

Chief Scientific Advisor Annual Update

Report by Prof. David Gally, CSA for Food Standards Scotland

1 Purpose of the paper

- 1.1 The paper summarises the observations and recommendations of FSS's Chief Scientific Advisor (CSA) on the use of science, evidence and information (SEI) in FSS and is for Board discussion and comment.
- 1.2 A [summary](#) of FSS' current programme of SEI, including links to specific projects and reports was presented to the Board by the Head of Science on 7th December 2022. In the current paper, I aim to provide a higher level 'strategic' evaluation of SEI building on the priorities detailed in that excellent paper.
- 1.3 The Board is asked to: **Discuss and provide a view on the overall scope, application and ambition of SEI in FSS given current restraints.**

2 Strategic aims

- 2.1 Science, evidence and information is the foundation of the organisation and is critical for its strategic objectives, especially: 1. Food is Safe and Authentic; 2. Consumers Have Healthier Diets; 3. Responsible Food Businesses are enabled to thrive; 4. Consumers are empowered to make positive choices about food; 5. FSS is trusted and influential.

3 Background.

- 3.1 I have now been in the role of FSS Chief Scientific Advisor (CSA) for two years. This post is a 60% full time equivalent (FTE) secondment from the Roslin Institute, University of Edinburgh, where I hold a Chair in Microbial Genetics. In August 2022, I set out the perceived main roles of the CSA to the Board, which include: (1) to support the legitimacy of FSS by having semi-independent oversight of the SEI; (2) to provide challenge on priorities and approaches for delivering SEI in FSS; (3) to enable wider scientific connectivity; (4) to provide mentorship & (5) to promote the public communication of science that is within the remit of FSS.
- 3.2 As laid out in the December Board paper, a key inward facing role of the CSA is 'to work closely with the Head of Science to strengthen FSS's science profile, and provide high level assurance and governance over the use of SEI across all areas of the business; offering independent challenge and advice to our officials, Senior Leadership Team (SLT) and the Board.' In this respect, I have provided advice and challenge to support research requirements, reviewed proposals, reports and risk assessments. I have worked with the Head of Science to support FSS's new Food Health Research Programme (FHRP) intersecting with strategies on food surveillance, dietary monitoring and foodborne illness reduction. In addition, with the newly created additional leadership capacity within Public Health Nutrition, I will

provide oversight and challenge to work that is part of the newly developed [Public Health Nutrition Strategy](#) (also tabled at this meeting).

- 3.3 Specifically, in light of major political and societal changes with knock-on resource implications, it is important that our SEI programme continues to align with our priorities and it was agreed that following the recent FSS prioritisation exercise, the CSA should undertake a review of the organisation's SEI needs and make recommendations as to how these can be addressed given current restraints. This paper aims to provide the board with an independent overview of the structures and processes for delivering SEI in FSS going forward.

4 General Assurance of SEI within FSS.

- 4.1 As CSA, I engage regularly with staff across the organisation and attend a number of key meetings where SEI is discussed and decisions taken on future requirements. In addition to the Board meetings and seminars these include: Science Division Meetings, the Nutrition Steering group, the Nutrition Programme Board and the Regulatory Strategy Programme Board. I review and sign off Business cases for SEI projects and was part of the Diet and Nutrition Strategy review in 2022 as well as the prioritisation exercise. I consider that my role in the senior leadership team (SLT) provides a good perspective of where and how SEI underpins policy priorities in FSS.
- 4.2 The impact of FSS's programme of SEI relies on the effectiveness of partnerships with organisations that can carry out major research projects and reviews. As CSA, I have been able to support these partnerships in a number of ways. I reviewed FSS recommendations for research requirements to be delivered by the Scottish Environment, Food and Agriculture Research Institutes (SEFARI) as part of the Scottish Government's Rural and Analytical Service Division (RESAS) strategic research programme for 2022-27 and have since attended updates on both the Nutrition and Food Safety programmes that have been taken forward. My FSS and university roles allow wider interactions with funding agencies including UKRI, the Wellcome Trust and DEFRA. I attend meetings with other CSAs to exchange information on possible emerging issues and in general to discuss how science could and should inform Scottish Government policies. I am part of two short-term working groups in this regard, one on anti-microbial resistance (AMR) and the other on local food production. I also have regular one-to-one meetings with my counterpart Robin May at FSA and with the Head of Science we contribute to the wider Science leadership network in Scotland. This includes two main groups focused on laboratory capacity and capability including the provision of whole genome sequencing in Scotland.
- 4.3 The main challenge for SEI, from my perspective, is one of selecting priority areas given limitation on resource and personnel as well as the fact that day-to-day demands can leave little space for FSS staff to think strategically about SEI needs. It is important as the SEI requirements should flow from needs identified by the wider organisation. The concept of a ring-fenced budget for SEI, to support the development of a research pipeline, would create a more structured framework for

