Final Report Summary - FOOD4ME (Personalised nutrition: An integrated analysis of opportunities and challenges)

Executive Summary:
The Food4Me project, funded under the EU Framework Programme 7, set out to provide answers to the key questions that would help shape current understanding of personalised nutrition. Among the areas explored was the potential of future personalised nutrition offerings and an analysis of the attitudes and beliefs of consumers to all aspects of personalised nutrition. The social and economic acceptability and viability of a variety of options for personalised nutrition were assessed. Allied to that was a need to consider the ethical and legal implications of personalised nutrition. This then led to key questions regarding the technologies that are available for the delivery of personalised nutrition and a lengthy multi-centered proof-of-principle study was conducted to explore the possibilities of personalised dietary, phenotypic and genotypic advice in delivering personalised nutrition. The project hosted a major communication programme drawing heavily on social media and culminating in its final conference in February 2015.

The project made a significant contribution to paving the future vision for the field of personalised nutrition. A rich source of information was gathered, which outlines the opportunities and challenges for this discipline in the future. All key outcomes are summarised in the project’s White Paper, available as a PDF booklet on the project website. It includes a detailed analysis of the future business environment, with a value predicted to reach between €8 and €46 billion by 2030. The findings also imply that attitudes towards personalised nutrition appear to be primarily driven by perceptions of benefit and how achievable the service is to access or adopt. The project conducted an in-depth assessment of the evidence regarding nutrient-gene interactions and set up knowledge-databases to provide essential information on relevant biomarkers and genes for the field of nutrigenetics. An intervention study in personalised nutrition was conducted and showed that while personalisation of dietary advice leads to more favourable dietary outcomes, the inclusion of genetic data does not appear to add additional value.

Based on this reflective analysis of personalised nutrition, the outcomes will assist regulators and future providers, which are likely to be public-private partnerships, to have a clear path of the future landscape in which consumer needs can be met.

Project Context and Objectives:
A summary description of project context and objectives:

In combatting the issues arising from unhealthy diets throughout Europe, public dietary advice is provided to promote improved healthy eating practices. This one size fits all dietary advice may not, however, be the most effective technique for improving public health across the population. In April 2011, the 4 year, EU FP7 funded project Food4me began investigating the potential of personalised nutrition as an approach for improving health in individuals.

The concept of personalised nutrition emerged following the sequencing of the human genome in 2000. It involves tailoring dietary advice specifically to an individual’s characteristics. It was hoped that with the identification of gene-nutrient interactions, an individual’s response and susceptibility to particular diets would be better understood and therefore appropriate dietary advice/modifications could be made to optimise health and lower disease risk through individualised dietary advice.
Although research in this area (known as nutrigenomics) deepened and made significant advances in the 10 years following the sequencing of the human genome, the translation of this knowledge to a sound public health service was not reached. Despite this, the potential of personalised nutrition in advancing public health awareness and delivery was too great to be dismissed without further exploration. For this reason, the Food4Me project set out to test the delivery of personalised nutrition and to explore its potential benefit in practice. The translation of such research into a trusted public health nutrition service, built on solid science and market research was central to the project.

Food4Me aimed to extend the current state-of-the-art in personalised nutrition by exploring all aspects of personalised nutrition including the business, science and technology and consumer perspectives. The project explored the opportunities and challenges in establishing suitable business models for the delivery of personalised nutrition at various stages of the food chain, in collaboration with stakeholders (the food industry, the media, health insurers, patient groups, retailers, regulatory authorities, medical professionals and scientists).

The project also examined new scientific tools for the exploration of dietary, phenotypic and genotypic data in the delivery of personalised nutrition and conducted a proof of principal research study, involving a large cohort of volunteers in 7 EU states. In addition, it aimed to assess the attitudes of consumers in all regions of the EU to all aspects of personalised nutrition and explore aspects within the ethical and legal dimensions of personalised nutrition. Based on this work, the consortium then evaluated the impacts of personalised nutrition on health and developed best practice guidelines for communicating to consumers about personalised nutrition.

