

UK RESEARCH AND INNOVATION - WRITTEN EVIDENCE (FDO0133)

Introduction

1. UK Research and Innovation (UKRI) welcomes the Committee's inquiry into this important topic. The food system is intrinsically linked to planetary, plant, animal and human health. UKRI funds research across the food system, supporting talent and skilled people, and collaborations with industry and policy makers, both nationally and globally. We work in close partnership with other funders.
2. This evidence submission outlines some of UKRI's key activities and investments to support activities focused on food, diet and obesity. We would be happy to provide further details to the Committee upon request.

UKRI's food, diet and obesity portfolio

3. UKRI's food, diet and obesity portfolio, supported by a range of investment mechanisms across its councils, represents a major investment for UKRI; £1.3bn spend between 2016/17 and 2020/21, with annual spend rising steadily during this period. Over 75% of the total portfolio has been provided through directed or strategic investments, including support to our institutes and large strategic programmes.
4. The portfolio is broad, spanning many themes across the food system. Within this evidence we focus on health and the development of obesity-related disease, highlighting some of our key investments and activities within this portfolio and their importance in understanding the links between food, a healthy diet and tackling obesity.

UKRI's key investments in diet-related health

5. Poor diet is now one of the leading drivers of non-communicable diseases across the globe. The 2 key contributors are malnutrition and obesity. Over 820 million people are undernourished around the world, with around 2 billion people facing moderate or severe food insecurity¹. Current trends suggest that by 2035, 51% of the global population will be overweight or obese and 1 in 4 people (~2 billion) will have obesity². In the UK, diet-related chronic disease accounts for £6.1 billion of annual

¹ [The State of Food Security and Nutrition in the World, 2019](#)

² [World Obesity Atlas 2023](#)

NHS spend (around 9%) and generates a wider economic loss of more than £54 billion per year (3% of UK GDP)³.

6. Some examples of UKRI investments and activities seeking to improve diet-related health include:
 - a. The BBSRC-supported [Quadram Institute](#) (£55.9m, 2022-2027), whose mission is to deliver healthier lives through innovation in gut health, microbiology and food. The institute is based on the Norwich Research Park, a unique environment that brings together researchers and clinicians to ensure research is focused on health and patient benefit. It is working alongside food and pharmaceutical industries to develop future foods, e.g., PulseON®, a novel ingredient derived from pulses which can increase the amount of resistant starch in processed foods to improve nutritional quality (collaboration with Kings College London and New Food Innovation); Vitamin B12 fortified pea shoots, commercially produced using aeroponics technology. In the size of a standard bag of salad, these fortified pea shoots can provide as much vitamin B12 as 2 beef steaks (collaboration with the John Innes Centre and LettUs Grow). The institute hosts the [Food & Nutrition National Bioscience Research Infrastructure](#), providing new and updated data and knowledge on food composition and intake. These data enable the UK to deliver nutritional policy and high-quality science, and support current and emerging national needs in nutrition, health and sustainability.
 - b. The [Transforming UK Food Systems Programme](#) (£47.5m), aiming to fundamentally transform the UK food system by placing healthy people and a healthy natural environment at the centre. The programme's activities are closely linked to the 4 themes set out in the National Food Strategy⁴ and address questions around what we should eat, produce and manufacture and what we should import. It also considers the complex interactions between health, environment and socioeconomic factors.
 - c. The [UK Prevention Research Partnership](#) (UKPRP), led by UKRI, is a £50m multi-funder initiative supporting novel research into the primary prevention of non-communicable diseases to improve population health and reduce health inequalities. Diet-related investments supported through this partnership include i) [SPECTRUM](#), investigating the commercial determinants of health and health inequalities including work on unhealthy food (e.g. high in fat, salt

³ [McKinsey Global Institute. Overcoming Obesity: An initial economic analysis, 2014](#)

⁴ [National Food Strategy](#)

- and sugar, ii) [GENIUS](#), aiming to build a network that considers the food system across the preschool, primary and secondary school settings in the UK, and school food provision in order to influence the quality of children's diets and reduce inequalities in dietary intake.
- d. A new Co-Centre for Sustainable and Resilient Food Systems (part of the [Co-Centres programme](#), £60m, 2024-2030), aiming to transform food systems across the UK and Ireland. Accelerating the transition towards a more environmentally and economically sustainable agri-food sector which provides healthy food for all.
 - e. UKRI's Better Health, Ageing and Wellbeing strategic theme (£75m, 2023-2029). One of the sub-themes focuses on Population Health Improvement where a [network of clusters \(£35m\)](#) is being supported to explore novel ways to transform health through change at the population level across the UK and reduce health inequalities.

