Objectives**

To ascertain whether teenagers carry the adrenaline autoinjector at all times and to understand their reasoning for not carrying it. To further evaluate how confident they feel to use it if required and to find out about their experience if they have had used it.

#### **Method**

We Identified 30 teenagers (12 to 18 years old) attending follow-up appointment who have been prescribed an AAI pen. It is expected that they carry their pen with them at all times. They were given a questionnaire to fill in before the clinic appointment to ascertain whether they are carrying it on them and reasons for not carrying it; how comfortable & confident they feel using it if required; and to find out about their experience if they had to use their pen.

#### **Results**

Our anecdotal impression is that a high proportion of teenagers do not carry their pen as prescribed and we are waiting for the questionnaire returns for the final results.

#### **Conclusions**

Teenagers with a background of anaphylactic reaction are a high risk population. They are prescribed AAI pen for home, school and trained on its use and are advised to carry it at all times. The parents are also trained along with. Actions plans are given out to families and for school.

Some of the teenagers do not carry their AAI pen, moreover they lack confidence to use it if required. Although the usage and training is discussed at time of consultation but due to anxieties around diagnosis there are chances of not registering everything they are told. We designed a questionnaire for the patients and parents to answer and aim to share our experience on return of the questionnaire. We aim to help teenagers to improve their understanding relating to use of AAI.

**P.086**

**Review of a clinical psychology service within a paediatric allergy team at Southampton Children's hospital**

Mary Halsey, Mich Lajeunesse, Emma Grainger-Allen, Christine Wilkes-Holmes, Carol Fudge  
*University Hospital Southampton, Southampton, UK*

**Objectives**

We established a clinical psychology service within a paediatric allergy team in October 2014 and evaluated the first 14 months of the service. To the author's knowledge, this is the first review of such a role. The post is funded for 2 sessions, equating to one day a week.

**Method**

Referrals to psychology were audited by presenting difficulties, referral source, age of child and outcome.

**Results**

During the initial 14 months, 40 children were referred to psychology. 27 families opted into the service, attending for initial assessment. Eight families were waiting for their initial assessment. Five families had not opted in. Children were 18 months to 17 years. Referrals came from a variety of professionals within the team. Presenting problems included anxiety related to eating, manifesting as avoidance of safe foods. Skin prick test and needle phobia were common, which often maintained avoidance of eating due to risk of needing to use an adrenaline autoinjector, and carries the additional risk of not using one when required. Low mood was present in some children living with multiple allergies. These children tended to also have severe eczema. Misinterpretation of anxiety as allergic symptoms was also seen.

The psychologist also joined clinic appointments. Support for parental anxiety was provided along with liaison with schools and health and social care providers.

Outcomes included supporting children with food challenges, decreasing avoidance of foods known to be safe and increasing tolerance of eating outside the home. Other outcomes included reduction in child and parent reported anxiety and tolerance of skin prick testing.

**Conclusions**

This service review outlines the role of a clinical psychologist in a paediatric allergy team. Due to the highly specialised nature of food allergy in children a dedicated psychologist working as part of the team has enabled appropriate referrals mainly around children with anxieties related to food.

**P.087**

**Ara h2 is a useful marker for peanut allergy in diagnostic uncertainty**

Irene Hernandez-Sanchez, Dinkar Bakshi

*Children's Hospital, Queen's Medical Centre, Nottingham, UK*

**Case Presentation**

**Background**

Open food challenges remain the gold standard for diagnosing peanut allergy, but there are problems with logistics and the risk of a reaction. Specific Immunoglobulin E (sIgE) antibodies to peanut components have been evaluated, as skin prick test (SPT) and sIgE to peanut extract have suboptimal accuracy. Various studies have concluded that sIgE to Ara h2 is more reliable, and should replace SPT and sIgE to peanut extract in diagnosing peanut allergy.

**Case Presentation**

We present the case of a 14 year old boy referred to the allergy clinic for peanut introduction. He had a highly atopic background with severe eczema, perennial allergic rhinoconjunctivitis, asthma, cows' milk allergy and multiple nut sensitisation. The total IgE antibody level (2421 kUa/L) and the sIgE to peanut (2.25 kUa/L) were raised, but the reaction to foods containing peanut was unclear. The wheal size on SPT to peanut was 0 mm and sIgE to peanut was considered a false positive due to high background total IgE levels. sIgE to Ara h2 antibody was significantly raised (2.3 kUa/L).

**Discussion**

It is well known that Ara h2 antibody to seed storage protein in peanut is a highly sensitive and specific marker for persistent peanut allergy. Previous studies have shown that an Ara h2 level > 1.75 ku/L has a 100% positive predictive value in diagnosing peanut allergy. sIgE to Ara h2 was the only diagnostic test that significantly correlated with severity. In children with strong atopic background, negative results on SPT are sometimes not enough to rule out peanut allergy. The negative results on SPT could be due to a masking effect of recent antihistamines, the child being a non-responder to SPT, incorrect technique, expired reagents for SPT or idiopathic.

**Conclusions**

Ara h2 antibody is a useful marker for diagnosing peanut allergy in children, when the SPT and sIgE test results are inconclusive, or in conflict with a history of peanut allergy.

## P.088

### **The impact of sublingual immunotherapy (SLIT) on quality of life in severe house dust mite (HDM) allergy.**

Gen Nen Ho<sup>1</sup>, Kate Swan<sup>2</sup>, Suzana Radulovic<sup>1,2</sup>, Sian Ludman<sup>2</sup>, Katherine Knight<sup>2</sup>, Victoria Timms<sup>2</sup>, Gemma Scanlan<sup>2</sup>, Roisin Fitzsimons<sup>2</sup>, Alia Boardman<sup>2</sup>, Susan Chan<sup>1,2</sup>

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

#### **Objectives**

The Cochrane Review for sublingual immunotherapy (SLIT) for allergic rhinitis (AR) 2011, analysed 9 studies comparing placebo to house dust mite (HDM) SLIT and demonstrated efficacy in reduction of AR symptoms. There were no paediatric studies looking at the impact of HDM SLIT on quality of life scores. This study aimed to determine whether HDM SLIT results in an improvement of health-related quality of life (HRQOL) as measured by Paediatric Allergic Disease Quality of Life Questionnaire (PADQLQ) in children after one year of immunotherapy.

#### **Method**

20 children with moderate-severe HDM allergy (according to ARIA classification of allergic rhinitis), 6 to 16 years old, initiated SLIT treatment at St Thomas' Paediatric Allergy Department and were followed up after one year of treatment. The SLIT treatment used was Staloral HDM (maintenance 2 drops daily). PADQLQ was used to assess the children's baseline HRQOL prior to the start of therapy and that after one year of therapy. Statistical analysis (one-tailed Wilcoxon signed-rank) was then conducted to determine whether there is a significant change in the overall PADQLQ score and individual symptom score after one year of SLIT.

#### **Results**

After 1 year of SLIT, there is a significant reduction in overall PADQLQ score in the children ( $p=0.036$ ). Analysis of the individual symptom scores showed a significant decrease in six symptoms after one year: coughing or wheezing while running or playing a game ( $p=0.008$ ), being different from friends ( $p=0.014$ ), coughing or wheezing ( $p=0.02$ ), feeling out of breath or tightness in the chest ( $p=0.014$ ), blocked or stuffy nose ( $p=0.03$ ), needing to carry or use medicines, inhalers or creams ( $p=0.039$ ).

#### **Conclusions**

This study suggests that 1 year of HDM SLIT improves quality of life in children suffering from severe HDM allergy. The greatest impact is seen in 6 domains of the PADQLQ, predominantly those with a respiratory emphasis.

## **P.089**

### **Making best use of your allergy appointment - a survey of patient understanding and preferences for information**

Anna Howells, Sharon Hall, Claudia Gore

*Department of Paediatric Allergy, St Marys Hospital, Imperial College NHS Healthcare Trust, London, UK*

#### **Objectives**

Medical appointments are a precious commodity; families and healthcare providers wish to use them in the best way possible. We observed that patients attending a paediatric allergy service frequently appeared not to know what to expect, had not stopped antihistamines or brought their medications. We aimed to establish the usefulness of the current appointment letter, evaluate patients' understanding of an allergy clinic and gain feedback on 4 prototype information-leaflets.

#### **Method**

Prospective questionnaire-study for patients/carers attending paediatric allergy clinics:

- Questionnaire 1 (Q1): explored patient recall of information on appointment letter and impact on the appointment.
- Semi-quantitative interview in waiting-room (Q2): assessing understanding of allergy, appointment requirements, feedback on prototype leaflets.

#### **Results**

A total of 103 patients/carers participated: 46/103 completed Q1 and 57/103 took part in Q2 interview. Q1: 35/46 (72%) reported to have read the letter. Follow-up patients were better informed than new patients about appointment duration (2-3 hours) and the need to stop antihistamines prior to clinic to allow testing. 'Know how long appointment takes': New patient (6/15 [40%]), follow-up patient (22/29 [75%]); Antihistamines stopped: New patient (4/15 [26%]), follow-up patient (19/29 [65%]). Few brought their medication or a list/picture of it to the appointment (8/46 [17%]).

Q2: 47/57 (87%) felt they had a basic understanding of allergy clinics or how long appointments take (28/57 [50%]). Prototype leaflets were well received with 25/57 (44%) patients/carers expressing a clear preference for a pictorial leaflet with succinct text.

#### **Conclusions**

Our results show that although many patients/carers read their appointment letter, some information is not remembered, potentially affecting the outcome and experience of the appointment.

Patients indicated a preference for concise and visually appealing additional information in addition to their standard appointment letter.

## P.090

### **A questionnaire study into whether peanuts are introduced into the diets of children after a negative peanut open oral food challenge.**

Anjli Jethwa<sup>1</sup>, Gary Stiefel<sup>2</sup>, David Luyt<sup>3</sup>

<sup>1</sup>South Warwickshire NHS Foundation Trust, Warwick, UK, <sup>2</sup>University Hospitals of Leicester NHS Trust, Leicester, UK, <sup>3</sup>University Hospitals of Leicester NHS Trust, Leicester, UK

#### **Objectives**

Oral food challenges (OFC) are essential within an allergy service to make a diagnosis where the clinical history and skin prick test/specific IgE have been indeterminate. OFCs are also used to assess for concomitant nut allergy where allergy tests are inconclusive. Where patients have negative challenges they are advised to include the nuts into their diets, but this advice is not always heeded. The objective was to determine the proportion of children who have introduced peanuts into their diet after a negative peanut OFC. This study also aimed to describe factors which influence parental decisions to introduce peanuts into their child's diet and whether a negative peanut OFC reduced parental anxiety.

#### **Method**

A retrospective, single-centre, cross-sectional mixed quantitative and qualitative questionnaire study. Questionnaires were sent to all parents of children aged 1-18 years who had a negative peanut OFC between 2007 and 2013.

#### **Results**

31/45 (69%) children introduced peanuts into their diet. Children with a clinical history of an allergic reaction to peanuts were more likely to introduce peanuts ( $p=0.037$ ). A negative peanut OFC reduced parental anxiety ( $p<0.001$ ). Dislike of peanuts was the main reason for failure of introduction although having another food allergy also had a negative influence ( $p=0.06$ ).

#### **Conclusions**

This study showed that the majority of children introduce peanuts after a negative OFC. However a significant proportion of children do not introduce peanuts into their diet, mainly because they dislike peanuts or have another food allergy. A previous allergic reaction to peanuts has a positive influence on introduction. The negative OFC reduced parental anxiety levels. Further studies are required to develop strategies to ensure peanuts are introduced into the diet.

## P.091

### **Paediatric oral food challenges at UCLH.**

Sophia Kallis<sup>2</sup>, Natasha G<sup>1,2</sup>, Ranu Malhi<sup>2</sup>, Jas Bansal<sup>2</sup>, Tracey Bridges<sup>2</sup>, Jonathan Cohen<sup>2,1</sup>, Leanne Goh<sup>2</sup>

<sup>1</sup>University College London Hospital, London, UK, <sup>2</sup>University College London, London, UK

#### **Objectives**

To evaluate the paediatric food challenge (FC) service of a large London teaching hospital to ensure safe and effective practice.

#### **Method**

Retrospective review of incremental food challenges (IFC) and supervised feeds (SF) between June 2015 and April 2016. Database analysis excluding inconclusive/incomplete tests. 1. Patient numbers and allergen types. 2. Outcomes. 3. Reviewing anaphylaxis cases: treatment required; skin prick test (SPT) size; and risk factors.

#### **Results**

244 FC were analysed, 3% of IFC and 8% of SF excluded as incomplete/inconclusive. There were 173 IFC and 71 SF. Failure rate was 24% for IFC and 21% for SF. Commonest IFC allergens: 32(18%) baked egg, 24(14%) peanuts, 14 (8%) mixed nuts; and 13(8%) baked milk. Commonest SF allergens: 18 (25%) peanuts, 16(23%) mixed nuts, 6(8%) baked egg and 3(4%) baked milk. 81%(26/32) of baked egg and 92%(12/13) of baked milk IFC were passed. 4 patients had anaphylaxis, all responded to a single dose of adrenaline: 1 almond IFC (SPT 0, previous anaphylaxis; mild asthma); 1 pistachio IFC (SPT 5.5; previous anaphylaxis; virus induced wheeze); 1 red lentils IFC (SPT 3.5; mild asthma) respectively and 1 peanut SF (SPT 2.5).

#### **Conclusions**

Our failure rate for IFC was lower and SF similar to that of a regional tertiary centre. This is likely to be due low risk patients already on IFC waiting list prior to the launch of the SF service, notably large number of patients passed baked egg and baked milk IFC during the study period, many of whom would have been risk stratified to have SF if there were no other risk factors. All of the anaphylaxis cases with risk factors had been appropriately risk stratified to have IFC, all were managed according to the Resuscitation council (UK) guidelines. Referrals for IFC were deemed to have been appropriate and reactions safely managed.

## **P.092**

### **Does eating baked egg or milk speed up the outgrowth of egg or milk allergy? A systematic review.**

Rosannah Lambert<sup>1</sup>, Kate Grimshaw<sup>1,2</sup>, Bethany Ellis<sup>1</sup>, Jaya Jaitly<sup>1</sup>, Graham Roberts<sup>1,3</sup>  
*<sup>1</sup>University of Southampton, Southampton, UK, <sup>2</sup>University Hospital Southampton NHS Foundation Trust, Southampton, UK, <sup>3</sup>David Hide Centre, Isle of Wight, UK*

#### **Objectives**

Recent research has demonstrated that the majority of children with egg and milk allergy can tolerate baked egg or milk. It has been proposed that the frequent ingestion of baked egg or milk speeds up the outgrowth of egg or milk allergy. This baked intervention is being introduced into clinical practice. The objective was to systematically review the evidence to determine whether the introduction of baked egg or milk into the diet of children with egg or milk allergies, respectively, speeds up the natural outgrowth of these allergies.

