FOOD STANDARDS SCOTLAND'S SCIENCE, EVIDENCE AND INFORMATION STRATEGY

RESEARCH PROJECTS AND CAMPAIGNS - OUTPUTS AND IMPACTS

This paper provides an up to date summary of research and evidence gathering projects commissioned under Food Standards Scotland's Science and Evidence programme since 2015. It includes links to project reports and provides a summary of key impacts, outlining how the findings have been used to inform policy and public health interventions by FSS and other parts of government. Where applicable, information has also been provided on how these projects have contributed to the wider scientific evidence base through publications in peer reviewed journals, research grants and publically available research resources.

Tenders for all research projects being funded by FSS are published on Public Contracts Scotland. Prior to publication, the majority of our research reports are subject to external peer review. To note that the list of projects does not cover annual food sampling programmes that FSS co-ordinates through Local Authorities (LAs) in Scotland. Details of this programme can be found here: Food Standards Scotland funded sampling grants | Food Standards Scotland. The results of the FSS/LA food sampling programme are recorded centrally on a database held by FSS called the Scottish Food Sampling Database (SFSD), and reported on an annual basis to all LAs in Scotland to support them in the targeting of enforcement activities. These datasets are not yet published but work is underway to develop dashboard reports on key findings which will be hosted on the FSS website. Datasets held on SFSD can also be made available for research purposes on request.

This paper also provides details on market research FSS has commissioned to generate consumer insights to support its campaigns, public health advice and media engagement.

All projects are listed under the following outcomes in FSS's Strategy for 2021-26:

Food is Safe and Authentic
Consumers Have Healthier Diets
FSS is trusted and influential

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STRATEGIC OUTCOME 1 – FOOD IS SAFE AND AUTHENTIC

Project Title (Year)	Purpose	Outputs and translation into policy
Whole genome sequence typing and analysis of Salmonella isolates (2022).	In order to improve our understanding of the link between Salmonella isolates from clinical cases, food and agricultural samples SSSCDRL (Scottish Salmonella reference laboratory) has been commissioned to perform WGS of 500 isolates of food, environmental and agricultural isolates.	This study will provide information to support understanding of the potential sources of Salmonella infection in clinical cases in Scotland. This will help FSS to further understand the risk posed by different types of exposure and help to inform future risk assessment.
Survey of consumer practices with respect to coated frozen chicken products (2021)	This survey was commissioned by Food Standards Agency (FSA), in collaboration with Food Standards Scotland, and involved an online survey to examine consumer behaviours in purchasing, storing and cooking coated frozen chicken products across the UK (including Scotland. It was carried out to support investigations into a spike in Salmonella cases in the UK linked to the consumption of coated frozen chicken products.	The research findings informed consumer advice on safety tips for handling, storing and cooking frozen chicken products.
A Microbiological Survey of Minced Beef at Retail in Scotland (2021)	This survey was commissioned to provide a current data set on the prevalence of pathogenic bacteria and indicator organisms, and of AMR in minced beef to help us to better understand transmission through the meat supply chain and identify interventions for preventing foodborne illness attributed to these products. It also examined risk factors associated with these organisms	Findings will be used to underpin risk assessment on the contribution of the food chain to STEC infection in Scotland, the transmission of AMR, and provide a dataset to examine the relationships between indicator organisms and pathogens.
The risk of STEC (Shiga toxin-producing *Escherichia coli*) contamination in wild venison (2020)	The study addresses knowledge gaps to better understand the risk of STEC (Shiga toxin-producing *Escherichia coli*) contamination of wild venison, and where is in the production chain contamination is most likely to occur.	Findings used to support best practice guides for the wild venison sector as reported in The newsletter of The Association of Deer Management Groups (Winter/Spring 2021): 18786-Scope-Newsletter-A4-12pp-220221.pdf (deer-management.co.uk) A master's thesis was also funded through this work which sequenced the non-O157 STECs identified in the study.
Antimicrobial resistance (AMR) of *E. coli* in animals presented for slaughter in Scotland (annual, on-going)	The results from this annual surveillance initiative are not reported by FSS but are published as part of the wider Scottish One Health Antimicrobial Use and Antimicrobial Resistance (SONAAR) programme, and contributes to the UK action plan for containing and controlling antimicrobial resistance.	HPS Website - Scottish One Health Antimicrobial Use and Antimicrobial Resistance in 2019
Survey of antimicrobial resistance bacteria in chicken and pork (2018)	The results of a survey commissioned by Food Standards Scotland and Food Standards Agency to show the prevalence of antimicrobial resistant (AMR) bacteria in fresh pork mince, and fresh and frozen chicken.	Used to inform the UK Strategy on AMR and future research needs in Scotland.

