Annual FSA Science Update

FSA 25/09/05 - Report by Julie Pierce

1. Summary

1.1 This paper is the annual update to the Board on the FSA's science delivery. It provides:

- A review of progress made, and impact delivered, over the last year.
- An overview of future strategic science priorities and the approach for delivering them across the next Spending Review (SR) period.

1.2 The Board is asked to:

- Review the progress and impact made.
- Comment on our future priorities and agree the focus for 2026 and beyond.

2. Introduction

2.1 This paper updates the Board on progress since the previous FSA Science Update from September 2024. It also aligns with the annual report of the CSA, presented in June 2025, and Annex 1 provides an update on actions taken in response to the recommendations made.

2.2 The FSA's science is delivered through a combination of internal and external expertise and capabilities. At the heart of this is a team of 170 scientists and analysts, who sit within the Science, Evidence and Research Division (SERD), with an allocated budget of £20M in FY25/26. More detail on how we resource and deliver our science can be found in Annex 2.

2.3 To support the FSA as a science and evidence driven organisation, SERD operates across three core areas of science delivery:

- **Risk analysis and market authorisations**: supporting both the FSA's risk analysis process and market authorisation programme. This is the largest area of science delivery.
- **Research and evidence**: delivering a portfolio of internal and external projects through our co-ordinated research and evidence programmes (REPs).

- **Science infrastructure**: maintaining and building the scientific tools, capabilities and systems required to enable efficient, effective and assured delivery of our science.

3. Risk analysis and market authorisations

3.1 This section focuses on the largest area of science delivery within the FSA and how this supports the FSA's risk analysis process and market authorisation programme.

3.2 It reviews the last 12 months and priorities for the remainder of FY25/26. It includes delivering risk and impact assessments and other types of supporting activities around three core FSA functions:

- **Incidents**: responding to food safety incidents such as pathogen outbreaks.

- **Market authorisations**: evaluating novel food and feed products (such as additives, GMOs) pre-market.

- **Risk analysis**: informing risk management, regulatory decisions and public health advice.

Incidents

3.3 As outlined in a recent Board paper, the incidents that the FSA responds to are becoming more complex, with supply chains that are more intricate. Against this background, to enable our decision-making and response, different types of evidence and information are needed, including that held by other public bodies and wider stakeholders. Risk assessment remains a vital part of the evidence base that underpins our incident response, adapting to rapidly consider new evidence, allowing prompt evolution of our response.

3.4 Some key examples of how our risk assessment advice has enabled robust action include:

- Glycerol in slush ice drinks: following an initial incident involving a toddler, our risk assessment enabled the development of voluntary advice in 2023 against consumption of these drinks by children aged 4 years old or under. We have updated the initial risk assessment to take account of further incidents since the original guidance was published. This new evidence has supported the issuing of updated guidance on the consumption of these drinks.

- Listeria in desserts: *L. monocytogenes* was detected in dessert mousses and genetically linked to a cluster of five cases, three of whom sadly died. The medium risk identified for vulnerable consumers and the evidence of high severity of illness necessitated prompt action, resulting in withdrawal of the implicated desserts from NHS hospitals and care homes in April 2025 to mitigate the risk to vulnerable consumers.

Market authorisation

3.5 In FY24/25 we achieved the stretch target of completing 100 safety assessments, including ones for novel foods, food and feed additives, and flavourings. This compares to 86 assessments published in FY23/24. Completed assessments can be found on our FSA Research & Evidence website.

3.6 The delivery of these assessments demonstrated the ongoing improvements in the service, development of our capability and provides confidence in our forecasts, continuous improvements and ability to support to the wider market authorisation service.

3.7 While numerous assessments have been delivered, we particularly want to recognise the progress with Cannabidiol (CBD), where the delivery of safety assessments has continued, with 14 published to date, supported by analysis of the size and value of the market, consumption and how and where CBD products were sold in the UK.

3.8 Precision Bred Organisms (PBO) is another area where significant progress has been made in terms of delivering outputs and generating evidence:

- In March, we published draft technical guidance on PBOs, which was the first new technical guidance the FSA has developed for a market authorisation regime and followed extensive advice from the Advisory Committee on Novel Foods and Processes.

- This guidance is now being finalised following user testing with stakeholders and an economic appraisal of the options for developing and implementing the new framework. This will ensure it reflects how assessments will be proportionate to the risk of each type of PBO to assure safety whilst also enabling a more efficient and streamlined route to market for precision bred food and feed.

- We also continue to monitor consumer awareness. Based on the latest findings from the FSA's Consumer Insights Tracker and supporting research, UK public awareness of precision breeding remains consistently low. As of March 2025, 87% of respondents reported they had never heard of precision breeding, with only 4% stating they knew what it was and 9% having heard of it but not understanding it.

3.9 As our scientific capability has grown, we have completed an increasing number of less complex assessments within the FSA's risk assessment unit, without the need to seek advice from our Scientific Advisory Committees (SACs). This matches other risk assessment activities, where the application does not present novel or challenging information. This allows SACs to focus their expertise on more complex assessments, allowing applications to progress more quickly but without compromising consumer safety.

Risk analysis

3.10 Evidence provided by SERD is integral to the FSA's Risk Analysis Process, enabling colleagues in policy to incorporate risk assessment, economic and social science evidence bases to inform their risk management.

3.11 Between 05/09/24 and 21/07/25, 14 risk assessments were completed under the Risk Analysis process. This is higher than previous years and is partially due to the completion of some larger, multi-year assessments, such as recycled plastic from the environment.

3.12 Key examples of work delivered this year include:

- Avian influenza: an updated risk assessment was published in February 2025 on the risk to UK consumers from imported US dairy products, given that a strain of avian influenza had been detected in US dairy cattle and milk. This used additional data to update the initial rapid risk assessment from May 2024 and has allowed the FSA to be prepared for potential outbreaks and share information with other government bodies.

- Titanium dioxide (TiO_2): in response to the EFSA Opinion on the safety of TiO_2 in food, the FSA requested that the Committees on Toxicity and Mutagenicity of Chemicals in Food, Consumer Products and the Environment (COT and COM) evaluate the evidence. As a result of this review, the COT published a Statement on the Safety of Titanium dioxide (E171) as a Food Additive concluding that it is unlikely that there would be a risk to health from current UK dietary exposures of TiO_2.

4. Research and Evidence

4.1 This section provides an update on the FSA's four Research & Evidence Programmes (REPs) listed below, providing highlights of key internal and external projects and their impact. Further resource and financial details of the REPs are provided in Annex 2.

Foodborne disease (FBD) and antimicrobial resistance (AMR)

4.2 This REP remains the largest in terms of overall spend, accounting for 57% of annual research budget in 24/25 (in large part driven by IID3, see below). Key highlights over the last year include:

- Third study of Infectious Intestinal Disease in the UK (IID3): finishing in 2027, IID3 aims to estimate the burden and causes of IID in the UK population. After some initial delays, data collection is now above expectations with samples being collected from all UK nations. While data collection continues, focus is turning to the analysis and modelling required to generate new FBD estimates and build a new cost of illness model in FY26/27. Some initial analysis work is planned for FY25/26.

