




# Connecting nutrition as a hard science and international knowledge networks: Proceedings of the Fourth International Summit on Medical and Public Health Nutrition Education and Research

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## ABSTRACT

**Introduction** Nutrition is a 'hard' science in two ways; the scientific rigour required for quality nutrition research, and equally, the challenges faced in evidence translation. Ways in which quality nutrition research can be synthesised and evidence effectively translated into practice were the focus of the Fourth Annual International Summit on Medical and Public Health Nutrition Education and Research.

**Setting** Wolfson College, University of Cambridge, and Addenbrookes Hospital at the Cambridge Biomedical Campus, Cambridge, in July 2018.

**Key findings** Open communication and collaboration across disciplines and systems, including transfer of knowledge, ideas and data through international knowledge application networks, was presented as a key tool in enhancing nutrition research and translation of evidence. Increasing basic nutrition competence and confidence in medical professionals is needed to encourage the implementation of nutrition therapy in prevention and treatment of health outcomes.

**Conclusions** A sustained focus on producing quality nutrition research must be coupled with increased efforts in collaboration and building of knowledge networks, including educating and training multidisciplinary health and medical professionals in nutrition. Such efforts are needed to ensure nutrition is both reliable in its messaging and effective in translation into healthcare.

## INTRODUCTION

Nutrition can be considered a 'hard' science in more than one way<sup>1</sup>: hard in the sense of scientific rigour, when conducted to high standards of quality and ethics in line with other areas of health science; and equally hard to translate from published knowledge to healthcare practice, due to a historically variable evidence base with confusion in interpretation by practitioners and the public. In this Summit, we explored how to retain the hard bedrock of evidence, while making nutrition less difficult to convert into practical action. 'Nutrition as a Hard Science

to International Knowledge Networks' was the theme of the Fourth Annual International Summit on Medical and Public Health Nutrition Education and Research, held by the Need for Nutrition Education/Innovation Programme (NNEdPro) Global Centre for Nutrition and Health, in partnership with Global Open Data for Agriculture and Nutrition (GODAN) at Wolfson College, University of Cambridge, and Addenbrookes Hospital at the Cambridge Biomedical Campus, Cambridge, on 19–20 July 2018. See online supplemental material for the Summit programme.

NNEdPro is an interdisciplinary think tank, training academy and knowledge network anchored in Cambridge, UK. Our work focuses on developing adaptable and scalable models for medical nutrition education, combining clinical/public health knowledge with leadership training to aid implementation in healthcare settings, globally. For the past 4 years, we have hosted this International Summit as an opportunity to bring together change makers from any country, profession and sector interested in the dynamic interfaces between Nutrition and Health. The 2015 Summit began as an introduction between these interfaces, encouraging global collaboration and setting the stage for next steps. The 2016 event focused on setting priorities, concentrating in 2017 on how to implement changes to have sustained impact.<sup>2–4</sup>

A key component of the 2018 Summit was the conceptual launch of the International Knowledge Application Network in Nutrition 2025 (I-KANN-25), a joint initiative between NNEdPro and GODAN, supported by the Laboratory of the Government Chemist. I-KANN-25 seeks to create a global network

to identify gaps in nutrition knowledge, then develop and deliver high-impact technology-based nutrition education to healthcare providers within a sustainable model framework. I-KANN-25 aims to promote translatable information at a global level and drive implementation of knowledge into policy and practice, bridging the gap between agricultural and health-related aspects of Human Nutrition. Summit discussions continue to inform this network, including the use of international knowledge networks to reach nutrition and public health goals in various sectors, including clinical nutrition, education and research.

The Summit comprised three themed sessions of speaker presentations: nutrition as a hard science; nutrition and implementation education; and meeting global nutrition challenges. Considering these themes, the overall focus was on how nutrition research can be synthesised, and evidence effectively translated into policy and practice in order to impact public health nutrition. There was a strong emphasis on the need for open communication and collaboration across disciplines and systems, using evidence, education and implementation as tools for change. The Summit was also the launch of

the new *British Medical Journal (BMJ)* journal, co-owned by NNEdPro, entitled: *BMJ Nutrition, Prevention & Health*. In light of the growing gap between nutrition science and practice and policy, the vision for this journal is to enable greater dissemination of evidence-based nutrition, making it accessible and leading to translation into health policies and healthcare practitioner practices.