#### **Method**

A systematic review of the literature was conducted in Medline, Embase and CINAHL. The inclusion criteria were: children, baked egg or milk intervention, and outgrowth of the egg or milk allergy. We identified 851 and 2816 distinct egg and milk articles respectively. Only 3 egg and 3 milk studies fulfilled our pre-specified inclusion criteria.

#### **Results**

The 3 studies for egg concluded that baked egg ingestion would speed up the outgrowth of allergy. All 3 milk studies agreed that baked milk ingestion would speed up the outgrowth of allergy. When critiqued, all studies were classed as weak because of their design, bringing into doubt this conclusion. Importantly, no study compared the outgrowth rates of baked tolerant participants ingesting baked products to baked tolerant participants not ingesting baked goods.

#### **Conclusions**

Although the studies concluded that a diet of baked allergen speeds up outgrowth, this is an inappropriate conclusion because of the lack of an appropriate control group. This review finds that there is no evidence to support the hypothesis that baked egg or milk increase the speed of the outgrowth of egg or milk allergy respectively. This area would therefore benefit from additional research to inform us whether it is actually beneficial to introduce baked foods into the diet of children with food allergies.

## P.093

### **Does self-administration of adrenaline at anaphylaxis during in-hospital food challenges have an adverse impact on health-related quality-of-life?**

Sarah Lindsley<sup>1</sup>, Marta Vazquez-Ortiz<sup>1</sup>, Nandinee Patel<sup>1</sup>, Audrey DunnGalvin<sup>2</sup>, Paul Turner<sup>1</sup>

<sup>1</sup>Imperial College London, London, UK, <sup>2</sup>University of Cork, Cork, Ireland

#### **Objectives**

Health-related quality of life (HRQL) is significantly impaired in food allergy. The experience of an in-hospital food challenge (FC), even if positive, can improve HRQL. However, FC may result in anaphylaxis, requiring treatment with adrenaline. We sought to compare HRQL post FC in children who experienced anaphylaxis treated with self-administered adrenaline, versus those experiencing more mild reactions.

#### **Method**

Double-blind, placebo-controlled FC to peanut were conducted in children enrolling in an oral immunotherapy trial (ClinicalTrials.gov Identifier: NCT02149719). Validated questionnaires (FAQLQ, FAIM, Self-Efficacy) were conducted prior to FC and at least 1 week after, in both the child and parent. Local ethical and regulatory approval was granted, and informed consent was obtained.

#### **Results**

Fourteen children (age range: 8-16yrs) undergoing FC were included in the analysis: seven had anaphylaxis during the procedure and self-administered adrenaline, and seven controls (matched for age/sex) who had mild reactions only. Across the cohort, children reported improved HRQL and self-efficacy ( $p < 0.01$ ), with no differences between the group where the child self-administered adrenaline, and the mild reactions group. Parents reported improved HRQL in themselves (FAQLQ-PB) ( $p < 0.01$ ) but not in their child ( $p = 0.23$ ). Nonetheless, they felt their child's ability to self-manage their food allergy had improved ( $p < 0.01$ ), irrespective of severity of reaction at FC.

#### **Conclusions**

There is no evidence that the occurrence of anaphylaxis at FC, and self-treatment by the child with an adrenaline auto-injector device, results in psychological harm to the affected individual or their family. The relationship between confidence in management and HRQL needs further assessment, since it is likely that these outcomes will be affected in different ways following a clinical or therapeutic intervention.

## P.094

### **Diagnostic utility of lip dose challenges for diagnosis of food allergy: a prospective study**

Sian Ludman<sup>2</sup>, Christine O'Keeffe<sup>1</sup>, Antony Aston<sup>1</sup>, Fiona Henley<sup>1</sup>, Eliana Leitao<sup>1</sup>, Ferdinand Morales<sup>1</sup>, Lee Noimark<sup>2</sup>, Paul Turner<sup>3</sup>, Marta Vazquez-Ortiz<sup>3</sup>

<sup>1</sup>St Mary's Hospital, London, UK, <sup>2</sup>Royal London Hospital, London, UK, <sup>3</sup>Section of Paediatrics, Imperial College London, UK

#### **Objectives**

Lip dose challenges (LDC) are often performed as an initial step prior to oral food challenges (OFC) in the UK. However, data is lacking regarding the diagnostic accuracy of LDC. Our aim is to evaluate the diagnostic utility of LDC compared to outcome of OFC in children.

#### **Method**

Children undergoing "low-risk" open OFC for suspected IgE-mediated food allergy were recruited from two South London tertiary allergy units from June-December 2015. LDC was performed thirty minutes prior to OFC by applying the food to the border between inner and outer lip. Objective symptoms following LDC were considered a positive outcome. OFC was subsequently performed regardless of LDC outcome, except where LDC triggered systemic, non-local symptoms. OFC outcomes were assessed according to PRACTALL consensus criteria.

#### **Results**

198 children with conclusive OFC were included in the analysis. Mean age was 7 years (SD: 4.7), median SPT was 2mm (0-10). Foods tested were: tree nuts (30%), peanut (16.6%), egg (16%), fish (10.5%), milk (6%), shrimp (4%), other (16.9%). 186 LDC were negative and 12 positive. One LDC triggered systemic symptoms: generalized urticaria). 167/198 OFC were negative and 31 positive. The diagnostic properties of LDC in relation to OFC outcome were as follows: true positive cases: 10, false positive: 2, true negative: 165, false negative: 21, false positive rate: 1%, sensitivity 32.2%, specificity 98.8%, positive predictive value: 83.3%, negative predictive value: 88.7%, positive likelihood ratio: 26.9, negative likelihood ratio: 0.69.

#### **Conclusions**

In this study, a positive LDC was uncommon, but where positive was associated with a low false positive rate and a high positive likelihood ratio. The diagnostic performance compares favourably with current measures of sensitisation. LDC may therefore be useful in determining whether OFC is required, if performed in clinic prior to arranging a further visit for OFC. Caution is required since LDC may trigger systemic reactions.

## **P.095**

### **Lip dose challenges: practice and perceptions in the United Kingdom**

Sian Ludman<sup>2</sup>, Marta Vazquez-Ortiz<sup>3</sup>, Antony Aston<sup>1</sup>, Lee Noimark<sup>2</sup>, Paul Turner<sup>3</sup>

<sup>1</sup>St Mary's Hospital, London, UK, <sup>2</sup>Royal London Hospital, London, UK, <sup>3</sup>Section of paediatrics, Imperial College, London, UK

#### **Objectives**

Lip dose challenges (LDC) are frequently performed as the initial step during an oral food challenge (OFC) in the UK. Guidance on how to perform and interpret LDC is unclear, and their clinical utility in diagnosis of food allergy is uncertain. Our aim was to investigate current practice using LDC.

#### **Method**

Healthcare professionals who are members of the BSACI were contacted between July-September 2015, and asked to complete an online questionnaire.

#### **Results**

147 respondents completed the questionnaire, representing 53 (of 79) BSACI-registered paediatric clinics in the UK: 88 (60%) doctors, 51 (32%) nurses and 8 (5%) dietitians. Most worked in specialist allergy clinics and district general hospitals (48% and 50%, respectively). Two-thirds (67%) worked in paediatric clinics, 16% cared for adults and 71% supervised >5 OFC per month.

72% felt that lip doses were a useful first step, and 81% used LDC as the initial step in OFC. There was a wide variation in how LDC were performed: for cow's milk, 45% would apply a drop to the inner lip, 44% a drop to the outer lip; for peanut, 17% would smear peanut butter on the inner lip, 19% to the outer lip, 34% rub a peanut on the inner lip and 27% rub it on the outer lip.

There was also wide variation in how to interpret LDC outcome. Of 104 respondents, the supervising clinician would not proceed to OFC under the following outcomes: itchy lip or mouth (17%); local erythema (31%), local urticarial or swelling (88%); urticaria/angioedema on face distant to application site or on body (93%).

#### **Conclusions**

According to this survey, most allergy healthcare professionals in allergy centres in the UK include LDC in their challenge protocols despite a lack of evidence on their diagnostic value. The diagnostic utility of LDC in the diagnosis of food allergy should be determined.

## P.096

### **The nutcracker study: clinical utility of component testing to Ara h 2 in predicting peanut allergy in egg allergic children.**

Deborah Marriage<sup>1</sup>, John Henderson<sup>2</sup>

<sup>1</sup>Bristol Royal Hospital for Children, Bristol, UK, <sup>2</sup>University of Bristol, Bristol, UK

#### **Objectives**

To examine the performance of Ara h 2 and peanut-specific IgE levels in the identification of peanut allergy in egg-allergic children.

#### **Method**

81 egg-allergic, peanut-sensitised children were recruited via Bristol Children's Hospital Allergy Clinic between January 2015 and March 2016. Peanut sensitisation was initially determined via skin prick testing (SPT). Children with values  $\geq 8$ mm were allocated to the allergic group (PA). The remainder underwent a peanut oral provocation challenge (OPC). Children who failed OPC were added to the PA group. The remainder were classified as Peanut Tolerant (PT). Specific IgE levels for a) peanut and b) the peanut component Ara h 2, were measured.

#### **Results**

Following SPT, 41/81(51%) children were allocated to the PA group; 16 were added following OPC (57/81 (70%)). 24/81(30%) were peanut-tolerant.

The number of children with positive peanut-specific IgE levels ( $\geq 0.35$  kUA/L) was higher in the PA group [50/55 (91%) vs 15/24 (63%);  $p < 0.005$ ]. Peanut-specific IgE levels in the PA group ranged from  $< 0.35$  to  $> 100$  (median 7.07) kUA/L and in the PT group from  $< 0.35$  to 51.6 (median 0.48) kUA/L.

The number of children with positive Ara h 2-specific IgE levels ( $\geq 0.35$  kUA/L) was significantly higher in the PA group [48/57(84%) vs 2/24 (8%);  $p < 0.0001$ ]. Ara h 2-specific IgE levels in the PA group ranged from  $< 0.35$  to  $> 100$  (median 3.73) kUA/L and from  $< 0.35$  to 1.54 (median 0.35) kUA/L in the PT group. One allergic child with a negative Ara h 2 reacted with facial urticaria, rhinorrhoea, conjunctival symptoms and cough. Both tolerant children with positive Ara h 2 levels had a high total IgE.

#### **Conclusions**

A positive Ara h 2-specific IgE level of  $\geq 0.35$  was the best predictor of peanut allergy in egg allergic children. A negative Ara h 2-specific level of  $< 0.35$  did not replace the need for an OPC.

## **P.097**

### **An evaluation of the use of adrenaline during food challenges in a tertiary children's allergy service**

Elizabeth Mather<sup>1</sup>, Katherine Knight<sup>1</sup>, Gemma Schnitzer<sup>1</sup>, Alia Boardman<sup>1</sup>, Roisin Fitzsimons<sup>1,2</sup>

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

#### **Objectives**

To evaluate whether adrenaline was used appropriately to treat anaphylaxis during food challenges in the hospital environment, in accordance with BSACI action plans.

#### **Method**

Data was drawn from the food challenge database for challenges that took place between the 30/3/11 and 30/3/16. Supervised feeds and drug challenges were excluded.

#### **Results**

2107 food challenges took place, 473 were positive and 26 children received adrenaline. Adrenaline was noted to be more frequently administered over the years.

79 children experienced signs of anaphylaxis but did not receive adrenaline, and 40 of the challenges that were positive had no symptoms or treatment documented.

101 challenges were inconclusive, and 42 of these had no reason specified to explain why the challenge was deemed as inconclusive.

#### **Conclusions**

Adrenaline use during food challenges has increased in the time period. Whereas recording of food challenge outcomes has been inconsistent.

In a large number of positive challenges BSACI action plan guidelines were not followed, despite respiratory symptoms being recorded, most commonly wheeze and cough.

As health care professionals, we should be using food challenges as an opportunity to reinforce correct treatment of an allergic reaction, and enable families to learn how to manage an anaphylaxis in a supported environment. It would be useful to explore the reasons why adrenaline was not given in the cases which appear to meet BSACI criteria.

Going forward a new database is being developed to ensure accuracy and consistency of information captured, through categorising reactions as per the PRACTALL guidelines. It will allow us to examine our practice and explore if we are performing more 'high risk' challenges, or better at managing anaphylaxis.

**P.098**

**Associated factors causing acute urticarial in children at an emergency room department of a tertiary care center: a 2 year retrospective case control study**

Karen Rose Matias

*Makati Medical Center, Makati City, The Philippines*

**Objectives**

To identify associated factors related to acute urticaria (AU) and determine an association between variables: history of previous urticaria, asthma, infection, intake of a specific food and medication among children; to identify any seasonal patterns by correlating temperature and humidity fluctuations to the occurrence of AU.

**Method**

This is a retrospective case-control study. All children 0-18 years of age seen at ED of the MMC from March 1, 2009 to December 31, 2010 with a principal diagnosis of acute urticaria were considered eligible patients. 500 charts were reviewed (285 subjects and 215 controls). Odds ratio with 95% confidence interval were calculated. Demographic characteristics and clinical data were included.

**Results**

The highest incidence of AU occurred at ages 1-2 years. With highest incidence in June 2009 and August 2010. AU appeared inversely proportional to temperature. More than 50% had unknown etiology. The most common triggers were the presence of viral symptoms predominantly respiratory tract infection, comprising 47.6% of subjects; a previous history of urticaria, asthma and who had insect bite were found to be significant.

**Conclusions**

The causative associated factors identified in cases of AU in the paediatric population were the presence of viral infections, food and medications; history of previous urticaria, asthma and insect bite within 24 hours. Respiratory tract infection was the most common associated factor. Temperature appeared inversely proportional to the occurrence of acute urticaria.

**P.099**

**The clinical safety of home oral challenges in children with previous and suspected hypersensitivity reactions to food: a secondary centre experience.**

Danielle Monteil<sup>1</sup>, Cinzia Pastacaldi<sup>2</sup>

<sup>1</sup>College of Medicine, Swansea University, Swansea, Wales, UK, <sup>2</sup>Singleton Hospital, Abertawe Bro Morgannwg University Health Board, Swansea, Wales, UK

**Objectives**

Emerging evidence favours early and continuing oral exposure to allergenic foods for preventing food allergy and maintaining immune tolerance to these foods. In patients with suspected or pre-existing food hypersensitivity an oral challenge may therefore be essential to ascertain food tolerance. The unavailability of adequate clinical resources in most secondary-care centres however, impedes provision of an in-hospital oral challenge to many eligible patients. Anecdotal evidence suggests that home-based oral challenges (HOC) can bridge this resource gap although their safety profile remains uncertain. We aimed to characterise the clinical safety of HOC by analysing data collected at our institution over a three-year period.

