Introduction

This publication outlines Areas of Research Interest (ARIs) for **Food Standards Scotland**, which are being published alongside those for Scottish Government and other public bodies to drive knowledge creation and mobilisation for evidence-informed policymaking in Scotland. Food Standards Scotland (FSS) is the public sector food body for Scotland; with a broad remit covering all aspects of the food chain which can impact on public health. Our mission is to be Scotland's leading authority on food safety, standards, and healthy eating; using science and evidence to provide assurance and advice that inspires consumer confidence and improves public health.

FSS has a Food and Health Research Programme (FHRP) comprising 6 priority themes, under each of which we have identified our Areas of Research Interest (ARI). Our ARI are the key research questions that FSS needs to address to ensure the delivery of our statutory responsibilities and strategic objectives relating to food safety, public health nutrition and consumer protection is based on robust science and evidence.

ARI key topics and associated questions

Areas of Research Interest cover six themes which sit under our Food and Health Research Programme (FHRP). These themes are organised as follows:

Understanding Scotland's diet

Supporting a healthier food environment

Understanding and mitigating risks to the food chain

Foodborne illness and food hypersensitivity

Evidence Based Regulation

Adapting to Change in our Food System

THEME 1 - Understanding Scotland's Diet

Background

FSS is committed to building a comprehensive evidence base to understand dietary patterns and inform public health nutrition policy. Central to this is the innovative tool Intake24 to collect and analyse dietary intake data. This enables FSS to assess progress against the Scottish Dietary Goals (SDG), identify at-risk population groups, and track changes over time. FSS is establishing a robust dietary surveillance programme that consolidates all monitoring activities, identifies evidence gaps, and supports new research. These efforts are underpinned by a commitment to digital innovation, including the use of dashboards and infographics to make data more accessible and impactful for policy makers and public engagement. In addition, the surveillance programme will consider options for improved reporting on under-represented groups and markers of environmental sustainability.

Questions

1.1 What are the current gaps in dietary surveillance data in Scotland and how can these be addressed?

1.2 How can dietary surveillance and/or retail purchase data be used more effectively to inform policy decisions and evaluate the impact of interventions across the food environment?

1.3 What are the most effective methods for visualising and communicating dietary surveillance data to influence stakeholders, including policymakers, industry, and the public?

1.4 How can consumer purchasing data (retail and OOH) be integrated with dietary intake data to provide a more comprehensive picture of dietary behaviours and trends?

1.5 How can dietary surveillance be used to monitor and evaluate the impact of structural changes in the food environment on health inequalities?

1.6 How can existing data on dietary intake and food purchasing behaviour be used to monitor and evaluate policies aimed at improving diets in Scotland?

1.7 How can dietary intakes be optimised to simultaneously improve population health and reduce greenhouse gas emissions in line with climate targets?

THEME 2 – SUPPORTING A HEALTHIER FOOD ENVIRONMENT

Background

FSS uses robust scientific evidence to inform change to the food environment, recognising that progress requires a whole system approach which addresses access, availability and affordability of healthy food relying solely on individual responsibility for behaviour change. The organisation leverages its data and research to influence policy, such as restrictions on promotions of high fat, sugar, salt foods, and to support action in the out of home environment such as the Eating Out, Eating Well Framework and code of practice for children's menus. FSS also collaborates with industry through evidence-backed programmes like the Reformulation for Health Programme,, supporting reformulation of products and improving access to out of home nutrition information. Scientific research findings are translated into accessible formats including briefing papers, dashboards, and media content to inform policy makers and empower consumers. Furthermore, FSS uses its evidence base to advocate for mandatory measures to improve the food environment when voluntary efforts fall short, ensuring that public health nutrition policy is grounded in rigorous, up-to-date science.

Questions

2.1 What are the most effective strategies to increase the availability and consumption of fibre and wholegrains through food environment interventions?

2.2 What is the impact of nutrition information (beyond calories) in OOH settings, and how can it be practically implemented across diverse business types?

2.3 How do promotional practices in OOH and retail settings influence consumer behaviour, and what is the impact of restricting promotions on HFSS foods?

2.4 How does the density and distribution of OOH food outlets relate to dietary health outcomes and inequalities across Scotland?

2.5 What messaging strategies are most effective in empowering consumers to demand and choose healthier, more sustainable diets?

