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Editorial: Food and Nutrition: Pathways to a Sustainable Future

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Abstract:	The world is waking up to the reality of climate change and the challenge of feeding 10 billion people in a healthy and sustainable way. For population and planetary health, food systems need to change. 'Food and Nutrition: Pathways to a Sustainable Future' was the first face-to-face Nutrition Society Summer Conference since 2018, bringing together leading contributors from across the globe to explore six pathways to a better tomorrow. Review papers from the conference symposia cut across disciplinary divides showcasing advances in scientific methods and our cumulative understanding of the impact of the food system on climate change. The depth, breadth and advancement of research presented demonstrates the power of collaborative research that can shape industry, individual and population recommendations and create a powerful shift towards the sustainable dietary patterns and systems that are so urgently required.

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Editorial: Food and Nutrition: Pathways to a Sustainable Future

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JP and LN jointly planned, wrote and edited the manuscript.

For Peer Review

1 Abstract

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3 people in a healthy and sustainable way. For population and planetary health, food systems
4 need to change. *'Food and Nutrition: Pathways to a Sustainable Future'* was the first face-
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12 systems that are so urgently required.

13
14 Key terms: sustainability, food systems, nutritional inequalities, planetary health,
15 personalised nutrition
16

17 A sustainable food future

18 The 2019 EAT-Lancet report presented a stark warning: "Food is the single strongest lever to
19 optimize human health and environmental sustainability on Earth. However, **food provision** is
20 currently threatening both people and planet."¹ It was timely therefore, that the Nutrition
21 Society Summer Conference 2022: *'Food and Nutrition: Pathways to a Sustainable Future'*
22 aimed to propose innovative solutions to achieve an urgent and significant shift towards a
23 more sustainable food and nutrition future.
24

25 The conference took place in Sheffield and was jointly hosted by Sheffield Hallam University,
26 The University of Sheffield and Sheffield City Council between the 12-15th July 2022. This
27 was the first in-person Nutrition Society Summer Conference since 2018, before FENS 2019,
28 and the first to be hosted in Sheffield for 21 years. The conference welcomed 252 delegates
29 from around the world, representing 13 countries: Australia, Canada, Chile, Ireland, Japan,
30 Korea, New Zealand, Nigeria, Singapore, Spain, United Arab Emirates, UK, USA, and
31 brought together global experts across a range of disciplines to share contemporary
32 research to advance our understanding of this important issue. The conference was
33 organised into six themes: *'Building ethical food systems'*, *'Eroding nutritional inequalities'*,
34 *'Enabling activity: lessons from exercise science'*, *'Sustaining an ageing population'*,
35 *'Understanding mechanisms for health'* and *'Navigating dietary trends'*.
36

37 The opening plenary was eloquently delivered by Professor Sir Charles Godfray and chaired
38 by Nutrition Society CEO Mark Hollingsworth. Sir **Godfray** described the challenges of
39 providing healthy, sustainable and equitable diets for all, in the context of climate change and
40 a growing population. Despite declining fertility rates, the global population is expanding and
41 is set to peak at 10.4 billion by 2100, due to increased longevity resulting in an ageing
42 population. The food system alone has the potential to dangerously heat the world, even if
43 every other industry is on target to meet the proposed climate change milestones. It
44 contributes 30% of global greenhouse gas emissions, occupies 40% of available land and
45 accounts for 70% of freshwater withdrawal, alongside having other environmentally
46 detrimental impacts². "We don't have the luxury of doing nothing", Sir **Godfray** reiterated,
47 "we need to sustainably intensify our food production". He concluded that the combined
48 effort of the food system needs to include modifying diets, sustainably increasing food
49 production, reducing waste and improving food governance: powerfully stating "if we fail on
50 food, we fail on everything".
51

52 The core scientific programme on day one began with Theme Highlights from *Nutrition in the*
53 *Treatment, Management and Prevention of Disease* from Dr Athanasios Koutsos (University
54 of Glasgow) who shared insights from the RISSCI Study highlighting the individual nature of

55 the serum cholesterol response when replacing dietary saturated fat with unsaturated fat.
56 From *Nutrition and Optimum Lifecourse* Kiu Sum (University of Westminster) characterised
57 dietary challenges doctors face in the workplace, including creating the time, opportunity and
58 culture to eat appropriately. Madeleine Thomas (University of Leeds) shared data supporting
59 the positive impact supermarket voucher schemes can have in increasing intake of fruit and
60 vegetables in the *Food Systems* theme. Within the *Novel Nutrition Research Methodologies*
61 *and Technologies* theme, Tilly Potter (Rowett Institute, University of Aberdeen) brought *n-of-*
62 1 studies to the fore explaining how this type of work can help us better understand and
63 interpret nutritional science accounting for individual contributory factors: microbiome,
64 genotype and key ecological factors.