Campylobacter: Estimating the healthcare cost of gastrointestinal infection in Scotland (2020)	This report assessed the direct healthcare costs associated with campylobacter infection in Scotland. The study explored the cost differences across age and deprivation (SIMD) category to identify key population groups with the highest financial burden from campylobacter. It has identified the groups where reductions in the incidence of campylobacter would potentially have the greatest impact on the costs incurred by the health service.	This report has produced an estimate for the direct costs of Campylobacteriosis on the NHS for Scotland. The findings will be used to evaluate the impact of interventions with consumers as part of the FSS Campylobacter reduction strategy.
Campylobacter: Estimating the burden of gastrointestinal infection in Scotland using data linkage (2020)	This study linked reported cases of laboratory confirmed campylobacter cases in Scotland with NHS records on hospitalisations and deaths during the 5-year period 2013-2017. Laboratory data was analysed based on factors of deprivation, hospitalisation, cancer, prescribing and mortality to determine the demographic characteristics of confirmed campylobacter cases. Additionally, rates of hospitalisation, mortality, and the incidence of complications and associated health problems across the Scottish population was determined.	Evidence generated by this study is being used to inform interventions with consumers as part of the FSS Campylobacter reduction strategy. The findings and plans for targeting interventions were presented to the FSS Board in May 2019.
Factors affecting variations in campylobacter disease rates in Scotland (2020)	This study was commissioned to understand why there are differences in disease incidence between more and less deprived populations, and to obtain an up to date picture of campylobacter infection in Scotland.	Evidence generated by this study is being used to inform interventions with consumers as part of the FSS Campylobacter reduction strategy.
Whole Genome Sequence Typing and Analysis of Non-O157 STEC (2020)	In order to improve our understanding of the importance of non-O157 STEC, FSS commissioned the Scottish *E. coli* O157/STEC Reference Laboratory (SERL) to undertake Whole Genome Sequencing on its historical collection of patient isolates to examine the genetic profile of organisms that have been implicated in illness in Scotland.	This data from this study will be used to support further research being undertaken by FSS and Public Health Scotland to compare the genetic profile of the non-O157 STECs in clinical cases in Scotland with the symptoms that have been reported by these patients. This will provide valuable insight into the severity of illness caused by non-O157 STEC strains, helping us move towards a more detailed, molecular approach for assessing the risks associated with STEC detection in food. The insights from this study on the different STEC strains which have been linked to human illness in Scotland were also used to inform appropriate risk management approaches that are required when strains with these characteristics are identified in food, as outlined in: Food Standards Scotland's risk management advice on the control of STEC in food production.
Review of UK official food and feed laboratory system (2019)	These publications summarise the findings of the first two phases of a review on official laboratories in the UK, conducted between September 2018 and March 2019. The reviews assessed the current capacity, capability and governance of the food and feed laboratory system in the UK. They also make recommendations for FSS and FSA on changes that would help to provide the capacity and capability needed to maintain the UK's high levels of food and feed safety standards when the UK leaves the EU and into the future.	Findings reported to the FSS Board in Nov 2019 to inform discussions on laboratory capacity and capability in Scotland.
Control of pathogens in cheeses made from unpasteurised milk (2018)	This review was undertaken to collate the scientific evidence on food safety controls which can be used to reduce the risks of food poisoning bacteria in the production of raw milk cheeses.	This report provides a useful resource for artisan producers and enforcement authorities on the most up to date evidence on microbiological safety risks associated with raw milk cheese production. This work

