About OMICS Group

OMICS Group International is an amalgamation of Open Access publications and worldwide international science conferences and events. Established in the year 2007 with the sole aim of making the information on Sciences and technology ‘Open Access’, OMICS Group publishes 400 online open access scholarly journals in all aspects of Science, Engineering, Management and Technology journals. OMICS Group has been instrumental in taking the knowledge on Science & technology to the doorsteps of ordinary men and women. Research Scholars, Students, Libraries, Educational Institutions, Research centers and the industry are main stakeholders that benefitted greatly from this knowledge dissemination. OMICS Group also organizes 300 International conferences annually across the globe, where knowledge transfer takes place through debates, round table discussions, poster presentations, workshops, symposia and exhibitions.
About OMICS Group Conferences

OMICS Group International is a pioneer and leading science event organizer, which publishes around 400 open access journals and conducts over 300 Medical, Clinical, Engineering, Life Sciences, Pharma scientific conferences all over the globe annually with the support of more than 1000 scientific associations and 30,000 editorial board members and 3.5 million followers to its credit.

OMICS Group has organized 500 conferences, workshops and national symposiums across the major cities including San Francisco, Las Vegas, San Antonio, Omaha, Orlando, Raleigh, Santa Clara, Chicago, Philadelphia, Baltimore, United Kingdom, Valencia, Dubai, Beijing, Hyderabad, Bengaluru and Mumbai.
The effect of eczema, environment and sociodemographic factors on the development of food allergy

Moshe Ben-Shoshan, MD, MSc
Division of allergy and clinical immunology, Montreal Children’s Hospital, McGill University
Disclosures

• Consultant Sanofi
• Consultant Novartis.
Outline

• Background: food allergy definition, prevalence.
• Is food allergy increasing?
• Why? Assessing potential determinants of food allergy: eczema, demographics and lifestyle factors
• Knowledge gaps
• Future directions
Prevalence and burden

• Food allergy affects up to 2.5% of the adult population and 6–8% of children less than 3 years of age in the US.

• The prevalence of anaphylaxis in the general population is at least 1.6% and probably higher.

• The rate of anaphylaxis-related hospitalizations increased from 21.0 to 25.1 per million population between 1999 and 2009.

• At the MCH 168 among 81,677 yearly ED visits are related to anaphylaxis (0.2%) and 85% of these due to foods [mainly peanuts (PN), tree nuts (TN)].
Classification

Adverse reaction to food

- Immune mediated
  - IgE mediated
  - Non-IgE
    - enzymatic
    - pharmacologic
      - Toxic
      - undefined

Non immune Mediated (food intolerance)

Majority of Rx

Lactase def-(10% of caucasian)

An abnormal Rx resulting from food ingestion

Diagnosis
SPT (skin prick test)

• Most infants have a sig detectable SPT at 3 months
• Skin tests may be false positive in 50% of cases
Specific IgE level

• Specific cut off levels were published for specific food allergens.

• Keet et al. J Allergy Clin Immunol. 2012 Nov;130(5)
Food challenge

- Types:  - open challenge
          - single blind
          - Double Blind Placebo Controlled
Diagnosis of specific food allergy relies on a careful history supplemented by confirmatory testing.
• What is the prevalence of food allergy in Canada?
• Is prevalence increasing?
• If yes why?
The SCAAALAR study (Surveying Canadians to Assess the Prevalence of Common Food Allergies and Attitudes towards Food Labelling and Risk)

A population-based study on peanut, tree nut, fish, shellfish, and sesame allergy prevalence in Canada

Moshe Ben-Shoshan, MD,a Daniel W. Harrington, MA,a Lianne Soller, BSc,b Joseph Fragapane, BSc,b Lawrence Joseph, PhD,b,d Yvan St Pierre, MA,b Samuel B. Godefroy, PhD,f Susan J. Elliot, PhD,e and Ann E. Clarke, MD, MScb,c Montreal, Quebec, and Hamilton and Ottawa, Ontario, Canada
Study Aims

- Prevalence of common food allergies
  - Peanut, tree nut
  - Shellfish, fish
  - Sesame.