65

66 **International acclaim**

67 Award winning research was recognised throughout the conference with Silver Medal
68 Winner Dr Sarah Berry (King's College London) asking 'how meaningful is the mean?'. An
69 entire industry has exploded to capture public enthusiasm for personalised nutrition but
70 Sarah cautioned that *what* you eat, *who* you are and *how* you eat need to jointly inform
71 personalised advice, which should still sit alongside population recommendations. Professor
72 Amelia Lake's (Teesside University) Rank Prize Winning Lecture explored the foodscape,
73 highlighting opportunities to improve population health via manipulation of food
74 environments, reinforcing the notion that eating is a simple act but a complex behaviour
75 necessitating multi-faceted solutions designed to influence food choice. This year's
76 postgraduate symposium celebrated excellent work by Megan Flint (Sheffield Hallam
77 University), Ezgi Ozen (University of Reading) and Lena Acolatse (Ulster University) on
78 plant-based food products, SFA intake and body composition and child food portion sizes
79 respectively, demonstrating that the future of nutrition science is in very safe hands. Dr Sara
80 Jimenez-Montilla (University of Granada) presented the British Journal of Nutrition Paper of
81 the Year³, which showcased associations between intrauterine growth and inadequate
82 postnatal nutrition and consequent neurodevelopmental outcomes in very-low-birth-weight
83 infants.

84

85 **Pathways to a sustainable food and nutrition future**

86 Symposium 1 highlighted the complexity and challenge involved in '*Building ethical food*
87 *systems*'. Professor Peter Jackson (University of Sheffield) emphasised the need to adopt a
88 food systems approach which includes food security and sustainability, proffering that this is
89 as much a sociocultural challenge as a technical one. Professor Emma Boyland (University
90 of Liverpool) discussed the ethical issues associated with advertising to children in an ever-
91 complex, multi-platform environment which focuses heavily on foods high in saturated fat,
92 salt and sugar (HFSS) and the role of the food system in protecting our future generations.
93 Dr Owen Fraser (President of AOAC Sub-Saharan African Section) described the complexity
94 and nuance required to accurately interpret and understand the macro- and micro-nutrient
95 composition of food in light of multiple available methodologies.

96

97 Symposium 2 '*Eroding nutritional inequalities*', focused on population groups who are
98 particularly vulnerable to nutritional inequalities: pregnant women (Dr Nicola Heslehurst,
99 Newcastle University); young infants and families during the Covid-pandemic (Dr Christian
100 Reynolds, City University); and users of food banks (Dr Rachel Loopstra, King's College
101 London and University of Liverpool). Despite research and activity that has been injected into
102 underserved communities such as these, food insecurity is prevalent and research needs to
103 be translated into action and policy to ensure a joined up, whole-systems approach and
104 prevent the cumulative inequalities.

105

106 In symposium 3, we heard from Dr Julia Zakrzewski-Fruer (University of Bedfordshire) who
107 emphasised the importance of considering the interrelationship between diet and physical
108 activity in paediatric settings with a focus on cardiometabolic risk reduction. Professor

109 Stensel (Loughborough University) outlined the myriad of internal and external factors driving
110 obesity, highlighting the role of physical activity on appetite control, summarising the
111 evidence on the effectiveness of pharmacological interventions for obesity, before concluding
112 with an overview of the role of physical activity in a sustainable future. Professor John Saxton
113 (University of Hull) showcased the potential of the role of physical activity in patients with
114 prostate cancer. Despite studies demonstrating that exercise interventions are feasible and
115 beneficial for aerobic exercise capacity, muscular strength, and quality of life, further studies
116 are required to understand the benefit on clinical end points such as progression free
117 survival.

118
119 Dr Liz Williams (University of Sheffield) opened symposium 4, '*Sustaining an ageing*
120 *population*' with a deep dive into sustainable protein for healthy ageing highlighting the risks
121 of inadequate protein intakes in older age and discussing sustainable protein sources that
122 might meet the demands of our expanding ageing population. Dr Crystal Haskell-Ramsay
123 (Northumbria University) followed with a focus on sustaining cognitive function exploring data
124 on cruciferous vegetables, blueberries, tart cherry, avocado, nuts, and reiterating the
125 importance of dietary variety. Dr Aisling O'Halloran (Trinity College Dublin) then shifted the
126 focus to specific micronutrients in older age reviewing what we can learn from the TILDA
127 cohort.

128
129 Symposium 5 focused on '*Mechanisms for health*' with Professor Ian Givens (University of
130 Reading) providing an overview and update of dairy products and their role in
131 cardiometabolic disease with many debates still afloat in this field, particularly in relation to
132 the difference between high and low-fat dairy sources and their impact on health. Professor
133 Suzan Wopereis (The Netherlands Organization) provided a detailed overview of how
134 phenotypic flexibility can be used to bridge the gap between current population health
135 guidelines and personalised nutrition which was followed by a fascinating talk by Dr Shilpa
136 Bhupathiraju (Harvard Medical School) who shared a detailed overview of the developing
137 field of precision nutrition including how biomarkers can advance our understanding of plant-
138 based diets. Metabolomics offer detail beyond dietary assessment, but this costly technology
139 is not yet fit to replace more traditional methods.