- Food Safety Research Network (FSRN): created in 2022, through co-funding by BBSRC and the FSA, the FSRN has become a major platform for food safety collaboration, working with 233 different organisations and supporting 40 projects. Such as advancing Shiga toxin-producing *E. coli* (STEC) diagnostics between industry and government. This year, the FSRN was successfully extended until 2028, following a competitive bid to BBSRC and with annual co-funding of £50k pa from the FSA.

- STEC programme: reflecting the emergence of different strains and sources that are increasingly driving STEC outbreaks, the FSA are co-ordinating partners (including Defra and FSS) to deliver STEC-focused projects including piloting new surveillance approaches (such as water sampling) and examining sources of infection.

- AMR surveillance: the FSA leads the food pillar of the UK AMR National Action Plan, working across government to identify potential risks associated with foodborne AMR. This has included supporting Defra's contribution to the NAO audit published in February 2025. As well as work conducted under PATH-SAFE (paragraph 5.4), the FSA has a delivered a programme of AMR surveillance:

    - Publication of results from a survey of UK farmed chilled salmon fillets. This found no *E. coli* or *Listeria monocytogenes* that were resistant to highest priority critically important antibiotics (HP-CIAs; such as colistin).

- Publication of the results of the 2024 EU harmonised survey of *E. coli* on raw, fresh chicken and turkey in retail sale in Northern Ireland. These showed no increase since 2022 and that at 12%, levels were lower than in most EU countries. No resistance to HP-CIAs was found.

- In 2025/26, we are conducting a survey for *E. coli*, *Salmonella*, STEC and AMR on whole head lettuce on retail sale in UK supermarkets. This was identified as an evidence gap and possible risk given the rise of incidents related to ready-to-eat foods. Results will be reported in early 2026.

Chemical, radiological and food hypersensitivity risks

4.3 This REP is the third largest programme by external spend and accounts for 13% of annual budget in 24/25. Key highlights over the last year include:

- Detection methods: development and validation of methods to fill scientific gaps that have been identified during chemical risk incidents, for example, the detection of PFAS in vegetables and migration of Mineral Oil Saturated Hydrocarbons (MOSH) and Mineral Oil Aromatic Hydrocarbons (MOAH) into food from food contact materials.

- Nitrates: we have updated our understanding of nitrate and nitrite food additives by commissioning a review covering human-focused literature (due to be published in October 2025).

- Non-nutritive sweeteners: working in partnership with DHSC colleagues to commission research to improve our understanding of actual UK consumer exposure to non-nutritive sweeteners through measurement of biomarkers in biological samples taken as part of the National Diet and Nutrition Survey (NDNS).

- Radiological preparedness: in addition to participating in training activities and emergency preparedness exercises, we invested in the Aquarius model which predicts how radioactive materials can move through freshwater environments and enter the food chain. This fills a gap in our suite of radiological modelling tools.

- New approach methods (NAMs) (footnote 1): improving the evidence base on NAMs for use in regulatory, chemical risk assessment. Publication of a literature review that captures how NAMs are currently being used in regulation globally, taking into account the views of international expert stakeholders on the adoption of NAMs into regulatory systems. Alongside this, we have supported academic partnerships to develop a case study on the use of NAMS to prioritise tropane alkaloid compounds. Both pieces of work are supporting our international engagement in this space, positioning ourselves as key collaborators for improving the use of NAMS in regulatory chemical risk assessments.

Market authorisations

4.4 Whilst the smallest REP by spend (only 6% in 24/25), this also aligns with externally funded innovation work being conducted under the CCP and Precision fermentation innovation programmes. Highlights from the last year include:

- Consumer views of CCPs: evidence reviews which investigated attitudes towards them (such as perceived benefits and risks), willingness to consume, and preferences and understanding around terminology. As part of the review, we also analysed data on this topic from our consumer insights tracker, along with previous data from our Food and You 2 survey. Potential benefits reported by respondents were around animal welfare, the environment and global food availability. Key concerns were around safety, unnaturalness and the impact on farmers. Respondents were generally unsure as to whether regulation will prevent the sale of unsafe CCPs but did expect products to be regulated and clearly labelled.

- Microbiological and cell banking hazards: literature reviews and expert elicitations on hazards associated with the production of CCPs. Both reports, to be published September 2025, identify key considerations for the risk assessment of these products and outline the most impactful existing uncertainties and data gaps that could be addressed to assure the ongoing safety of these products on the UK market. The outputs from these reports will be used in the development of guidance through the CCP sandbox and support the FSA risk assessment of CCPs.

Regulating the food system

4.5 This REP is the broadest in scope and second largest programme by spend (24% of annual budget in 24/25). Key highlights over the last year include:

- Cost/benefit analysis supporting the Spending Review: this demonstrated the rationale and economic impact (public health benefits, supporting economic growth) of FSA activities. These analyses enabled Finance and Strategy colleagues to build business cases and supported the FSA's overall bid to the Treasury.

- Trade & SPS: analysis of the costs and benefits of a range of options to help remove trade barriers under an SPS agreement.

- National Level Regulation (NLR): as reported to the Board in September 2024, a proof-of-concept trial demonstrated that NLR was feasible and capable of delivering compliance insights comparable to, or better than, routine local authority inspections.

- Analysis supporting policy changes on meat charging: as reported to the Board in June 2025, multi-disciplinary analysis shaped the Board recommendation to move to targeted rather than blanket subsidies on meat charging.

- SALIENT: an on-going programme of randomised controlled trials, run in partnership with Defra and DHSC to understand what interventions in the food system can effectively encourage and enable people to have a healthier and more sustainable diet. Results are becoming available and full results of each trial will be available from November 2025. An evidence synthesis of all trials will be available in Spring 2026 and can feed into the developing Food Strategy.

5. Science Infrastructure

5.1 In addition to our research programmes, we sustain and build underpinning scientific infrastructure (including skills, testing capabilities, research tools, governance and assurance mechanisms) to enable the ongoing delivery of the FSA's science and address its evidence needs, and ensuring that can be done effectively and efficiently in the future.

5.2 This section provides details across three different areas, listed below:

Building and sustaining science capabilities

5.3 Official Laboratory (OL) support: across 24/25, we continued to support the Public Analyst (PA) OLs in England and Wales, to sustain capacity and build capability. Key examples of this are:

- OL Open Grant programme: with an investment of £350k in 24/25, these grants have established multiplex PCR allergen testing, increased CBD test coverage in GB, and strengthened heavy metal testing via equipment investment (to avoid obsolescence). The 25/26 Open Grant Programme is currently running, with the same funding as before.

