Food allergy: Guidelines Implementation – Clinical & Economic Benefits

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Modern age of guidelines

• Began in 1992
• Institute of Medicine (IOM)* report
• ‘systematically developed statements to assist practitioner and patient decisions about appropriate healthcare for specific clinical circumstances’

Known as National Academy of Medicine (NAM) since June 2015
Clinical practice guidelines

“Statements that include recommendations intended to optimize patient care that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options." (IOM 2011)*

• Rather than dictating a one-size-fits-all approach to patient care, clinical practice guidelines offer an evaluation of the quality of the relevant scientific literature, and an assessment of the likely benefits and harms of a particular treatment.

• Trustworthy guidelines should be based on a systematic evidence review, developed by panel of multidisciplinary experts, provide a clear explanation of the logical relationships between alternative care options and health outcomes, and provide ratings of both the quality of evidence and the strength of the recommendations.
What do patients want?

• Benefits and downsides of a diagnostic procedure or a treatment option
  – What will I gain?
  – Will I feel better (reduced symptoms or morbidity and improved QoL)
  – Will I live longer (reduced mortality)
  – What will I lose?
  – Is it safe and will I dislike some aspects related to the intervention (adverse events, burden – extra time and effort)?
  – How much will it cost me?

• Clinicians’ role is not only to order a diagnostic test or prescribe a treatment, but also to advise patients – sometimes to decide for them – which of the available tests or treatments is likely to be most beneficial and which one to choose.
Confidence in guidelines

• Purpose of guidelines is to make explicit recommendations with a definite intent to influence what clinicians do

• Level of confidence
  – evidence-based
  – transparent
  – explicit
    • whose values and preferences
    • influence on the final recommendations

→ facilitate implementation, adaptation to local circumstances, and updating of guidelines
Guidelines are not

• Guidelines are not reimbursement policies
• Guidelines are not performance measures
• Guidelines are not legal precedents
• Guidelines are not measures of certification or licensing
• Guidelines are not for provider selection or public reporting
• Guidelines are not recipes for cookbook medicine
Guidelines for the management of cow’s milk protein allergy in children 2012 (CMPA in children)
World Allergy Organization (WAO) Diagnosis and Rationale for Action against Cow’s Milk Allergy (DRACMA) Guidelines

Allergy
EUGENE JOURNAL OF ALLERGY
AND CLINICAL IMMUNOLOGY

POSITION PAPER

EAACI Food Allergy and Anaphylaxis Guidelines: diagnosis and management of food allergy

Practice parameter

Food allergy: A practice parameter update—2014
GRADE

Grading of Recommendation, Assessment, Development and Evaluation
Merits of GRADE system

- Clear separation between quality of evidence and strength of recommendations
- Explicit consideration of the relative importance of various outcomes to patients
- Explicit acknowledgement of values and preferences assumed when making recommendations
- Explicit advice to make recommendations about the most appropriate course of action, even when very little evidence is available
- Grading the strength only for recommendations about the diagnostic or therapeutic course of action, but not about prognosis or aetiology
- Clear and pragmatic interpretation of ‘strong’ and ‘weak’ recommendations
- Balance between simplicity and methodological comprehensiveness
An overview of steps followed during the development of an evidence-based clinical practice guideline