- To identify potential demographic predictors of food allergies in Canada.
Methods

- Cross-sectional, nationwide, random telephone survey.
- Eligible respondents: 18 years or older, living in the household, no language-mental-hearing barrier.
- At least ten attempts to contact households and calling done on different days and at different times during the day.
Food Allergy: Definitions

1. **Perceived:** Self-reported food allergy

2. **Probable:** Self report of convincing history and/ or physician diagnosis

3. **Confirmed:** Clinical history with confirmatory tests provided by treating MD
10,596 households contacted

3666 households agreed to participate (35%)

9667 individuals

Sesame
0.09%
C: 0.27%
A: 0.04%

Shellfish
1.42%
C: 0.73%
A: 1.65%

Fish
0.48%
C: 0.23%
A: 0.55%

PN
0.93%
C: 1.82%
A: 0.68%

TN
1.14%
C: 1.46%
A: 1.04%
The overall prevalence for all foods in Canada was 8.07% (6.2%-7.2%)
<table>
<thead>
<tr>
<th></th>
<th>Canada</th>
<th>USA</th>
<th>Diff</th>
<th>(95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PN (perceived)</strong></td>
<td>1.00</td>
<td>0.62%</td>
<td>0.2%</td>
<td>(0.02%, 0.52%)</td>
</tr>
<tr>
<td>Children</td>
<td>1.77</td>
<td>0.83</td>
<td>0.88%</td>
<td>(0.24%, 1.52%)</td>
</tr>
<tr>
<td>Adults</td>
<td>0.78</td>
<td>0.59</td>
<td>-0.05</td>
<td>(-0.30, 0.20)</td>
</tr>
<tr>
<td><strong>TN (perceived)</strong></td>
<td>1.22</td>
<td>0.66</td>
<td>0.44</td>
<td>(0.18, 0.71)</td>
</tr>
<tr>
<td>Children</td>
<td>1.73</td>
<td>0.51</td>
<td>1.15</td>
<td>(0.55, 1.76)</td>
</tr>
<tr>
<td>Adults</td>
<td>1.07</td>
<td>0.74</td>
<td>0.17</td>
<td>(-0.10, 0.50)</td>
</tr>
<tr>
<td><strong>Fish</strong></td>
<td>0.48</td>
<td>0.39</td>
<td>0.07</td>
<td>(-0.10, 0.23)</td>
</tr>
<tr>
<td><strong>Shellfish (probable)</strong></td>
<td>1.42</td>
<td>2.03</td>
<td>-0.69</td>
<td>(-0.37, -1.01)</td>
</tr>
<tr>
<td>Children</td>
<td>0.50</td>
<td>0.52</td>
<td>0.26</td>
<td>(-0.20, 0.70)</td>
</tr>
<tr>
<td>Adults</td>
<td>1.69</td>
<td>2.54</td>
<td>-0.96</td>
<td>(-0.56, -1.37)</td>
</tr>
</tbody>
</table>
• Is the prevalence of food allergy increasing?
Methods

- Random sample of K – Gr 3 children
- Public and private schools
- Survey
- Skin prick tests
- Peanut specific IgE levels
- Food challenge
Methods

Grouping by questionnaire

1. PN tolerant
2. Never ingested
3. Convincing Hx
4. Uncertain Hx
Methods

Convincing Hx of PN allergy

+ SPT
IgE $\geq 0.35$kU/L
Positive FC
Methods

Never/rarely ingested PN

+ SPT AND IgE $\geq 15$ kU/L

+ SPT AND FC

Uncertain Hx of PN allergy

+ SPT AND IgE $\geq 15$ kU/L

+ SPT AND FC
Results

<table>
<thead>
<tr>
<th></th>
<th>Diff (00/02 and 05/07)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full responders</td>
<td>0.13%</td>
<td>-0.38%, 0.63%</td>
</tr>
<tr>
<td>Full and partial responders</td>
<td>0.30%</td>
<td>-0.27%, 0.87%</td>
</tr>
<tr>
<td>Full, partial and non-responders</td>
<td>0.28%</td>
<td>-0.15%, 0.70%</td>
</tr>
</tbody>
</table>
Conclusion

• Prevalence has remained relatively stable (1.6%) in Montreal school children between 2000/2002 and 2005/2007.

• Our findings are consistent with recent reports suggesting that the prevalence of eczema and asthma might have stabilized or decreased in developed countries which already have a relatively high prevalence of atopic conditions.
What factors are associated with the increased prevalence of food allergy?
Sex

• Anaphylaxis is more common in adult females potentially due to the effect of estrogens that enhance mast cell activation and allergic sensitization, and progesterone that inhibits histamine release, but potentiates IgE induction.

