Institution: University of Portsmouth

Unit of Assessment: 2 Public Health, Health Services and Primary Care

Title of case study:
University of Portsmouth allergy research leads to overturn of inappropriate Department of Health guidelines on maternal feeding during pregnancy and breastfeeding

1. Summary of the impact

Our research has led to a change in DoH guidelines on maternal consumption of peanut during pregnancy/breastfeeding.

Guidelines until 2009 advocated the avoidance of peanut in allergic families. However evidence base for this advice was poor and the advice was adopted by families regardless of their allergy status leading to significant constraints on their lifestyles. Our research revealed that peanut allergy is not associated with maternal peanut consumption, and that there was no need for pregnant women to avoid peanut during pregnancy. On the basis of our research DoH concluded that previous guidance was inappropriate and it was thus withdrawn.

2. Underpinning research

The underpinning research was carried out under the leadership of Professor Taraneh Dean (Professor of Health Sciences, University of Portsmouth; Honorary Deputy Director of Asthma and Allergy Research Centre, Isle of Wight) during the period 2001-2010. The main co-investigator for this research is Dr Carina Venter (University of Portsmouth)

Food hypersensitivity (FHS) is an adverse reaction following food ingestion that can be either a food allergy (if immunologically mediated) or a non-allergic FHS. It is important that those producing guidance or developing education programmes have robust population-based epidemiological data regarding prevalence and risk factors of FHS to key food allergens in children and other age groups.

Whilst there is evidence demonstrating increasing prevalence of other manifestations of allergies such as asthma and atopic dermatitis, there had been a paucity of studies, investigating the prevalence of FHS.

Following a competitive call Professor Dean was commissioned[1] by the Food Standards Agency to establish the first UK birth cohort with the specific aim of establishing prevalence of FHS using the objective outcome measure of food challenges[2]. The team specifically investigated the prevalence of peanut allergy, which is the most common cause of food induced anaphylaxis in children, in a whole population birth cohort (total 969 children) born between 2001 and 2002. This cohort was compared with previous cohorts of children born in the same geographical location, Isle of Wight, UK. The cohort was recruited ante-natally and followed up at 1, 2 and 3 years of age: the 10 year follow up is the subject of a current NIHR Fellowship. Prevalence of FHS to peanuts and other foods was 1.9%, 3.8% and 4.5% at ages 1, 2 and 3 respectively. Based on double-blinded, placebo-controlled, food challenge (DBPCFC), a gold standard methodology used for such studies, and a good clinical history, the cumulative incidence of FHS was 5.0% (48/969, 95% CI: 3.7–6.5).[3]

The research team also established, using a validated food frequency questionnaire for consumption of allergenic foods, that maternal dietary intake of food allergens, and peanut in particular, during pregnancy and breast-feeding did not influence subsequent development of FHS in children[4]. We also discovered that the governmental advice to avoid peanuts was actually followed by mothers regardless of their family history of allergy, which could have had a detrimental effect and actually increase the prevalence of allergic disorders in children[5]. The team was able to use this evidence, based on their robust methodology, to call into question results from previous studies. Overall, 33.7% of parents reported a food-related problem and, of these, only

12.9% were diagnosed with FHS by DBPCFC and history. Consequently, the results from this study challenged the previously-held perception that peanut allergy and other food allergies are

increasing.[6] The team demonstrated that peanut allergy prevalence has changed over time, with a peak in peanut sensitisation and reported allergy in children born in 1994-1996, but, since the late 1990's, this seems to have stabilised.

3. References to the research

1. Food Standards Agency (sponsor), awarded to: Prof Taraneh Dean (PI), *Prevalence and Incidence of Food Allergy and Intolerance in British Population, grant period*: 2001-2006; £603,605 (Grant ref.T07023). Food Standards Agency (sponsor), awarded to: Prof Taraneh Dean (PI), *Trends in incidence of peanut allergy in England in the last 15 years,* grant period: 2003-2006, £115,758 (Grant ref. T07034). Professor Dean was the single applicant for both awards.

2. **Venter C**, Pereira B, Grundy J, Clayton B, Roberts G, **Higgins B**, **Dean T**. *Incidence of parentally reported and clinically diagnosed food hypersensitivity in the first year of life.* Journal of Allergy and Clinical Immunology 2006; 117: 1118-1124. DOI: 10.1016/j.jaci.2005.12.1352.