promoting engagement within the organisation around current and future evidence needs. A protected SEI budget should help deal with the long lead in times due to the procurement process, although this does not necessarily help commission research in a timely manner to match an urgent need for evidence. A dedicated budget makes it easier to commit to collaborative and longer-term funding for research and data acquisition. I therefore fully support the recent establishment of a FHRP as a means of strengthening engagement across FSS and as an effective way of delivering on our priorities through external partnership.

- 4.4 A further challenge for FSS is to ensure it continues to maintain the balance of scientific skills and expertise needed to support our strategic priorities. Currently the main SEI in FSS is split between the three teams that make up the Science Division (Risk Assessment, Food Protection Science and Surveillance and the Analytical Unit) and our Diet, Nutrition and Policy Branch (NSP). [The Public Health Nutrition Strategy's](#) vision is to drive Scotland towards a healthier and more sustainable food environment. The team work closely with Scottish Government (SG) and Public Health Scotland (PHS) to deliver this work which underpins SG policy on diet and health, and to ensure consistency of messaging around a healthy balanced diet.
- 4.5 The Science Division primarily supports other parts of the organisation by delivering horizon scanning, risk assessment and advice for risk management priorities which are defined elsewhere in FSS. Requests for this type of scientific advice can be wide ranging, cutting across a variety of disciplines and is also prone to massive perturbations e.g. when major incidents occur. This is mitigated to some extent through our MOU and strong working relationship with FSA which allows our respective science teams to share resources and expertise. This is a key relationship which not only ensures FSS is actively involved in the UK risk analysis process, but provides a means of accessing specialist scientific advice in areas that we cannot resource ourselves. In light of on-going pressures on both organisations it will be important to keep this relationship under review in order to ensure FSS is able to continue to access the breadth of science expertise needed to deliver our priorities.
- 4.6 Overall, the expertise and commitment of the scientists I have spoken to and interacted with in FSS is exceptional. My view is one of a high level of professionalism with teams that are highly respected across government, academia and stakeholders.

5 Evaluation of future requirements

- 5.1 At the last meeting, the board asked for a "detailed review of our science and evidence needs, taking account of FSS' recent prioritisation. During that exercise the Board recognised that science and evidence was a core enabling function for their delivery. I have not assessed against every priority as the dependence on science and evidence is at different stages eg research evidence needs of SAFER is at a different stage to understanding needs around food safety. This does not

assess against each priority and my approach has been to assess governance, capability and critical elements of science infrastructure.

- 5.2 There is an expectation of a certain type of SEI that an organisation like FSS should be engaged in. There are three elements to this:
- 5.2.1 The first is that in order to meet our statutory obligations we have to monitor key information on food safety and consumer diets. This is our bedrock.
 - 5.2.2 The second is we need to have the capacity to analyse this data and advise on trends, assess risks and identify appropriate action.
 - 5.2.3 The third level is to horizon scan, prime and be actively involved in research, which is also key to ensure the on-going professional development of our 'science' staff. These 3 layers are used in terms of commenting on our future requirements.