**Method**

HOC was considered if the child's risk of a severe reaction was clinically deemed low. This was determined by an absent/significantly reduced specific-IgE level and skin-prick response. HOC was suggested to parents who would be willing to reintroduce the food to the child's regular diet. They were informed about the possibility of a severe reaction and given verbal and written guidance for implementing the protocol at home.

**Results**

Data was collected over three years. 60 children participated and 13 allergens were tested. A total of 147 HOCs were performed, with two children reporting mild reactions (1.36%; 95% CI = 0.0 – 3.23%). Of the remaining 58 children, 55 successfully reintroduced the allergen into their diet. The other three did not due to parental unwillingness to continue exposure. Of these, one later became allergic again.

**Conclusions**

HOC is reasonably safe in low-risk patients although a clinical setting remains the ideal location for oral challenge. As the ultimate objective of HOC is to reintroduce the food and induce long-term immune tolerance to it, continued exposure is essential. On-going parental cooperation is therefore critical and should be weighted accordingly when assessing patient eligibility for HOC.

## **P.100**

### **Component- resolved diagnosis in hazelnut allergy in children- experience in a district general hospital in UK S Mukherjee, KY Lee**

Samudra Mukherjee, KY Lee

*Basildon & Thurrock University Hospital NHS Foundation Trust, Basildon, UK*

#### **Objectives**

Peanut allergy may not always predict tree-nut allergy although fear factor often leads to complete tree-nut exclusion once peanut allergy is diagnosed, leading to unnecessary avoidance of all tree-nuts. Traditional Specific IgE measurement for hazelnut(a popular tree-nut) often comes from cross reactivity to tree pollens(Birch) rather than true clinical reactivity which can often better predicted by specific IgE to Cor A8 protein in Hazelnut.

#### **Method**

This was a retrospective review of children who underwent hazelnut challenge over 2 year. Children, referred for tree-nut and peanut allergy are tested for specific IgE for peanut, hazelnut, cashew, pistachio and cor a8 along with other relevant allergens following an allergy focussed clinical history. None of the children had known exposure to hazelnut before or allergic to milk. Children who had raised hazelnut IgE values (median 3.6, range 0.93- 16.30) but had normal Cor-a8 IgE levels of <0.35 underwent open label oral food challenge, using standardised protocols with Nutella.

#### **Results**

Over two year period (2014-2015), 16 patients underwent cor-a8 IgE testing along with other relevant allergens and had an open Nutella challenge. 13 patients (8 female, 5 male), with median age of 7 years (range 6-15 years), tolerated Nutella without any adverse reaction. 2 had local cutaneous reaction and 1 had generalised urticaria. 11/13 has introduced Nutella under dietician supervision. Incidence of other clinically relevant sensitisation were noted to peanut (17/18), Egg (6/18), Tree pollen (6/18) and both tree and peanut (3/18).

#### **Conclusions**

In our small series, the 81.3% of peanut allergic patients had a successful oral food challenge. Our observations were limited by the open label nature of the oral food challenge. Nevertheless, it provides evidence that component- resolved diagnosis can be a useful tool in the diagnosis of hazelnut allergy in the district general hospital setting.

## **P.101**

### **Improving the food challenges unit: a patient satisfaction study**

Arun Mukkavilli<sup>1</sup>, Alia Boardman<sup>2</sup>, Tom Marrs<sup>2</sup>, Rosy Wells<sup>2</sup>

<sup>1</sup>King's College London (GKT) School of Medicine, London, UK, <sup>2</sup>Guy's and St Thomas NHS Foundation Trust, London, UK

#### **Objectives**

1. To assess patient satisfaction with the Children's Allergy Service - Food Challenges Unit at St Thomas' Hospital; assessing various aspects of the food challenge service from appointment booking to managing procedure outcomes. 2. To identify areas to improve for a better patient experience.

#### **Method**

Data was collected via an online questionnaire. The questionnaire was offered to patients and carers following visits to the Food Challenges unit. Responses (n=55) were collected over twelve weeks via trust iPads or patient smartphone, with URLs disseminated via flyers.

#### **Results**

The majority of responses were from patients undergoing food challenges (54.5%), while 34.5% attended for supervised feeds. Appointment booking was described as 'not easy' or 'difficult' by 15% of patients. Most attendees (83.3%) had a 'good idea' of what to expect at their appointment, while 16.7% had 'some idea'. Appointment punctuality was good (96.4% patients seen <15 minutes of appointment time). Patient satisfaction with staff was excellent; all respondents reported confidence and trust in the unit's staff. Similarly, all respondents understood their visit's outcome, with 96.4% reporting a 'definitely' or 'mostly' clear idea. Among non-allergic outcomes, 95.5% had a clear idea on introducing the tested food to their child's diet. In allergic outcomes, all respondents reported being clear on managing future reactions, although 7% reported that staff had not discussed management of future reactions.

#### **Conclusions**

Patient satisfaction was high with unit staff, appointments' punctuality and clarity about appointment outcomes. Areas identified for improvement included the booking process, pre-appointment information, and the unit's facilities (including kitchen amenities) and play area. Additionally, we believe that introducing a website for patients undergoing challenges with information about challenges, foods to bring (with recipes) and a guide/video about the challenge process would improve satisfaction with the service.

**Cow's milk protein allergy (CMPA) prescribing practices in Devon: Efficacy of a primary care educational programme**

Pratheeshaa Varuni Nageswaran<sup>1</sup>, Susannah Costelloe<sup>2</sup>, Lorna Pring<sup>2</sup>, Rebecca Franklin<sup>2</sup>, Halima Sadiya Gumi<sup>3</sup>, Sian Ludman<sup>2</sup>

<sup>1</sup>Peninsula College of Medicine and Dentistry, Devon, UK, <sup>2</sup>Royal Devon and Exeter NHS Foundation Trust, Devon, UK, <sup>3</sup>North Devon District Hospital, Devon, UK

**Objectives**

CMPA is the second most common childhood food allergy. Current recommendations state around 90% of children should tolerate extensively hydrolysed formula (eHF). Unnecessary amino acid formula (AAF) use increases costs and may delay tolerance.

Royal Devon and Exeter hospital (RD&E) instituted an educational update to GPs in East Devon. Our aim was to investigate whether education improved prescribing practices, and if primary and secondary prescribing met the recommendations.

**Method**

We accessed prescription data for 118 North, East and West Devon GP practices covering 173,141 children from 2011-2016. Retrospective case note analysis was performed on 372 children presently seen at RD&E and North Devon District hospital for CMPA. Statistical calculations were performed using Excel.

**Results**

The prescription of specialist formulas in primary care rose by 121% from 2011-2012 to 2015-2016. Rates of eHF compared to AAF went from 54%:46% to 61%:39%.

Pre-education programme (2013-2014), the eHF:AAF ratio was 66%:34% in East Devon. Post-education the ratio was 63%:37% (2014-2015) and 60%:40% (2015-2016).

In secondary care 19% had IgE mediated CMPA and 81% had non-IgE CMPA. Management included maternal dietary manipulation (23%) and specialist infant formula (59%). The initial ratio of eHF:AAF, including trials of eHF, was 82%:18% (63%:37% post-trial); IgE mediated 78%:22%, non-IgE mediated 84%:16%. Reasons cited for initial AAF included: reaction to breast milk, failure to thrive, blood in stool and a sibling previously on AAF. Formula was stopped at 22.6 months on average but 18% continued at 2 years.

**Conclusions**

Our data showed a rapid increase in specialist formula prescriptions over 5 years; the reasons for this are unclear. Devon primary and secondary care did not prescribe to the recommended 90%:10% eHF:AAF ratio but improved practice.

The education initiative had no effect on prescribing ratios in that area, suggesting necessity for continuing education and better dissemination of national guidance.

## **P.103**

### **Nurse-led food challenge in children - is it challenging in a district general hospital?**

Jodie Nguyen, Max Thomas, Kay Playle, Samudra Mukherjee  
*Basildon University Hospital, Essex, UK*

#### **Objectives**

Food allergy is common in children. However, comprehensive allergy services providing clinical consultation, laboratory evaluation and oral food challenge (OFC) for children in the UK remain limited. OFCs, the cornerstone of diagnosis, are mostly performed in tertiary or large district general hospitals (DGHs) under doctor supervision. However, in Basildon University Hospital, with pressure on junior rotas, nurse-led OFCs have been conducted since 2014 on selected patients. The aim of this study is to examine the feasibility and safety of nurse-led paediatric food challenges in a DGH.

#### **Method**

This was a retrospective review of all paediatric OFCs conducted in Basildon University Hospital between May 2014 and April 2016. Children aged 0-16 are referred from paediatric consultant clinics following allergy-focused history and examination, and targeted investigations including specific IgE and skin prick testing. An advanced nurse practitioner then arranges and performs the OFC on the paediatric ward, following informed consent. If there are any objective signs of immediate allergic reaction, the OFC is terminated and appropriate treatment commenced.

#### **Results**

65 OFCs were performed on 37 children (aged 0-15 years, 68% male) during the two-year time period, with a 6.7% did-not-attend (DNA) rate. Of those attending, 52% of the OFCs were for tree nut allergies, 20% egg, 15% peanut, 6% milk, and 7% other. 14% resulted in positive challenges, with only 7 children (10% of total) requiring chlorphenamine treatment. No children required adrenaline.

#### **Conclusions**

Nurse-led paediatric food challenges are feasible and safe, provided children are carefully selected. DNA rates are lower than national average. It avoids involvement of already stretched junior doctors in DGHs, it can reduce referral to tertiary centre allergy services, and reduce waiting lists. This model could increase patient satisfaction and improve quality of life. This model can be easily replicated in other DGHs.

## **P.104**

### **Living with allergy in adolescence.**

Anissa Patel, Helen Wileman, Kaite Lowe, Michaela Musial, Meera Patel, Sarah Eisen, Leanne Goh, Penny Salt

*University College London Hospital, London, UK*

#### **Objectives**

To assess the impact of allergic disease on quality of life (QOL) in adolescents and to identify information and support they need.

#### **Method**

All >11year olds attending allergy clinic between September -December 2014, were requested to complete a questionnaire developed using: the RCPCH 'Your allergy care' questionnaire; the validated 'Food allergy QOL Questionnaire for adolescents'; and the RCPCH allergy care pathways.

#### **Results**

66% response rate: 36.4% questionnaires were fully completed, outstanding responses followed up by telephone. 50% boys, 41% girls, 9% did not disclose gender. Median age was 13.7 years (12-18 years). 77% ≥ 3 allergic comorbidities, 1 patient had a single allergic condition. 82% had been living with allergies for > 5 years. Average scores were greater in patients with anaphylaxis (i.e. worse QOL). Overall, greater number of comorbidities did not correlate with higher scores: in 'fears' and 'social' categories <2 conditions reported worse QOL, in 'eating' and 'shopping' categories <2 conditions reported better QOL. 50% of patients reportedly 'didn't need more help'. 41% reported receiving written information (14% wanted more). 55% reported being taught administration of medication. 9% with adrenaline auto injectors reported not being taught. 9% indicated 'medication concerns were not answered in a way they understood'. 41% reported receiving 'conflicting information'. 100% rated the service 'very good' or 'excellent', 91% would recommend to family/friends.

#### **Conclusions**

Our adolescent patients are amongst the most severe of our patients, often with longstanding and multiple allergic comorbidities. We will offer our adolescent patients this questionnaire as a communication tool, addressing concerns during their appointment. In addition we have improved our pre-appointment written information. All patient training is now recorded and countersigned, to facilitate reliable monitoring of this important aspect of care. We also aim to streamline information giving within our multidisciplinary team (MDT) through case discussions during our MDT meetings.

## P.105

### **Hazelnut molecular components in predicting clinical reactivity in a northern United Kingdom population.**

CAROLINA PERALES-CHORDA<sup>1</sup>, JAMES GARDNER<sup>2</sup>, JULIE PENTLAND<sup>2</sup>, GILLIAN VANCE<sup>2</sup>, DOLORES HERNANDEZ-FERNANDEZ DE ROJAS<sup>1</sup>, LOUISE MICHAELIS<sup>2</sup>

<sup>1</sup>Hospital Universitario y Politecnico La Fe, Valencia, Spain, <sup>2</sup>Newcastle Upon Tyne Hospital NHS Foundation Trust, Newcastle Upon Tyne, UK

#### **Objectives**

We studied the sensitisation profile to hazelnut allergy in a northern United Kingdom paediatric population to see if results correlated with published studies to improve our diagnostic decision pathway and provide additional prognostic information.

#### **Method**

We reviewed the demographics, type of reaction (oral, systemic or exclusion) and other IgE mediated allergic co-morbidities. We reviewed the molecular resolved diagnostic tests (CRDs) results to hazelnut in patients attending clinic in 2015. Only patients with IgE sensitisation or reported IgE hazelnut allergy were selected.

#### **Results**

78 children (29 female and 49 male) had IgE sensitisation to hazelnut with a median age of 10 (range 2-17 yrs). 64 (82%) had allergic rhinitis, 38 (60%) seasonal and 13 (20%) perennial with seasonal exacerbation, 59 (76%) had eczema and 45 (58%) asthma. 31 (40%) children have food pollen syndrome (FPS) symptoms with fruits, legumes and vegetables.

A proportion, 21 (29%) reviewed, had never eaten nuts and also presented with IgE allergy to egg (14 (67%)) and cow's milk (10 (48%)) and they were co-sensitised to hazelnut (17 (81%)) with *Cor a 1* (8) and peanut (11 (52%)) with *Ara h 2* (10).

Children presenting with systemic symptoms after eating hazelnut (13 (16.7%)) were most sensitised to *Cor a 9* (2) and *Cor a 14* (4) than *Cor a 1* (1). In children with FPS (11 (14.1%)) were most frequently sensitised to *Cor a 1*. Both groups present with equal IgE sensitisation to grass and tree pollen.

#### **Conclusions**

Eczema, rhinitis and asthma is common in children with IgE sensitisation to hazelnut (although a biased population). Co-existing peanut allergy is common. Positive results to *Cor a 9* and/or *Cor a 14* could help us to identify the risk of systemic reactions in patients who have never eaten nuts. *Cor a 1* sensitisation is more relevant in children presenting with oral symptoms, however patients can be sensitised to both. Further studies are required.