The importance of obesity-related research

7. Obesity is one of the greatest long-term national and global health challenges. It is currently the second highest risk factor for ill health and premature death. It is associated with reduced life expectancy, negatively impacts mental health and is a risk factor for a range of chronic diseases, including cardiovascular disease, type 2 diabetes, musculoskeletal disorders (e.g., osteoarthritis), some cancers, liver and respiratory disease⁵.
8. In the UK, it is estimated that over 60% of adults and 30% of children leaving primary school are currently overweight or living with obesity⁶. The UK has the fourth highest levels of obesity in Europe⁷.
9. There is no single cause of obesity, it is a complex web of societal, environmental, food system, food insecurity, behavioural and biological factors which has exposed our inherent human vulnerability to weight gain. Alongside a sedentary lifestyle, poor nutrition and over consumption, particularly of energy dense, high fat, salt sugar and processed foods, is a key contributing factor.
10. Although a great deal of progress has been made in terms of research (e.g., identification of genetic factors associated with obesity, development of anti-obesity drugs) further research is needed to 1) better understand the biological mechanisms involved in obesity, 2) understand the range of social and environmental factors which drive

⁵ [World Health Organization – fact sheets, Obesity and overweight](#)

⁶ [Obesity Profile - OHID](#)

⁷ [Obesity statistics – House of Commons Library](#)

dietary decisions for different social, economic and cultural groups (e.g., the socioeconomically disadvantaged and those with disabilities).

11. Research and innovation will also play an important role in developing alternative, cost effective and sustainable routes to food production that deliver good nutrition which is affordable for all.

UKRI's key investments in obesity-related research

12. UKRI's annual spend on obesity-related research and innovation is ~£34m. Research will enable us to better understand the drivers behind rising levels of obesity and help identify and develop effective real-world interventions.
13. Some examples of key UKRI strategic investments and programmes in this area include:
 - a. The [MRC Epidemiology Unit](#) and [MRC Metabolic Diseases Unit](#) at the University of Cambridge. Undertaking research to improve understanding of the mechanisms responsible for obesity and related metabolic diseases, including the complex interplay between genetic, developmental, behavioural and environmental factors that operate throughout life. This knowledge is underpinning the development and evaluation of strategies to prevent and treat these conditions.
 - b. Longitudinal cohort studies that include survey and questionnaires relevant to obesity research. An example is the [Avon Longitudinal Study of Parents and Children \(ALSPAC\)](#) based at the University of Bristol. The cohort of over 14,000 pregnant women and their offspring has been extensively studied for over 20 years and provides a rich source of data on factors influencing health and development, including childhood obesity.
 - c. MRC's [Tackling Obesity](#) response mode priority area - seeking multidisciplinary and interdisciplinary proposals to tackle overweight and obesity at key transition points across the life course or in vulnerable groups, or both. Particularly, seeking to better understand what makes an effective intervention. Greater integration and synergy across existing pockets of expertise in the biological, behavioural, psychological, environmental and social sciences is being encouraged to address this.

The definition of a) ultra-processed food (UPF) and b) foods high in fat, sugar and salt (HFSS) and their usefulness as terminologies for describing and assessing such products

14. There currently is no agreed definition for UPF and they are not referred to in UK government dietary recommendations. However, the

most widely used definition is derived from the NOVA classification system which groups all foods according to the nature, extent, and purpose of the industrial processes they undergo⁸.

15. It is important to note the limitations of the NOVA classification system, including the broad nature of the UPF category which captures a wide range of foods with differing nutritional contents. For example, there is no distinguishing within this category between saturated/unsaturated fat, presence/absence of micronutrients, essential fatty acids or fibre.
16. A common, robust classification system, that takes nutritional content into consideration, would help enable more meaningful research and interventions.

The cost and availability of a) UPF and b) HFSS foods and their impact on health outcomes

17. In the UK, UPF are currently reported to make a significant contribution to total dietary intake⁹, the highest in Europe. There has been a growing number of academic publications linking UPF to negative health outcomes, such as weight gain, obesity, cancer, type 2 diabetes, cardio-metabolic risks (in children), cardiovascular diseases, irritable bowel syndrome, depression and reduced quality of life¹⁰¹¹. Although such studies have shown consistent associations between the consumption of UPF and a higher risk of chronic diseases, it is difficult to untangle from the overall impact of less healthy dietary patterns and other behaviours which affect health.
18. Further research and innovation is needed to understand the impact of UPF on health across the life course. In particular,
 - An improved mechanistic understanding of the links between processed foods and health across the life course.
 - Innovation in food manufacturing, to improve nutritional content and understand factors underpinning food composition, texture and palatability including understanding any unintended consequences of processing on health and the environment.
 - A better understanding of the biological, social, cultural and environmental drivers that influence diet choice, including UPF.