   Web: http://www.sciencedirect.com/science/article/pii/S0091674906001680

   Web of Science citation count: 76 (rated in the top 5% of outputs for Immunology and Allergy journals); Impact factor: 12.047

3. **Venter C**, Pereira B, Voigt K, Grundy J, Clayton CB, **Higgins B**, Arshad SH, **Dean T**. *Prevalence and cumulative incidence of food hypersensitivity in the first 3 years of life.* Allergy 2008; 63: 354-359. DOI: 10.1111/j.1398-9995.2007.01570.x.

   Web: http://onlinelibrary.wiley.com/doi/10.1111/j.1398-9995.2007.01570.x/abstract

   REF 2 output: 2-TD-002 Scopus citation count: 75 (rated in the top 5% of outputs for Immunology and Allergy journals); Impact factor: 6.271.

4. **Venter C**, Pereira B, Voigt K, Grundy J, Clayton CB, **Higgins B**,Arshad SH, **Dean T**. *Factors associated with maternal dietary intake, feeding and weaning practices, and the development of food hypersensitivity in the infant.* Pediatr Allergy Immunol 2009; 20: 320-327. DOI: 10.1111/j.1399-3038.2008.00832. REF 2 output: 2-BH-004

   Web: http://onlinelibrary.wiley.com/doi/10.1111/j.1399-3038.2008.00832.x/abstract

   Web of Science citation count: 14 (rated in the top 25% of outputs for immunology and allergy journals); Impact factor: 3.376

5. **Dean T**, **Venter C**, Pereira B, Grundy J, Clayton CB, **Higgins B**. *Government advice on peanut avoidance during pregnancy - Is it followed correctly and what is the impact on sensitization?* Journal of Human Nutrition and Dietetics 2007; 20: 95-99.

   DOI: 10.1111/j.1365-277X.2007.00751.x.

   Web: http://onlinelibrary.wiley.com/doi/10.1111/j.1365-277X.2007.00751.x/abstract

   Web of Science citation count: 14; Impact factor: 1.972

6. **Venter C,** Arshad H, Grundy J, Pereira B, Clayton C, Voigt K, **Higgins B**, **Dean T**. *Time trends in the prevalence of peanut allergy: three cohorts of children from the same geographical location in the UK*. Allergy, 2010; 65: 103-108.

   DOI: 10.1111/j.1398-9995.2009.02176.x.

   Web: http://onlinelibrary.wiley.com/doi/10.1111/j.1398-9995.2009.02176.x/abstract.

   REF 2 output: 2-TD-001

   Scopus citation count: 48 (rated in the top 5% of outputs for Immunology and Allergy journals); Impact factor: 6.271

4. Details of the impact

Three sets of impact has been established by this research:

1) Changes to DoH guidelines. In June 1998, the UK government's Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) published a report on recommending that ''pregnant women who are atopic or for whom the father or any sibling of the unborn child has an atopic disease, may wish to avoid eating peanuts and peanut products during pregnancy and breast feeding.'' This advice was given in the absence of any robust studies on the prevalence of peanut allergy and its trend, and in the absence of any link between maternal peanut consumption and peanut allergy in their offspring. The House of Lords, Science and Technology Committee report on Allergy (6th Report, Session 2006-7) reviewed the evidence in the area and recommended "that this advice should be withdrawn immediately pending a comprehensive review by the Food Standards Agency and the COT". COT's Statement on the review of the 1998 COT recommendation on peanut avoidance stated that "Since the COT recommendations were made, there have also been several studies published on the frequency of sensitisation and allergy to peanuts, which could inform understanding of whether the prevalence of this allergy is increasing. It was therefore considered timely to re-assess the current state of scientific knowledge in this area and, based on the evidence now available, to re-consider whether the 1998 COT dietary recommendations remain appropriate" (CS1: http://cot.food.gov.uk/pdfs/cotstatement200807peanut.pdf). Nine out of the 14 UK studies examined, originated from the Isle of Wight Team (http://cot.food.gov.uk/pdfs/cotstatement200807peanut.pdf page 12) illustrating the major contribution the team has made to the evidence base. Following this review COT Committee concluded that "the previous dietary recommendations are no longer appropriate because of a shift in the evidence base (CS2)". The roll out of their revised guideline and advice has benefitted groups along the entire healthcare supply chain: individual parents, GPs and allergy services. The revised advice is also being included within general advice given to mothers about pregnancy and development of their baby, including the 'Pregnancy' and 'Birth to Five' books (http://www.nhs.uk/Conditions/pregnancy-and-baby/pages/foods-to-avoid-pregnant.aspx#Peanuts) (CS3).