## **P.106**

### **Service evaluation of Paediatric allergy clinic: Patient experience survey as a quality and service improvement tool**

Mala Raman

*Torbay Hospital, Torquay, UK*

#### **Objectives**

Allergy cases account for a significant proportion of the total referrals to the paediatric department. Due to the lack of nurse specialist, consultant time is taken up for diagnosis and education. A subsequent clinic visit is required to meet the dietician after a waiting time of two months or more. This service evaluation was undertaken to identify the gaps in the service provision using parent/patient experience questionnaire.

#### **Method**

The service evaluation questionnaire was developed based on the RCPCH patient reported experience measure. There were 28 questions. The questions were designed to get information about the child's journey from the time of referral to the clinic appointment. This questionnaire was administered by a health care assistant or nurse who was not part of the allergy clinic for that day. Parents/patients were asked to fill out the form after the appointment.

#### **Results**

49 questionnaires were collected over a period of five months. 52% of parents suspected their child suffered with an allergy for more than twelve months before they were seen in the clinic. 15% had to wait for over twelve months before the referral was made by their GP. 83% of patients were seen in the allergy clinic within four months of referral. 47% reported their child not being seen at the stated time in their appointment letter. 94% would recommend this clinic to friends and family.

#### **Conclusions**

Majority of parents were satisfied with the overall care provided. To stream line the service we have appointed an allergy nurse and developed a short film about the appointment process and skin prick test. The appointment letter now has a link for this short film. It is feasible to provide high quality allergy service in a district general hospital.

## P.107

### **The use of a patient reported experience measure in allergy care to understand patients' needs and improve quality of service.**

George Raptis<sup>1</sup>, Kyriacos Kyriacos Gregoriou<sup>2</sup>

<sup>1</sup>Royal Hospital for children, Glasgow, UK, <sup>2</sup>School of Medicine, University of Glasgow, Glasgow, UK

#### **Objectives**

- To gain a view of the perception that patients and their parents/guardians have about their allergy care.
- To identify aspects of ongoing patient care that require improvement.
- To identify areas of patient education requiring improvements.

#### **Method**

Data was collected via the patient-reported experience measure (developed by the Royal College Paediatrics Child Health and Picker Institute Europe). Patients (n=50) attending the allergy clinic at the Royal Hospital for Children were asked to fill in an age-appropriate questionnaire after the clinic or to return it by post or email.

#### **Results**

- Thirty completed questionnaires were returned.
- The ongoing allergy care was found to be satisfactory.
- Patients (53%) overall have an informed perception about their allergies but they are unaware of the side effects (29%) of the medications they are using.
- Patients (52%) are unaware of the ways health professionals communicate with each other or when and how the allergy service should communicate with schools.
  
- A high proportion of patients (33%) reported that they do not have the contact details of the allergy services.

#### **Conclusions**

This survey highlights the vital need of collecting patient reported experience data regularly, especially when the feedback relates to young patients, to understand their views and to improve the quality of allergy care.

In order to create a safe home and school environment for the child we will need to strengthen communication channels between all professionals involved and ensure that patients are aware of these communications.

Further work is needed on patient education since lack of awareness about medication side effects was reported.

Allergy services will also need to be accessible for patients for ongoing patient/family support.

## **P.108**

### **Evaluation of SCoRING system for grading oral food challenge reactions**

Nicola Rogers, Jennifer Rowley, L Porter, Emma Grainger-Allen  
*Southampton, UK*

#### **Objectives**

There are currently no universally agreed parameters to grade food challenge outcomes, although there are numerous published systems. None have been validated. We compared an in house SCoRING system (see separate abstract) with the most widely used grading score from the PRACTALL guidelines.

#### **Method**

We compared grading systems on the twenty most recent positive food allergy challenges. SCoRING was undertaken prospectively whilst the PRACTALL score was derived from clinical notes. The outcome of the challenge was agreed by a multidisciplinary team a week after the event.

#### **Results**

Of the twenty cases only fourteen were included, due to missing notes (n=1) and lack of data to generate the PRACTALL grade (n=5). There were 8 mild PRACTALL reaction grades and 6 severe reactions. The SCoRING grade was higher in those with severe reactions median 6 versus 3.43 in moderate cases. The SCoRING system grade correlated with the total PRACTALL score ( $R(13)=0.81$ ,  $P < 0.001$ ).

#### **Conclusions**

Clearly it would be beneficial to have a simplified, standardised and validated, universal grading system to aid in the summary of food challenge reactions and direct further clinical management. SCoRING allows identification of positive challenges at an earlier stage than would be advised by PRACTALL, which has implications for patient safety.

## **P.109**

### **A novel smart phone based digital triage tool for children with allergies**

Simon Rosenberg<sup>2</sup>, Lucy Walker<sup>2</sup>, Roisin Fitzsimons<sup>1</sup>, Aikaterini Anagnostou<sup>1</sup>, Paul Turner<sup>3</sup>, Adam Fox<sup>1</sup>

<sup>1</sup>St Thomas' Hospital, London, UK, <sup>2</sup>Tell the Doctor, London, UK, <sup>3</sup>Imperial College, London, UK

#### **Objectives**

To produce a real time resource to deliver digital triaging of patients with food allergy and enhance communication between allergists and their patients during the extended periods between consultations.

Background: Patients and doctors have both identified the difficulties in accurate recall and time efficient reporting of serious incidents such as anaphylaxis, when attending time limited, and often only annual outpatient appointments. Furthermore, physicians are usually unaware of sometimes highly significant events that may have occurred to their patients between consultations, where active intervention may reduce the risk of occurrence. 88% of patients now carry smartphones and regularly use them to access online information.

#### **Method**

In close consultation with patients and families, a digital app called 'Tell the Doctor' (funded by Nominet Trust), was developed that allowed reporting on allergic reactions, in the community, when they occurred. These are automatically uploaded, in real time, to a web-based doctors' dashboard. This displays the patients' responses to the doctor defined form in the app, relating to the cause and nature of the reaction, which would be required to make a decision as to whether further contact with the patient would be appropriate. A pilot study of the feasibility and usability of the app was carried out in the tertiary Paediatric Allergy clinic at St Thomas' Hospital, London.

#### **Results**

To date, 2 patients have been recruited to the feasibility study, which opened April 2016 and 25 further participants will be added within the next 6-8 weeks. Their ability to use the app and the doctors' ability to obtain useful data from the dashboard will be assessed.

#### **Conclusions**

This proof of concept pilot study will demonstrate whether an app can facilitate the real time data required for effective digital triage.

## P.110

### **Do written asthma plans in children improve asthma control and reduce unscheduled healthcare usage? A systematic review and meta-analysis**

Tammy Rothenberg

*Homerton University Hospital, London, UK*

#### **Objectives**

To perform a systematic review of studies comparing the use of a written asthma plan with none in children with asthma, and to perform a statistical meta-analysis to derive an estimate of effect on hospital admission and unscheduled visit rates, asthma control, symptom scores and quality of life scores.

#### **Method**

A systematic comprehensive search was used to identify randomised controlled trials comparing the use of a written asthma action plan with no written action plan in children with asthma. Studies meeting the inclusion criteria were assessed for risk of bias and data were analysed using RevMan5.3.

#### **Results**

Four studies with a total of 443 participants met the criteria for inclusion in meta-analysis. No studies compared admission rates. There was a significant reduction in the mean number of unscheduled visits to hospital emergency department (ED) (151 participants, mean difference  $-0.33$ , 95% confidence interval  $-0.74$  to  $-0.08$ ). There was a reduction (not statistically significant) in the numbers of participants who had at least one unscheduled attendance in ED or at a general practitioner with an acute asthma event (383 participants, odds ratio (OR)  $0.84$ , 95% confidence interval  $0.48$  to  $1.49$ ).

The symptom score of 124 participants was lower, standardised mean difference of  $-0.42$  (95% confidence interval  $-0.78$  to  $-0.06$ ). The mean difference in night-time awakening for 151 participants was  $-1.28$ , (95% confidence interval  $-1.84$  to  $-0.72$ ) in those with a written action plan. There was no difference in quality of life scores between the two groups.

#### **Conclusions**

This systematic review showed that the use of written asthma action plans for children significantly reduced the mean number of unscheduled visits to hospital, mean symptom scores and reduced night time awakenings. This study may be relevant for other condition-specific patient held action plans such as those used in food allergy for children.

## P.111

### **The conundrum of several different anaphylaxis guidelines.**

Jennifer Rowley<sup>1,2</sup>, Michel Erlewyn-Lajeunesse<sup>1,2</sup>

<sup>1</sup>Southampton Children's Hospital, Southampton, UK, <sup>2</sup>University of Southampton, Southampton, UK

#### **Objectives**

The National Institute of Clinical Excellence (NICE), the European Academy of Allergy and Clinical Immunology (EAACI) and the Royal College of Paediatrics and Child Health (RCPCH) have each released guidance on managing patients with anaphylaxis. Each guideline varies in its content and focus, with a certain degree of overlap. We reviewed the current management of children presenting in anaphylaxis to establish if any of these guidelines are being preferentially followed.

#### **Method**

We reviewed the notes of all patients under 18 years, presenting to the Emergency Department (ED) or Paediatric Assessment Unit (PAU) at Southampton General Hospital during 2015, with the discharge coding of 'anaphylaxis'. All episodes coded as 'allergic reaction' or 'angioedema' were also reviewed and those that were clinically managed as anaphylaxis were included. Documentation was reviewed against the current NICE, EAACI and RCPCH guidelines.

#### **Results**

Nine acute episodes were managed as anaphylaxis. All patients were managed in accordance with the NICE guideline, with the exception of being given information on biphasic reactions and patient support groups at discharge. Six fulfilled the EAACI diagnosis criteria for anaphylaxis. Retrospectively assessing if our patients were managed in line with EAACI advice was difficult as clinical records were not in enough detail to capture certain suggestions (e.g. patient's position). Other suggestions are unquantified (e.g. what is meant by 'early management'). Similarly, the RCPCH care pathway advises poorly defined things that are not easily measurable (e.g. 'recognise the patient is unwell'; 'give early adrenaline').

#### **Conclusions**

Each of these different guidelines vary slightly but share key messages, like the need to provide adrenaline auto-injectors and essential advice at discharge. It is difficult to compare our current management against unquantified and broad statements like those found in the EAACI and RCPCH guidance. It is therefore difficult to assess if these useful documents are being followed appropriately.

## P.112

### **Acute anaphylaxis requires a discharge planning proforma**

Jennifer Rowley<sup>1,3</sup>, Laura Porter<sup>1</sup>, Nicola Rogers<sup>2</sup>, Graham Roberts<sup>1,3</sup>, Emma Grainger-Allen<sup>1</sup>, Michel Erlewyn-Lajeunesse<sup>1,3</sup>

<sup>1</sup>Southampton Children's Hospital, Southampton, UK, <sup>2</sup>University of Dundee, Dundee, UK, <sup>3</sup>University of Southampton, Southampton, UK

#### **Objectives**

All patients with anaphylaxis should be treated correctly and provided with a safe and appropriate discharge plan. Anaphylaxis guidelines have been published by the National Institute of Clinical Excellence (NICE), the European Academy of Allergy and Clinical Immunology (EAACI) and a care pathway produced by the Royal College of Paediatrics and Child Health (RCPCH). But guidelines vary and are not always followed. To explore this further, we reviewed the management and discharge of all children presenting with anaphylaxis.

#### **Method**

We reviewed the notes of all patients under 18 years, presenting to the Emergency Department (ED) or Paediatric Assessment Unit (PAU) at Southampton General Hospital during 2015, with the discharge coding of 'anaphylaxis'. All episodes coded as 'allergic reaction' or 'angioedema' were also reviewed and those that were clinically managed as anaphylaxis were included. Documentation was compared to local, NICE, EAACI and RCPCH standards.

#### **Results**

21,995 children were seen acutely in ED or PAU during 2015. Nine of these episodes were managed as anaphylaxis. All patients had an appropriate history taken, had adrenaline auto-injectors (AAIs) prescribed at discharge and were referred for specialist follow-up. Documentation of the information provided prior to discharge was poor, with the exception of advice on trigger avoidance. None documented the provision of information on patient support groups or on the risk of biphasic reactions.

#### **Conclusions**

Anaphylaxis remains a rare event for acute paediatric services and we should not expect practitioners to be fluent in the after management following initial emergency therapy. Documentation about what advice is provided needs improving, as at present it appears many patients are not being given all the key information they require. Support tools with patient information and checklists should be readily available and could be adopted nationally to improve standards.

**Could your patient with a headache have Coeliac disease?**

Helyeh Sadreddini, Kiran Kumar

*Royal Chesterfield Hospital, Chesterfield, UK*

**Case Presentation**

**Background**

Coeliac disease (CD) is a common condition with a prevalence estimated to approximate 0.5-1%, it is a life-long gluten-sensitive autoimmune disease of the small intestine affecting genetically susceptible individuals.

CD individuals may present classically with gastrointestinal-related symptoms or atypically. Neurologic symptoms are not frequently seen and include seizures, headache, ataxia and psychiatric problems. We report on two patients with CD presenting solely with headache.

**Case presentation**

Our first case is AO; a fit and well girl presenting at 11 years of age with a 5 month history of tension headaches, seemingly worse during school time. MRI of her brain was normal. Neurology agreed a diagnosis of tension headaches, bloods were suggested. Tissue transglutaminase (tTG) antibody was >128, endomysial antibodies were positive. Endoscopy and biopsy was positive, with a Marsh type 3a severity.

Our second case is JB with a background of asthma whose brother has autism. He presented at 9 years of age with a 4 month history of migraine. He had an MRI which showed an incidental Arnold-Chiari malformation, type1. He was noted to previously have had bloods undertaken with weak positive endomysial antibodies. Repeat analysis showed tTG 89 and positive endomysial antibodies. Endoscopy and biopsy was positive, with Marsh type 3a severity. Both patients are currently on a gluten free diet and are now free of their headaches.

**Discussion**

Children presenting with headaches are commonly seen in paediatric clinics. These cases illustrate the importance of thinking about CD as a differential, particularly where symptoms are not settling. Both cases had some possible perceived stressors in their lives, which could be the cause of the headache but should only be implicated after other organic pathology is excluded.

**Conclusions**

CD should be considered as a differential in children presenting with headaches, timely dietary exclusion leads to a resolution of symptoms.

## **P.114**

### **Do children consume nuts regularly after passing the formal nut challenges?**

Farrukh Sheikh, Demetria Hadjiyiannis, Kelly Parker, Kelly Tonge, Neha Khanna, Jan Reiser  
*East & North Herts NHS Trust, Stevenage, UK*

#### **Objectives**

To ascertain whether children consume nuts regularly after passing formal nut challenge or do they continue to avoid the nuts from previous habit and anxiety.