Establish the guideline panel
Define the scope of the guidelines
Prioritize the problems
Ask precise clinical questions
Decide on the relative importance of outcomes
Identify the existing evidence for every clinical question
Develop evidence profiles
Grade the quality of existing evidence for each outcome separately
Determine the overall quality of available evidence across outcomes
Decide on the balance between desirable and undesirable consequences
Decide on the strength of recommendation
Formulate the recommendation reflecting its strength
Write guideline
<table>
<thead>
<tr>
<th>Rank</th>
<th>Explanation</th>
<th>Examples*</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Further research is very unlikely to change our confidence in the estimate of effect</td>
<td>Randomized trials without serious limitations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well-performed observational studies with very large effects (or other qualifying factors)</td>
</tr>
<tr>
<td>Moderate</td>
<td>Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate</td>
<td>Randomized trials with serious limitations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well-performed observational studies yielding large effects</td>
</tr>
<tr>
<td>Low</td>
<td>Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate</td>
<td>Randomized trials with very serious limitations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observational studies without special strengths or important limitations</td>
</tr>
<tr>
<td>Very low</td>
<td>Any estimate of effect is very uncertain</td>
<td>Randomized trials with very serious limitations and inconsistent results</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observational studies with serious limitations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unsystematic clinical observations (e.g. case series or case reports)</td>
</tr>
</tbody>
</table>
Factors influencing the quality of evidence

Study design (experimental vs observational)

Factors that can decrease the quality
- Limitations in study design and/or execution
- Inconsistency of results
- Indirectness of evidence
- Imprecision of results
- Publication bias

Factors that can increase the quality of evidence
- Large magnitude of effect
- All plausible confounding may be working to reduce
  the demonstrated effect or increase the effect if no effect was observed
- Dose-response gradient
What do clinicians want?

- To know the existing diagnostic or therapeutic approaches
- Which of the options will achieve the most benefit and has the least downsides for their patients
- How confident they can be about the balance of these desirable and undesirable consequences
- CPG should offer answers to these questions by advising about the most appropriate actions for patients
  → a recommendation
    Clear
    Unambiguous
    Developed transparently
Desirable effects clearly outweigh undesirable ones
Strong recommendation for a given action

Desirable effects likely or a little outweigh undesirable ones
Conditional recommendation for a given action

Undesirable effects likely or a little outweigh desirable ones
Conditional recommendation against a given action

Undesirable effects clearly outweigh desirable ones
Strong recommendation against a given action
A summary of the GRADE approach to grading the quality of evidence for each outcome

<table>
<thead>
<tr>
<th>Source of body of evidence</th>
<th>Initial rating of quality</th>
<th>Factors that may decrease the quality</th>
<th>Factors that may increase the quality</th>
<th>Final quality of a body of evidence *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomised trials</td>
<td>High</td>
<td>1. Risk of bias</td>
<td>1. Large effect</td>
<td>High (★★★★★ or A)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Inconsistency</td>
<td>2. Dose–response</td>
<td>Moderate (★★★★ or B)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Indirectness</td>
<td>3. All plausible residual confounding would reduce the demonstrated effect or would suggest a spurious effect if no effect was observed</td>
<td>Low (★★★ or C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Imprecision</td>
<td></td>
<td>Very low (★★ or D)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Publication bias</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observational studies</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Implications of the two grades of strength of recommendations in the GRADE approach

<table>
<thead>
<tr>
<th>Target group</th>
<th>Strong recommendations*</th>
<th>Conditional (weak) recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>Most people in your situation would want the recommended course of action and only a small proportion would not</td>
<td>The majority of people in your situation would want the recommended course of action, but many would not</td>
</tr>
<tr>
<td>Clinicians</td>
<td>Most patients should receive the recommended course of action</td>
<td>Recognize that different choices will be appropriate for different patients and that you must make greater effort to help each patient to arrive at a management decision consistent with his or her values and preferences; decision aids and shared decision making are particularly useful</td>
</tr>
<tr>
<td>Policy makers</td>
<td>The recommendation can be adopted as a policy in most situations</td>
<td>Policy making will require substantial debate and involvement of many stakeholders</td>
</tr>
</tbody>
</table>

GRADE, Grades of Recommendation, Assessment, Development and Evaluation.