		enabled FSS to address a recommendation made in the Report of Investigations into the outbreak of *E. coli* O157 which occurred in Scotland in 2016. The findings of were used to inform the development of guidance which was developed by FSS in collaboration with the Scottish Food Enforcement Liaison Committee (SFELC) to support the safe production of unpasteurised cheeses: Guidance for Local Authorities on cheese made from unpasteurised milk
***E. coli* O157 Super-shedding in Cattle and Mitigation of Human Risk (2014-2018).**	This report is the culmination of a successful 4-year international research collaboration, which was commissioned to strengthen the evidence base on the prevalence of *E. coli* O157 in Great Britain, and improve our understanding of the phenomenon of 'supershedding' by cattle. The study also undertook a trial of a novel vaccine for reducing excretion by cattle as a means of mitigating transmission. The project was originally commissioned by the Food Standards Agency in Scotland to address Recommendation 24 of The Public Inquiry into the September 2005 Outbreak of E.coli O157 in South Wales: **The feasibility of identifying "supershedder" cattle on farms should be explored as a potential means of reducing the likelihood of spreading *E.coli* O157 to other cattle** FSS managed the project with a funding contribution from FSA. Scotland has some of highest levels of *E. coli* O157 and this research has shed some light on the possible reasons for this. It has produced valuable evidence that will support strategy in Scotland for reducing the risks of *E. coli* O157.	12 published peer reviewed publications 2 in progress. Methodologies for *E. coli* O157 research contained within the report. This programme supported the installation of a pipeline at the Scottish *E. coli* O157/STEC Reference Laboratory to facilitate routine *E. coli* O157 diagnostics and outbreak investigation in Scotland. 11 invitations to present research at home and internationally. This project led to 2 funded PhD studentships, 1 MSc project and 4 other projects (including projects funded by RESAS and Wellcome trust). Included in this work is research to investigate the prevalence of non-O157 Shiga-toxin producing *E. coli* and characterisation of antibiotic resistance in Enterobacteriaceae in beef cattle in GB. The evidence generated from this work will enhance our understanding of STEC and AMR in the environment and contribute to wider government strategy in these areas.
Review of Priority Chemical Contaminant Risks, Food Production and Consumer Diets in Scotland. (2018)	This project involved a review of scientific and grey literature to assess the key chemical contaminants risks which have the potential to impact on the Scottish food chain and makes recommendations on future work needed to address evidence gaps.	These findings are being used by FSS to refine the chemical contaminants component of its Strategy for Reducing Foodborne Illness in Scotland and allow more efficient targeting of our chemical contaminants research and messaging to protect consumers in Scotland.
Developing Scotland's Shellfish Water monitoring programme (2018)	The study examined the statistical model used to inform the risk assessment of the Scottish monitoring programme for marine biotoxins in shellfish from classified production areas and consider alternative statistical models.	Final report produced which identified the strengths of current approaches and opportunities for improvements to inform future discussions with Scotland's shellfish industry. Opportunities for integration of FSS and SEPA programmes and recommendations for Standard Operating Procedures (SOP) for sanitary surveys are also provided. Review of international shellfish research and the results of national-scale data analysis of shellfish *E. coli*