#### **Method**

We identified 50 consecutive potential nut allergy children who passed open food Nut challenges. It is expected of them to eat the nuts post challenge on a regular basis to maintain tolerance. They were subsequently sent a questionnaire to ascertain whether they were eating the nuts challenged and tolerated or were still avoiding them.

#### **Results**

Our anecdotal impression is that a high proportion of children do not continue to consume nuts after passing nut challenge and we are waiting for the questionnaire returns for the final results.

#### **Conclusions**

Children with potential nut allergy are a high risk population with atopic background and at times often have other coexisting food allergies. Oral food challenges are time consuming and an expensive resource requiring a visit to hospital as a day case. Appropriately selected group of children who are expected to pass a challenge undergo open food challenge (OFC) to confirm tolerance to nuts. On passing the OFC children are expected to consume nuts (challenged and passed) on a regular basis to continue long term tolerance.

The exercise of the process may be is being undermined by the previous anxieties of the families and/or lack of reliable information regarding the benefit of eating the nuts. Although it is discussed at the time of the challenge, there is much going on and may have been difficult to remember. We plan to institute a parent information leaflet (PIL) to hand out at the time of a passed challenge to better inform the family and perhaps improve subsequent consumption of the nuts.

## P.115

### **Umbilical cord blood chemokines and the development of atopic dermatitis and atopy at age 6 years**

Hermaleigh Townsley<sup>1</sup>, Robert Siebers<sup>1</sup>, Kristin Wickens<sup>1</sup>, Tristram Ingham<sup>1</sup>, Mike Epton<sup>2</sup>, G. Ian Town<sup>2</sup>, Julian Crane<sup>1</sup>

<sup>1</sup>University of Otago, Wellington, New Zealand, <sup>2</sup>University of Otago, Christchurch, New Zealand

#### **Objectives**

Recently, some cohort studies have suggested that levels of thymus and activation-regulated chemokine (TARC) and macrophage-derived chemokine (MDC) in umbilical cord blood may be predictive of whether infants will develop atopic dermatitis or atopy during childhood. In a large infant cohort we investigated the potential predictive value of cord blood TARC and MDC for atopic dermatitis and atopy at age 6 years.

#### **Method**

647 cord blood samples from an unselected infant cohort were analysed for MDC and 270 cord blood samples for TARC (haemolysis was found to affect TARC, but not MDC) by ELISA. At age 6 years a diagnosis of atopic dermatitis was made using the UK Working Party Diagnostic Criteria for Atopic Dermatitis protocol. Blood samples were obtained and serum analysed for specific IgE levels by 3rd generation chemiluminescence enzyme immunoassay. Atopy was defined as any specific IgE  $\geq$  0.35 KU/L. Logistic regression was used to calculate odds ratios, adjusted for potential confounders.

#### **Results**

Neither cord blood TARC or MDC levels were associated with flexural dermatitis at age 6 years (aOR 1.05; 95% CI 0.55-2.02 and 1.64; 95% CI 0.85-3.18, respectively). Cord blood TARC and MDC levels were also not associated with atopy at age 6 years (aOR 1.06; 95% CI 0.62-1.82 and 1.08; 95% CI 0.62-1.90, respectively). A significant correlation in girls only was found between cord blood MDC levels and levels of specific IgE to cat allergen ( $p=0.05$ ) and between TARC levels and specific IgE levels to milk. ( $p = 0.011$ ).

#### **Conclusions**

Cord blood TARC and MDC levels at birth are not predictive of atopic dermatitis and atopy at age 6 years.

## P.116

### **Higher prevalence of cashew nut, pistachio nut and almond allergy in British South Asian Children**

David Vaughan<sup>2</sup>, Emmanuel Oyewole<sup>2</sup>, Gary Stiefel<sup>1</sup>, David Luyt<sup>1,2</sup>

<sup>1</sup>University of Leicester, Leicester, UK, <sup>2</sup>University Hospitals of Leicester, Leicester, UK

#### **Objectives**

Allergy to peanuts and tree nuts is one of the most serious allergies affecting children in the UK. The dual allergen hypothesis proposes that environmental exposure without ingestion increases the risk of developing peanut allergy. In Leicester we have a unique opportunity to similarly assess the effects of a suspected increased environmental exposure to almond, cashew nut and pistachio nut as there is a large immigrant south Asian population in which these particular tree nuts are frequently included in traditional cuisine.

#### **Method**

In our allergy clinic we prospectively collected data on all new referrals over the 3-year period January 2012 to December 2014 (n=2638). The data comprised demographic (including ethnicity) and clinical (allergy diagnoses and all skin prick test results including negative weals) information. Our nut SPT panel is almond, Brazil nut, cashew nut, hazelnut, peanut, pecan nut, pistachio nut and walnut. We defined a SPT weal  $\geq 3$ mm as sensitisation and  $\geq 8$ mm as allergy. We then measured the relative risk in south Asian children in relation to white children.

#### **Results**

South Asian children were significantly more likely to be either sensitised or allergic to almond (relative risk (RR) 1.87 and 3.95 respectively), cashew nut (RR 1.94 and 2.59) and pistachio nut (RR 2.06 and 3.71). By contrast they were not more likely to be either sensitised or allergic to other tree nuts, peanuts or non-nut foods of egg white or milk.

#### **Conclusions**

We presumed that the south Asian community continued with traditional eating practices but that nuts were withheld from infants and young children because of previous Department of Health guidance. Further evidence of actual eating practices would support the dual allergen hypothesis, and demonstrate that it is nut-specific. Perhaps future preventative strategies advising early introduction of nuts will need to be tailored for different ethnic groups.

## P.117

### **A qualitative study highlighting positive impact of early nutritional support provided by Allergy UK Via dietitians' service for families whose children have suspected food allergy**

Amena Warner<sup>1</sup>, Rachel De Boer<sup>2</sup>, Holly Shaw<sup>1</sup>, Ruth Chalmers<sup>2</sup>, Charlotte Stedman<sup>2</sup>, Hasita Prinja<sup>2</sup>, Mary Feeny<sup>3</sup>

<sup>1</sup>Allergy UK, Kent, UK, <sup>2</sup>Guy & St Thomas's Hospital, London, UK, <sup>3</sup>Kings College, London, UK

#### **Objectives**

Food allergy in the UK is increasing, yet limited national resources are allocated to diagnose and manage this modern epidemic. Allergy diagnosis is part of a complex jigsaw puzzle to establish if food allergy is IgE, Non IgE mediated or a combination of both.

Increasing calls to Allergy UK's helpline highlighted the need for developing ways to support children with a history suggestive of food allergy. These children often endure long waits to access allergy services for clinical testing on their journey to food allergy diagnosis. It is not uncommon for a parent to remove one or more food groups suspected of causing allergic symptoms in their child. This may result in a nutritionally incomplete diet, impacting on growth and development.

#### **Method**

- Senior helpline advisor ensures inclusion/ exclusion criteria met
- 30 minute telephone consultation provided with specialist allergy dietitian
- Allergy focused diet history taken
- Nutritional support and dietary guidance provided to parents/carers
- Recommendations documented and sent to the GP as part of a collaborative approach in the journey to diagnosing food allergy.

#### **Results**

- Over 200 families have been provided with nutritional advice and support
- Each consultation based on a holistic assessment of the individual child/family
- Parents reported a 97% improvement in confidence and knowledge for children with suspected food allergy
- Evaluated by post-phone call evaluation forms and testimonials
- Collaborative working between health professionals.

#### **Conclusions**

Benefits of telephone-based timely nutritional support as demonstrated by Allergy UK's dietitians' service is a lifeline to support families of infants/children with a suspected food allergy and provides a safe interim measure whilst waiting to access allergy services.

**Allergy to vitamin B12 injection and subsequent desensitisation: a case report**

Rosy Wells, Victoria Timms, George Du Toit

*Children's Allergy Service, St Thomas' Hospital, London, UK*

**Case Presentation**

**Background**

Vitamin B12 is essential for normal functioning of cells. Those whom are deficient must receive supplemental vitamin B12, either orally or by injection, to prevent development of neurological and haematological sequelae. Vitamin B12 injections (either as cyanocobalamin or hydroxocobalamin) are generally well tolerated, with very few case reports of allergy. However, when allergy develops to vitamin B12, there is often no effective alternative.

We discuss the first reported case of vitamin B12 allergy in a child whom underwent desensitisation.

**Case Presentation**

A 12-year-old girl was referred to our Children's Allergy Department with a history of an allergic reaction to vitamin B12 injection. She had a background of short gut syndrome following a neonatal volvulus and therefore was unable to absorb enteral vitamin B12 supplementation. After confirming allergy to vitamin B12 by intradermal testing, our patient underwent desensitisation to vitamin B12. She received increasing concentrations of vitamin B12 in increasing volumes over three separate visits (a total of 14 intramuscular injections). She developed some local erythema at the injection site on 3 occasions and after the 10<sup>th</sup> injection was noted to have angioedema of her ears and some facial flushing. She went on to tolerate the required maintenance dose (1ml of 1:1 hydroxocobalamin) and has since been tolerating monthly injections.

**Discussion and Conclusion:**

- Vitamin B12 allergy is rare but often no treatment alternative is available
- This is the first reported case of vitamin B12 desensitisation in a child
- Protocol used is similar to that reported by colleagues in 2 adult patients
- Desensitisation using this protocol was safe and effective in our patient and could be used in future

## Category: Basic Science

P.120

### **Immunoproteomic investigation of *Fusarium lateritium*, an allergenic sensitizer in the population of Kolkata, India**

D. Dey, S. Gupta-Bhattacharya  
*Bose Institute, Kolkata, India*

#### **Objectives**

The global prevalence of fungal allergy has augmented identification of allergenic fungal species and their IgE-reactive components. A combination of clinical and immunoproteomic approach has been employed to identify allergens from *Fusarium lateritium* (FL), a prevalent aerospore in India.

#### **Method**

Quantitative and qualitative estimation of the areospores of Kolkata metropolis, India was performed by two yearlong air sampling and concurrent in vivo test (Skin Prick Test) on local allergic population respectively. FL appeared as a major threat. A cohort of 11 FL-sensitive patients was selected as study subjects and individual sera were used for further in vitro tests like specific IgE-ELISA and basophil histamine release. First gel-based profiling of FL proteome was done through mono and two-dimensional gel (3-10 pI). Parallel immunoblots were followed using patients' sera. As sequence databases of FL are unavailable, a proteomic workflow employing MALDI TOF/TOF was used to identify allergens.

#### **Results**

FL appeared to be one of the dominant aerospores. Antigenic extract elicited > +1 SPT response in 32% of the local populace. Individual patient sera induced significant histamine release upon sensitizing basophils and elevated specific IgE level in ELISA with FL extract. 43 bands and 106 spots (approximated) were observed in coomassie-stained mono and two-dimensional gel respectively in the range of 14.3-97.4 kDa. Mono-dimensional immunoblot with individual sera revealed 7 immunoreactive bands/zones and 7 sero-reactive spots were found in two-dimensional immunoblot using pooled sera. 34kDa protein was present in the highest frequency amongst the patient population indicating it to be a major allergen. This spot was identified as glyceraldehyde-3-phosphate dehydrogenase through conventional MS/MS-based MASCOT database search ( $p < 0.05$ ).

#### **Conclusions**

This proteome-based analysis is a pilot study to search allergens from FL. The identified major allergen would lead an improved way of component-based diagnosis and therapy.

## P.121

### **The effect of vitamin D supplementation on cathelicidin levels, vitamin D receptor (VDR) and E-cadherin expression after nasal allergen challenge in allergic rhinitis**

Natasha Gunawardana<sup>2,1</sup>, Gaynor Campbell<sup>5</sup>, Sarah Lindsley<sup>3,1</sup>, Ryan Thwaites<sup>1</sup>, Elizabeth Mann<sup>4</sup>, Tanushree Tunstall<sup>3</sup>, Peter Openshaw<sup>1,3</sup>, Sebastian Johnston<sup>1,3</sup>, Catherine Hawrylowicz<sup>4</sup>, Trevor Hansel<sup>1</sup>

<sup>1</sup>Imperial College, London, UK, <sup>2</sup>Royal Brompton Hospital, London, UK, <sup>3</sup>St. Mary's Hospital, London, UK, <sup>4</sup>King's College London, London, UK, <sup>5</sup>Edinburgh University, Edinburgh, UK

#### **Objectives**

Vitamin D may affect the innate and adaptive immune system in allergic disease with a need to study the effect on the respiratory mucosa *in vivo*. We studied the effects of vitamin D supplementation on inflammation and epithelial barrier function after nasal allergen challenge (NAC).

#### **Method**

We carried out a double-blind randomised controlled study of vitamin D supplementation, with grass pollen NAC before and after supplementation. Subjects with a clinical history of hayfever and serum vitamin D (25(OH)D) levels <75nmol/L were recruited; 12 subjects received vitamin D supplementation (4000U orally daily for 28-35 days) and 4 placebo. Mucosal lining fluid (MLF) was sampled at hourly intervals up to 8h. MLF was eluted by centrifugation, and mediators including IL-4, IL-5, IL-13 and cathelicidin levels were measured by multiplex immunoassay. Nasal mucosal samples were taken by nasal curettage at screening and at 8 hours after NACs. Immunohistochemistry assessed vitamin D receptor (VDR) and E-cadherin protein expression.

#### **Results**

Vitamin D supplementation increased serum vitamin D levels ( $P<0.01$ ). Elevated levels of cathelicidin in nasal MLF were seen between 2-8h after NAC, with IL-5 increasing later at 4-8h. There was no significant difference between vitamin D and placebo in induction of any of these mediators (AUC). Expression of the nuclear VDR was increased post NAC but there was no alteration after supplementation. E-cadherin altered from continuous epithelial junctional expression to a diffuse punctate pattern following NAC, with no change following supplementation.

#### **Conclusions**

Although serum vitamin D levels were normalised, we were unable to detect changes in NAC induced generation of mucosal mediators, despite cathelicidin being a vitamin D responsive anti-microbial peptide. This lack of effect in allergic rhinitis is consistent with clinical studies that failed to show the benefit of vitamin D supplementation in adult asthma.