*Strong recommendations based on high quality evidence will apply to most patients for whom these recommendations are made, but they may not apply to all patients in all conditions; no recommendation can take into account all of the unique features of individual patients and clinical circumstances.
General process followed for developing CPG on diagnostic tests

- **Patient**
- **Intervention**
- **Comparison**
- **Outcome**

**PICO**

- IDENTIFY CLINICAL PROBLEMS REQUIRING GUIDANCE
- GENERATE FOCUSED QUESTIONS (PICO)
- REACH CONSENSUS AMONG PANEL MEMBERS ON THE FINAL QUESTIONS (REFINE THEM IF NECESSARY)

- IDENTIFY ALL PATIENT IMPORTANT OUTCOMES
- DEFINE THE CONSEQUENCES OF BEING CLASSIFIED IN EACH OF THE CATEGORIES (TP FP FN TN)
- EXPLICITLY RATE IMPORTANCE OF OUTCOMES

- PERFORM A SYSTEMATIC REVIEW
- USE EXISTING HIGH QUALITY UP-TO-DATE SYSTEMATIC REVIEW
- PERFORM AS SYSTEMATIC AS SEARCH AS POSSIBLE AND TRANSPARENTLY SUMMARIZE IDENTIFIED EVIDENCE

- PREPARE SUMMARIES OF EVIDENCE INFORMING GUIDELINE PANEL’S DECISIONS ABOUT EACH QUESTION ASKED

- FORMULATE SUGGESTED RECOMMENDATIONS

- DISCUSS EACH RECOMMENDATION DURING A GUIDELINE PANEL MEETING

- FINALIZE RECOMMENDATIONS
Example of the patient-important consequences of being classified into TP, TN, FP, and FN categories

**Question 1:** Should skin prick tests be used for the diagnosis of IgE-mediated CMA in patients suspected of CMA?

<table>
<thead>
<tr>
<th>Population</th>
<th>Patients suspected of cow’s milk allergy (CMA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention:</td>
<td>Skin prick test (SPT)</td>
</tr>
<tr>
<td>Comparison</td>
<td>Oral food challenge (OFC)</td>
</tr>
</tbody>
</table>

**Outcomes**

| TP | The child will undergo OFC, which will turn out positive with risk of anaphylaxis, albeit in controlled environment; burden on time and anxiety for family; exclusion of milk and use of special formulae. Some children with high pre-test probability of disease and/or at high risk of anaphylactic shock during the challenge will not undergo challenge test and be treated with the same consequences of treatment as those who underwent food challenge. |
| TN | The child will receive cow’s milk at home with no reaction, no exclusion of milk, no burden on family time and decreased use of resources (no challenge test, no formulae); anxiety in the child and family may depend on the family; looking for other explanation of the symptoms. |
| FP | The patient will undergo an OFC, which will be negative; unnecessary burden on time and anxiety in a family; unnecessary time and resources spent on oral challenge. Some children with high pre-test probability of CMA would not undergo challenge test and would be unnecessarily treated with elimination diet and formula that may led to nutritional deficits (e.g., failure to thrive, rickets, Vit D or calcium deficiency); also stress for the family and unnecessary carrying epinephrine self injector which may be costly as well as delayed diagnosis of the real cause of symptoms. |
| FN | The child will be allowed home and will have an allergic reaction (possibly anaphylactic) to cow’s milk at home; high parental anxiety and reluctance to introduce future foods; may lead to multiple exclusion diet. The real cause of symptoms (i.e., CMA) will be missed leading to unnecessary investigations and treatments. |
| Inconclusive results | Either negative positive control or positive negative control: the child would repeat SPT which may be distressing for the child and parent; time spent by a nurse and a repeat clinic appointment would have resource implications; alternatively, child would have slgE measured or undergo food challenge. |
| Complications of a test | SPT can cause discomfort or exacerbation of eczema that can cause distress and parental anxiety; food challenge may cause anaphylaxis and exacerbation of other symptoms. |
| Resource utilization (cost) | SPT adds extra time to clinic appointment however; OFC has much greater resource implications |
Example of evidence profile generated based on systematic review conducted for these guidelines