⁸ [The UN Decade of Nutrition, the NOVA food classification and the trouble with ultra-processing | Public Health Nutrition | Cambridge Core](#)

⁹ [SACN statement on processed foods and health - summary report](#)

¹⁰ [Ultra-Processed Foods and Health Outcomes: A Narrative Review - PMC \(nih.gov\)](#)

¹¹ [SACN statement on processed foods and health - summary report - GOV.UK \(www.gov.uk\)](#)

- Validated, reliable and age- appropriate methods, tools, biomarkers, models, and human intervention strategies to facilitate the translation of fundamental research to applied nutrition research to realise the potential health impacts for different population groups.

The role of the food and drink industry in driving food and diet trends and on the policymaking process.

19. There is considerable scope to continue working in partnership with industry to facilitate the crucial sharing of data and insight. Developing novel approaches to improve nutritional content and address food compositional quality (sugar, salt, fat and fibre content), while maintaining safety in and across the food processing and manufacturing sector.
20. In 2022, UKRI (BBSRC, Innovate UK, MRC) and Defra invested £15m in 6 innovation hubs as part of a [Diet and Health Open Innovation Research Club \(OIRC\) initiative](#). OIRC is helping to address critical shared barriers to innovation across the food and drink sector. These hubs bring together world-class leaders from academia, industry and wider stakeholders to address the challenge of producing and encouraging the uptake of healthier, more nutritious food products in the UK. Specific areas of focus include:
 - Understanding the interplay between food components and human physiology
 - Improving health and nutrition through biofortification
 - Biological, social and psychological determinants of food choice and eating behaviour
 - Development of functional foods and beverages
 - Understanding how food and beverages deliver improved nutrition across the life-course
21. A [call for early-stage feasibility projects](#) (£2.5m), linked to the OIRCs, is currently underway to support UK registered businesses and UK research organisations in the design and development of innovative food products to support sustained health and wellbeing. Proposals that have the potential to have a positive impact on obesity and malnutrition are being particularly encouraged.
22. Other investments by UKRI (BBSRC, Innovate UK) include:
 - a. [£17m Better Food for All](#) investment, supporting UK businesses to develop innovative solutions to address significant nutrition challenges. The innovations being developed range from meat alternatives, processing methods to improve nutrient retention, plant-

based protein-packed fruit and vegetable smoothies, salt alternatives and drinks designed to improve gut health.

- b. [£16m to support novel low-emission food production systems](#) that create new sources of resource efficient, low-emission foods, particularly proteins, while delivering healthy and sustainable diets. Projects that realise unmet consumer demand for healthier, more sustainable alternative food products through the creation of new UK products were encouraged.
- c. [Investment in an alternative proteins innovation and knowledge centre](#) (£15m), aiming to ensure the UK capitalises on its cutting-edge research and innovation potential across its world-leading science base and alternative protein industry. Investigating and improving the nutritional profile of alternative protein products and their dietary impacts is a key element.

Policy tools that could prove effective in preventing obesity amongst the general population, including those focussed on the role of the food and drink industry in tackling obesity

- 23. UKRI is working with government partners, including Defra and DHSC, to support investments to gather robust evidence concerning the effectiveness of interventions aimed at encouraging and enabling healthier, nutritious, and more sustainable diets for all. One example is the [SALIENT food trials project](#); working with the public, policymakers and food system partners to design and evaluate a set of interventions that can increase purchasing of healthy, sustainable foods across a range of contexts.
- 24. The Transforming UK Food Systems Programme and the UKPRP SPECTRUM and GENIUS projects, highlighted in sections 6b and 6c, are also working to gather evidence to support policymaking.

About UKRI

- 25. Launched in 2018, UKRI is a non-departmental public body sponsored by the Department for Science, Innovation and Technology and the largest public funder of research and innovation in the UK. UKRI is nine councils working individually and collectively across all disciplines and sectors. Together we connect discovery to prosperity and public good, enriching lives and enabling high productivity economic growth, job creation and high-quality public services across the UK.

26. UKRI invests in people, teams, places and infrastructure, strengthening the skills, organisations, and collaborations needed to explore and develop game-changing ideas within and across disciplines. We build and tune a portfolio of investments with aligned incentives to capture the benefits of research and innovation for the UK, tackling challenges from climate change to healthy aging, and harnessing the opportunities from new technologies from AI to engineering biology. UKRI works with our many partners and stakeholders to shape a dynamic, diverse and inclusive research and innovation system that gives everyone the opportunity to participate and to benefit.

15 April 2024