**T cell-mediated drug allergy: the role of in-vitro testing in the paediatric population**

Wei Yann Haw<sup>1</sup>, Marta E Polak<sup>1</sup>, Carolann McGuire<sup>1</sup>, Michel Erlewyn-Lajeunesse<sup>2</sup>, Michael Ardern-Jones<sup>1,2</sup>

<sup>1</sup>University of Southampton, Southampton, UK, <sup>2</sup>University Hospital Southampton NHS Foundation Trust, Southampton, UK

**Objectives**

Delayed type (T-cell mediated) drug hypersensitivity reactions (DHR) are often hard to diagnose, especially in the paediatric setting. Such reactions may range from mild to severe or life threatening. Despite this, there is a significant lack of published data specifically addressing the use of in-vitro diagnostics in the management of DHR in children. We set out to compare the use of lymphocyte proliferation assay (LPA) against combination cytokine assays in the paediatric population and their potential use in the acute and post-recovery phases.

**Method**

The study included 16 patients, 7 children with DHR in the acute phase, 7 post-recovery and 2 children tested during both acute and post-recovery phases. A total of 18 in-vitro tests were undertaken ex-vivo using ELISpot and [<sup>3</sup>H]-Thymidine assays to measure drug-specific cytokine release (interferon (IFN)- $\gamma$  and interleukin (IL)-4) and proliferation above background.

**Results**

Antibiotics are the most group known to cause DHR, followed by anti-convulsants and anti-fungals. Causative drugs as identified by positive assays, were most frequently detected by cytokine assays compared to LPA in both acute (IL-4 100%; IFN- $\gamma$  88.9%; LPA 77.8%) and post-recovery phase (IL-4 66.7%; IFN- $\gamma$  66.7%; LPA 33.3%). Combination cytokine assays (IFN- $\gamma$  and IL-4) showed higher positive drug-specific responses and were superior to LPA in the detection of all types of cutaneous DHR in the acute and post-recovery phases.

**Conclusions**

In-vitro drug-induced T cell proliferation and cytokine release assays were useful for identification of culprit drug in DHR in children. In-vitro assays are pain-free, and allow safe testing for multiple potential harmful drugs, even in the acute setting. Cytokine assays (IFN- $\gamma$  and IL-4) were better than LPA, but when combined, they offer even greater sensitivity for detection of drug-specific T cells. These novel in-vitro assays may offer a significant advancement in our management of DHR in children.

P.123

**Physicochemical and immunologic characterization of grass allergoids: detection of allergen composition and identification of novel epitopes**

Matthew Heath, Sviatlana Starchenka, Andrew Bell, Murray Skinner  
*Allergy Therapeutics Plc, Worthing, UK*

**Objectives**

The rationale behind chemical modification of allergens using glutaraldehyde to decrease allergenicity through disruption of conformational IgE epitopes, while maintaining immunogenicity via preservation of sequential IgG epitopes. The resulting product is a molecule containing individual allergens in chains which may have a higher molecular weight. The use of allergoid preparations is a large sector of the allergy immunotherapy market, associated with proven clinical efficacy and short-course therapy. This investigation sought to investigate the allergen composition and epitope specificity of IgG-antibodies induced by glutaraldehyde polymerized grass allergens.

**Method**

The profile of polymerization of grass allergens into allergoids was characterised by high performance-size exclusion chromatography (HP-SEC). Different sizes of allergoid fractions were further purified, fragmented and analysed via tandem mass spectrometry. Recognition of linear IgG-epitopes of the group 1 major allergen - Lol p 1 - and the capacity of these IgG-antibodies to block binding of human-IgE was determined.

**Results**

HP-SEC highlighted native and allergoid extracts as not two discrete preparations but instead a formula of native and modified allergens, within which IgG reactive epitopes are present. Proteomic analysis of a twelve grass mix allergoid preparation confirmed the presence of allergens from multiple grass species. IgG-reactive epitopes were mapped on the group 1 crystal structure. The capacity to block binding of human-IgE was highlighted.

**Conclusions**

Epitope specificity of IgG-antibodies induced by glutaraldehyde polymerized allergens recognize common but also novel epitopes compared with native extracts and have the propensity to effectively inhibit human-IgE binding to allergens which may be part of the mechanism of action of SIT.

## P.124

### **Microcrystalline tyrosine (MCT) as an adjuvant in allergy immunotherapy: a mouse study**

Deborah Leuthard<sup>1</sup>, Sina Weiss<sup>1</sup>, Sandra Freiberger<sup>1</sup>, Agathe Duda<sup>1</sup>, Matthew Heath<sup>2</sup>, Matthias Kramer<sup>2</sup>, Murray Skinner<sup>2</sup>, Pal Johansen<sup>1</sup>, Thomas Kuendig<sup>1</sup>

<sup>1</sup>University Hospital Zurich, Zurich, Switzerland, <sup>2</sup>Allergy Therapeutics Plc, Worthing, UK

#### **Objectives**

Coprecipitates of L-tyrosine (microcrystalline tyrosine; MCT) with allergens/allergoids, and especially formulations also containing MPLA have been described as suitable adjuvants in Allergen Immunotherapy (AIT) that facilitate short-course therapy. This ongoing study aims to assess the potential of MCT in AIT as well as to further elucidate action mechanisms of the adjuvant.

#### **Method**

A murine model for immunisation and AIT was applied. Typically, mice were immunised subcutaneously or sensitised intraperitoneally with ovalbumin (OVA) and MCT or OVA and alum. Immune responses were assessed by OVA-specific ELISA for IgG, IgG1, IgG2a, IgG2b, IgG3 and IgE. T-cell analysis was done by OVA-specific cytokine-ELISA after in vitro restimulation of spleen cells. The clinical effect was examined by measuring the change in body temperature after a systemic challenge with OVA. Possible mechanisms of action of MCT as an adjuvant were studied both in vitro and in vivo. Here, the role of MCT in activating inflammasomes and Toll-like receptors was investigated.

#### **Results**

After three fortnightly immunisations, the levels of IgG antibodies in mice treated with MCT-based vaccines were comparable to those in mice treated with alum-based vaccines. The IgE production was slightly higher in the alum-treated mice, whereas the MCT-treated group showed slightly stronger IFN- $\gamma$  response. The potential sensitisation risk by multiple injections with therapeutic allergens was slightly lower with MCT than with alum, and a challenge of sensitised mice with OVA-MCT showed less systemic anaphylaxis than a challenge with OVA-alum. Concerning the action mechanisms, results from in vitro experiments with antigen-presenting cells suggested that MCT is able to induce inflammasome-dependent IL-1 $\beta$  secretion. Moreover, immunisation with OVA-MCT in MyD88-deficient mice showed decreased immune responses compared to wild type mice.

#### **Conclusions**

MCT and alum are comparable adjuvants with regards to the immunogenicity potential of allergens in mice, supporting MCT's use as a suitable, biodegradable, adjuvant alternative to alum in AIT.

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**Degradation of Surfactant Protein D (SP-D) by Dipeptidyl Peptidase I (DPPI): A mechanism for lung injury in asthma?**

Yaroslav Shkanov<sup>1</sup>, Rose-Marie Mackay<sup>1</sup>, Rhys George<sup>1</sup>, Laurie Lau<sup>1</sup>, Rana Abadalkareem<sup>1</sup>, John Pedersen<sup>2</sup>, Andrew Walls<sup>1</sup>

<sup>1</sup>*Immunopharmacology, University of Southampton, Southampton, Hampshire, UK, <sup>2</sup>UNIZYME Laboratories, Hørsholm, Denmark*

**Objectives**

SP-D orchestrates innate immunity in the lung and has been found to be degraded in the airways of asthmatic patients, compromising the lung immune system. An increased degree of mast cell activation is also a prominent feature in asthmatic airways, contributing to the release of inflammatory mediators and proteases. Among the proteases is DPPI. Our aims were to investigate the capacity of DPPI to cleave SP-D and alter its functionality.

**Method**

Recombinant human mast cell protease DPPI was incubated with a recombinant fragment of human surfactant protein D over a range of physiological conditions and time periods. The potential for SP-D cleavage was analysed by SDS polyacrylamide gel electrophoresis (PAGE), and Western blotting with antibodies specific for SP-D and DPPI was employed to confirm the identity of component proteins. Functionality of SP-D was assessed by bacterial growth inhibition.

**Results**

DPPI induced a concentration-dependent degradation of SP-D with the appearance of new fragments of 8 and 10 kDa. The addition of protease inhibitors or heat-inactivation of DPPI resulted in substantially less degradation of SP-D, indicating dependence of an intact catalytic site. Incubation of SP-D with DPPI significantly reduced its ability to inhibit bacterial growth.

**Conclusions**

The ability of DPPI to cleave SP-D and attenuate its function could contribute to inflammatory changes in the lungs of asthmatics.

## P.127

### **Innovative nasal filters allow for allergen exposure monitoring and are acceptable to wear**

Samantha Tyler<sup>1</sup>, Ross Yarham<sup>1</sup>, Anna Kuklinska-Pijanka<sup>1</sup>, Maria Stacey<sup>1</sup>, Hayley Gallagher<sup>1</sup>, Peter Kenney<sup>2,3</sup>, Torben Sigsgaard<sup>3</sup>, Martin Chapman<sup>1</sup>, James Hindley<sup>1</sup>

<sup>1</sup>Indoor Biotechnologies, Cardiff, UK, <sup>2</sup>Rhinix ApS, Aarhus, Denmark, <sup>3</sup>Aarhus University, Aarhus, Denmark

#### **Objectives**

Settled dust is an easily available sample type yielding lots of allergen. However, this is only a snapshot of the allergen reservoir and may not take into account the full spectrum of allergen which a subject breathes in during their whole day. In this study, we sought to assess the feasibility of using a new nasal filter for the assessment of allergen exposure.

#### **Method**

The nasal filter consists of a membrane that removes particles by means of interception and impaction. Volunteers wore the nasal filter for up to 24 hours during their normal daily routine. For comparison, settled dust was collected from each volunteer's home. Allergen was extracted by gentle rocking in PBS-tween for two hours. The levels of ten major allergens captured were quantified using a multiplex array for quantification of indoor allergens which allows for quantification of airborne allergen down to 0.01ng/ml (mouse Mus m 1). Finally, in a randomized control trial the device was evaluated on usability and tolerance.

#### **Results**

Significant levels of allergens were readily detectable in the nasal filter extracts and ranged from 39ng/filter to 0.01ng/per filter, including allergens from house dust mite (Der p 1, Mite Group 2), cat (Fel d 1), dog (Can f 1), mouse (Mus m 1) and pollen (Bet v 1). There was some correlation with corresponding samples collected from settled dust. Most people (90%) seemed to quickly (within 60 minutes) forget that they were wearing the nasal filter. Most (85%) did not experience a difference in breathing resistance.

#### **Conclusions**

These data indicate that nasal filters may be considered a simple and easily wearable method for monitoring allergen exposure. This sampling method which takes into account a wider spectrum of potential allergen exposure sources may improve our understanding of the role of allergens in the development of allergic disease.

**P.128****Quantitative Immunoassays for native and denatured major milk allergens, Bos d 5 ( $\beta$ -lactoglobulin) and Bos d 11 ( $\beta$ -casein).**

Ross Yarham<sup>1</sup>, Anna Kuklinska-Pijanka<sup>1</sup>, David Gillick<sup>1</sup>, Elizabeth Young<sup>1</sup>, James Hindley<sup>1</sup>, Karine Patient<sup>2</sup>, Herve Bernard<sup>2</sup>, Martin Chapman<sup>1</sup>

<sup>1</sup>Indoor Biotechnologies, Cardiff, UK, <sup>2</sup>INRA, Gif-sur-Yvette, France

**Objectives**

Allergy to milk is one the most prevalent allergies affecting around 3% of children. At present there is no effective treatment for milk allergy and therefore strict avoidance is recommended. This however can be difficult as milk is an ingredient in many foods. The development of diagnostics and therapeutics for milk allergy depends on accurate and reliable methods for standardisation. Our aim was to develop quantitative immunoassays that could be used to accurately measure specific milk allergens.

**Method**

Monoclonal antibody pairs recognising major milk allergens Bos d 11 ( $\beta$ -casein) and Bos d 5 ( $\beta$ -lactoglobulin) in its native and denatured state and were obtained. Subsequently two-site ELISAs and Luminex xMAP assays were developed using highly purified, IgE validated allergens as standards. The assays were used to measure milk allergens in different types of foods and diagnostic/therapeutic preparations.

**Results**

The Lower Limit of Detection (LLOD) for ELISA was 7.8ng/ml for both native and denatured Bos d 5 and 15.6ng/ml for Bos d 11. The Luminex assays proved to be even more sensitive with LLOD up to 40-fold lower compared to ELISA (0.2 ng/ml, 2.0ng/ml and 4.9 ng/ml for native Bos d 5, denatured Bos d 5 and Bos d 11 respectively).

**Conclusions**

These data demonstrate that these immunoassays are suitable for the quantification of specific milk allergens, in their native and denatured forms, as well as in food samples containing relatively low levels of milk allergen. 'Hypoallergenic' baby formula may still contain cow's milk allergen. Immunoassays for quantification of specific milk allergens have been developed. The assays can be used separately (as ELISA) or be 'multiplexed' (Luminex assays) allowing simultaneous quantification of multiple allergens in a single sample. The immunoassays will allow standardization of milk protein levels in diagnostic and therapeutic extracts and detection of milk allergens in foods.

## Category: Allied Health

### P.129

#### **Home baked milk reintroduction (BMR) ladder for children less than 3 years with IgE-mediated milk allergy: tolerance outcome, safety and parental satisfaction.**

Heidi Ball, Gary Stiefel, Kerrie Kirk, Kristian Bravin, David Luyt  
*Children's Allergy Service, University Hospitals of Leicester, Leicester, UK*

#### **Objectives**

Standard practice in our service is to advise all children with IgE-mediated milk allergy with SPT<8mm and no previous anaphylaxis to start the BSACI milk reintroduction ladder from 1 year of age. Many centres do not recommend this over concerns of anaphylaxis and prefer supervised challenges. We reviewed our practice to assess the development of tolerance with home introduction, as well as safety and parent's satisfaction.

#### **Method**

Data was collected at 2 review appointments (6 and 12 months) following advice on *starting* BMR. We scored tolerance from 0(no baked milk) to 6(fresh milk tolerance). After the second review a questionnaire was sent to all patients to determine satisfaction, confidence on home introduction and any allergic symptoms.

#### **Results**

53 children were assessed. 49 had BMR<24 months of age. SPT at reintroduction was 3-4mm in 27, 5-7mm in 24 and 8mm in 2. At first review 45(85%) children had successfully introduced baked milk (17 of these tolerating level 4) whilst at second review 49(92.5%) were tolerating baked milk (32 of these level 4, 12 level 6). 29 reactions were recorded, (mild=27, moderate=2, mainly cheese flavouring).