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No. of studies</th>
<th>Study design</th>
<th>Factors that may decrease quality of evidence</th>
<th>Final quality</th>
<th>Effect per 1000</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>True positives (patients with CMA)</td>
<td>23 studies (2302 patients)</td>
<td>Consecutive or non-consecutive series</td>
<td>Serious(^2) None Serious(^3) None</td>
<td>Unlikely</td>
<td>Prevalence 80%: 536 Prevalence 40%: 268 Prevalence 10%: 67</td>
<td>CRITICAL</td>
</tr>
<tr>
<td>True negatives (patients without CMA)</td>
<td>23 studies (2302 patients)</td>
<td>Consecutive or non-consecutive series</td>
<td>Serious(^2) None Serious(^3) None</td>
<td>Unlikely</td>
<td>Prevalence 80%: 108 Prevalence 40%: 324 Prevalence 10%: 486</td>
<td>CRITICAL</td>
</tr>
<tr>
<td>False positives (patients incorrectly classified as having CMA)</td>
<td>23 studies (2302 patients)</td>
<td>Consecutive or non-consecutive series</td>
<td>Serious(^2) Serious(^4) Serious(^3) None</td>
<td>Unlikely</td>
<td>Prevalence 80%: 92 Prevalence 40%: 276 Prevalence 10%: 414</td>
<td>CRITICAL</td>
</tr>
<tr>
<td>False negatives (patients incorrectly classified as not having CMA)</td>
<td>23 studies (2302 patients)</td>
<td>Consecutive or non-consecutive series</td>
<td>Serious(^2) None Serious(^3) None</td>
<td>Unlikely</td>
<td>Prevalence 80%: 264 Prevalence 40%: 132 Prevalence 10%: 33</td>
<td>CRITICAL</td>
</tr>
<tr>
<td>Inconclusive(^5)</td>
<td>1 study (310 patients)</td>
<td>Non-consecutive series</td>
<td>- - - - -</td>
<td>-</td>
<td>-</td>
<td>IMPORTANT</td>
</tr>
<tr>
<td>Complications</td>
<td>Not reported</td>
<td>- - - - -</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>NOT IMPORTANT</td>
</tr>
<tr>
<td>Cost</td>
<td>Not reported</td>
<td>- - - - -</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>NOT IMPORTANT</td>
</tr>
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</table>
A global survey of changing patterns of food allergy burden in children

Susan L Prescott, Ruby Pawankar, Katrina J Allen, Dianne E Campbell, John KH Sinn, Alessandro Fiocchi, Motohiro Ebisawa, Hugh A Sampson, Kirsten Beyer and Bee-Wah Lee
<table>
<thead>
<tr>
<th>Europe / Nordic (n=34)</th>
<th>Asia / Oceania (n=18)</th>
<th>Americas (n=15)</th>
<th>Africa (n=12)</th>
<th>Middle East (n=10)</th>
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<tbody>
<tr>
<td>UK</td>
<td>Australia</td>
<td>Canada</td>
<td>Ghana #</td>
<td>Israel</td>
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<tr>
<td>Germany</td>
<td>New Zealand</td>
<td>USA</td>
<td>Mosambique #</td>
<td>United Arab Emirates #</td>
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<td>Switzerland</td>
<td>China</td>
<td>Colombia</td>
<td>Tanzania #</td>
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<td>Spain</td>
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<td>Paraguay</td>
<td>Botswana #</td>
<td>Pakistan</td>
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<td>Portugal</td>
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<tr>
<td>Italy</td>
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Data available from 83 WAO member countries and 6 non-member countries #

Figure 1 List and distribution of countries who participated in the survey or which had published data available on food allergy prevalence.
Figure 2 Summary of food allergy prevalence from studies that provided data for children aged 5 years or less. Studies are categorised according to level of evidence; OFC proven food allergy (black bars); food allergy based on symptoms and sensitisation (grey bars) or questionnaires/parental reporting (yellow bars).
Figure 3 Summary of food allergy prevalence from studies that provided data for children older than 5 years. Studies are categorised according to level of evidence; OFC proven food allergy (black bars); food allergy based on symptoms and sensitisation (grey bars) or questionnaires/parental reporting (yellow bars).
Studies reporting Food Allergy Prevalence for children of all ages (e.g. 0-18 years)