### STRATEGIC PLANNING FOR I-KANN-25 AND THE *BMJ* NUTRITION, PREVENTION & HEALTH

For NNEdPro strategic planning, Summit delegates were grouped into topics based on their background and experience. Each group discussed how their topic should be represented in I-KANN-25 and the new *BMJ* journal. Group discussions were summarised, with attendees listed in table 1.

#### Global food security

This group reiterated that I-KANN-25 must ensure multi-disciplinary collaboration across both healthcare-focused professions, as well as those in research, agriculture, policy and public health. The group stressed it will be

**Table 1** Participants and presentations from day 1 (strategy workshops) of the Fourth International Summit on Medical and Public Health Nutrition Education and Research

Day 1: Strategy workshops		
<ul style="list-style-type: none"> <li>▶ Introduction and wrap-up of past summits</li> <li>1. Questions for round-table discussions: What does an international nutrition knowledge application network mean to your network?</li> <li>2. How can this be achieved by 2025?</li> <li>3. What role can NNEdPro and the I-KANN-25 framework play?</li> <li>4. Other considerations</li> </ul>		
Round-table discussions	Topic	Members
	GODAN open data	Andre Laperriere, Ruthie Musker, Nida Ziauddeen, Glenys Jones, Sharon Kiburi, Emmanuel Fiagbenu, Okeke Celestine, Sonigitu Asibong Ekpe
	Biomedical research priorities in nutrition	Rob Winwood, Daniela Martini, Julian Braybrook, Michelle Venables, Liset Brooshoofd, Zorita Diaconeasa, Rossella Dodi
	Population research priorities in nutrition	Giuseppe Grosso, Francesca Ghelfi, Ruth Walker, Francesca Giopp, Melissa Adamski, Serena Ru Bing Yue, Duygu Ağaçindüz
	Role of primary care in nutrition education and research	Sile Griffin, David Unwin, Rosie Gilbert, Harriet Holme, Ronald Chawatama, Godelieve Docx, Gena Kadar, Ali Ahsan Khalid
	Role of dietitians in nutrition education and research	James Bradfield, Hei man Emily Ng, Tanzil Miah, Victoria Carter, Arabella Mason, Vittoria Ercolanelli, Vani Tadevall
	Global food security	Shivani Bhat, Emily Fallon, Lydia Smith, Dora Pereira, Rachel Keane, Praewphan Siriyut, Dionysia Angeliki Lyria
	Public understanding of nutrition and health	Mei Yen Chan, Mhairi Brown, Sherjeel Aman, Mariam Ioseliani, Helena Triguero, Ricardo Di Deo
	Medical nutrition education	Eleanor Beck, Kathy Martyn, Marie Docx, Daniela Gonzalez Ruenes, Gwen Twillman, Caryl Nowson, Masara Elgares
	Culinary medicine	Luke Buckner, Iain Broadley, Giuseppe Di Pedè, Ally Jaffee, Elaine MacAninch, Johan Docx, Claudia Favari
	Strategic advisory committee/ <i>BMJ</i> group	Sumantra Ray, Martin Kohlmeier, Minha Rajput-Ray, Pauline Douglas, Daniele Del Rio, Janet O'Flaherty, Allison Lang, Mark Stuart
Scientific minisymposium	<p><b>Professor Kalpana Gupta</b> Boston University School of Medicine</p> <p><b>Dr Christina Khoo</b> Director of Global Health Science and Regulatory Affairs, Ocean Spray Cranberries</p> <p><b>Dr Daniela Martini</b> Laboratory of Phytochemicals in Physiology of the University of Parma</p> <p><b>Dr Ana Rodriguez-Mateos</b> Department of Nutritional Sciences, Faculty of Life Sciences and Medicine King's College London</p>	

GODAN, Global Open Data for Agriculture and Nutrition; I-KANN-25, International Knowledge Application Network in Nutrition 2025; NNEdPro, Need for Nutrition Education/Innovation Programme.

vital to consider the numerous issues facing food security including geographical, cultural and diversity issues as well as economics and national education levels. It was felt that collaboration between the *BMJ Nutrition, Prevention & Health* journal with I-KANN-25 would be best placed to develop multidisciplinary working, providing evidence-based research.

