the ISAAC studies that airborne allergen sources were common, little has been reported about food allergens. We reviewed data from our laboratory and outpatient records of patients consulted to estimate the magnitude of the disease in our population.

**Methods:** Patients attending the only specialist allergy diagnostic facility in the country (Asthma, Allergy and Immune Dysfunction Clinic) were offered semi-quantitative allergen specific IgE antibody determination as part of their diagnostic work-up. Alongside skin-prick testing, the Euromimmun immuno-blot was used to establish IgE reactivity to a variety of allergen sources.

**Results:** Six hundred thirty five patients were enrolled between January 2009 and April 2011. These were born between 1931 and 2010. IgE reactivity to egg, codfish, cows milk, wheat flour, rice, soya bean, peanut, hazelnut, carrot, potato and apple was investigated using the immuno-blot technique. Results were scored negative or positive. The grades of positive were weak (+), low (+), moderate (+ +) and high (+ + +). Overall, 47% of the patients reacted to one or multiple allergen sources. Across the age spectrum, allergen specific IgE reactivity was most frequent against potato (16%) and peanut (15%) and lowest against milk (2.7%) and codfish (2.7%). Others were intermediate. Egg white reactivity was highest in those below the age of 5 years (7%). IgE reactivity in patients born before 1959 was less than 1%. This increased to 3.4%, 4.8% and 64% respectively in those born before 1969, 1979 and 1989. Nineteen (19%) of patients born in 1990 to 1999 were reactive to a variety of food allergen sources. Likewise, 12% of those born between 2000 and 2011 were reactive. Food allergen reactivity paralleled inhalant allergen source sensitisation in all age groups.

**Conclusions:** In this sample of symptomatic patients we have shown that allergen specific IgE reactivity to dietary sources was high. An exponential increase in IgE reactivity in patients born between 1990 and 2011 was a surprising observation. Possible explanations include urbanisation, life-style and dietary changes in this predominantly urban population. The results call for a systematic investigation of the predisposing factors.

**436**

**Ten Years Follow up of Japanese Survey on Immediate Type Food Allergy**

Takanori Inai, MD, PhD,1 Chizuko Sugizaki,2 and Motohiro Ebisawa, MD, PhD.1,2 Pediatrics, Sagamihara National Hospital, Sagamihara, Japan; 1Clinical Research Center for Allergy and Rheumatology, National Hospital Organization, Sagamihara National Hospital, Sagamihara, Japan.

**Background:** The food labeling system for food allergens was introduced from April 2002 in Japan. To confirm the effectiveness of the system, we regularly conduct a nationwide food allergy survey every 3 years.

**Methods:** The survey was conducted in cooperation with over 1000 volunteer doctors in Japan at 2001+2002, 2005 and 2008. We have sent questionnaires to contributing doctors every 3 months based on the previous survey system, and contributing doctors were asked to report immediate type food allergy cases seen by those doctors. In this survey, immediate type food allergy was defined as the patients who had developed symptoms due to food allergic reaction within 60 minutes after intake of causative foods. The details of questionnaire consisted of age, sex, cause of food allergy, symptoms, antigen-specific IgE, and type of onset.

**Results:** A total of 8581 immediate type food allergy cases were reported by the doctors in these surveys. The most common causative foods were hen’s egg (39.0%), milk products (18.0%), wheat products (9.4%), fruits (5.3%), crustacean (4.6%), peanuts (3.7%), fish egg, buckwheat and fish (3.6%). The most common clinical symptom was observed on skin (89.7%) followed by respiratory system (29.6%). Interestingly, the causes of food allergy were completely different from infancy (egg, milk, and wheat) to adulthood (wheat, crustacean and fruits). Anaphylactic shock was observed in 10.9% of the total reported cases. The cases of anaphylactic shock were due to hen’s egg (27.1%), milk products (21.4%) and wheat (18.1%). Eleven percentages of patients had been hospitalized.

**Conclusions:** We could clarify the detail of the immediate type food allergy cases seen in Japan for a recent decade. Based on these data, countermeasures against food allergy have been conducted in collaboration with the Ministry of Health, Labour, and Welfare in Japan in order to improve quality of life of patients with food allergy.

**437**

**Association between Cows Milk Allergy and Gastroesophageal Reflux Disease on Mexican People**

Fernando Ramirez Jimenez, MD, Ma de la Luz Garcia Cruz, MD, Ma del Rosario Gonzalez Galarra, MD, Karla Paola Ruiz Cervantes, MD, Carlos Guillermo Najera Villatoro, MD, and Luis Manuel Teran Juarez, PhD. Clinical Immunology and Allergy, National Institute of Respiratory Disease, Distrito Federal, Mexico.