• Lower rate of physician diagnosis in males as adult males are known to be less likely to have a regular doctor.
Age

- PN allergy is usually manifested prior to age 2 yrs.
- Generally PN allergy is lifelong, but 20% may resolve.
- In North America shellfish allergy is the leading cause for food allergy in adults, while in Asia shellfish allergy is reported to be the leading cause in children as well. Shellfish are introduced to the children’s in Canada after age 5.

Education

• Education level may be associated with family lifestyle corresponding with less bacterial exposure.

• High health literacy.

• Increased endorsement of previous AAP recommendation.
Urban versus rural

- A higher prevalence in urban settings of asthma and eczema.
- Individuals living in a city consume more shellfish compared to non-urban areas.
- Studies in inner city reveal high levels of exposure to cockroach (40%) and mites (in 19%) proteins. These cross-react with shellfish.

Immigrants

- Recent studies suggest increased prevalence of allergic diseases that commensurate with length of stay in Westernized countries regardless of age at arrival, sex or atopic status.

- Asthma symptoms in Chinese adolescents were lowest among residents of mainland China, were greater for those in Hong Kong and those who had immigrated to Canada, and were highest among those born in Canada.

- Possibly due to western dietary habits and lifestyle
Foods and Atopic dermatitis

- 3 patterns of cutaneous reactions to food in pt with AD:
  - 1. Immediate type IgE mediated.
  - 2. Pruritus occurring soon after ingestion of food with scratching leading to exacerbation of AD.
  - 3. Exacerbations of AD 6-48h after exposure to food (may occur also after an immediate reaction).

Breuer et al 2004, Wuthrich et al 1993
Tolerance

(Lack JACI 2008)

• low-dose exposure to environmental foods (on tabletops, hands, and dust) through skin leads to TH2 responses

• Early high-dose oral consumption induces tolerance,
Loss-of-function variants in the filaggrin gene are a significant risk factor for peanut allergy

Sara J. Brown, MD, a,c,d,** Yuka Asai, MD, e,f,** Heather J. Cordell, DPhil, j Linda E. Campbell, MSc, a Yiwei Zhao, MD, PhD, a Hailui Liao, MD, PhD, a Kate Northstone, PhD, k John Henderson, MD, k Reza Alizadehfar, MD, i Moshe Ben-Shoshan, MD, f,i Kenneth Morgan, PhD, h Graham Roberts, DM, l Laurv J.N, Masthoff, MD, m Suzanne G.M.A. Pasmans, MD, PhD, m Peter C, van den Akker, MD, n Cisca Wijmenga, PhD, n Jonathan O’R, Hourihane, PhD, o Colin N.A, Palmer, PhD, b Gideon Lack, PhD, p Ann Clarke, MD, MSc, f,g Peter R, Hull, MD, PhD, q Alan D, Irvine, MD, d,r and W. H, Irwin McLean, PhD, DSc a
Hygiene hypothesis

- Smaller family size, decreased exposure to pets and livestock, fewer infections during infancy, increased use of antibiotics and Vx.

- In animal models: certain bacterial components may repress the development of allergic reactions potentially through the induction of T regulatory.

Hygiene hypothesis

- No correlation between the increase in allergic disorders and decrease in infection with pathogenic organisms.

- Unfortunate speculations that vaccinations would increase the risk for allergies.

- Updated hypothesis: dietary factors and their interaction with commensal, non-pathogenic microorganisms early in life may be protective against food allergies.

Frei Ret al. Microbiota and dietary interactions - an update to the hygiene hypothesis? Allergy 2012; 67(4):451-61
Atopy (Eczema)

Genes

Demographics (age, sex)

Lifestyle habits (food introduction)
Conclusion

• Food allergy is common in Canadians and world wide (up to 8%)

• Timing of food introduction, presence of eczema and life style habits may affect the development of food allergies.

• Randomized controlled trials are required to establish the role of environmental factors and eczema in the development of food allergies.
Acknowledgements

Health Canada
AllerGen NCE
Dr Ben-Shoshan is a recipient of the FRSQ junior 1 award.
Let Us Meet Again

We welcome you all to our future conferences of OMICS Group International

Please Visit:

www.omicsgroup.com
www.conferenceseries.com
http://dermatology.conferenceseries.com