### Nutrition and biomedical research

As highlighted throughout the Summit, key case examples refuted the misconception that nutrition is not based on a hard science. It was proposed that the lack of balance between biomedical research compared with nutrition and behaviour change studies in practitioners and patients remains a challenge. In areas saturated with evidence, it was felt that communication in a more digestible manner was vital, potentially through infographics such as those used by European Union Food Information Council.<sup>5</sup>

### Nutrition education

Several groups focused on different aspects of nutrition education. The discussion which focused on dietitians' roles in nutrition education and research expressed a vision that I-KANN-25 would be an online platform allowing transfer of knowledge between parties, and of research ideas. This transfer would allow parties who were unable to complete a project in isolation to collaborate with others to further research within the nutrition field. One group felt it would be beneficial to share mistakes that occurred in research, so that others could discuss and learn from these experiences. Another group focused on education of healthcare professionals and the public, an area signposting towards already established courses or information was thought to be useful. Interestingly, the group went on to identify potential pitfalls they could envision, including raising public and scientific awareness of the resource as well as missing distribution to those unable to access the internet.

The applicability of 'culinary medicine', described as learning about food, nutrition and its application within a kitchen setting, was discussed by one group, including details of the model, examples and potential audiences. The key focus of culinary medicine was translation of knowledge to changing behaviour and health of patients. Examples of culinary medicine were provided at the local, global and health professional perspectives, including:

- ▶ NNEdPro's India Network—creating a sustainable health promotion Teaching Kitchen programme,<sup>6</sup> envisioned in line with the key UN Sustainable Development Goals.<sup>7</sup>
- ▶ Brighton & Hove Food Partnership—helping the Brighton public learn to cook, eat a healthy diet, grow their own food and waste less food.<sup>8</sup>
- ▶ Culinary Medicine UK—assisting doctors to learn the foundations of clinical nutrition and how best to motivate their patients to lead healthier lives using food.<sup>9</sup>

The nutrition education group also focused on the medical curricula, a key priority of NNEdPro. The group identified that I-KANN-25 should be focused on increasing nutrition competencies to sustain learning throughout a medical career. The group stressed the importance of developing skills to allow appropriate referrals to dietitians and qualified nutritionists, following basic nutritional intervention and increasing competence and confidence when discussing nutrition with their patients. An example of how this may be achieved was from medical schools that included a dietitian in curriculum development. The group also envisioned I-KANN-25 developing apps, or promoting existing evidence-based apps, to further nutrition education, allowing greater buy-in from students.

Groups discussed themes that were then expanded on further throughout the plenary sessions of day 2 (table 2), progressing from science through to education and global challenges.

### NUTRITION AS A HARD SCIENCE

Nutrition science is complex but significant advances have been made in uncovering evidence of the effects of many dietary constituents, including the use of vitamin C to eradicate scurvy. The science has led to the formation of dietary guidelines, but due to complexity of the science, population-level guidelines are limited in their ability to maximise individual nutritional health. Keynote speaker, Dr Fiona Godlee, highlighted the need for sound nutrition science in the field of preventive medicine and emphasised that nutrition and lifestyle diseases, drawing on the example of non-alcoholic fatty liver disease, are prevalent and present a huge cost to healthcare systems. Despite this, nutrition training for doctors is relatively non-existent, resulting in an unsustainable culture of 'a pill for every ill' for both treatment and prevention. Nutrition scientists, doctors and other healthcare professionals must assess gaps in knowledge and develop innovative means to individualise nutrition advice, a message that was echoed by Professor Martin Kohlmeier, inaugural editor of *BMJ Nutrition, Prevention & Health*. Professor Kohlmeier highlighted the significant accomplishments made in nutrition research, including the potential role of vitamin D supplementation in reducing the risk of developing influenza A. Professor Kohlmeier also proposed that the strength of nutrition as a science lies in the ability to continually question findings and develop further research. Professor Daniele Del Rio used the example of polyphenols to illustrate this point. In research settings, polyphenols have been shown to have beneficial effects on inflammation, cell growth, brain function and urinary tract infection. When these potential effects are studied within human subjects, however, there is variability in outcomes. As a hard science, there is a need for knowledge creation within the science of nutrition to be individualised in its delivery.