		provided the evidence-base for the recommendations. The recommendations made by this project and implications for future classification protocols are being considered by FSS, Scottish Government, SEPA and the shellfish industry as part of Scotland's aquaculture growth strategy.
Exploring improvements to models used in risk assessment of the Scottish monitoring programme for marine biotoxins in shellfish harvested from classified production areas. (2018)	The study examined the statistical model used to inform the risk assessment of the Scottish monitoring programme for marine biotoxins in shellfish from classified production areas and consider alternative statistical models.	This study was undertaken to evaluate the model used by FSS to design its biotoxin sampling programme and identify areas for improvement.
Campylobacter Attribution Extension (2015-2016)	This study was the last in a series of research projects that were commissioned by FSS to improve our understanding of the key sources which contribute to the burden of campylobacter infection in the Scottish population. It provides evidence that chicken continued to be the most important source of human infection, most likely through the consumption of undercooked chicken or through cross-contamination in the kitchen.	This report updates data published in FSS's earlier study **Employing source attribution and molecular epidemiology to measure the impact of interventions on human campylobacteriosis in Scotland (2012-2015)** The results contributed to the ACMSF's third report on Campylobacter which was published in 2019. The findings were used to underpin FSS's Campylobacter reduction strategy reported to the FSS Board in Aug 2017 and May 2019
Estimating Quality Adjusted Life Years and Willingness to Pay Values for Microbiological Foodborne Disease (Phase 2) (2017)	This project was commissioned by FSA, with support from FSS, to estimate the value of the pain and suffering associated with microbiological foodborne disease for the UK using both Quality Adjusted Life Year (QALY) and monetary Willingness to Pay metrics.	Will be used by FSS to construct a similar QALY model for Scotland to support parallel work FSS is funding with PHS to estimate the healthcare costs of foodborne illness in Scotland FSS is contributing to a further UK cross government research programme to assess the value of a Life Year. This work will support government departments and agencies to quantify and monetise risks to longevity (including foodborne disease) in the UK.
The capacity and pathogenic potential of bacteria that internalise into plant tissue (2017)	This study was funded by FSS and FSA to investigate the capacity and pathogenic potential of bacteria that can internalise into plant tissues. It concluded that current washing practices used in post-harvest production do not remove or inactivate any internalised bacteria and are ineffective at removing all external bacteria from plant surfaces. These conclusions reinforce the importance of Good Agricultural Practices, such as use of clean irrigation water.	Findings presented to ACMSF in May 2012 Also used to inform the development of FSS's Fresh produce tool for industry and advice on the washing of fresh produce Wright, Kathryn M., et al. (2017), 'Differences in internalization and growth of *Escherichia coli* O157:H7 within the apoplast of edible plants, spinach and lettuce, compared with the model species *Nicotiana benthamiana*', *Micro Biotech,* 10 (3), 555–69, 10.1111/1751-7915.12596. Wright, Kathryn M. and Holden, Nicola J. (2018), 'Quantification and colonisation dynamics of *Escherichia coli* O157:H7 inoculation of microgreens species and plant

		grow th substrates', *Int J Food Microbiol,* 273, 1-10, https://doi.org/10.1016/j.ijfoodmicro.2018.02.025. Merget, B., et al. (2020), 'Variability in grow th responses of non-O157 EHEC isolates in leafy vegetables, sprouted seeds and soil extracts occurs at the isolate level', *FEMS Microbiol Lett,* 367 (1), 10.1093/femsle/fnaa030.
Employing source attribution and molecular epidemiology to measure the impact of interventions on human campylobacteriosis in Scotland (2012-2015)	This study w as commissioned to improve our understanding of the sources of campylobacter infection in humans in the Scottish population.	The w ork has been cited in FSS and FSA/S board papers on *Campylobacter*. The results contributed to the ACMSF's third report on Campylobacter w hich w as published in 2019. 23 peer review ed publications. 6523 genomes have been deposited in the open online campylobacter database (PubMLST) Invited presentation at Food Standards Agency Review , Warw ick, March 2016 USDA w orkshop on Use of Whole Genome Sequencing (WGS) analysis to improve food safety and public health. Washington, USA, 2018. Work referenced in EFSA opinions on campylobacter Used in FSS Board papers in June 2015, March 2016 and Oct 2016. This w ork led to 4 funded PhD studentships and 7 other projects (including RERAD, BBSRC, DEFRA, MRC and RESAS)
Risk assessment of the Scottish programme for the marine biotoxins in shellfish harvested from classified production areas (2016)	The aim of this study w as to assess the Scottish inshore monitoring programme for biotoxins in shellfish from classified production areas in Scotland. FSS used findings from this study to refine the biotoxin monitoring scheme based on current data.	Follow up project w as commissioned to assess the robustness of the statistical model applied to undertake the risk assessment and identify improvements.
The fate of surrogate verocytotoxic *E. coli* contaminating the rhizospheres of root vegetables during processing and retail and w holesale distribution (2016)	This project w as commissioned to provide a better understanding of the survivability of *E. coli* at all stages along the vegetable production and distribution chain. The results w ill be used to inform future risk assessments and food safety advice in relation to fresh produce.	2 peer review ed publications: • Hutchison, M.L. et al (2017); Journal of Applied Microbiology • Monaghan, J.M., and Hutchison M.L. (2016); Letters in Applied Microbiology Findings w ere also used in the development and updating of FSS's Fresh Produce Tool.
Use of treatments to prevent the growth of pathogens on sprouted seeds (2016)	This project w as commissioned to investigate the effectiveness of soaking and w ashing treatments that could be used at home. The results from this project w ill be used by FSS to inform future risk assessments and food safety advice in relation to seeds for sprouting.	Findings use to inform guidance and tools. Sprouts and seeds intended for sprouting: question and answ er guidance | Food Standards Agency