- Herb and spice testing: proof of concept trials conducted to examine the feasibility of moving from microscopy to Fourier Transform Infrared Spectroscopy (FTIR) methods, offering multiple benefits.

- New GMO testing capability: supported by the FSA, we brought together expertise from the GMO National Reference Laboratory (NRL) and the OL network to established genetic testing for GMO rice and GMO soya in the UK once more. Previously there had been no GB-based accredited supplier and testing was outsourced to European labs.

- Skills: continued to invest (£72k) in the PA training programme, supporting the MchemA scheme (the qualification required to operate as a PA). The number of examinees has now increased to 8 (from 6 and 3 for the prior 2 years), which is significant given the low number of PAs (less than 20 in UK) and that the MchemA takes 5-6 years to complete.

5.4 The Pathogen Surveillance in Agriculture, Food and the Environment (PATH-SAFE) programme ended in March 2025, after 4 years. The programme evaluation concluded that it had produced useful data, methods and tools, related to foodborne pathogens and AMR in a variety of contexts, that are valuable to improving surveillance in the UK. Key highlights from the programme include:

- It delivered 30 projects with 65 delivery partners, and produced over 100 outputs, including 25 peer-reviewed journal papers. Outputs from the AMR surveillance projects were published in the 2023 UK VARSS report, published in 2024. A further 80 plus outputs and publications are planned.

- Development of environmental surveillance tools, including wastewater and air sampling, to track pathogens and AMR in the agri-food-environment. The outputs from these projects have allowed assessment of how these methods, which proved effective during the Covid pandemic, could complement or replace traditional surveillance methods and better target interventions. For example, research conducted by Bangor University, developed data-driven 'active management' approaches to monitor, predict and limit the spread of norovirus and AMR genes from hospital-derived and municipal wastewater, in shellfish beds and

recreational waters, leading to the provision of policy recommendations for AMR and viral risk monitoring and control.

- Alongside technical advances, PATH-SAFE established and promoted a collaborative, four nation, One Health approach to surveillance, which has been referenced as an exemplar within initiatives such as the UK Biological Security Strategy and the UK AMR NAP.

- In FY25/26, £1m of additional funding has been secured from the UK Integrated Security Fund (ISF). This will build on pilots completed under PATH-SAFE and focus on onsite diagnostics, STEC environmental surveillance and further development of a pathogen genome data sharing platform. This will form part of a new national Food Surveillance Programme (FSP) being developed (see paragraph 6.19).

5.5 Retail Surveillance Survey (RSS): the results of the fifth RSS were published in June. It provided the FSA with intelligence on emerging risks and supported maintaining PA laboratory capabilities. Notably, findings on caffeine supplements led to revised industry guidance, issued jointly by the FSA, FSS, and DHSC, to protect consumers from the risks of excessive caffeine intake. The next RSS has been commissioned for FY 25/25, covering a range of commodities and potential hazards. This includes testing slushies to gain a better understanding of how glycerol is used by the industry and whether the market has moved to lower inclusion levels.

5.6 Social science review: following a rapid assessment of our social science portfolio last year, we have implemented the recommendations made: we have focused on risk analysis and our core reform priorities, are managing our portfolio towards an approximate 25:75 split of proactive to reactive work and have changed the frequency of Food & You 2 to once (not twice) a year.

Assuring our science & performance

5.7 Science Advisory Committees (SACs): in an ongoing response to the recommendations of the CSA's previous report to the board (as outlined in Annex 1 of the 2024 annual science paper), an internal audit was undertaken into how the FSA deals with conflicts of interest for its SAC members. The audit was able to confirm that members are declaring their key interests in line with the Good Practice Guidelines. Processes have been updated to collect additional information from members in future including high level summary information on the source(s) of grant(s) received.

5.8 Science Council (SC): progress continues on the SC's rolling programme of delivery projects including:

- In November 2024, the SC published its report on what the FSA would need to consider if it included wider impacts (environmental, nutritional etc) outside of food safety risk assessments, when making a risk management decision (for example in approving regulated products). The project provides an understanding of what would be required in future to better factor these wider impacts into risk management decisions.

- The SC started a new project to understand how Artificial intelligence (AI) technologies might impact the FSA strategic goals. In June, an expert workshop was held and the results of this will be part of the evidence to inform a report on deployment of AI to deliver food assurance, which is due in late September 2025.

5.9 Advisory Committee for Social Science (ACSS): four new members have been recruited to bolster expertise in economics and build expertise in statistical methods and organisational behaviour. Delivery highlights in year include:

- The first joint meeting between ACSS and Defra's Social Science Expert Group, in partnership with the British Academy, on using systems thinking for policy and regulatory changes.

- The programme of projects delivered via the ACSS working groups (WG):

    - Wider Consumer Interests WG completed a scoping review on consumer understanding and concerns about ultra-processed foods (UPFs), published to coincide with the House of Lords inquiry report on Food, Diet & Obesity and directly informing the current UKRI public dialogue on UPF.

    - Economics WG supported the 2025 Spending Review, including the development of a Policy Impact Matrix to make an economic case to HM Treasury on the impact of FSA activities.

    - Assurance WG continues to quality assure new work prior to starting and members have also peer reviewed specific pieces of work.

5.10 Cross-government science: we continue to engage with, and deliver across, all relevant cross-government initiatives, as an active member of the CSA, deputy CSA and CSA officials' networks. This included FSA input into the cross-government R&D summaries developed for the Spending Review, which supported a strong research settlement.

5.11 New CSA: with the departure of Robin May, the FSA is recruiting a new CSA and a focus later in 25/26 will be their induction and supporting them in the new role.

5.12 Social science assurance: following the independent review of our social science work, we published a one-year on update GSR Review 1 Year On, reporting that all recommendations had been implemented.

Delivering impact, communications & engagement

5.13 Studentships: we continued engagement with UK PhD training partnerships, including the Norwich Research Park DTP, White Rose DTP and UK Food Systems Centre for Doctoral Training. This year, we have supported 6 PhD studentships and 2 internships.

5.14 Policy fellowship: we are hosting a BBRSC-funded policy fellowship with Dr Amber Barton, a researcher from the Sanger Institute.

5.15 Social mobility internships: we are supporting three summer research placements, as part of the Generation Research programme, run out of York University. Designed to support social mobility, these placements provide opportunities for undergraduates to get paid experience to support future PhD applications.

5.16 Publications: in 24/25, we published and migrated over 230 publications to our new, more accessible publication platform, including 147 new publications and 87 reports previously on food.gov as PDFs. Links to all the reports published since the last update are contained in Annex 3.

5.17 Impact monitoring: the integration of the new publication platform with additional monitoring software is allowing us to understand the impact of our publications. For example, in the last 12 months our reports have been cited in the news media almost twice every day on average and they have received over 50 mentions in governmental policies. This impact is not confined to the UK and much is international. More details about our impact statistics can be found in Annex 3.