Of the 17 who returned questionnaires, only 2 were not happy about introducing baked milk at home and 1 did not feel they had adequate support/confidence for BMR or managing allergic reactions. Questionnaires highlighted several reactions to less cooked milk (e.g. yoghurt). 82.3% rated overall care with respect to milk allergy as good/excellent.

#### **Conclusions**

Our practice of BMR is safe, practical and results in high resolution of milk allergy (when started early). Parents achieve this best when they have a package of care (written BMR ladder and action plan for management of allergic reactions). In parents who are anxious, supervised challenges should still be considered, although this may be better instigated when moving from baked to less cooked milk.

## P.130

### **Precautionary allergen labelling (PAL) - Nuts about getting it right**

Rachel De Boer<sup>1</sup>, Hannah Hunter<sup>2</sup>, Charlotte Stedman<sup>1</sup>, Ruth Chalmers<sup>1</sup>, M Hazel Gowland<sup>3</sup>, Lauri-Ann Van der Poel<sup>1</sup>

<sup>1</sup>St Thomas' Hospital, London, UK, <sup>2</sup>Guy's Hospital, London, UK, <sup>3</sup>Allergy Action, St Albans, UK

#### **Objectives**

Current practice now includes advice to consume particular tree nuts and peanuts to maintain tolerance, nutritional adequacy and variety. Patients need to make informed decisions about PAL. Studies confirm that some consumers attribute grades of risk according to the word format used, as well as trust in the supplier, whether they reacted last time they ate the product. Evidence indicates that advisory labelling may not tally with actual presence. An intelligent digital food search tool was used to survey current advisory labelling for both peanuts and tree nuts present on all prepacked foods from five major UK supermarkets.

#### **Method**

Using the Healthcare Professional portal of a digital food search tool (FoodMaestro®), we searched prepacked food products available in ASDA, Morrison's, Sainsbury's, Tesco and Waitrose. Product ingredients data are classified from trusted sources in line with categories informed by allergy specialists and expert dietitians. 90071 products were searched for PAL ('may contain' labelling and related formats). Word formats were recorded. Further searches were made within food categories known to represent a challenge for people with nut / peanut allergies such as biscuits.

#### **Results**

The digital food search tool found over 5000 word formats to communicate 'may contain' for any allergen. 7065 of 90071 (7.8%) products carried PAL for peanuts and 25 482 (28%) carried PAL for different 'tree nuts'.

#### **Conclusions**

The format for 'may contain' labelling needs to be standardised and if used, should be clear and legible. Food suppliers should specify which tree nuts / peanut may be present, in order to help those seeking to eat some and avoid others. A digital food search tool provides an effective health care and consumer resource to improve avoidance, maintain tolerance and enhance nutritional variety.

## P.131

### Is there a doctor on board?

Amy Foggitt<sup>1</sup>, Nisha Verma<sup>1</sup>, David Thursfield<sup>1</sup>, Harsha Kariyawasam<sup>1</sup>, Nada Al Bahrani<sup>1,2</sup>, Magda Dziadzio<sup>1</sup>, Joanna Lukawska<sup>1</sup>

<sup>1</sup>University College London Hospital, London, UK, <sup>2</sup>King Fahd University Hospital, Dammam, Saudi Arabia

### Objectives

There are around 10 000 planes flying approximately 1 million people at any one time. 1 in every 604 flights involves a reported medical emergency totalling 44, 000 in-flight medical emergencies (IFME) worldwide every year. Health care professionals (HCPs) provide assistance in around 76% of IFME: doctors in 48%, nurses in 20%, and others in 7.7%. We sought to find out what they expect to be available in such circumstances and what is actually available, focusing on adrenaline. Severe allergic reactions including anaphylaxis account for 2.2-3.7% of in-flight medical emergencies. Up to 55% of anaphylaxis occur in individuals with no history of allergy. Anaphylaxis can lead to cardiac arrest in less than 15 minutes. Effective administration of adrenaline is essential.

### Method

We surveyed 10 UK based airlines regarding emergency adrenaline on board. We also asked doctors and nurses if they had participated in an IFME and what they expected to find in an in-flight medical emergency kit (IFMEK)

### Results

88 respondents: 48 doctors (54.5%) and 40 nurses (45.5%)  
79% of doctors (38) and 90% (36) of nurses have not assisted in an IFME.  
Of these, 95% of doctors and 89% of nurses expected adrenaline in the IFMEK  
Of 10 Airlines based in the UK none carry emergency adrenaline.

### Conclusions

HCPs who respond to an IFME are in a precarious and unfamiliar situation. HCPs are not aware of the paucity of tools and medications available for their use and that the European EMK is in fact no more than a first aid kit containing plasters and bandages, but no adrenaline. In 1986, the Federal Aviation Administration upgraded in-flight emergency kit in the USA to include adrenaline. European Aviation Safety Agency (EASA) still does not mandate it. Is it not time we followed suit?

## P.132

### **Can I help you? - Horizon-scanning allergy priorities using enquiries to the Anaphylaxis Campaign**

M Hazel Gowland<sup>1,2</sup>, Lisa J Stratford<sup>1</sup>, Moira M Austin<sup>1</sup>

<sup>1</sup>*Anaphylaxis Campaign, Farnborough, UK*, <sup>2</sup>*Allergy Action, St Albans, UK*

#### **Objectives**

To monitor and classify allergy enquiries to the Anaphylaxis Campaign to identify issues of interest or concern to different stakeholders by subject, season and location.

#### **Method**

The Anaphylaxis Campaign has provided information and support to patients and consumers at risk from severe allergy since 1994. Experienced staff continue to receive enquiries from members (individuals, health care professionals and businesses selling food, allergy-related pharmaceutical products, and related scientific and consultancy products and expertise), as well as from non-members and the media. Enquiries once made by correspondence (letter) and telephone now arrive more frequently by email, as well as via social media such as Facebook and Twitter. Information collated is classified by month, by subject and by enquirer. Detailed data were collected for January to June 2016.

#### **Results**

Preliminary analysis indicates that some enquiries are seasonal, relating for example to starting a new school term, or going on holiday. Some follow the publication of the Campaign's newsletter. Other enquiries follow the publication of research and media coverage of studies underway. Patients / consumers and parents / carers in particular are looking for authoritative guidance on what to eat or feed children, and access to immunotherapy. Early indicators of challenges accessing patient care and health-related quality of life issues may also be identified.

#### **Conclusions**

Improved understanding of individuals and organisations making enquiries, and the routes via which their enquiries arrive, as well as early provision of clinically / technically authoritative guidance following the publication of research may serve to reduce anxiety, shape food industry best practice and guide health care professionals to improve the service they provide.

### **Food allergy law and consumer protection - an update from UK courts**

M Hazel Gowland<sup>1</sup>, Michael J Walker<sup>2</sup>

<sup>1</sup>Allergy Action, St Albans, UK, <sup>2</sup>Government Chemist Programme, LGC, Teddington, UK

#### **Objectives**

Food allergen avoidance is now a key public health requirement, with a forensic perspective in cases involving allergy-related personal injury, fatality or criminal non-compliance by a food supplier. Such non-compliance in the provision of food information, managing food safety or controlling other related risks continues to be examined in UK criminal and civil courts. In December 2014, enhanced allergen labelling in the Food Information Regulation 1169/2011 EC became enforceable in UK law. 14 key allergen ingredients must be highlighted on packaging and declared on request to customers throughout the European Union. One purpose of this is to support food allergen avoidance for those with food allergies, intolerances and coeliac disease, both for the person at risk, and also all those making choices on their behalf including carers and caterers.

#### **Method**

Earlier in 2014, an investigation began into the death of a 38 year old man in North Yorkshire from peanut allergy. This led to the eventual conviction, with a custodial sentence, of a caterer for a number of offences including manslaughter (gross negligence), selling unsafe food and providing misleading information about food on sale. The prosecution involved early close cooperation between the police and the trading standards team, the availability of clinical and analytical expertise, key post mortem evidence and understanding allergen information provided throughout the food supply chain.

#### **Results**

Sampling and analysis repeatedly indicate that peanut may be found in dishes sold as suitable for those with peanut allergy. Although required to do so by law, staff do not always know whether they are using peanut or ground almond. Peanut as a curry thickener has been detected in other ingredients and utensils, and may be uncontrolled in that environment.

#### **Conclusions**

Further prosecutions have taken place, leading to fines and other penalties. Patients who need to avoid peanut should understand this risk.

## P.134

### **Can you bake your cake and eat it? Do baked egg challenges make a difference to families?**

Mumtaz Idris, Ferdinand Morales, Eliana Leitao, Christine O'Keeffe, Fiona Henley, Claudia Gore  
*Imperial College Healthcare NHS Trust, London, UK*

#### **Objectives**

Complete egg avoidance is difficult for patients to achieve especially if they have multiple food allergies. We aimed to evaluate if children have late reactions upon re-introduction, if baked egg is successfully included at home and if quality of life (QoL) benefits are achieved.

#### **Method**

Retrospective database survey (all departmental challenge outcomes period September 2014 to February 2016), identifying children who underwent a baked egg challenge, their test results and documented reactions. Telephone interview of parents/carers of children who passed the challenge, using a semi quantitative questionnaire.

#### **Results**

145 children were challenged, 51/145 (35%) failed, 4/145 (2.7%) inconclusive, 90/145 (62%) passed. 42/90 (47%) were successfully contacted. Following challenge, 34/38 parents correctly understood which egg-containing products could be included.

Inclusion of BE at home: 38/42 (%) successfully include BE, 4/42 (%) had later reactions at home leading to continued avoidance (2/4 vomited, 1/4 abdominal pain, 1/4 eczema flare), 5/38 (%) had initial mild symptoms (3/5 eczema flare, 1/5 loose stool, 1/5 rash 3 hours later) but continued to include successfully.

QoL: 33/38 parents felt their quality of life was improved (71% rated the improvement 7-10/10 on VAS) and 35/38 (92%) of parents felt their child's QoL had improved (84% rated 7-10/10). 36/38 had other food allergies. 32/38 (84%) of children had  $\geq 1$  other food allergy (range 1-7).

Skin prick test (SPT) results were variable in children who passed the challenge: whole egg extract wheal diameter mean 6.5mm (range 0-17mm) and raw egg mean 12mm (range 0-25mm). SPT in those without late reactions did not differ from those with late reactions (extract 5mm and raw egg 12mm).

#### **Conclusions**

Baked egg is tolerated well after challenge with the majority including it successfully and reporting better quality of life. Late reactions after challenge are uncommon, not severe and not predictable by test results.

## P.135

### **Management of eczema in the acute care setting-audit of NICE eczema guideline in a paediatric accident & emergency department.**

Konstantinos Kakleas, Lloyd Steele, Claudia Gore

*Paediatric Allergy Department, St Mary's Hospital, Imperial College Healthcare NHS Trust, London, UK*

#### **Objectives**

Eczema is a chronic inflammatory skin disorder affecting 20-25% of children in the UK. The burden of the condition on children's quality of life (QoL) is high, making early recognition and appropriate treatment important. Although rarely an acute, severe medical problem, children and infants are brought to the emergency department because of difficulties with disease control. We audited the care provided in a dedicated paediatric accident and emergency department against the NICE eczema guideline (CG57).

#### **Method**

We retrospectively collected all data from A&E electronic records for children diagnosed with eczema (coded on electronic discharge) from March 2015 to January 2016. All records were reviewed to assess adherence to NICE guidelines for eczema diagnosis and treatment.

#### **Results**

32 patients were identified. Reason for attendance was eczema, infected eczema, eczema herpeticum. Age ranged from 8 months to 7 years. In 4/32 (12.5%) eczema severity was documented; QoL was not routinely assessed (only 1/32; 3%). In 5/32 (16%) triggers were identified (stress, viral illness, food). Emollients were prescribed for 30/32 of patients (93%). Topical corticosteroids (TCS) were prescribed for 19/32 (60%); with mild or moderate TCS for the face and moderate to potent TCS for the body. Antibiotic treatment was commenced for 7/32 (22%), 6/7 received Co-Amoxiclav. Education for patients was mostly not documented, and only 1/10 patients was given verbal advice. Follow-up was planned with the GP (14/32; 44%), Dermatologist (4/32; 12.5%) and Allergist (5/32; 16%) because of uncontrolled eczema.

#### **Conclusions**

Management of eczema in the emergency setting is variable and NICE guidance is not followed routinely. Staff and patients require education and training regarding eczema management, as prompt and correct diagnosis will improve quality of care, quality of life and decrease likelihood of re-attendance to hospital.

**P.136**

**A 2 year retrospective analysis of oral provocation challenges to cake/egg undertaken at Bristol Royal Hospital for Children. M Kanchanatheera**

Myriam Kanchanatheera

*Bristol Royal Hospital for Children, Bristol, UK*

**Objectives**

To review cake/egg challenge outcomes performed over a 2 year period, 2014-2015, and to determine whether increased serum testing to egg white and Ovomuroid (Gal d1) IgE over this period in addition to skin prick testing has affected challenge outcomes.

**Method**

A retrospective review of children having undergone oral provocation challenges to cake/egg in Bristol between Jan 2014 and Dec 2015 was performed. Outcomes and testing prior to challenges were looked at in detail.

**Results**

A total of 163 oral provocation challenges were analysed.

In 2014, 72 challenges were performed, of which 15 were to cake and 80% passed, 55 were to egg and 65% passed, and 2 were to raw egg and 50% passed.

In 2015, 91 challenges were performed, of which 29 were to cake and 86% passed, 61 were to egg and 55% passed and 1 was to raw egg and 100% passed.

In 2014, a total of 18 children who underwent a cake/egg challenges, had serum IgE to egg white and or to Ovomuroid in addition to skin prick testing and in 2015 a total of 42 children, had these tests.

**Conclusions**

Results showed that there was changing practices over this period on the practioners part, there was increasing numbers of serum tests in 2015 as compared to 2014, but it is difficult to determine whether this has improved the rate of putting the right children forward to successfully complete an oral provocation test to cake/egg, as in both years, there was a wide variance in age/sex and ethnic origin of the children challenged.

## **P.137**

### **Is the Yellow Fever Vaccine safe for egg allergic children?**

Katherine Knight

*Guys and St Thomas' NHS Trust, London, UK*

#### **Objectives**

To determine whether vaccinating children with an egg allergy to the Yellow Fever Vaccine (YFV) is safe if an adapted YFV protocol is used.