**Table 2** Speakers and presentations from day 2 of the Fourth International Summit on Medical and Public Health Nutrition Education and Research

Day 2: Annual summit		
Speaker name	Organisation	Presentation title
<i>Session 1: Nutrition as a hard science</i> Chair: Professor Sumantra Ray		
Professor Sumantra Ray	NNEdPro Founding Chair and Executive Director	Marking 10 years of NNEdPro and launch of the <i>BMJ Nutrition, Prevention &amp; Health</i>
Dr Fiona Godlee	Editor-in-chief, <i>The BMJ</i>	<i>Keynote: current evidence, controversies and conjecture</i>
Professor Martin Kohlmeier	Editor-in-chief, <i>BMJ NPH</i>	<i>Nutrition is a hard science: a vision for BMJ Nutrition, Prevention &amp; Health</i>
Professor Daniele Del Rio	NNEdPro Scientific Director	Basic nutrition sciences and human health: from molecules to mankind
<i>Session 2: Nutrition and implementation education</i> Chair: Pauline Douglas, RD Introductions: Nida Ziauddeen		
Dr Celia Laur	University of Waterloo	<i>Case study A:</i> From the Canadian ‘More-2-Eat’ (M2E) study to Nutrition Education Policy for Healthcare Practice (NEPHELP) in the UK and beyond (NELICO India)
Professor Sumantra Ray	NNEdPro Founding Chair and Executive Director	
Dr Rajna Golubic	University of Cambridge	<i>Case study B:</i> Knowledge, attitudes and practices in food allergy management of dietitians without specialist allergy training and of health professionals without nutrition training
Dr Glenys Jones	Association for Nutrition	
<i>Panel discussion</i> Chair: Pauline Douglas, NNEdPro Education Director Panellists: Kathy Martyn (Allied Health) Elaine Macaninch (Dietetics) Anne Swift (Public Health) David Unwin (General Practice) Luke Buckner (Medical Students/Junior Doctors)		
<i>Session 3: Meeting global nutrition challenges</i> Cochairs: André Laperriere, GODAN Executive Director, and Sumantra Ray Introductions: Shivani Bhat		
Professor Eleanor Beck	University of Wollongong	<i>Case study A:</i> Nutrition down under—research, policy and education-based approaches to ANZ challenges
Professor Caryl Nowson	Deakin University	
Dr Dora Pereira	University of Cambridge	<i>Case study B:</i> Nutrition in Africa—tackling iron deficiency anaemia in the Gambia through research and innovation
Dr Shailaja Fennell	University of Cambridge	<i>Case study C:</i> Nutrition in India—Transforming India’s Green Revolution by Research and Empowerment for Sustainable Food Supplies (TIGR2ESS)
Professor Nitya Rao	University of East Anglia	
Dr Lydia Smith	National Institute of Agricultural Botany	<i>Case study D:</i> Developing a global open data strategy for agriculture and nutrition
Dr Nida Ziauddeen	GODAN	
Dr John Ingram	University of Oxford	<i>Keynote: Why food systems knowledge is a prerequisite for enhancing nutrition</i>
<i>Session 4: Announcements and competition winners</i> Cochairs: Professor Martin Kohlmeier and Professor Sumantra Ray Introductions: James Bradfield		
Launch of the International Academy of Nutrition Educators (IANE): Dr Giuseppe Grosso and Shivani Bhat		
Dr Francesca Ghelfi	European Institute of Oncology	From essay to execution: future of the International Knowledge Application Network in Nutrition 2025 (I-KANN-25)
Dr Fiona Godlee and Professor Martin Kohlmeier	The Editors Perspectives: <i>The BMJ</i> and <i>BMJ Nutrition, Prevention &amp; Health</i>	
The Right Honourable Lord Balfe	Honorary President, NNEdPro and British Dietetic Association	Closing address
The Right Honourable Lord Balfe, Dr Daniele Del Rio and Professor Sumantra Ray	A Look Forward	