6. Strategic Science Approach and Future Priorities

6.1 This section outlines our strategic approach to and future priorities for science, including how we will innovate and build future science capabilities and infrastructure. It updates the forward look from the previous science paper and looks at priorities for the next SR period (26/27 onwards). It takes a strategic view focusing on approaches, priority themes and direction, without detailing specific research projects. These will be captured within more detailed plans that sit under this high-level view, including using our REPs to capture our portfolios of projects.

Progress against previous priorities

6.2 This section highlights progress against the priorities presented last year (in the future look section of the 2024 Science paper), under four themes:

- Enhanced food system surveillance: this continues to be an ongoing priority with recent progress and longer-term ambition covered in paragraphs 5.5 and 6.19, respectively.

- Tools for better regulation: in the 2024 report, the focus was the skills and tools needed to deliver a better market authorisation service. This continues to be a priority, alongside a wider focus on innovation, for regulated products but also tools and approaches to make FSA evidence provision faster. Progress towards this in 24/25 is covered in paragraphs 4.3 and 4.4 and our longer-term ambition is covered in paragraph 6.26.

- Social science: last year we focused on implementing recommendations from an independent review of our social science function, and a rapid assessment of our social science portfolio. This work has now been delivered (summarised in paragraph 5.6).

- Science engagement & education: whilst the rationale for this remains a priority, this area will be incorporated into the wider impact strategy (paragraph 6.11). Ongoing work associated with this area is described in paragraphs 5.13 to 5.17.

6.3 From the list above, we plan to continue priorities 1 and 2 and will move work on priorities 3 and 4 into business as usual. We have also added two new strategic priorities:

- Understanding foodborne disease (see paragraphs 6.13 to 6.18 for details)

- Evidence to regulate a changing food system (see paragraphs 6.29 to 6.32 for details)

Future funding

6.4 Through our 2025 bid, the FSA has secured an uplift in our capital research settlement across the SR period (details in Annex 2) but was unable to secure additional funding specifically for biosecurity. As a result, we have reviewed our ambitions in this area and will refocus our efforts, including more effort on partnership working and building collaborations, to leverage

biosecurity resources from others.

Future approach to research and evidence

6.5 Even with additional funding, research resources are limited and need to be focused on areas that others will not support. This includes aligning to the FSA's strategy and focusing most of our science on the first two pillars of our vision (food is safe and what it says it is). But it also recognises that science can support the third pillar (that food is healthier and more sustainable) albeit with a lower level of input. This includes working with FSA colleagues in NI, where the FSA retains the nutrition policy remit.

6.6 It reflects the external drivers that are changing the food system and the need to regulate differently in the future. Key drivers include:

- Reported increases in foodborne disease and the drivers of those changes:
- The risks posed by chronic exposure to chemicals in the environment.
- The ongoing issues with diets, obesity and the impact of UPFs.
- The challenges and opportunities associated with new technologies including artificial intelligence and engineering biology.
- The UK's relationship with the EU and the future of SPS.

6.7 In the coming year our science work needs to:

- Provide evidence in our role as a regulator; informing policy making and enforcement and supporting other business functions.
- Maintain key infrastructure required to sustain the science needs of the FSA into the future. Some of this infrastructure is of national importance, underpinning UK public health and providing surge capacity during incidents. (such as laboratory testing).
- Create new expertise through conducting research, which in turn feeds into future work of the FSA (such as recruitment of new talent or access to experts for our SACs), as well as increasing expertise in the food system more widely.

6.8 For access to longer-term research, the FSA will invest in partnerships, in particular with other research funders (such as UKRI). Whilst giving less direct control on research outputs, this allows leverage of external funds with relatively small investment and offers excellent value for money.

6.9 We will increase our collaboration with our international peers (such as partnering with Food Standards Australia New Zealand (FSANZ) on cost of illness modelling) and seek to build research collaborations with EU partners and institutions such as EFSA.

6.10 Finally, we recognise the power of convening and leading research networks (formal and informal). As demonstrated by PATH-SAFE and FSRN, this gives us influence within wider research communities, allowing us to draw on extended pools of expertise and resources, and

steer research direction.

Strategic impact framework

6.11 We are developing a strategic framework to support the delivery of science impact. This will then be used to develop more detailed delivery plans (e.g. communications, outreach). The new framework will focus on the following priorities:

- Establishment of logic models to demonstrate clearer pathways to impact for projects and analysis, designed to address the four different types of impact we want to deliver: policy, economic, capability and knowledge.

- Better communication of our science, targeting relevant stakeholders. This will include increasing the number of newsletter subscribers and preparing additional resources to accompany our publications, such as lay-person summaries or infographics.

- More targeted approach to external engagement including developing bespoke stakeholder maps depending on the type of impact we wish to have and the target audiences we want to influence.

- Development of a science outreach programme, focused on universities, to promote governmental science as a career path and support social mobility.

- Improved measurement of impact by building on the statistics obtained through our new publication platform and Altmetrics. We will review and refresh our impact KPIs.

Research & evidence priorities for next SR period

6.12 To deliver this more strategic approach, we will focus on four cross-cutting areas of research, evidence and innovation:

Understanding foodborne disease

6.13 Foodborne pathogens (and associated AMR) remain a primary concern for the FSA and drivers, such as reported increases in foodborne illness rates and SPS, reinforce the need to refocus on this as a priority.

6.14 It is an area where we must continue to lead research but also work in partnership with other funders (such as BBSRC), research networks (such as FSRN, AMAST AMR Research Network) and research organisations (such as Quadram Institute, UKHSA, APHA).

6.15 Across this foodborne disease priority, there are four areas of activity:

- Innovation (such as new methods of doing science)

- Discovery (such as what is out there and how much of it)

- Intervention (such as what can we do about it and how likely is it to work)

- Evaluation (did it work and why/why not).

6.16 Over the next SR period, much of the focus will be on discovery and intervention (with evaluation coming later as interventions are deployed). Innovation is also a priority but much of this is linked to the better surveillance priority described below.

6.17 Specific areas of focus will include:

- Gaining a better understanding of the drivers of FBD increases through research and surveillance, including exposure assessments, source attribution studies, and analysis of data on changes in behaviour and other factors (travel or climate change for example).

- Exploring how behaviours influence the transmission of foodborne pathogens and how this can be translated/quantified for use in risk assessment.

- Completion of IID3 and delivery of new FBD estimates and a revised cost of illness model.

- Future alignment with EU and a potential return to conducting harmonised pathogen/AMR surveys, and the benefits of accessing larger, cross-European datasets (alongside ongoing UK-focused surveillance).

- Building partnerships to deliver more strategic research and build new research programmes, including working with new research programmes (such as FSRN, AMAST, Health Protection Research Unit for Gastrointestinal Infections).