THEME 3 – UNDERSTANDING AND MITIGATING RISKS TO THE FOOD CHAIN

Background

FSS's risk assessment function relies on a robust, up to date evidence base relating to the microbiological and chemical hazards that have the potential to contaminate Scotland's food chain, the biological effects of these hazards and their impacts on human and/or animal health, and the extent to which our population is, or may become, exposed to these hazards from food and other likely sources. This scientific evidence is key in enabling us to characterise the risks associated with current and emerging hazards in commonly consumed products and understand food safety risks in novel and innovative products which are new to the market. It can be generated through food and environmental surveillance, dietary monitoring and toxicological studies, in addition to the investigation of food safety management systems and modelling approaches for estimating the attribution of contaminants along the food chain. It also depends on the availability of robust methods for sampling and testing food for the full range of hazards that may occur.

In order to mitigate food safety risks, we also need to understand how microbiological and chemical hazards are affected as a result changes in the environment and production methods, and the interventions that will have the greatest impact in preventing contamination. This evidence supports us in developing guidance for businesses and enforcement authorities in effective food safety management.

This research theme aims to support method development and the generation of data that will strengthen our understanding of microbiological and chemical food safety hazards in food produced in Scotland, and the design and evaluation of effective interventions for mitigating the risks.

Questions

3.1 What analytical methods and tests can be used for rapid, accurate identification and quantification of pathogens and chemical contaminants in different foods?

3.2 What data sources and approaches can be used to strengthen our ability to assess food safety risks?

3.3 How are changes to the environment (including climate) likely to impact on contaminant risks to Scotland's food chain?

3.4 What are the most effective intervention strategies for preventing or controlling microbiological and chemical contaminant risks at different parts of the food chain?

THEME 4 – FOODBORNE ILLNESS AND FOOD HYPERSENSITIVITY

Background

Foodborne illness reduction continues to be a key strategic priority for FSS. It has been estimated that with 2.4 million individual illnesses and more than 16,000 hospitalisations per year, the annual burden on the UK economy is £9.1 billion. The most important pathogens which are associated with foodborne illness are campylobacter, salmonella, Shiga toxin-producing Escherichia coli (STEC), listeria, and norovirus which can contaminate food at any point in the production chain from farmed animals, the environment, or contact with infected humans. The contamination of food with pathogens which are resistant to antimicrobials is a further concern. Reducing the spread of antimicrobial resistance (AMR) is a priority for the UK, and government has published a 5-year AMR National Action Plan (NAP) 2024-29 which sets out actions to address this. FSS contributes to work led by Scottish Government to implement these actions in Scotland and monitor AMR in humans, animals, food and the environment. FSS's strategy for reducing foodborne illness sets out our framework for managing the risks of pathogens in the food chain. The strategy is based on a 'One Health' approach; recognising the need to understand pathogen risks in Scotland in the context of veterinary, environment, water and foodborne transmission, which relies on strong partnership working between all relevant stakeholders.

Food hypersensitivity is another form of foodborne illness with potentially serious impacts on the health and well-being of those affected. It is estimated that, in the UK, there are up to 2.4 million adults living with a diagnosed food allergy, and 600,000 people diagnosed with Coeliac Disease with many more living with sensitivities and intolerances to certain foods.

This research theme aims to generate evidence that will improve our understanding of the profile of foodborne illness and food hypersensitivity in Scotland in terms of incidence, any demographic, geographical and socioeconomic trends, and the main causes of illness.

Questions

4.1 What are the key sources and transmission routes for pathogens and AMR in Scotland's food chain and environment?

4.2 What are the geographic and socioeconomic trends in foodborne illness in Scotland, and what are the factors that make people more vulnerable to the risks of food poisoning?

4.3 What are the impacts of food hypersensitivity and food allergy in Scotland?

4.4 What is the societal and economic burden of foodborne illness and food hypersensitivity in Scotland?

4.5 How do consumers in Scotland perceive the risks of foodborne illness and food hypersensitivity, and what behaviours and attitudes are putting them at increased risk of illness?

4.6 What are the most effective ways of targeting our advice on the risks of foodborne illness and food hypersensitivity to consumers in Scotland?