GODAN, Global Open Data for Agriculture and Nutrition; NNEdPro, Need for Nutrition Education/Innovation Programme.

## NUTRITION AND IMPLEMENTATION EDUCATION

While nutrition is an established hard science, strategies are required to promote the use of new interventions into routine practice, once proven effective. In particular, there is a need for nutrition training of multidisciplinary healthcare professionals to enhance delivery and translation of nutrition evidence. This is a central theme of NNEdPro's 'Nutrition Education Policy for Healthcare Practice' (NEPHELP) project. NEPHELP is core funded by the 2017 Medical Nutrition Industry (MNI) grant—awarded to NNEdPro and the British Dietetic Association. Professor Sumantra Ray (SR) highlighted that a central objective of this project is to evaluate current nutrition education provided to the healthcare workforce, identify gaps in nutrition education provision and develop a tailored learning package. Dr Rajna Golubic gave an overview of preliminary results of the evaluation, which showed that doctors feel nutrition training during their medical degree was minimal, and either informal or entirely absent during their career development. Doctors also felt that responsibility for nutrition should lie with dietitians, but continuous nutrition training is required to ensure best practice.

For example, an area that would benefit from clarification is the treatment of cow's milk protein allergy (CMPA). CMPA is a common food allergy in infants and young children and current guidelines advise strict exclusion of cow's milk protein from the diet. However, Pauline Douglas, RD, pointed out that overprescription of amino acid formulas is a huge cost to the National Health Service and is not benefiting children who may have improved quality of life through tolerance development. NNEdPro's project to investigate healthcare practitioner knowledge, attitudes and practices towards identification and management of CMPA, while developing a model for improvement, has found a lack of consensus in management pathways and disagreement on best practice.

## MEETING GLOBAL NUTRITION CHALLENGES

The Summit finished with a broader consideration of global nutrition-related issues in specific contexts or populations. The presentations within this section highlighted the combined importance of collaboration, education and innovation to address these issues. Developing stakeholder collaboration has been a long-standing key strategy for NNEdPro and GODAN in their aim to create a network of open data in nutrition. Nida Ziauddeen provided an overview of the network's goal of open, accessible data across food systems, which enables efficiency within the nutrition and public health field and can help inform policy. Dr John Ingram illustrated that stakeholder engagement is also key across the food system, where an understanding of the different actors involved and their interactions, by way of a 'food systems perspective', is fundamental to improving nutrition outcomes. The National Institute for Agricultural Botany Innovation Farm, as described by Dr Lydia Smith, is a key example of

the success of collaboration in achieving common goals. The farm is a knowledge transfer initiative comprising stakeholders within science, academia and industry. The farm supports the translation of plant science discoveries into practical applications to address the issues of food security, climate change, sustainable resources, and health and nutrition.

The importance of education as a tool for addressing nutrition issues was evident at the NNEdPro Summit. Professors Eleanor Beck and Caryl Nowson from NNEdPro's Australia and New Zealand Network (ANZ Network) stressed that both collaboration and education are key to achieving nationwide adoption of nutrition competencies within Australian medical curriculum. This is a necessary step in the ANZ Network goal to strengthen the nutrition competence of medical professionals in Australia and New Zealand. Professor Nowson explained that collaboration across universities is necessary for respected professional bodies to recognise that medical graduates are not meeting basic competencies required to assist patients from a nutrition perspective. Professor Beck also notes that educators can begin to make local efforts to promote nutrition education even before any changes are achieved in policy or curriculum. Lunchtime lectures, web-based learning such as Monash University Food as Medicine courses<sup>10</sup> and relevant student research projects should be considered to stimulate interest in nutrition education outside of formal curriculum. Dr Nitya Rao and Dr Shailaja Fennell from the Transforming India's Green Revolution by Research and Empowerment for Sustainable Food Supplies group highlighted that education is needed to address gender inequity issues within India by improving the health and nutrition literacy of women and youth, proposing implementation of innovation kitchens/workshops within rural communities in India.