- Seek to gain better access to wider data sets, for example through participation in the FSRN's F-MIN initiative, aiming to share insights from industry microbiology test data.

6.18 We anticipate that this priority will account for around 20% of our external spend and will be delivered via our FBD & AMR REP.

Better surveillance

6.19 To deliver better surveillance, we are building a national Food Surveillance Programme (FSP) which seeks to:

- Build resilient, sustainable national laboratory capacity.

- Develop and deploy a comprehensive range of methods that can accurately and rapidly test for the safety and authenticity risks facing the food system.

- Rapidly identify new and re-emerging risks in the food system.

- Establish partnerships to ensure food surveillance is part of a cross-government, One Health approach to protect the UK's biosecurity.

- Continue to innovate, exploring and deploying new technologies to deliver our future surveillance programmes with better efficacy and efficiency.

- Access and share the data we need in a manner that is timely and efficient.

- Develop new scientific expertise to support the UK's future surveillance needs such as bioinformatics.

6.20 Led by the FSA, this FSP will join-up existing surveillance activities focused on pathogens and those on food contaminants and standards. It will align with the work of our partners (such as Defra, UKHSA), wider cross-government initiatives (such as UK Biological Security Strategy, BSS) and build on the legacy of previous initiatives (such as PATH-SAFE). Efforts will be made to leverage external funding (Integrated Security Fund (ISF) for example) to support this programme, alongside FSA research & evidence budgets.

6.21 The programme will focus on FSA-relevant surveillance applications including:

- Improved foodborne pathogen monitoring at a population-level to identify disease trends, emerging risks, and generate policy-focused evidence.

- Better methods to verify food standards and authenticity, to support monitoring and enforcement and build national laboratory capabilities.

- Innovation to enhance the FSA's work across incidents, borders and inspection.

- Increasing monitoring for persistent chemical pollutants (such as PFAS) within the environment, as sources of food contamination and to better understand exposure.

- Conduct technology foresight, ensuring the FSA has sight of new and emerging technologies, and the potential application of these in food surveillance.

6.22 Through pilots conducted during PATH-SAFE, promising new technologies have been identified and the FSP will progress these towards deployment. These include onsite diagnostics (rapid testing methods to support inspection), monitoring for pathogens in wastewater, and metagenomics (using high throughput sequencing to simultaneously identity multiple known and unknown pathogens within a single sample).

6.23 The programme will also develop improved technical enabling capabilities to help deliver better surveillance in the future, including:

- Data sharing (such as deployment of the PATH-SAFE genomic data sharing platform to support incidents).

- Skills (continuing to support activities to maintain lab capabilities and the training of new public analysts for example).

- Food defence & surge capacity (such as mapping specialist testing facilities).

6.24 As a large proportion of the costs of maintaining an effective surveillance programme is maintenance of the NRLs and ongoing sampling, it expected that this priority will account for approximately 30% of our ongoing external spend (making it the largest priority area). Much of this work is cross-cutting across multiple REPs but will also sit under our non-research infrastructure programme.

Innovation in regulatory science

6.25 To become a better regulator, we must innovate in the way we deliver regulatory science, developing new approaches and methods to improve our risk assessment, analysis and other regulatory science functions.

6.26 Under this priority area, we will continue to build on current innovation programmes and push these towards deployment for routine usage. Specific priorities include:

- New toxicological and chemical risk assessment tools including NAMs, associated skills development and practical examples of how NAMS can be applied to chemicals or groups of chemicals of concern, to improve our risk assessment capability and throughput.

- Development of both new tools and survey methodologies (such as using biomonitoring) to improve our understanding of exposure assessment in relation to people's diets.

- Innovation in novel foods, including alternative proteins, building on the CCP Sandbox and Innovation Hub programmes. These are already identifying key evidence gaps that if addressed will reduce uncertainties in risk assessment and will facilitate the development of innovative approaches to the assessment of these kinds of novel food.

6.27 Innovation that can support the FSA to interrogate data faster (such as AI-based analytics) or make data that we hold easier to understand (such as digital data dashboards). A prime example includes the use of AI tools to support literature review and synthesis; we are piloting these and working with international peers to share learnings and best practice.

6.28 The work required to support this priority will be diverse including research and investment in skills and capabilities. As a result, we expect this priority to account for approximately 20% of our external spend, delivered through our chemical and market authorisation REPs.

Evidence to regulate a changing food system

6.29 To be an effective food regulator, the FSA needs to understand the wider food system, how it is changing and the drivers of change such as shifting consumer behaviours, technological innovation and government policies.

6.30 Hence, we need a strong evidence base, gathered from a wide range of sources. This includes horizon scanning and insight analysis, our own monitoring data and assessment/analysis of research from others. We need to translate this evidence into outputs that can be used by policy and delivery teams, for both short-term (such as incidents or supply chain disruption) and longer-term (such as policy development) scenarios.

6.31 Looking forward, the focus in this area will be on evidence to support the implementation of regulation. Given the dynamic nature of regulation, work under this priority will need to be agile and able respond rapidly to new asks or reprioritisation. As a result, this area will be

characterised more by shorter (in-year), responsive research, rather than the longer-term programmes highlighted under the three priority areas above. Some likely themes will include:

- Identifying the impacts of regulatory changes, whether driven externally (such as SPS) or internally (such as meat charging).

- Identifying and monitoring emerging risks and opportunities (such as emerging technologies, climate change, economic and behavioural shifts among consumers and business) and shaping the FSA response to them.

- Contributing to UK and devolved government strategies and initiatives, through generating evidence on the implementation of regulatory interventions, through supporting the new Food Strategy (looking at opportunities to use regulation to improve outcomes for deprived areas for example), and regulatory strategies supporting healthy diets (such as the healthy food standard and school food standards).

- Working with FSA policy and operational counterparts to apply evidence and analytical thinking earlier in the cycle such as using theory of change, logic modelling and behavioural insights to frame policy options.

- Convening partners from across government and academia to leverage new data and research. Specific opportunities include the URKI-funded Transforming UK Food Systems programme and the BBSRC public dialogue on ultra-processed food, which will generate new insights on the food system and food additives, respectively.

6.32 Over the coming SR period, this priority area will be the smallest in terms of external spend (10-15%, mostly delivered via the Regulating the food system REP) but will also include delivery through internally led evidence projects (giving the flexibility for rapid and responsive evidence generation).

7. Conclusions

7.1 The FSA continues to deliver impactful science supporting risk analysis, incidents, policy-making and other statutory work. This has included delivery of in-house analysis and external research. Alongside this, the ongoing science infrastructure required to enable this science delivery has been maintained and new technical capabilities built.

7.2 Looking forward to the next SR period, we will continue to build on this, utilising the uplift in our research budget but continuing to focus finite resources on key priorities. In coming years, research efforts will focus on foodborne disease and generating the evidence needed to regulate within a changing food system. We will continue to innovate, investing in new methods and approaches to enhance our surveillance and regulatory science capabilities. Building and maintaining strong scientific partnerships will be critical in achieving this.