The project was innovative in that it is the first of its kind in personalised nutrition, involving members from academia, industry and SMEs with various backgrounds. This ensured that all aspects of personalised nutrition were considered, from all angles. This multidisciplinary approach was reflected in the project’s various work-packages:

WP 1: Business and value creation models
WP 2: Consumer attitudes to personalised nutrition
WP 3: Technologies to deliver personalised nutrition
WP 4: Testing models for the delivery of personalised nutrition
WP 5: Ethical and legal aspects of personalised nutrition
WP 6: Communication
WP 7: Management
Stakeholders

Project Results:
A description of the work performed since the beginning of the project and the main S & T results/foregrounds:

The Food4Me project started in April 2011 and reached completion in March 2015. Throughout the project significant results were disseminated through the publication of several scientific journal articles, social media outlets and print media. The Business and value creation models work-package gathered a wealth of data from both consumers and industry stakeholders. Consumer marketing research was conducted through a series of focus groups and a pan-EU questionnaire, which was administered to over 8000 European citizens. The stakeholder research included a series of workshops which involved brain-storming for future scenarios and business model concepts. This data was used to produce two scientific papers and a short booklet on future business scenarios in the field (all available from the project website).

The research regarding future models for the delivery of personalised dietary advice indicated that they could be classified into three approaches: firstly, the diagnostic level to assess a basic nutritional profile for the individual; secondly, the dietary behaviour level where the advice is adapted to personal food and lifestyle preferences and finally at the psycho-social level where the coaching approach is adapted to fit personal preferences.

Setting up a personalised nutrition businesses will therefore require the integration of a constellation of activities, from diagnostics, data mining and dietary advice generation to interface providers and developers of other tools and devices that make personalised nutrition advice actionable in daily life.

It was estimated that a personalised nutrition service may cost between € 200 and € 500 for a full service including follow-up
sessions, with the diagnostics part representing about half of that cost. The estimated market size in Europe could be between 42 to 93 million consumers/citizens, which would bring the potential value of such an “integrating” business model to reach between €8 billion and €46 billion by 2030. The complexity of a personalised nutrition business model and its strong link with societal changes indicates that personalised nutrition will probably develop as a result of initiatives where public and private interests are combined.

The Consumer Attitudes work-package collected a vast amount of qualitative and quantitative data to explore how European consumers feel about personalised nutrition. To date, several outcomes of this research have been published on topics such as: Factors influencing European consumer uptake of personalised nutrition (Stewart-Knox et al. 2014), Psychological Determinants of Consumer Acceptance of Personalised Nutrition (Poinhos et al. 2014), Promoting healthy dietary behaviour through personalised nutrition: technology push or technology pull? (Stewart-Knox et al. 2014) and the perceived impact of the National Health Service on personalised nutrition service delivery among the UK public (Fallaize et al. 2015).

The results of these analyses imply that attitudes towards Personalised Nutrition appear to be primarily driven by perceptions of benefit and how achievable it is to access or adopt. In addition, the extent to which an individual trusts the regulatory systems associated with consumer protection and Personalised Nutrition, (in particular in relation to personal genetic data protection), influences attitudes towards Personalised Nutrition, and subsequently behavioural adoption. The research found that a limited group of about 30% of the population is willing to pay more for a Personalised Nutrition service than for a generic, non-personalised nutrition service. Based on consumer willingness to pay for Personalised Nutrition services, the additional price of personalisation over and above standardised nutritional advice was found to be less than 50% (or €50) in comparison to generic services.

Health was found to be amongst the main predictors of a positive attitude towards Personalised Nutrition but not intention to adopt personalised nutrition. Price, sensory appeal and familiarity were found to be negatively associated with positive attitudes towards personalised nutrition and/or intention to adopt it. Based on these findings, it could be concluded that Personalised Nutrition providers may benefit from taking into consideration the underlying determinants of food choice in potential consumers. Finally, people who engaged in a personalised nutrition service were found to have more positive attitude towards it following the exposure.

The third work-package, Technologies to deliver personalised nutrition, carried out extensive research to establish the most relevant genes in relation to dietary interactions for health outcomes. A series of gene cards are being prepared for publication in Genes and Nutrition and knowledge-databases have been set up to provide essential information on relevant biomarkers and genes for the field of nutrigenetics. These online knowledge bases can be accessed by contacting project personnel (available via the project website). This Technology work-package also developed algorithms for the delivery of personalised nutrition advice and the consortium are currently using this foreground to collaborate with another EU FP 7 project (Qualify) for optimisation in this area. Novel methods for assessing health parameters using very small blood-spot samples were explored and offer great potential for future research in this area (manuscripts pending publication).