Monitoring

- 5.3 Reducing the risks of foodborne disease continues to be a strategic priority for FSS. Our research programmes in this area rely on clinical surveillance data held by PHS to enable us to identify trends and relationships that could lead to strategies to protect consumers. I welcome the recent data sharing agreement with PHS and this opens up the opportunity to take a deeper dive into areas such as: (1) understanding transmission routes for food borne infections; (2) evaluating the impact of strain variation on disease severity; and (3) investigating the demographics of foodborne infections. In addition, as whole genome sequencing (WGS) of food borne pathogens associated with human infection is becoming more mainstream, it is important that an FSS-PHS partnership is able to drive a 'One Health' surveillance strategy in Scotland and research activities aimed at understanding the attribution of foodborne disease. This will rely on our ability to access WGS data and supporting (meta) data collected through clinical investigation of infectious intestinal disease in addition to similar data in relation to food, livestock and the wider environment. A UK-wide WGS surveillance scheme for foodborne disease is currently being piloted through the UK Treasury funded PATH-SAFE programme, alongside the development of a strategy for implementing this capability in Scotland. The FSS-PHS partnership will be key to ensuring this work can be built on to improve our surveillance capability with systems that help us to investigate outbreaks and react faster to emergent pathogen risks. It is also worth noting the data sets held by PHS on some of the debilitating chronic conditions which can be associated with unhealthy diets. There may be scope to use these to augment our own evidence base on food purchasing and consumption to examine links between diet related disease and consumer behaviour. This represents a new avenue to be explored through our data sharing agreement and one which would complement the science we take forward through FSS's Public Health Nutrition Strategy. **I am content that in terms of monitoring the approach is meeting FSS' needs.**

Analytics

1.1 At the second, analytical level, it is critical that FSS has the necessary infrastructure and expertise in place to optimise the value of the data it collects. Good progress has been made on this with enhancements in the use of food sampling data stored on the Scottish Food Sampling Database (SFSD) which has been made possible through the new analytics group in the Science division. It is evident that equivalent extraction and visualisation is more challenging with other FSS systems including the Scottish National Database (SND), which records food law enforcement activities. While this is partly due to SND being part of a larger system with separate implementation and inputs in different local authorities I believe there is a need for FSS to articulate, at a more strategic level, what questions it seeks to address with this data and what type of analyses are needed to generate outputs that allow action to be taken. This is a priority task for the developing data and digital grouping within FSS and applies to all data to be collected for the organisation, but will be of particular importance to the success of the SAFER programme. A further achievement with regard to our use of data has been the development of a new performance dashboard for reporting activities and progress in key business areas. More work is required to set appropriate baselines and targets to enable the Senior Leadership Team and Board to identify significant trends and areas for improvement. Data and digital is still a developing area which will be no surprise to the Board but further progress here is critical to successful delivery of both the data and digital programme and to overall FSS efficiency improvement.

1.2 With regard to horizon scanning I am very supportive of the new incidents prevention framework as a means of driving more impactful engagement with our scientists on the potential risk factors associated with significant incidents and the need for new research, surveillance and risk assessments to deliver targeted mitigation strategies. To a large extent this is occurring by default but implementation of this framework will provide a more structured and cross organisational approach to risk management. There is still the risk of a combination of major incidents paralysing the organisation and such incidents, such as the E. coli O157 outbreak in 2016, have left a heavy toll on the organisation. These types of incidents are a huge challenge to a regulator as the risks with specific products are, on the whole, understood. Therefore despite hazard control and limits set, infections will continue to happen as food safety is balanced alongside commercial considerations and consumer choice. Nevertheless, we still have to strive to provide evidence for approaches that avert future incidents in the current framework and this is still a priority for our SEI programmes.

Horizon Scanning and Surveillance

- 5.4 I consider our national surveillance strategy (agreed by the Board in [March 2022](#)) to be well designed given financial constraints and the expense of microbiological and chemical analytical testing. However, it is important that every effort is made to dovetail such surveillance with testing carried out at the FSA, and other organisations, and the sampling needs to be cognisant of horizon scanning to

identify products with a higher level of threat. This includes keeping up to date with changes to food supply chains including ways in which consumers may acquire such products, such as directly through web-based marketplaces. Effective surveillance is also reliant on having access to the necessary laboratory services with the capacity and ability to develop the full range of methods needed to aid risk assessment. This latter point, which is a risk the Board is well aware of, and the overall fragility of local authority support for the Public Analyst laboratories, really does favour the coalescence of analytical laboratories into existing institutes and/or public bodies that have related laboratory provision. Control sample testing and compliance data should be a main stay of our data, however overall reductions in local authority Environmental Health Officers has had a detrimental impact on our ability to generate this valuable source of evidence. Our sampling strategy will go some way to resolving this, possibly with ring-fenced sampling budgets, but it is also part of a larger challenge being addressed by the Scottish Authority Food Enforcement Rebuild (SAFER) programme and wider government reviews of Scotland's laboratory infrastructure. Work is also underway to enhance our systems for detecting threats from imported products including diseases that could damage our agricultural system and food security. The dynamic nature of our food system and changing regulatory regimes will make it increasingly important for FSS to invest in this area in order to build up a more objective view of the risks to public health and how we might intervene. **Overall, the direction of travel supports FSS' needs but there are a number of external dependencies that pose risks.**