Annex 1 - Response to the recommendations in the CSA's Annual Report

The CSA presented his annual report in June 2025. Below is a summary of how the work in this annual science update addresses the recommendations in the CSA report.

Recommendation 1. The FSA look to bolster research capabilities both through existing partnerships and by seeking new ones over the next 12 months

Recommendation 5. The FSA establishes formal collaborative arrangements with comparable international regulators (in New Zealand or Canada for example) to jointly consider specific technical areas

Recommendation 11. The FSA should work closely with other government partners to identify critical research areas where the UK may need to 'step up' to address research priorities that were previously expected to be delivered by international partners but have now been discontinued

Response: as noted in paragraphs 6.8 to 6.10, an integral component of our future approach to research and evidence is to invest more effort on partnership working and building collaborations, The renewal of the FSRN, co-funded with BBSRC, is a key example of this. We are also looking to strengthen our relationships with the European Food Safety Authority (EFSA), US food and Drug Administration (FDA), SFA and the German Federal Institute for Risk Assessment (BfR). Regarding our research priorities we work closely with the Government Office for Science and other government departments to align our ARI and are publishing detailed research questions is to help with this. We are working closely with Defra to co-ordinate surveillance and method development activities.

Recommendation 2. The FSA colleagues from relevant teams attend and present at leading meetings of professional scientific societies in order to maximise recruitment to our scientific advisory committees

Response: one of the priority areas of our strategic impact framework (paragraph 6.11) is better communication of our science and targeting relevant stakeholders. One of our bespoke stakeholder maps will be to enhance our access to external experts to raise awareness of the benefits of joining the SACs.

Recommendation 3. We extend the use of 'in-house' assessment of market authorisation applications by FSA officials to ensure that SAC expertise is used primarily for the most technically challenging applications.

Recommendation 4. We expand our use of other regulators' opinions (OROs) and abbreviated risk assessment processes (ABBs) to also include more challenging and innovative applications

Recommendation 6. We assess whether a 'modular' approach to risk assessment (currently being considered as part of our CCP sandbox) might be more widely applied to the market authorisation process as a whole

Recommendation 7. The FSA establishes regular meetings between key players in the (food) innovation landscape with the express purpose of identifying products under very early-stage development that might ultimately require FSA approval

Response: much of this will be covered by the activities that will be undertaken as part of the innovation in regulatory science priority (see paragraphs 6.25 to 6.28)

Recommendation 8. That FSA continues to engage closely with relevant stakeholders who may be able to build on the pioneering work of PATH-SAFE

Recommendation 9. Science and policy colleagues jointly consider PATH-SAFE outputs that may have direct 'operational' relevance for FSA and could be incorporated into our ongoing programme of regulatory reform.

Response: as noted in paragraphs 6.19 to 6.24, we seek to take an integrated approach to better surveillance, including building on the successes of the PATH-SAFE. With additional investment in this year (from the ISF) we are continuing to develop key PATH-SAFE pilots and then continue to develop capabilities further, via the national Food Surveillance Programme, which is one of the 4 science priorities for the future (over the next SR period).

Recommendation 10. The FSA should actively seek to identify dependencies on international data and infrastructure that may be threatened in the current international climate

Recommendation 12. Consider priority actions in key emerging areas, including Changing patterns of food trade as a result of tariffs; the FSA's role in supporting enhanced domestic food production; effective implementation of approaches with animal welfare benefit, such as the 'Demonstration of Life' protocol; and a more coordinated approach to regulating 'functional' food and feed

Response: the impact of geopolitical changes are being looked at as part of our regular, biennial strategic assessment of risks and opportunities in the food system, which would include, for example, changes to trade patterns, infrastructure and the impact of e.g. trade deals and tariffs. This question is being considered as part of the Regulating the food system research and evidence programme (see paragraph 4.5). We are working closely with Defra on their food strategy which includes measures to enhance the resilience of UK food supply. In 2024, the UK was 65% self-sufficient for all food and 77% self-sufficient for indigenous type food (things we can grow here). The work we undertake to address our priority to innovate in the way we deliver regulatory science will consider a more coordinated approach to regulating 'functional' food and feed.

Annex 2 - Business Analysis, Finance & Performance Data

As stated in paragraph 2.3 SERD operates across three core areas of science delivery:

- Risk analysis and market authorisations
- Research and evidence
- Science infrastructure

The current distribution of FTE across each of these is shown in Figure 1.

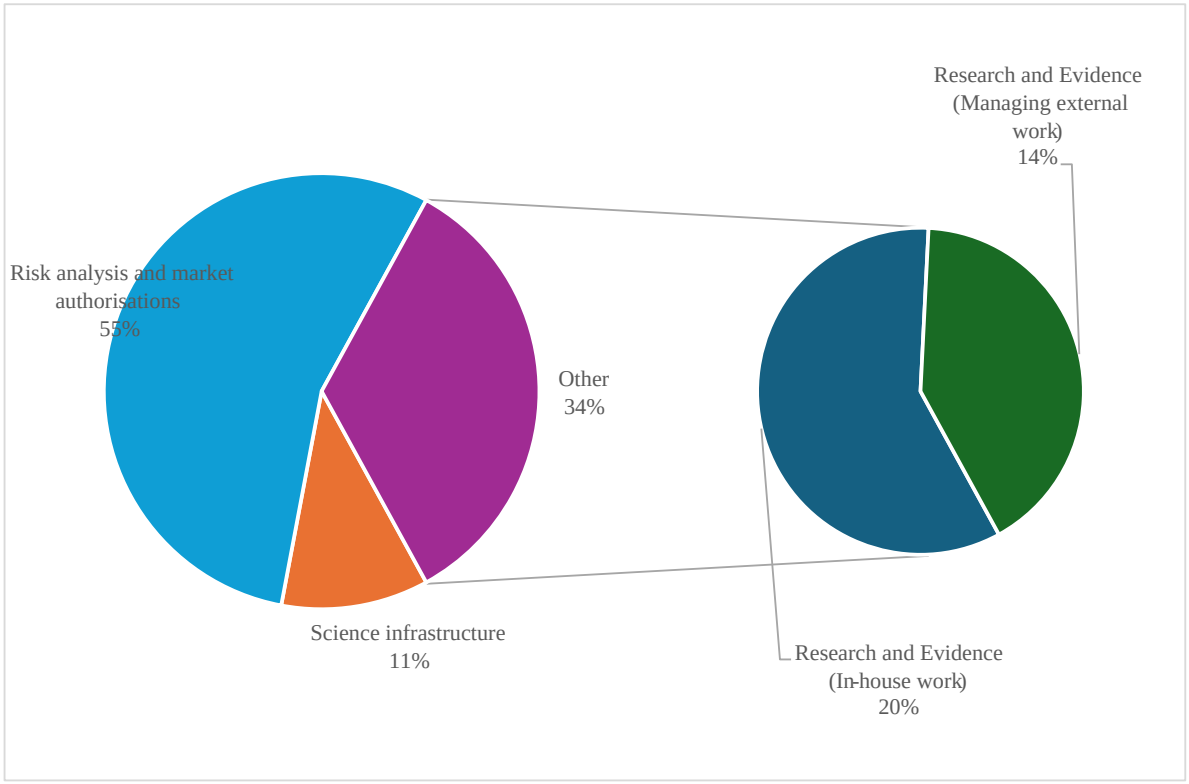

Figure 1 distribution of staff effort

The science budget is split between investment in staff and 3rd party spend and the trend over the last few years can be seen in Figure 2