Lastly, the Summit emphasised that innovation is at the forefront in addressing complex global nutrition issues where current intervention or efforts are not proving effective. The use of the novel nanoiron supplement, iron hydroxide adipate tartrate (IHAT), exemplified this. IHAT is used for the treatment of iron deficiency anaemia in young children within the Gambia, as described by lead researcher of the IHAT-GUT trial, Dr Dora Pereira. Current supplementation with soluble iron may be associated with increased risk of infection due to how readily available the iron is to the cell, and therefore to any potential pathogens present. IHAT is effectively absorbed while remaining nanoparticulate in the gut, similar to the iron in foods we eat, resulting in a slower release of iron, with less risk of infection for vulnerable populations. Innovation in technology can also enhance the ability to reach wider, global audiences for research or education purposes, such as through web-based applications and social media, if adopted effectively by public health researchers and educators. Dr Fennell proposed the use of mobile applications to assist the mapping of demand for education, training and skilling programmes in different rural and periurban communities in India,

and using social media to connect interested groups and improve the availability of information. Similarly, Professor Nowson suggested the value of an online platform to monitor and record the development of nutritional competencies within Australian medical courses.

## CONCLUSIONS AND NEXT STEPS

The 2018 NNEdPro Summit reiterated that nutrition is indeed a hard science, both from the perspective of the required scientific rigour needed to properly research diet and nutrition, through to the challenges with knowledge dissemination. However, through a combined focus on research as well as accurate implementation and translation into medical education and patient facing information, nutrition can be reliable in its messaging. Throughout all of these discussions, an underlying message was the need for valid and reliable data to inform decisions at the individual, local and global levels. This need led to the topic of the 2019 Summit: ‘Closing the Gap: Data-based Decisions in Food, Nutrition and Health Systems’.

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## REFERENCES

- Kohlmeier M. Nutrition is a hard science. *BMJNPH* 2018;1:1–2.
- Barnes K, Crowley J, Laur C, *et al*. Proceedings of the second international summit on medical nutrition education and research. *Public Health* 2016;140:68–72.
- Crowley JJ, Laur C, Carter HDE, *et al*. Perspectives from the third International summit on medical nutrition education and research. *Front Public Health* 2018;6:93.
- Laur C, Ball L, Ahankari AS, *et al*. Proceedings of the inaugural international summit for medical nutrition education and research. *Public Health* 2016;140:59–67.
- EUFIC. Dietary fats (infographic). Brussels, Belgium, 2016. Available: <https://www.eufic.org/en/whats-in-food/article/dietary-fats-infographic> [Accessed 20 Mar 2019].
- NNEdPro. ‘NNEdPro-GIP network in India’. Cambridge, United Kingdom, 2019. Available: <http://www.nnedpro.org.uk/india-regional-network/4592886024> [Accessed 20 Mar 2019].
- United Nations. Sustainable development goals. Available: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/> [Accessed 20 Mar 2019].
- Brighton & Hove Food Partnership. The Brighton & Hove food partnership is all about food, 2019. Available: <https://bhfood.org.uk/> [Accessed 20 Mar 2019].
- Culinary Medicine. Culinary medicine homepage. United Kingdom, 2019. Available: <https://culinarymedicineuk.org/> [Accessed 20 Mar 2019].
- Monash University. Food as medicine – free open online course, 2019. Available: <https://www.monash.edu/medicine/scs/nutrition/short-courses/food-as-med> [Accessed 20 Mar 2019].