		Fresh Produce Tool.
A Survey of Fish Authenticity in the Scottish Public Procurement Sector (2016)	This survey was commissioned by FSS as an investigation into the potential for fraudulent labelling of fish products supplied to Public Sector organisations in Scotland.	Used to inform FSS surveillance strategy and Tactical Assessment for Food Fraud.
Beef Origin Project II – Improvement of the British Beef Isotope Landscape Map (Isoscape) for Scotland and Northern Ireland (2016)	The project was commissioned to investigate whether information on the geographical origin of beef can be obtained through the analysis of its stable isotopic composition. The intention was to assess the potential of using this technology as scientific tool to support food fraud investigations by linking a sample of beef to the environment where the animal was grown/reared.	A web-tool was developed to enable confirmation of origin of UK beef, with some ability to analysed beef of Scottish origin. FSS used the data generated by this study to commission the development of an isotopic database for beef origin testing. This database is currently managed by the company Food Forensics on behalf of FSS and has been used to support investigations into mislabelling of Scottish beef.
Development of The Fresh Produce Tool (2015)	This project developed an online tool to help growers of fresh produce minimise the risks of microbiological contamination of their crop This tool will be completely updated in 2021 with a full re-write to reflect up to date evidence and regulations and launched on an updated platform.	This tool is being updated for re-release in 2021.
Development of The Safe Smoked Fish Tool (2015)	This project developed an onlinetool to support smoked fish producers in managing the risk of contamination of smoked fish *by Listeria monocytogenes*. This tool will be completely updated in 2021 with a full re-write to reflect up to date evidence and regulations and launched on an updated platform.	This tool is being updated for re-release in 2021.
Review of the currently available field methods for detection of marine biotoxins in shellfish flesh (2015)	This project was to review the status of currently available rapid, field testing methods for detection of marine biotoxins in flesh in shellfish.	Used to update FSS industry guidance documents on managing shellfish toxins and toxin end product testing. Used in Board paper in Oct 2016 2 peer reviewed publications

STRATEGIC OUTCOME 2 – CONSUMERS HAVE HEALTHIER DIETS

Project Title (Year)	Purpose	Outputs and translation into policy
Purchase and Consumption of Non-Dairy Alternative Products and Oat-Based Products (2021)	This report provides information on retail purchase and consumption in Scotland and GB between 2019 and 2020, using data from Kantar, covering popular oat-based products and non-dairy alternative drinks, cream alternatives and yoghurt alternatives to assess current purchase and consumption in Scotland.	This report will be used as a basis for further investigation and to inform updates to food consumption advice. The risk assessment team will use this information to inform a product survey to survey chemical risks from known potential contaminants in the most commonly-purchased and consumed products in these categories.
Consumption of meat alternatives and engagement with Veganuary (2021)	This report provides information on consumption of meat alternative products in Scotland between 2019 and 2020, using data from Kantar. The report also provides insights into engagement with Veganuary in 2020 and 2021 across GB.	This report will support further work on healthy sustainable diets, and adds to existing FSS data on monitoring trends in food consumption and dietary intake.
Healthier catering guides (2021)	These short guides for food businesses provide practical tips and advice on making changes to the food and drinks that businesses buy, prepare, promote and serve to make it healthier.	Promoted by Association for Nutrition on social media channels.
Exploring the impact of COVID-19 on food and drink retail purchasing patterns in Scotland (2021)	This report provides information on retail purchase of food and drink in Scotland between January and July 2020, compared with 2019, using data from Kantar. This data provides a baseline for monitoring the impact of COVID-19 on retail purchasing behaviours over longer term.	Data presented at the SG Science and Engineering Conference in 2021, and was used within the Scottish Obesity Alliance webinar 'How Covid-19 has impacted on achieving healthy weight in Scotland'. Data used to inform development of Covid-19 Situation Report. Data used to monitor changes in consumer behaviours as committed to in board paper in October 2020.
Pilot of Intake24 in the Scottish Health Survey (2020)	Intake24, an online dietary recall system designed to collect detailed dietary intake data, was piloted in the Scottish Health Survey (SHeS) in 2018. Following this pilot, Intake24 will be included within the 2021 Scottish Health Survey.	Data has undergone secondary analysis to further explore intakes of discretionary foods, red meat and other areas of dietary policy relevance. Data is used to monitor dietary intakes and compare with the dietary goals, as committed to in board paper in October 2020.
Vitamin D Omnibus Survey (2020)	This research provides an insight into consumer knowledge and understanding of vitamin D supplement advice in Scotland. The results of the poll informed development of the FSS digital marketing campaign on Vitamin D.	FSS Vitamin D campaign page