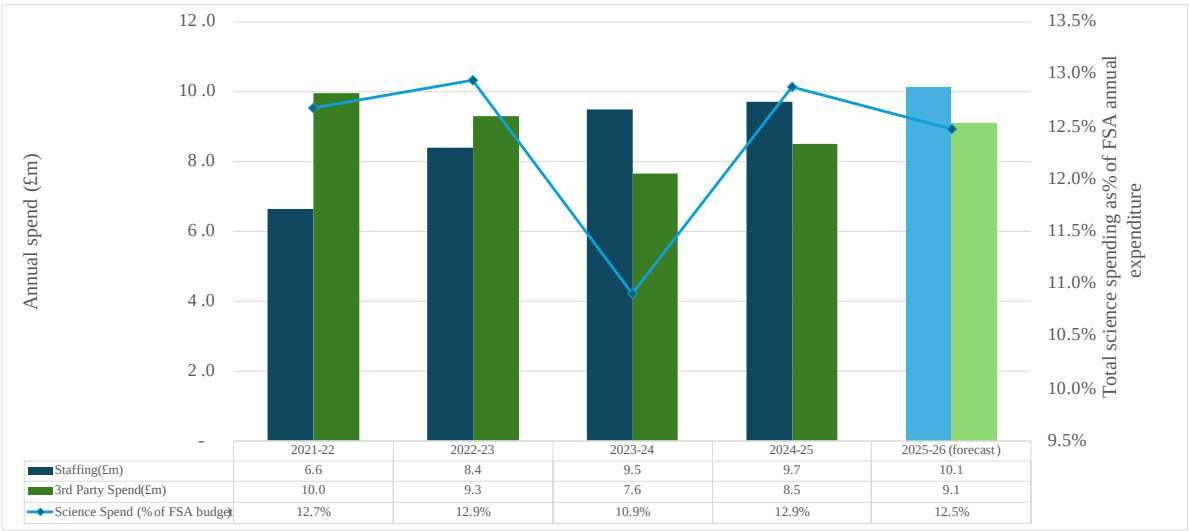

Figure 2 distribution of spend over time

The distribution of our spend in FY24/25 is shown in Figure 3 and our forecast spend for FY25/26 is shown in Figure 4. The main difference in spend profile between FY24/25 and FY25/26 is an increase in the spend on work associated with chemical risks, funded through a slight reduction in spend on foodborne disease (our largest programme) and regulating the changing food system (as we have shifted more research to internal delivery in this programme).

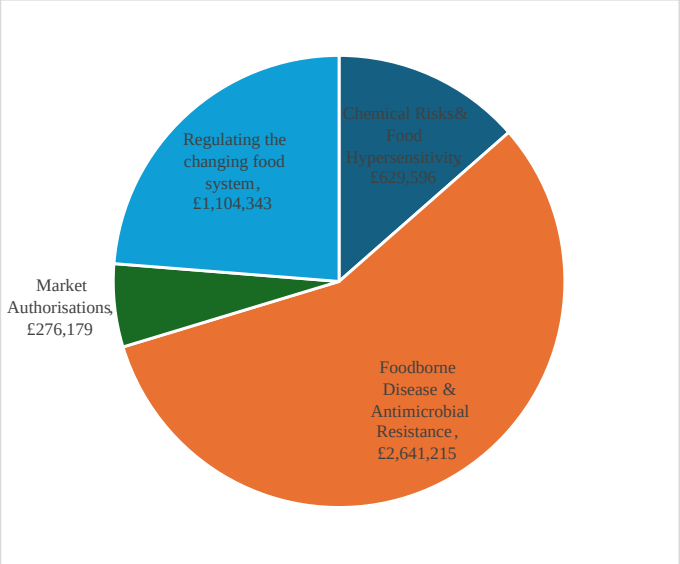

Figure 3 Actual external research spend in FY24/25. N.B £2.0M of the foodborne disease and antimicrobial resistance spend is on the IID3 project (see paragraph 4.2)

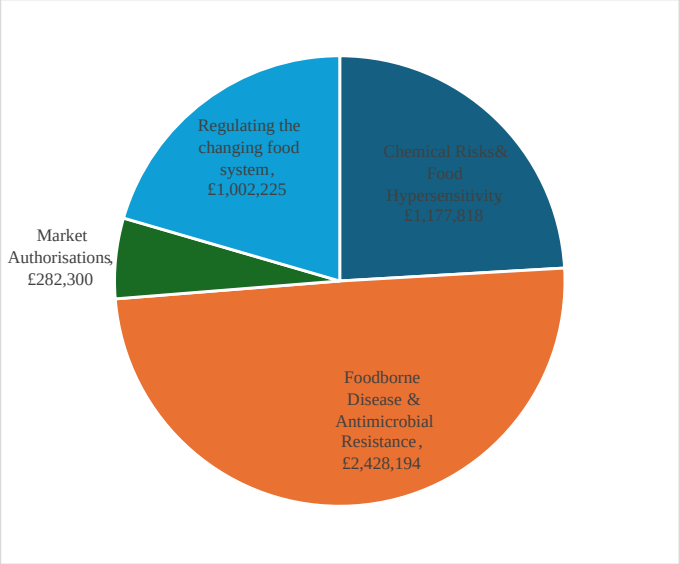

Figure 4 Forecast external research spend in FY25/26. N.B £1.5M of the foodborne disease and antimicrobial resistance spend is on the IID3 project (see paragraph 4.2)

Annex 3 - Science Publications and Impact

As part of our impact workstream, we monitor engagement with FSA research projects, evidence, and publications. This annex captures engagement and impact with FSA science publications since the previous annual Science Paper.

FSA science reports

- A total of 54 reports were published in year (a 25% increase compared to last year). A full list is presented at the end of this annex.
- These have been viewed a total of 57,107 times
- Our report that received the most attention was "Impact of Climate Change on the UK Food System" with 4,105 unique views (this is almost three times as many views as our highest viewed report last year)

Peer-reviewed scientific papers

- In addition to work published by the FSA, there are also peer-reviewed publications by FSA affiliated authors (e.g. FSA staff or collaborator), or that are reliant on FSA data.
- There were 10 peer-review publications with FSA authors, a 43% increase compared to last year
- There were 48 publications acknowledging FSA funding or data, a major increase on the 17 from last year, and these were cited 1,641 times.
- The most impactful paper was "Time trends in the epidemiology of food allergy in England: an observational analysis of Clinical Practice Research Datalink data".