2) Provision of evidence that food allergy levels have not increased. The birth cohort established by Professor Dean is the only birth cohort worldwide set up specifically to investigate epidemiology of food allergy using objective measures and her findings provided the first demonstration that unlike other manifestations of allergic disorders (eg Asthma) the rates of food allergy has not increased. This key evidence has informed policy (CS4,5) as well as the advice that allergic consumers receive from healthcare professionals and supporting organisations. As a result Prof Dean and Dr Venter have delivered expert advice to bodies including the European Food Safety Authority, the National Institute of Clinical Excellence, the Royal College of Paediatrics and the European Academy of Allergy and Clinical Immunology. Their prevalence data has significant reach and has been included in 2010 US Food Allergy Guidelines (CS6). The impact of this work has been confirmed by the chief executive of Anaphylaxis Campaign (CS7): "Their research is in these areas is world leading in part because they are in a unique position to perform longitudinal cohort studies with very little attrition. In the Allergy world 'Isle of Wight cohorts' are recognised by all".

3) Changes in public awareness with respect to the prevalence of food allergy. Since the publication of their findings Professor Dean and Dr Venter have contributed to numerous public engagement exercises (e.g. Focus on Health: Asthma and Allergy in your Family, http://www.port.ac.uk/uopnews/2012/11/29/expert-advice-for-asthma-and-allergy-sufferers/) and training events for healthcare professionals (e.g. Allergy Academy flagship training event for all healthcare professionals http://allergyacademy.org/), ensuring there is widespread awareness that prevalence of food allergy has not increased. As stated in a letter by the director of Allergy Academy (CS8), which has led the delivery of education in

Allergy to over 5000 healthcare professionals, "The information on prevalence of food allergies as provided by Professor Taraneh Dean and her team has been used to inform many of the educational sessions given at the Allergy Meeting.

4) The paper: Venter, C.; Pereira, B.; Voigt, K.; Grundy, J.; Clayton, C. B.; Higgins, B.; Arshad, S. H.; Dean, T. Prevalence and Cumulative Incidence of Food Hypersensitivity in the First 3 Years of Life. Allergy 2008, 63, 354-359, was included in the 2008 version of the "If you only read five papers this year…" session thus reflecting its value to the clinical allergy community.
Our work on raising the awareness has also been subject of critical media review (CS9).

5. Sources to corroborate the impact

CS1. http://cot.food.gov.uk/pdfs/cotstatement200807peanut.pdf Department of Health's Revised COT statement

CS2. Letter from Head of Food Allergy Branch, Food Standards Agency UK to a British Dietetic Association, Royal College of Midwives, Community Practitioners and *Health Visitors Association* and British Society of Allergy and Clinical Immunology

CS3. http://www.nhs.uk/Conditions/pregnancy-and-baby/pages/foods-to-avoid-pregnant.aspx#Peanuts Pregnancy and childbirth handbook

CS4. Letter from Head of Food Allergy Branch, Food Standards Agency UK re. Dean et al. Prevalence studies.

CS5. Buck, J., Hattersley, S., & Kimber, I. (2010). Food allergy–science and policy needs–The UK Food Standards Agency Research Programme. *Toxicology*,*278*(3), 319-325.

DOI: 10.1016/j.tox.2010.08.007

CS6. Letter from Professor of Pediatrics and Division Chief, Food Allergy Institute, Mount Sinai Medical Center, USA and Lead author of the American Academy of Pediatrics (AAP) guidance on allergy prevention and Associate Editor of the Journal of Allergy and Clinical Immunology

CS7. Letter from Chief Executive Officer of The Anaphylaxis Campaign UK re Dean et al. Prevalence studies.

CS8. Letter from Joint Clinical Lead for Allergy at Guy's & St Thomas' Hospitals NHS Foundation Trust, the UK's largest specialist allergy service, since 2007 and Director of the King's College London Allergy Academy

CS9. http://news.bbc.co.uk/1/hi/health/7218276.stm Baby allergy fears 'over the top' (31/01/2008), BBC News