Published data available from 23/89 countries (those with not data not shown)

Country: UK, Colombia, Finland, Lithuania, Poland, USA, Spain, Netherlands, Canada, France, Australia, Japan, Greece, Slovenia, Belgium, Hong Kong, Germany, Italy, Switzerland, Turkey, Denmark, China, Austria

Food Allergy Prevalence in children (all ages)

Figure 4 Summary of food allergy prevalence from studies that provided data for children of all ages (generally ranging 0–18 years). Studies are categorised according to level of evidence; OFC proven food allergy (black bars); or questionnaires/parental reporting (yellow bars).
Food Allergy – A rising global health problem

• The socioeconomic burden of allergic diseases is rising in countries worldwide regardless of their economic status.
• Food allergies are increasing in both developed and developing countries, especially in children.
• Food allergies are escalating to epidemic proportion and becoming more severe and complex, and the heaviest burden is on children and young adults.
• Food allergies are complicated by other allergic diseases such as asthma and atopic eczema.

Reference: www.worldallergyweek.org
Food Allergy – A rising global health problem

• Food allergy can be fatal, and appropriate diagnosis is essential.
• There is a need for food labelling worldwide.
• There is a need for more clinical knowledge as well as resources to treat food allergy, including the availability of life-saving medications such as epinephrine (adrenaline).
• Increased disease awareness, improved patient care, better healthcare delivery, and a focus on preventative strategies are greatly needed.

Reference: www.worldallergyweek.org
Socioeconomic costs
Rise with the Incidence of Food Allergy

• Direct costs include treatment cost, emergency department visits, and hospitalizations.
• Indirect costs include time lost from school, lower productivity, and premature death.
• The quality of life of patients with food allergy is greatly reduced.
WHO GUIDE TO IDENTIFYING THE ECONOMIC CONSEQUENCES OF DISEASE AND INJURY

World Health Organization

Department of Health Systems Financing Health Systems and Services
<table>
<thead>
<tr>
<th>Level</th>
<th>Question / topic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Macro:</strong></td>
<td>1. What impact does ill-health have on gross domestic product or its rate of growth?</td>
</tr>
<tr>
<td>Society</td>
<td>2. How much does society pay for medical and other expenses because of illness?</td>
</tr>
<tr>
<td></td>
<td>3. What is the impact on social product (i.e., both market and non-market consumption lost opportunities), or on social welfare more generally?</td>
</tr>
<tr>
<td><strong>Micro:</strong></td>
<td>1. What impact does ill-health have on a household’s income or consumption patterns (over a single year, or for a longer period of time)?</td>
</tr>
<tr>
<td>Households</td>
<td>2. How much do households pay for medical or other expenses because of illness (for an episode, over a year, or over a lifetime)?</td>
</tr>
<tr>
<td>Firms</td>
<td>1. What impact does ill-health have on a firm’s operating costs, output or profit?</td>
</tr>
<tr>
<td></td>
<td>2. What is the impact of ill-health on productivity in the workplace (including impaired performance while still at work, as well as absenteeism)?</td>
</tr>
<tr>
<td>Government</td>
<td>1. What proportion of government expenditure could have been saved and directed to an alternative use in the absence of illness? (e.g., what social security payments could be avoided by the prevention of or cure for disease?)</td>
</tr>
<tr>
<td></td>
<td>2. What impact does ill-health have on the government workforce and on the government’s ability to provide services?</td>
</tr>
</tbody>
</table>
Review article