Priority: Diet and Nutrition

- 5.5 FSS's role in monitoring Scotland's diet generates an invaluable data set which complements our food and feed surveillance programmes; supports risk assessment, and enables us to influence policy on diet and health. The baseline monitoring in this area comes from consumer purchasing data that we commission through Kantar and then align with data collected through [Intake 24](#), the dietary assessment tool that allows us to obtain consumption data as part of the wider Scottish Health Survey and compare against the Scottish Dietary Goals. There have been and will continue to be major drivers for change in dietary behaviour and we are able to collect and analyse this data to understand these changes, for example the impacts of financial challenges over this last winter on purchasing and consumption. The more data we can collect in this area, the more we can ask questions about the purchase behaviours and dietary intakes of specific population groups and link this with health outcomes. I am very supportive of the direction of travel for this work, which is to collect and analyse the raw data from these sources in-house through the development of our own analytic tools. This will provide us with much more flexibility in terms of what this data can be used for and provide better value than commissioning bespoke analysis from external providers. This allows us to be reactive to policy requirements provided we have the necessary skills within the organisation to analyse and present this data in a way that drives and underpins our work.
- 5.6 As with the Science Division, our public health nutritionists are recognised experts in their field and clearly appreciate the complexity of the policy area they are

working in and the need to ensure our focus for change is underpinned by robust science and evidence. The dietary monitoring undertaken by our Nutrition Science and Policy (NSP) team is unique across Government and presents significant opportunities for FSS to question, publicly, why Scotland's diet is not improving and influence government intervention. Moving forward, there are good examples of where the NSP team can collaborate with data capture and analysis to measure the impact of changes they have helped bring about, these areas include: (1) Ways to monitor impact of folic acid fortification in flour; (2) How to assess impact of calorie labelling in the out of home food environment; (3) How to interrogate purchasing data to provide evidence to restrict unhealthy promotions and; (4) How to compare dietary intake data with the Scottish dietary goals and link with health outcomes.

On a personal note, as a microbiologist, I have real concerns for the wider health impacts of poor diet not just through traditional 'nutrition' and 'calorie' lenses but as a result of the perturbation of our microbial populations and the long-term consequences of such dysbiosis for development, immunity and health. While we can test for immediate threats in our food (pathogens, contaminants and allergens), risks of long term exposure to diets high in processed foods, with chemicals introduced for production and preservation, are much harder to assess but may be as important as the lack of whole foods in the context of a 'poor diet' with huge financial and well-being implications for the Scottish population. I support our partnership with PHS to define interventions and provide expertise to support local and healthy food provision. There is real potential for this work to be developed further, and I am encouraged that this will be a key feature of the reshaped FSS Public Health Nutrition strategy.

Overall, I am satisfied that the proposed direction of travel on diet and nutrition and the approach being proposed, alongside recent development such as Intake 24 means we are well-placed to deliver on this priority.

Social Science Needs

- 5.7 This function did not exist prior to the 2019/20 re-structure. Over the past 2 years, we have made good progress in developing our social science capacity which has enabled us to collect new insights on the food interests of consumers in Scotland, and collaborate with FSA to generate UK wide data sets for the purposes of our joint [Annual Review of Food Standards](#).. For diet and nutrition, insights into consumer behaviour will be more valuable for informing government about trends which can be used to underpin policy development rather than supporting consumer-facing campaigns, the impact of which are difficult to assess. This is an important shift in enabling the new approach for diet and nutrition. One area for consideration for further development it that, whilst it is difficult to get cut through with campaigns, it would be worthwhile for FSS to consider how our evidence base can be used more effectively to underpin our advice given resource limitation. **An area where there could be more focus is on the use of data on the reach and impact of our outputs.** This would allow FSS to decide where such information should best be targeted between commercial, political and consumer audiences.