THEME 5 – EVIDENCE BASED FOOD REGULATION

Background

As a regulator it is critical that FSS has a current evidence base on the factors that enable and encourage Scotland's food businesses to adhere to legal requirements and the barriers which prevent them from complying with food law. This includes an understanding of the extent to which different sectors are aware of the legislation that applies to them, their access to guidance, the company policies and behaviours which promote a positive food culture and the behaviours and attitudes that prevent compliance. In parallel, it is also important for us to ensure that our methods for regulating food safety and standards remain fit for purpose and can keep pace with changes to Scotland's food chain and the wider policy landscape. This relies on having up to date knowledge of the challenges faced by enforcement authorities when delivering food law, and the sanctions, interventions and support mechanisms that are most effective in driving compliance. One of the priorities for FSS's 2026-31 is to reform and modernise Scotland's food law delivery system, and this research theme will enable us to build the evidence base we need to regulate our food system in the most effective and efficient way possible to maximise consumer protection, enable responsible food businesses to succeed, and ensure best use of public resources.

Questions

5.1 What evidence do we need to identify and predict risks in food production to improve the targeting of enforcement activities and interventions?

5.2 How can social science be used most effectively to strengthen our understanding of the cultures, attitudes and behaviours within different food businesses in Scotland that either promote or prevent compliance?

5.3 What are the external factors (e.g. societal, economic, political, environmental) that are likely to have an impact on the extent to which food businesses in Scotland are able or motivated to comply with food law?

5.4 What factors present the biggest barriers to different food production sectors in Scotland regarding their ability to comply with food law?

5.5 What data sources and methods are available that will enhance our ability to identify non-compliance and food crime?

5.6 What regulatory approaches have been identified in other countries or sectors as being the most effective in promoting compliance?

5.7 What are the most effective methods for regulating on-line food sales and e-commerce.

5.8 How can we make better use of analytical and data science for assuring provenance and traceability of foods produced and sold in Scotland?

THEME 6 – ADAPTING TO CHANGE IN OUR FOOD SYSTEM

Scotland's food system has evolved significantly since FSS was established in 2015, with environmental impacts, technological innovations in food production, new business models, dietary trends and wider food policies all driving transformation in the way our food is grown, processed and sold. Added to this, the disruptions to our agri-food supply chain resulting from geopolitical events, a changing climate and the COVID-19 pandemic have prompted action from government to prioritise food security and work with the industry on strategies for promoting a more resilient and sustainable food system for Scotland. Addressing these issues, whilst enabling everyone in Scotland to access a safe and healthy diet requires a systems thinking approach which recognises how the various stages of food production and consumption are interconnected and how they are influenced by social, economic, environmental, and political factors. The introduction of the Good Food Nation (Scotland) Act 2022 has been a particularly important milestone in that regard; providing a legislative basis for positive progress which will rely on effective collaboration across government to ensure new policies and initiatives for a better food system in Scotland are fully co-ordinated. FSS has a role to play in supporting government in achieving its ambition for a more sustainable, resilient and equitable food system, ensuring that there are no unintended consequences for food safety, standards and public health nutrition. This relies on evidence that helps us to predict and detect potential disruptions and emerging risks to our food chain and understand the opportunities and challenges that are associated with new food processing technologies, novel foods and changing diets.

Questions

6.1 How will climate change impact on Scotland’s diet and the safety of our food chain?

6.2 How do consumers in Scotland perceive the changes that are happening to the food system e.g. novel foods and emerging technologies. What are their key attitudes and concerns in this regard?

6.3 What are the most significant emerging opportunities and threats to Scotland’s food system that are associated with new technologies, social change and wider food policies?

6.4 What interventions will be most effective in promoting sustainable and healthy diets in Scotland whilst maintaining high levels of food safety and standards?

6.5 What sources of intelligence and methods can be used to strengthen our ability to predict and identify disruptions and risks to Scotland’s food chain?

Working with us / Getting in touch

FSS commissions projects for its Food and Health Research Programme through open tender, with opportunities advertised on Public Contracts Scotland.

FSS also works with other UK research funders, including the Food Standards Agency and UKRI in areas of shared interest, and supports Scottish Government's Environment, Natural Resources and Agriculture Strategic Research Programme, which is carried out by the Scottish Environment, Food and Agriculture Research Institutions (SEFARI).

FSS is interested in hearing from all scientists in the research community who are already undertaking work relating to its ARIs, or have an interest in any of the themes included in its Food and Health Research Programme.

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