#### **Method**

An audit of children with an egg allergy attending the department for the YFV between April 2013 and April 2016 was carried out in order to determine how many had been successfully vaccinated and how many had reacted adversely to the vaccine. Of those children who had reacted to the YFV, at what stage of the adapted YFV protocol had this occurred. The adapted protocol being; skin prick test to the YFV, 1/10th of the YFV as an intramuscular injection followed by the remainder of the dose intra muscularly.

#### **Results**

20 children with an egg allergy attended the department between April 2013 and April 2016 to receive the YFV. 2 children had had a clinical allergic reaction to egg within the last 12 months, 14 over 12 months ago and 4 had never eaten egg previously but were avoiding based on diagnostic testing. 17 children did not show any signs of sensitivity or allergic reaction to the vaccine and received the full YFV dose. 3 children did not proceed to the full vaccination as they showed signs of sensitivity at the skin prick testing stage or the 1/10th of the vaccination dose. Out of the 3 children that reacted, 1 required oral antihistamine, 2 did not require any treatment. There were no systemic allergic reactions

#### **Conclusions**

Using an adapted YFV protocol is a safe way to administer the YFV- 85% of children with an egg allergy referred to our department for the YFV safely received the full vaccine with no adverse reaction. Using this protocol also makes it possible to identify those children who are sensitive to the YFV and therefore halt the vaccination process.

## P.138

### **Trust wide awareness to the new food allergen labelling regulation under 'Food Information Regulation UK' (FIR UK) at Sunderland Royal Hospital**

Prashant Kumar, Judith Hunter, Shazia Majeed  
*Sunderland Royal Hospital, SUNDERLAND, UK*

#### **Objectives**

Food allergen labeling regulation is changed significantly as new FIR UK has come in force since December 2014. It now covers all unpackaged food in addition to the packaged food. Information about 14 food allergen in all food served in the hospital should be available and Hospital staff serving the food to patients are responsible for providing information to patients. Failure to comply is a criminal offence, Trust may be liable to criminal prosecution and individual may be fined. This was a trustwide Food safety governance audit. It was done to assess the awareness to the new responsibilities of the staff involved in cooking or serving the food since the new FIRsUK has come in force.

#### **Method**

After an initial sampling audit in Paediatrics, information from carer of allergy patients and staff involved in serving the food, the need to improve awareness to the new regulation was identified. Detailed information about FIR UK, their responsibilities & where to find allergen information on intranet was sent to all staff involved in cooking and serving the food by e mail two weeks prior to the survey. Two weeks after the information was sent, a trustwide audit survey to assess the awareness was done.

#### **Results**

Most Staff involved in serving the food were aware of the law and felt safer.

- Aware of the law (96%), allergen involved (95%)
- Aware of their responsibility & penalty in case of non-compliance (95%)
- Aware where to access the allergy information on Trust Intranet (97%)
- Found the exercise useful (95%)
- Feel safer (94%)

#### **Conclusions**

Most staff are aware of about change in the Allergen labelling laws and there is improved food safety.

- **Patients: are safer** because of availability of with Allergy information
- **Staff are safer:** as they will comply with regulation
- **Trust:** Reduced risk of non-compliance of regulation

**P.139**

**Assessing the quality and reliability of online health information in relation to peanut consumption during pregnancy.**

Dean Sharman, Helen Smith, Christina J Jones  
*Brighton and Sussex Medical School, Brighton, UK*

**Objectives**

Consumer health information is widely available, and nowhere more so than on the internet. The quality and reliability of this information can be hugely variable. The debate over consumption of peanuts during pregnancy and the causation of childhood allergy is one that continues. This can mean uncertainty and worry for women looking for information to guide their dietary choices throughout pregnancy. This study aimed to identify the class, interventions described, reliability and readability of the websites

**Method**

The search term "Can I eat peanuts whilst pregnant" was entered into Google and the first 200 websites that returned were analysed for (1) Class of website (Health portal, patient group, professional, commercial, non-profit, journalism or other); (2) JAMA criteria; (3) SMOG readability tool; (4) intervention described. We also analysed 20 random sites from the original 200 using the DISCERN tool to compare reliability with the JAMA criteria.

**Results**

The most common websites returned were other (e.g. social media) (26%), followed by professional (24%) and patient group (17%). Although less common, journalism (13%) and health portal websites (11%) returned the highest average JAMA score with commercial sites (7%) scoring the lowest. 23% of websites returned mentioned maternal consumption of peanuts as an intervention to prevent their babies developing an allergy. Preliminary analysis of readability (SMOG) showed just 3% of websites within the recommended range of reading grade appropriate for consumer health information.

**Conclusions**

Variation between measures used to evaluate reliability suggest that some evaluation tools are subjective to the opinion of the user and are not always a true predictor of website reliability or quality. Despite the uncertainty surrounding maternal consumption, 23% of websites mentioned it as an intervention. Better regulation of online information is needed to protect consumers from untrustworthy sources and to ensure information is at the appropriate reading level.

## P.140

### **Comparison of three popular skin prick tests solutions used routinely in the United Kingdom following the loss of a major brand.**

Bethan Tomsett, Fiona Henley, Mumtaz Idris, Ferdinand Morales, Christine O'Keeffe, Claudia Gore  
*Imperial College Healthcare NHS Trust, London, UK*

#### **Objectives**

Due to a large supplier of skin prick test (SPT) solutions ceasing all production, there has been a nationwide need to find a suitable replacement of equivalent standards to ensure replicable results from previous years. SPT is an essential diagnostic tool in allergy and standardisation is vital for accurate assessment and action. We compared skin reactivity to routine allergen SPT with a small nut panel, supplied by three different manufacturers.

#### **Method**

Prospective clinical evaluation of new skin prick test solutions. Patients requiring SPT to Peanut, Hazelnut, Almond, and Walnut were tested using the baseline supplier - Stallergens (A) and either Lofarma (B) or Inmunotek (C) SPT solutions in addition. A single operator undertook comparison SPTs on the same patient, with standardised lancets during their clinical episode. Wheal diameter was documented as in standard practice. Differences in results of  $\geq 2$ mm of the maximum wheal diameter and  $\geq 1.5$ mm of the mean diameter were considered relevant.

#### **Results**

A total of 20 children had additional comparison SPT performed.

10 children had 28 tests using solutions from suppliers A and B. Discrepancies were seen in 18/28 (64%) tests results. 7/28 (25%) supplier B-solutions were negative ( $< 3$ mm) and positive on supplier A; 1/28 (4%) negative on A but positive on B.

10 children had 29 tests using solutions from supplier A vs. supplier C. Discrepancies were in 6/29 (21%) tests, with 2/29 (7%) supplier C being  $< 3$ mm and none of supplier A.

Solutions from supplier B showed significantly more discrepancies than those from supplier C ( $p=0.008$ ) when compared to supplier A.

#### **Conclusions**

This small sample audit suggests that there are considerable differences amongst Skin Prick Test Solutions currently available as diagnostic products from different suppliers. Less reactive solutions carry a risk tests being potentially false negative or children undergoing unnecessary food challenges.

## P.141

### **Accessing psychological services for children with allergy and their families: A survey of clinician views and experience.**

Judith Young<sup>1,2</sup>, Eleanor Minshall<sup>2</sup>

<sup>1</sup>University of East Anglia, Norwich, UK, <sup>2</sup>Addenbrookes Hospital, Cambridge, UK

#### **Objectives**

Despite the evidence illustrating that allergy impacts on the psychosocial functioning of children and families, it is unclear to what extent clinicians are able to refer to psychological services. This survey aims to explore clinician views of psychological need and ability to access psychology services.

#### **Method**

Professionals attending a regional Allergy Network meeting completed a structured questionnaire. The participant sample (n = 29) was multi-disciplinary: 12 Nurses, 7 Consultants, 5 Dieticians, 2 GPs, 2 Junior Doctors and 1 Nursery Nurse.

#### **Results**

Based on their clinical experience, the overwhelming majority (28/29) of professionals strongly agreed or agreed that there is a real need to address the psychological aspects of allergy in children as well as the physical aspects. Almost all of the participants (n = 28; 97%) wanted to be able to access psychology services for parents of and or children with allergy in their care. When asked, based on their experience, which groups of parents and/or children could benefit from psychological services: 97% reported those with a history of anaphylaxis; 83% feeding difficulties; 83% nut allergy; 79% teenagers, 69% fears of needles and/or skin prick testing; 69% those with adrenaline auto injectors. Almost half (48%) reported that parents of children with milk allergy could benefit. Only 43% of respondents (12/28) were able to refer to psychology services. This was either via a general paediatric psychology service or by referral to a clinical psychologist working in an allied paediatric specialty, such as gastroenterology.

#### **Conclusions**

These findings illustrate that, despite recognising need, fifty seven per cent of professionals who participated in a Paediatric Allergy Network survey reported that they were not able to access psychological services for children with allergy or their parents. Access to and models of psychology service provision in paediatric allergy require further attention.

## Category: Primary Care

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### Management of tomato allergies in children

Adnan Bajraktarevic<sup>1</sup>, Sasa Mandic<sup>1</sup>, Lejla Ahmetovic<sup>1</sup>, Zilha Ahmetovic<sup>1</sup>, Jasmina Tajic<sup>1</sup>, Nermina Tajic<sup>1</sup>, Almir Masala<sup>2</sup>, Amina Selimovic<sup>3</sup>, Ferid Krupic<sup>4</sup>

<sup>1</sup>Public Health Institution of Canton Sarajevo Pediatrics Department, Sarajevo, Bosnia and Herzegovina, <sup>2</sup>Faculty for Sport and Management, Sarajevo, Bosnia and Herzegovina, <sup>3</sup>Pediatric Clinic Sarajevo, Sarajevo, Bosnia and Herzegovina, <sup>4</sup>Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden

### Objectives

Food allergies are tend to be over diagnosed, but finally thirty percent of children have true allergies reactions to food.

### Method

The authors of study recruited 30 children with confirmed tomato allergy, diagnosed either from open food challenge or from their medical history. The severity of allergy varied within the group. Twenty two suffered from only mild symptoms but eight suffered from more severe symptoms during five years period 2010-2015. IgE enzyme linked immunosorbent essay ELISA using patients' serum against various tomato extracts was accomplished and IgE immunoblot was performed.

### Results

Percentage of presentation of tomato allergy are 71.5% dermatologic reaction as skin rash, eczema, or hives (urticaria), 19% as abdominal cramps, nausea, vomiting, diarrhea, 3% an itching sensation in throat, 3% coughing, sneezing, wheezing, or runny nose, 3% swelling of face, mouth, tongue or throat (angioedema), and 0.5% very rarely, anaphylaxis.

### Conclusions

Tomato allergy are extremely rare about less of 0.5% from all allergies on food but 13,5% from vegetable allergies. Type of allergies are commonly known as contact allergy.

## P.143

### **Automated Defibrillators (AED) everywhere; so why not Allergy emergency kit (AEK) at eateries in London?**

Deepanjali Choudhury<sup>1</sup>, Wassim Matta<sup>3</sup>

<sup>1</sup>Imperial College, London, UK, <sup>2</sup>Kingsbury Court Surgery, Dunstable, UK, <sup>3</sup>Leagrave Surgery, Luton, UK

#### **Objectives**

To conduct a qualitative study of a cohort of restaurant owners in central London assessing willingness and collating viewpoints on stocking of Allergy Emergency Kit (AEK) (AAI +/- antihistamine) as part of their first aid kit for severe allergic reactions/ anaphylaxis if legislation changed in the UK like in parts of USA and Canada.

#### **Method**

50 restaurants (minimum 30 table seating) located in central London were contacted to participate in this survey of which 45 (30 senior managers and 15 owners) agreed to a face to face appointment to complete a structured interview with a questionnaire

#### **Results**

Participants were 45/50 central London restaurants (77% senior managers and remainder were owners). Of the 45, 10 were Italian, 18 Asian, 10 Continental and 7 family restaurant chains.

- 95% felt strongly the need of standardised training for staff induction and ongoing appraisal.
- 76% felt food allergen labelling had raised allergy awareness .54 % commented on increased workload and 46% were concerned about litigation
- 5% had witnessed staff dealing with customers having mild allergic reactions.
- 88% were willing to stock just antihistamines available for customer usage during a mild reaction. Of the 88%, 20% had allergic employees, 10% themselves had FA or had children with FA
- 40% were receptive to stocking undesignated AAI in an AEK for usage by customers if allowed to .Comments were in relation to subsidised costs.
- 55% felt with staff training, they would be happy for staff to administer AAI in emergency without civil liability clause in the future legislation.
- 70% restaurants would bear the expenses of AEK provided training was standardised and a free public health initiative

#### **Conclusions**

Legislation allowing wider access to an AEK in settings like restaurants requires robust standardised training alongside of provision and consideration of immunity from liability.

### **Which cream? GP perspectives on eczema management and prescribing in primary care**

Gurdeep Jagdev, Konstantinos Kakleas, Antony Aston, Claudia Gore  
*St Mary's Hospital, London, UK*

#### **Objectives**

Eczema is the commonest paediatric skin disorder (20-25% children in UK) and parents frequently report difficulties in its diagnosis and treatment. General Practitioners (GP) have a key role supporting families with education and access to acute and long term medications. We explored GP confidence, knowledge and barriers to prescribing/referring in managing childhood eczema.

#### **Method**

A prospective survey was conducted of GPs in St. Mary's Hospital Urgent Care Centre and local practices (January - April 2016) using a semi-quantitative questionnaire that allowed qualitative feedback. Confidence questions were rated 0 (not confident) - 10 (very confident).

#### **Results**

20 questionnaires were completed with 3/20 [15%] of GP's interviewed having had previous post-graduate training within a dermatology service and 7/20 [35%] previously attending a course specifically aimed at treating childhood eczema.

Eczema Treatment: A higher degree of confidence was displayed (score 7 - 10) regarding following national eczema guidelines 13/20 [65%] and selecting emollients 17/20 [85%], while up to two thirds did not know key aspects of the national standard, including amounts required. 11/20 [55%] of GP's reported difficulties prescribing medication recommended by a specialist.

Pathway in primary care: 15/20 [75%] felt confident (score 7-10) that their practice could provide emergency appointments for those with flaring eczema. 14/20 [70%] felt pressure from parents (in up to 50% of appointments) to refer to a hospital specialist.

Access to education/training: 12/20 [60%] were open to teaching through e-learning, 8/20 [40%] via a website and 7/20 [35%] through outreach clinics. Topics requested included: use of topical calcineurin inhibitors 19/20 [95%], topical steroids 17/20 [85%] and indications for specialist referral 16/20 [80%].

#### **Conclusions**

General Practitioners experience prescribing barriers and identify training-needs in eczema treatment. Improving knowledge and prescription-pathways may facilitate patients' improved access to timely and appropriate medications and improve management/impact of the disease.