Website access

- In the last year, views of our science reports totalled 408,299 across 324,443 visitors with most visiting from the UK (77%), but 23% from outside the UK.
- A significant spike of ~9,000 daily visitors was recorded in November 2024 to a regulated product assessment on 3-Nitrooxypropanol (published in 2023), a component of the cattle feed additive Bovaer, which garnered media attention after approval for use in the UK.
- Page views to FSA Research and Evidence (Scholastica) publications across this period totalled 48,212.

Policy usage

- Across the last year, FSA publications were mentioned in 55 policy documents, both in the UK and overseas.
- The most referenced research was "Longitudinal study of infectious intestinal disease in the UK (IID2 study): incidence in the community and presenting to general practice" which received 22 mentions in policies

Other impact (mainstream & social media)

- As these are new metrics, they cannot be compared to last year, but we will be able to report on annual changes in the future.
- FSA research publications have been mentioned 635 times in news outlets both in the UK and overseas. They are also getting referenced outside of traditional routes with 595 mentions on social media.
- The largest spike of 80 news mentions referred to a 2007 FSA study on "Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the community: a randomised, double-blinded, placebo-controlled trial" which was driven by proposed plans of the US Food and Drug Administration to phase out artificial food dyes.
- The long-term impact of our research is also emphasized as over 50% of our social media references referred to a FSA funded study from 2018 on dietary solids and infant sleep that was used to refute a TikTok trend in early 2025, that erroneously suggested feeding babies' butter before bed could stabilise blood sugar levels and promote better sleep.

FSA science reports published since the last update:

1. Impact of Climate Change on the UK Food System
2. New Approach Methodologies (NAMs) to Support Regulatory Decisions for Chemical Safety
3. Use of AI in the UK Food System
4. Surveillance Sampling Programme (2023-24)
5. Improving Allergen Communication in SME Food Businesses in Out-Of-Home Settings
6. Developing a New Testing Methodology for Honey Authentication

7. Small and Micro FBO Tracking Survey Wave 4
8. A Rapid Evidence Review on Consumer Responses to Cell-Cultivated Products
9. Review of Methods for the Detection of Allergens in Novel Food Alternative Proteins
10. Campylobacteriosis Case Rates in the UK: An Expert Elicitation Exercise
11. Consumer Insights Tracker (July 2024 to September 2024)
12. Contaminants Monitoring Programme for Wild Caught Fish, Crustaceans and Cephalopods
13. Review of Capability of Methods for the Verification of Country of Origin for Food and Feed
14. Food Hygiene Rating Scheme Audit of Display and Business Survey: 2023
15. Evaluation of Vending Guidance in Health and Social Care Settings Across Northern Ireland
16. Using NHS Data to Monitor Trends in the Occurrence of Severe, Food-Induced Allergic Reactions Work Package 1
17. Consumer Insights Tracker (October 2024 – December 2024)
18. FS900284 Survey of the Microbiological Contamination of Cull Ewes and Prime Lamb at Slaughter in England and Wales
19. Analysis of CBD Products (2022-23) | Published in FSA Research and Evidence
20. PATH-SAFE Phase 1 Evaluation Report
21. Exploring the Impact of Giving Free Food Samples and Loyalty Cards on Food Choices: A Stepped Wedge Trial in Workplace Food Outlets
22. A Rapid Evidence Review on Consumer Responses to Precision Fermentation
23. Understanding Consumer Trust in the FSA and Food System
24. Retail Surveillance Sampling Programme 2024/25
25. Consumer Insights Tracker (January 2025 – March 2025)
26. Using NHS Data to Monitor Trends in the Occurrence of Severe, Food-Induced Allergic Reactions Work Package 2
27. Making Food Better Tracker Survey 2024
28. Disease Attribution to Foods for Four UK Pathogens
29. Transmission of AMR _Campylobacter_ and _Escherichia Coli_ During the Processing of Chicken Meat
30. Food Allergy Awareness Champions: Improving Food Safety Standards in Online Food Procurement for People With Food Hypersensitivities
31. The Availability of Fast-Food Outlets and Grocery Retailers in Northern Ireland and Their Distance to Secondary Schools
32. Using Citizen Science to Explore Plant Breeding and Investigate Food-Chain Transparency for Novel Breeding Methods

33. Understanding Consumer Needs in Relation to Food Hygiene Ratings in an Online Food Ordering Environment

34. Surveillance of AMR in *Escherichia ?coli* on Raw Fresh Beef and Pork Meat in Retail Sale in Northern Ireland in 2023

35. Qualitative Research on Reformulation With Food Manufacturers in Northern Ireland

36. School Food Standards Compliance Pilot: Feasibility Phase 2 Research

37. Supply of Data Requirement to Assess the Safety of Currently Non-Permitted Waste Streams to Be Used for Rearing Insects for Feed

38. Food Hygiene Rating Scheme Audit of Display and Business Survey: 2024

39. Chemical Contaminants in Wild Caught Fish and Crustaceans – Northern Ireland.

40. Consumer Insights Tracker (April 2024 to June 2024)

41. PATH-SAFE Final Evaluation Report

42. Consumer Insights Tracker Report July 2023 March 2024

43. Small and Micro FBO Tracking Survey Wave 4 Technical Report

44. Consumer Attitudes Towards Potential Divergence of Food Safety Regulations Within the UK

45. Infectious Intestinal Disease Survey During COVID-19: Additional Analysis on Association of Behaviours With Illness

46. Survey of Infectious Intestinal Disease in the UK: Effect of COVID-19 Response and Associated Measures on IID in the UK

47. Food Hygiene Rating Scheme Audit of Display and Business Survey: 2023 Technical Report

48. Peanut Contamination of Mustard Ingredients: Awareness and Actions Taken by Those With a Peanut Allergy

49. Food Hygiene Rating Scheme Audit of Display and Business Survey: 2024 Technical Report

50. Consumer Insights Tracker: Technical Report 2024

51. Consumer and Stakeholder Perceptions of Urban-Grown Food

52. Consumer Views of Potential Regulatory Divergence in the Meat Sector

53. GSR Review 1 Year on – Summary

54. Chemical Contaminants in Wild Caught Fishery Products and Crustaceans – Northern Ireland.

1. New Approach Methodologies (NAMs) include but are not limited to, high throughput screening and other in vitro assays, omics and in silico computer modelling strategies (such

as Artificial Intelligence (AI) and machine learning) for the evaluation of hazard and exposure in risk assessment. More details at https://cot.food.gov.uk/New%20Approach%20Methodologies%20%28NAMs%29