The Scottish Diet - It needs to change 2020 update	This report collates of diet and health statistics and provides an update to the on the Scottish Diet. It is used by policy makers, educators, stakeholders including the food industry, health professionals and consumers. The report highlights the ongoing challenge to improve the Scottish diet, including new sections exploring the out of home food environment. Data included is pre- COVID-19 pandemic, and therefore provides a baseline for further investigation regarding the impact on diet in Scotland.	Report was promoted on websites and social media, including by Health Protection Scotland.
The Out of Home Environment in Scotland (2019)	This report provides an overview of the OOH market, focussing on three key areas: delivery & takeaway, food "on the go" and children's OOH consumption. This informs advice and policy development to improve the Out of Home food environment.	Used in The Scottish Diet - It needs to change 2020 update Cited in briefings documents published by Obesity Action Scotland.
Monitoring retail purchase and price promotions in Scotland (2014 - 2018)	This report provides information on retail purchase and price promotions in Scotland between 2014 and 2018, using data from Kantar. It follows on from data last published by FSS in 2018. This data provides essential evidence to support SG policy development to restrict HFSS promotions and to inform dietary monitoring and progress towards the SDG.	Used in The Scottish Diet - It needs to change 2020 update. Cited in briefing documents published by Obesity Action Scotland. Data used to monitor changes in consumer behaviours, as committed to in FSS board paper October 2020.
Eatwell Guide Booklet (2019)	Eating well and having a healthy lifestyle can help us feel our best – and make a big difference to our long-term health. So why not make a change today? The Eatwell Guide shows the proportions in which different types of foods are needed to have a well-balanced and healthy diet. The proportions shown are representative of your food consumption over the period of a day or even a week, not necessarily each meal time.	Booklet for consumers.
Analysis of a Food Standards Scotland Public Consultation on Improving the Out of Home Food Environment in Scotland (2019)	Following the publication of the 'Scottish Government Diet and Healthy Weight Delivery Plan, FSS carried out a public consultation on 'Proposals to Improve the Out of Home Food Environment in Scotland.' The consultation, which ran for 14 weeks between November 2018 and February 2019, sought views on a range of measures to improve the Out of Home food environment in Scotland. A total of 131 responses were received to the consultation, with an equal split between individuals and organisations. Third sector and local government were the most common types of organisations responding, with small caterers and manufacturers least common.	Consultation responses are publically available (where permission has been given by respondents). https://consult.foodstandards.gov.scot/nutrition-science-and-policy/proposals-to-improve-the-out-of-home-environment-i/consultation/published_select_respondent The work of this report was used to inform the Recommendations for an Out of Home strategy for Scotland Board Paper Sept 2019
Qualitative Consumer Research on eating outside the home (2019)	Food Standards Scotland (FSS) commissioned research consortium to conduct qualitative research with consumers to explore their views on eating outside the home (OOH) and to provide an independent report of their findings. This research was commissioned to support the FSS public consultation on 'Proposals to improve the out of home food environment' which ran between November 2018 and February 2019.	The work of this report was used to inform the Recommendations for an Out of Home strategy for Scotland Board Paper Sept 2019
The out of home environment in Scotland 2015-2018 (2019)	Food Standards Scotland (FSS) commissioned Kantar Worldpanel to provide data on the Out of Home (OOH) food and drink landscape in	The work of this report was used to inform the Recommendations for an Out of Home