A framework for measuring costs to society of IgE-mediated food allergy

Both immunoglobulin E (IgE)-mediated food allergy and food intolerance can lead to many changes in personal behaviour and health care resource use which have important economic consequences. These costs will impact directly, indirectly and intangibly on both individuals and society in general. It is important to measure the cost of illness (COI) of food allergy as a first step in developing and evaluating measures to reduce and control the burden of illness. This paper outlines a framework for assessing COI of food allergy from different viewpoints. It offers a structure for identifying the different cost impacts on allergic and nonallergic consumers, food producers and society as a whole, and for scoping, measurement and valuation of relevant costs. Within this structure, the existing literature is reviewed. This review illustrates the lack of information and clear methodology for assessing costs of food allergy. The paper concludes that there is a need for a more structured research programme to generate data essential for future evaluations of procedures and technologies for the diagnosis, treatment and management of food allergy.

S. Miles, R. Fordham, C. Mills, E. Valovirta, M. Mugford

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Key words: cost of illness; economic impact; food allergy.

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Accepted for publication 24 February 2005
# Matrix of types of cost of food allergy by stakeholders

<table>
<thead>
<tr>
<th></th>
<th>Consumers</th>
<th>Carers and proxy carers</th>
<th>Health services</th>
<th>Industry and employers</th>
<th>Regulators and enforcers</th>
<th>Society</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual</td>
<td>Household</td>
<td>Parents and other friends and relatives</td>
<td>Community and voluntary sector</td>
<td>Education sector</td>
<td>Food industry</td>
</tr>
<tr>
<td><strong>Direct costs</strong></td>
<td>Out of pocket expenses, Self-care</td>
<td>Out of pocket expenses</td>
<td>Informal care</td>
<td>Outreach and social care</td>
<td>Attendance in class, School and college programmes for allergy and food education</td>
<td>Hospital and primary care</td>
</tr>
<tr>
<td><strong>Indirect costs</strong></td>
<td>Loss of education and income from employment</td>
<td>Housekeeping costs</td>
<td>Loss of income from employment</td>
<td>College, school and nursery organization</td>
<td>Public health campaigns</td>
<td>Costs of regulation, Costs of adaptation to market forces</td>
</tr>
<tr>
<td><strong>Intangible costs</strong></td>
<td>Quality of life</td>
<td>Quality of life</td>
<td>Quality of life</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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*Note: The table continues with more details for each category.*
Costing framework for food allergies

1 Identifying the viewpoint of the analysis:
• identifying the stakeholder(s) for which the analysis is relevant;
• considering problems of double counting;
• if assessing economy wide policy, taking account of all stakeholders.

2 Discriminating between:
• costs of type 1 IgE-mediated allergy vs food intolerance;
• costs directly attributable to food allergy and those of associated allergic conditions (e.g. asthma, atopic eczema), and other co-morbidities.

3 Should be able to identify:
• all major direct costs;
• indirect costs and
• intangible costs.
Food allergy in children and young people

Costing report
Implementing NICE guidance

February 2011

NICE clinical guideline 116
Analysed the recommendations

• Skills and competencies of healthcare professionals
• Diagnosis and assessment in primary care
• Referral to secondary care and specialist allergy clinics

• Healthcare professionals involved in the diagnosis of food allergy in children and young people should have the relevant skills and competencies.
NICE – Food allergy Costing report

• Feedback suggests that some GPs and other healthcare professionals may not have received sufficient training in food allergy

• It is not anticipated that the training of GPs and other healthcare professionals will have a significant impact on NHS resources because training may be covered as part of continued professional development.

• Where there is a lack of allergy specialists at a local level, investment may be required if implementation of this guideline leads to an increase in the number of referrals to specialists.
Costing methodology
Benefits

• Improved training in allergy for healthcare professionals, resulting in earlier diagnosis of food allergy in children and young people

  ➔ This will lead to potential savings to the healthcare service
  – reduced appointments with GPs and other healthcare professionals
  – avoidance of unnecessary testing and medication
  – reduction in emergency admissions
Benefits (2)

• Improvements to the diagnosis pathway
  ➔ A potential shift from secondary care to primary care or specialist community-based allergy services may release hospital resources and reduce costs
  ➔ Patients may also benefit from receiving treatment closer to home
Benefits and savings