140
141 In the second plenary lecture, Professor Kieran Tuohy (University of Leeds) discussed the
142 mechanisms of action for improving health via manipulation of the dietary microbiome.
143 Promising research was highlighted including the use of novel ingredients and techniques to
144 optimise gut microbiota, and improve BMI, waist circumference and hepatic fat. Whilst there
145 are encouraging data emerging from short term interventions, Professor Touhy reiterated the
146 need for long-term interventions which study the dietary impact on the gut microbiome.

147
148 On the final day of the conference we heard of the challenges associated with '*Navigating*
149 *dietary trends*' (symposium 6). Dr Carrie Ruxton (Nutrition Communications) opened by
150 unpacking the anatomy of a message: general, segmented, and individual, and the tensions
151 this can create for both practitioners and people. Dr Megan Blake (University of Sheffield)
152 showcased the 'superpowers' of surplus food use, taking us way beyond distribution alone
153 into social cooking, social eating, and more. "The benefits are more than nutritional" said
154 Professor Ciarán Forde (Wageningen University and Research) as he described the
155 complexity of ultra-processed foods, exploring why classification is complicating our
156 understanding, reiterating that reformulation is a fact of life in modern food systems and that
157 the right reformulate should be defended. "Processing", he said, "has an image problem":
158 we have forgotten the role it can play in enabling our food systems to be *more* sustainable.

159

160 **Input from industry**

161 Quorn Foods' contributions throughout the conference raised the profile of mycoprotein
162 research and, having enjoyed a delicious breakfast from the Quorn breakfast truck on day

163 two, delegates could hear more of the science on day three. *The Quorn Foods Breakfast*
164 *Symposium* was chaired by Barbara Bray MBE, with contributions from Dr Hannah Theobald
165 (Quorn Foods), who shared insights into the history and nutritional qualities of, and
166 production technologies associated with fungal proteins and Dr Emma Derbyshire, exploring
167 the case for recognising fungal protein as a third protein food group. University of Exeter
168 Professors Ben Wall and Francis Stephens went on to showcase how mycoprotein research
169 is influencing sports nutrition from 'molecule to movement' and what collective effects
170 mycoprotein can have on glycaemia, insulinaemia and lipidaemia in the context of overall
171 cardiometabolic health.

172

173 **Beyond the science**

174 The scientific programme of the conference was accompanied by a varied social programme
175 which aimed to be inclusive and focus on moving more and the sustainability theme of the
176 conference. This programme of activities included guided walking and running routes around
177 Sheffield and yoga provided by local activity coordinators and Sheffield Hallam University.
178 On the evening of Day 1 there was a Greener, Fairer, Healthier showcase of local Sheffield
179 organisations involved in sustainable food production where canapes were provided using
180 food that would otherwise have been destined for landfill. A drinks reception kindly
181 sponsored by IFIS was held on the second evening, presenting a Sheffield 'Conference
182 Cocktail' enjoyed with music from a harpist. The much-anticipated conference dinner took
183 place on Thursday evening in the grandiose Sheffield Cutlers' Hall which entailed eating,
184 drinking, and dancing late into the night: a fitting way to celebrate the first face-to-face
185 conference that many had attended post-lockdown.

186

187 **In summary**

188 Bringing the conference to a lively conclusion our panel discussion: '*Sustainable diets in*
189 *turbulent times*' was elegantly chaired by Dr Christian Reynolds. Our panellists, Barbara
190 Bray MBE, Kristin Bash (University of Sheffield) and Professor Peter Jackson (University of
191 Sheffield) pitched their respective takes on next steps for a sustainable food and nutrition
192 future. We heard about the need for us to adjust the lens, to take a full ecological perspective
193 on the multiplicity of challenges: from the complex political landscape to post-Brexit Britain,
194 from power asymmetry in food systems to food governance and regulation. There is not one
195 answer but by working with, and improving on, the science and evidence we have globally,
196 genuine change can happen, for everyone.

197

198 '*Pathways to a sustainable future*' celebrated genuine advances in nutritional science and
199 consistent and passionate acceptance of climate change as everyone's responsibility, and a
200 problem which is affecting us all. We know that "an immense challenge facing humanity is to
201 provide a growing world population with healthy diets from sustainable food systems"⁽¹⁾. To
202 that end, we heard how novel methodologies, technologies and innovation applied across
203 the whole food system were keys to a better future and how, to achieve anything, we need to
204 embrace the realities of working across all relevant disciplines. We explored sustainability in
205 its broadest sense: in order to live healthily for longer and in a way that does not further
206 challenge our already overstretched planet. **The review papers from this conference**, we
207 hope, provide a compelling argument that the time for change is now.

208

209 Jenny Paxman, Sheffield Hallam University

210 Lucie Nield, Sheffield Hallam University

211

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