A major undertaking of Food4Me project was the completion of a Proof-of-Principle (PoP) Randomised Controlled Trial (RCT) on the implementation of personalised nutrition (PN) across seven European centres. The RCT was designed to mimic a real-life internet-based personalised nutrition service and to provide an insight into the effectiveness of PN advice compared with non-personalised “one size fits all” recommendations. The foreground produced includes the creation of an online dietary assessment tool.

A total of 5562 individuals registered their interest to take part in the study via the Food4Me website. Of the individuals who consented to participate, 65% were female and 64% were below 45 years of age. A total of 3811 individuals completed a second screening phase. Of these individuals, one in two adults were either overweight or obese. A total of 1607 participants were then randomised into the study.

In summary, following the intervention the participants who received personalised nutrition advice ate significantly healthier diets compared with the control, regardless of whether this personalisation was based on their diet alone, their phenotype or their genotype. These results indicate a lack of added value from using genomic information to personalise lifestyle-based interventions but great promise for the potential of personalisation of dietary advice, tailored to an individual’s needs. The project website and social media will be updated as additional results emerge.
The fifth work-package explored the ethical and legal aspects of personalised nutrition. Ethically, it seems important to argue for a perspective that combines incentives for healthier lifestyles with an understanding of health and disease as partly uncontrollable. Second, there is an ethical challenge to find a balance between individual autonomy and societal interest to stimulate healthy lifestyles and nutritional habits in order to manage controllable health risks. Personalised information on health risks may contribute to empowerment, as people are made aware of risks and means of managing them. At the same time – as health information is available on both population and personal level - lifestyles or behaviours, which are in opposition with medical recommendations or nutritional advice, might appear increasingly intolerable within a societal perspective and especially in a context characterized by difficulties to finance health care. Targeting selected risk groups for primary or secondary prevention might for health insurance organisations be an interesting means of individual and population health promotion and lower health care costs. The question is, whether it is equally in the interest of the targeted risk groups and health insurance takers in general.

Regarding the regulatory exploration of personalised nutrition, discussions with the European Commission show that the EU has a pragmatic approach supporting ‘soft law’ instruments such as guidance documents, codes of conduct and papers of advisory bodies. Another significant conclusion was the importance of the distinction between medical and non-medical purpose of the offering. Classification of the PN offering as healthcare or not depends on the status of the various professionals involved. This status is determined by the national law of each Member State. Accordingly the offering may have different classification and undergo different legal provisions depending on the legislation of the EU Member State. A detailed regulatory report is available via the project website.

Since the beginning of the Food4Me project the European Food Information Council (Communications work-package), has produced targeted and timely dissemination material and performed activities to gain maximum impact and reach the widest and most varied audiences possible. This effort has been supported by all Food4Me project partners and the use of social media has enabled the Food4Me project to engage the wider public, researchers, the media, opinion leaders and regulators.

Potential Impact:
The potential impact (including the socio-economic impact and the wider societal implications of the project so far) and the main dissemination activities and the exploitation of results:

The key findings of the project were presented to a range of stakeholders and members of the European Commission at the Food4Me final conference in February 2015. The project produced a White Paper entitled “Personalised Nutrition: paving a way to better population health”. A PDF of this White Paper is available to download from the project website (www.food4me.org) and it outlines all of research conducted, the key outcomes and the future vision for personalised nutrition.

To date, the project has published 19 peer-reviewed articles and many more are underway. The information provided from the research of the Food4Me project ensures that the public, industry and research organisations will be better informed regarding what can realistically be achieved by personalised nutrition. It is hoped that the detailed and reflective analysis of personalised nutrition, carried out by the project, will assist regulators and future providers of personalised nutrition, which are likely to be public-private partnerships, to have a clear path of the future opportunities and landscape in which consumer needs can be met. It is envisaged that such nutrition offerings will then enable European citizens to make informed choices regarding nutrition offerings in a more carefully legislated and trusted setting.

List of Websites:
www.food4me.org

Related information

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