• Implementing clinical guidelines:
  – Improved training in allergy for healthcare professionals, resulting in earlier diagnosis of food allergy in children and young people.
    • This will lead to savings to the healthcare system from
      – reduced appointments with GPs and other healthcare professionals,
      – avoidance of unnecessary testing and medication,
      – a reduction in emergency admissions.
  – Improvements to the diagnosis pathway.
    • A potential shift from secondary care to primary care or specialist community-based allergy services may release hospital resources and reduce costs.
    • Patients may also benefit from receiving treatment closer to home.
**Prevention is Better than Cure?**

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Study Design</th>
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</table>
| Abhijeet J Bhanegaonkar et al. 2015 | Malaysia | A cohort Markov model simulated the AD incidence and burden from birth to age 6 years in the target population fed with PHF-W vs. CMF | • Costs savings (-$1,113)
• Avoided AD cases (-14% absolute percentage),
• Additional days without AD symptoms (+38 days),
• Additional years without AD diagnosis (+0.69 years, i.e., just over 8 months), and
• QALY gains (+0.041 QALYs). |
| Bhanegaonkar A et al. 2015 | US | Markov model was developed integrating published data, a survey of US paediatricians, costing sources and market data, and expert opinion. | • 14-percentage point reduction in AD risk
• Decreased the time spent post-AD diagnosis by 8.3 months per child
• Increased days without AD flare by 39 days per child
• Costs savings (-$495) |
| Lee BW & Detzel PR. 2015 | Asia Pacific | Review | Costs were higher in more developed countries (Australia, North Korea and Singapore), with overall costs ranging from approximately USD 1,000 to 6,000, than in less developed countries (Philippines, Indonesia and Malaysia), where costs ranged from USD 199 to 743. |
Economic value of atopic dermatitis prevention via infant formula use in high-risk Malaysian infants

Abhijeet J Bhanegaonkar¹, Erica G Horodniceanu¹, Amir Hamzah Abdul Latiff², Sanjay Woodhull³, Phaik Choo Khoo³, Patrick Detzel⁴, Xiang Ji¹, and Marc F Bottema¹*
pHF-W reduces the proportion of patients developing AD by 14 percentage points
Cumulative *Discounted* Total Costs
(Malaysian Ringgit $)

- **PHF-W** reduces the cumulative costs associated with AD by $1,116 at 6 years.
- **PHF-W** is also less expensive over almost the entire period.

Weeks since birth vs. Discounted cumulative costs for an average infant entering the model.
Direct and Indirect Costs by Category (Malaysian Ringgit $)

The cost of AD are largely driven by visit, pharmacological treatment, and indirect costs (each accounting for about 1/3 of costs)

pHF-W reduces costs for all key categories

Note: Indirect costs include time loss for taking care of AD child, travel to clinic, and time loss to go to the lab.
Over the 6-year follow-up period, use of pHF-W instead of CMF among high-risk infants results in:

- costs savings ($-1,113)
- avoided AD cases (-14% absolute percentage),
- additional days without AD symptoms (+38 days),
- Additional years without AD diagnosis (+0.69 years, i.e., just over 8 months), and
- QALY gains (+0.041 QALYs).

pHF-W appears to be a cost effective strategy for the prevention of AD in high-risk infants.
Summary

• Clinical practice guidelines offer an evaluation of the quality of the relevant scientific literature, and an assessment of the likely benefits and harms of a particular diagnostic test or treatment.

• Trustworthy guidelines
  – based on a systematic evidence review
  – developed by panel of multidisciplinary experts
  – provide a clear explanation of the logical relationships between alternative care options and health outcomes
  – provide ratings of both the quality of evidence and the strength of the recommendations
The Era of Allergy: Local and Global Insights and Intervention

Date: 17th – 20th October 2016
Venue: Shangri-La Hotel
Kuala Lumpur, Malaysia