**Background:** The World Allergy Organization estimates 520 million people with food allergy on the world. The data that support the prevalence fluctuate in relation of the method employed to obtain these, for example, questionnaires, measurements of IgE-specific, oral challenges; the last one is consider the gold standard. Similar situation occur to allergy to cow’s milk (CMA), the prevalence reported is 1 to 17.5% in preschoolers, 1 to 13.5% in 5 to 16-year-olds, and 1 to 4% in adults. About 40% of infants referred for specialist management of Gastroesophageal Reflux Disease (GERD) have CMA. This situation increases to 56% in severe cases. These allergic reactions are typically not IgE-mediated. The gold standard for GERD is the pH measurement in 24 hours (specificity 100%), exist other test more accessible, with considerable sensitivity (80%) like scintigraphy.

**Methods:** The objective was determinate the frequency of GERD in patients with IgE-mediated CMA. We evaluated retrospectively 20 patients with IgE-mediated CMA of a group of 47 patients with food allergy between 6 months to 39 years aged. They had one or more IgE-specific to proteins that are considered major allergens: casein, beta-lactoglobulin (BLG) or alpha-lactalbumin (A-LA). All the patients had study to discard GERD, through by scintigraphy (study with more access in our Institute). Patients with CMA and negative scintigraphy, had pH measurement. We made 3 groups each one to represent the positivity of IgE-specific to major allergens and these were associated with the presence or absence of GERD.

**Results:** GERD was found in 80% of patient with CMA. 77.8% of patients with IgE to casein had GERD diagnosed by scintigraphy (P < 0.008) Likelihood ratio obtained for this relationship was 7; 70% of patients with IgE to A-LA have GERD (P < 0.03), the likelihood ratio was 4. No significant difference was found between the presence of IgE to BLG and GERD. Additionally, we found that 40% of patients with food allergy without CMA presented GERD.

**Conclusions:** We found high association between IgE-mediated CMA and evidence of GERD on Mexican people opposed to previous literature.

**438**

**An Investigation of Food Choice Behaviour of Food Allergic and Non-food Allergic Children**

Isolde Sommer, MPH, Heather Mackenzie, PhD, Carina Venter, PhD, and Taranach Dean. University of Portsmouth, Portsmouth, United Kingdom.

**Background:** Childrens food choice behaviour is influenced by a number of family and social factors. About 20% to 30% of the population modifies their diet for a suspected adverse reaction to food. Since avoidance is the mainstay of managing food allergy, it can be assumed to significantly affect food choices. It is therefore important to understand if and to what extent food allergy influences the way parents and children make their food choice decisions.

**Methods:** The research project has utilised an innovative observational approach in the form of a board game to investigate parental-child
communication and food choice behaviour. Parents/guardians and children were given a problem-solving task related to food choice behaviour. Each session lasted up to 15 minutes and was conducted with 5 food allergic and 7 non-allergic children (aged 4–8 years) and their parents/guardians. The sessions were videotaped and analysed by constructing a 4-category scheme, which classifies parental utterances along 2 dimensions, food choice behaviour control and food choice recognition. Observational categories were compared between the 2 groups.

Results: Preliminary findings indicate considerable variability in how parents/guardians and children with and without food allergy communicate when making food choice decisions. In general, children with food allergies seem to be more cautious and appear to have less responsibility when choosing their foods than healthy children of the same age.

Conclusions: Given the preliminary findings, this study will illuminate how food allergy affects the way parents/guardians and children make their food choice decisions.

FOOD ALLERGY GASTROINTESTINAL MANIFESTATIONS

439
Probiotic Effect of the Regulation of Innate Immune Response, dc and Adaptive Cellular Immune Response and the Balance TH1, TH2, TREG Through Sensors TLR-2 AND TLR-4, on the Intestinal Mucosa in BALB/C Health Status and Balb/C Status of Exposure to LPS

Azwin Lubis, MD,1 Anang Endaryanto,2 Subijanto Marto Sudarmo,3 I.G. M. Reza Gunadi Ranuhi,3 and Alpha Fardah Ahiyyah.3 1Child health, Pediatric allergy immunology, Surabaya, Indonesia; 2Division of Pediatric Allergy Immunology-Child Health Department, and, 3Division of Pediatric Gastroenterology-Child Health Department, Faculty of Medicine, Airlangga University-Soetomo Hospital, Surabaya, Indonesia.

Background: The concept of improving host defense as a preventive effort in the face of exposure to pathogens through the gut mucosal immune system must be developed where the normal intestinal flora plays an important role. Probiotics through various research can improve intestinal mucosal immune system, but so far the effect of probiotics on the regulation of innate immune responses of dendritic cells and adaptive cellular immune response as well as the balance of TH1, TH2, TREG through TLR-2 sensors and TLR-4 on the intestinal mucosa Balb/c healthy status and Balb/c LPS exposure status is unclear. The purpose is to examine the effect of probiotics against dendritic cells regulation of innate immune responses and adaptive cellular immune response as well as the balance TH1, TH2, TREG through TLR-2 sensors and TLR-4 on the intestinal mucosa in BALB/C health status and Balb/C status of exposure to LPS.