Research Programme

- 5.8 At the research level, I have undertaken a review of projects which have been proposed for our FHRP in 2023/24, **and consider them to align well with the outputs of our prioritisation exercise and the core monitoring and analysis areas defined above.** For example, 47% of the FHRP proposed budget is on understanding and mitigating risks to the food chain (with a further 4% with foodborne illness and allergy), while understanding the Scottish diet and supporting consumers represents 30% of the proposed work. The FHRP is also well connected to wider research priorities we have been supporting through RESAS, UKRI and Wellcome applications, which set our interests on food safety and diet in the context of issues around sustainability, environmental protection, traceability and food security. Therefore, at the horizon scanning and research level I am confident there is an appropriate spread of effort on the key priority areas. As noted in 4.3 and recommendation 6.1, it will be important to continue to keep this under review, through improved engagement across the organisation to evaluate research impact and prioritise evidence needs to meet changing policy needs.

6 Recommendations

- 6.1 **(i) The FHRP needs to form a governance group with membership, including Diet and Nutrition, that enables evidence needs to be discussed and selected from across the whole organisation.** This oversight should also be able to feed directly into data and digital governance (as below). The CSA could chair this grouping with regular ‘evidence prioritisation’ meetings.
- 6.2 **(ii) The budget for SEI should be ring-fenced, as previously discussed, so the FHRP programme can forward plan effectively and take its own decisions on SEI priorities.** This arrangement should help protect the percentage spend on SEI within FSS, otherwise there is a real threat that FSS will erode its SEI and not have its own data and analytical capacity to underpin its primary monitoring functions.
- 6.3 **(iii) There is significant untapped potential in our core data sets, and there is a need to invest in expertise which enables us to make improvements in data quality, identify trends and present outputs in ways our stakeholders can easily interpret and apply.** There is no doubt that data handling and analytical skills will be key to FSS’s ability to deliver the priorities set out for 2023/24 and beyond. . The solution, as discussed in the organisation, lies in both developing the data and digital skills of individuals already in FSS, as well as bringing in new staff with the IT and scientific capabilities needed to support our digital infrastructure as well as data analysis and visualisation.
- 6.4 **(iv) In order to optimise the value of the data we collect, it will be important for FSS to take stock of the key questions it needs to address at a strategic level.** This should include the FHRP governance approach as defined in 6.1 and other structures which enhance engagement with staff across all business areas on the data needed to address our priorities.

- 6.5 (v) **We should continue to develop our evidence base and needs with PHS.** Alongside the recent progress on a data sharing agreement, there is a proposal to support an epidemiologist/data scientist funded by FSS and embedded in PHS. I view this as a critical if we really want to bring together our data on what we buy and consume with what foodborne infections we get and detail on diet-related diseases. An important task is to draw up the specific areas of collaboration and define how these will be used to support the primary functions of FSS. There is however a resource question the senior executive will need to consider
- 6.6 (vi). **There should be a regular science meeting based on our evidence needs defined within the FHRP and this should include key stakeholders in Scotland and potentially FSA when relevant.** The meetings should also highlight new areas and breaking issues across the organisation. In addition, we should aim to have an internal seminar series on key areas of science which while they could be included within our existing Board seminars for information would be better targeted to the wider organisation. In this way science in FSS will continue to promote itself

7 Summary

- 7.1 It is appreciated how difficult it is to achieve impact as a relatively small organisation within the complex systems that encompass food safety and public health. Scientists within FSS take great pride when their work results in a better understanding of an issue, ideally with advice, risk assessment or legislation that can make a difference. The challenge is to stay vigilant, having this core role as ‘monitor’ and look to identify issues, understand them and identify ways to reduce risk or implement change for health benefit. As our strategy sets out, we are tackling a dynamic food system where innovation, local and global events will drive change in what foods are available and their real and hidden costs. As a consequence, FSS must stay adaptable and ensure that we continue to discuss and act on our evidence needs as well as support our scientists to have the skill sets and partnerships to optimise the use of the SEI.
- 7.2 The Board is asked to: **Discuss and provide a view on the overall scope, application and ambition of SEI in FSS given current restraints.**

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