Methods: Male Balb/c divided into 4 treatment groups. Two groups given probiotics for 21 days, one group will be given exposure to LPS on day 15. One group will be exposed to LPS alone and one group as control group without treatment. All groups terminated after a day-to-21. Immunohistochemical examination of ileal mucosa using monoclonal antibodies specific for dendritic cells, TLR-2, TLR-4, IL-1, IL-2, IL-4, IL-6, IL-10, IL-2, TNFα and TGFβ.

Results: In LPS group there were downregulation both innate and cellular immune system indicates the occurrence of adaptive homeostasis disorders. In the group receiving probiotics there were upregulation both innate and cellular immune system is adaptive to indicate an alert. When the probiotic group exposed by LPS, it was still maintained by the improvement of the balance indicate TREG immune system remains in a state of homeostasis.

Conclusions: Probiotics can improve alertness status innate and cellular adaptive immune mucosa in healthy mice and can maintain the balance of TH1, TH2 and TREG so that homeostasis is maintained.

440
Gluten Induced Systemic Disease (GISD) with Distinct Clinical Phenotype Different from Celiac Disease

Natasha M. Kushnir, MD. Allergy & Immunology Clinic of East Bay, Berkeley, CA.

Background: Patients who have complex presentation involving multiple organs are difficult to diagnose. Non-infectious diseases that present with similar clinical patterns yet test negative to the known markers often arise due to certain change in environment or exposure. Such syndromes and diseases require careful study and call for new diagnostic modalities.

Methods: Patients who have complex presentation involving multiple organs are difficult to diagnose. Non-infectious diseases that present with similar clinical patterns yet test negative to the known markers often arise due to certain change in environment or exposure. Such syndromes and diseases require careful study and call for new diagnostic modalities.

Results: Average length of symptoms prior to diagnosis was 5 years. Of 42 patients 34 were previously treated for 3 or more health issues. None of the patients were previously diagnosed with celiac disease, 7 patients underwent diagnostic endoscopy with biopsies. Most prevalent symptom (94%) was severe fatigue. Following symptoms were reported on questionnaire: sleep problems requiring medications, concentration/memory problem, constipation, depression, headaches/migraine, gastroesophageal reflux, nocturnal muscle spasms, abdominal distension, joint pain, rashes, and gum recession. Most common laboratory abnormality was positive ANA with homogenous pattern. All but 2 patients tested negative to rTG, gliadin and endomyseal antibodies. Of 17 patients screened for food allergy 94% were positive for 10+ food by skin test. Hundred percent of patients reported significant improvement at 1 month interval with complete resolution of above listed clinical symptoms at 6 months. Best recovery was achieved in patients when treatment regimen included supplemental therapy with CoQ10, fish oil and digestive enzymes based on papain. Of 25 patients attempted gluten introduction after complete clinical recovery 100% reported relapse of symptoms within 48 hours following gluten challenge.

Conclusions: We report the emergence of new clinical phenotype of non-celiac gluten induced systemic disease (GISD). Although recent publications specifying existence and possible explanation of this condition arise, mechanism is not understood. Thus further studies are needed to facilitate recognition, testing and understanding of GISD.

441
Patterns of Food Allergens in Kenyan Children

Rose Kamenwa, MD,1 and Tula Bowry, PhD2. 1Pediactrics & Child Health, Aga Khan University Hospital, Nairobi, Kenya; 2Nairobi Diagnostic Laboratory, Upperhill Medical Centre, Nairobi, Kenya.

Background: To determine the patterns of food allergens in children presenting to pediatric gastroenterology clinic at the Aga Khan University Hospital, Nairobi.

Methods: This data includes children evaluated from March to November, 2010. All the children presenting for evaluation of various gastrointestinal symptoms and who had positive history of atopy in at least one first degree relative were included. History of recurrent cough was sought and the skin was examined for eczema. Skin Prick Test was performed by an expert in allergy and immunology. Prick to Prick Test was done for local foods where commercial antigens were not available. Positive tests were followed by an exclusion and rechallenge programme but this was excluded from analysis due to poor compliance. Analysis was performed to determine frequencies and associations of the different gastrointestinal symptoms and food allergens. Both skin Prick and Prick to Prick results were analysed together.

Results: The commonest food allergens in order of frequency were cow milk (65%), egg (35%), beef (26%), beans (14%), chicken, corn, wheat, soya and rice (9%), fish (8%) and peanut (5%). Common local infant complementary