	Scotland between June 2015 and 2018. This report provides evidence on how this environment has changed over time, including the types of businesses visited and the most popular foods and drinks purchased OOH.	strategy for Scotland Board Paper Sept 2019
Scoping the need for dietary guidelines for Scotland to support the population on their journey towards a healthier diet (2019)	These reports establish that there is support for Dietary Guidelines in Scotland to provide advice in addition to the foods and proportions recommended for a healthy, balanced diet as shown in the Eatwell Guide. This research involved engagement with a wide range of stakeholders and consumers.	Used as evidence for the next phase of work to develop dietary guidance for Scotland which will include developing and testing an online resource.
Briefing paper on Discretionary foods. (2018)	The aim of this briefing paper prepared by the FSS Nutrition Science and Policy team is to provide more up to date and detailed information to support the FSS position on discretionary foods and provide an comprehensive evidence base for actions to reduce current intakes	Paper used as evidence by Scottish Government in its Health Harms of Foods and in the FSS out of home consultation. The paper has also been used by other interested parties including CRUK
Latest estimation of food and nutrient intakes in Scotland (2013-2016)	The study update's annual trends in food consumption and nutrient intakes using the same robust secondary analysis methodology previously developed to convert purchase to consumption.	The Scottish Diet - It needs to change 2018 Part of rolling 3 year program to monitor Scottish food and Drink consumption Progress towards the SDG
The Scottish Diet - It needs to change 2018 update	The situation report collates current evidence on diet and health statistics using info-graphics to provide information for policy makers, stakeholders including the food and drink industry, health professionals and consumers to and shows how far we are from meeting the current Scottish Dietary Goals.	Evidence used to contribute figures to the SG A healthier Future consultation Progress towards the SDG
Monitoring retail purchase and price promotions in Scotland (2010 - 2016)	This report provides information on retail purchase and price promotions in Scotland between 2010 and 2016, using data from Kantar Worldpanel.	The data from this report was used to update The Scottish Diet It Needs to Change in 2018
Availability of nutritional information for a sample of out-of-home food outlets in Scotland. (2018)	This report provides evidence on the availability of online nutrition and portion size information for savoury meals and meal accompaniments from 86 branded out of home businesses in Scotland.	Report used as evidence in FSS out of home consultation in 2018
Marketing strategies used within premises by out of home businesses (2018)	This report provides evidence on marketing strategies used within premises of a small sample of branded out of home businesses in Scotland.	Report used as evidence in FSS out of home consultation in 2018
An Evaluation of a Pilot on the Use of MenuCal within Small and Medium Scottish Food Businesses (2018)	This report provides an evaluation of a pilot of MenuCal conducted in partnership with the Scottish Enforcement Liaison Committee (SFELC) Diet, Nutrition and Health Working Group. The pilot identified a number of areas of improvement for the MenuCal tool, which FSS will take forward.	MenuCal can be accessed by businesses on the FSS website.
A review of the evidence base for modelling the costs of overweight, obesity and diet-related illness (2017)	The report provides a review of the evidence base for modelling the costs of overweight, obesity and diet-related illness for Scotland, and critical appraisal of the cost-effectiveness evidence base for population wide interventions to reduce overweight, obesity and diet-related illness.	The work was presented to the internal SG Scottish Food and Drink Evidence, Evaluation Collaborative to inform consideration of future Economic assessments on Obesity for Scotland.
Stochastic modelling to estimate the potential impact of fortification of flour with folic acid in the UK. (2017)	Dietary modelling was carried out to find out the most effective way of adding folic acid to flour for the purpose of reducing Neural Tube Defects (NTDs) such as Spina Bifida in the unborn child.	Used as evidence to seek a Scientific Advisory Committee on Nutrition (SACN) - update on Folic Acid. An FSS Board paper on folic acid was discussed in August 2017 and to provide advice to Scottish Ministers.

Field testing of the use of INTAKE24 in a sample of young people and adults living in Scotland* (2016)	INTAKE24 is an open-source self-completed computerised dietary recall system based on multiple-pass 24-hour recall. The online system offers similar data quality to interviewer-led recalls at a significantly lower cost.	2 peer reviewed publications Public Health England (PHE) and the National Diet and Nutrition Survey (NDNS) Board and consortium have decided to move forward with INTAKE24 as the dietary tool for the NDNS from 2019. Next phase of INTAKE24 is a trial within the Scottish Health Survey (SHS)
Monitoring foods and drinks purchased into the home in Scotland (2016)	This report provides up-to-date data on trends and patterns in the purchase and promotion of foods and drinks from 2010-2015 which can inform action to improve the diet and purchasing habits in Scotland.	Data was used to update the monitoring of the Scottish Dietary Goals. Used in Board papers in Dec 2016 and March 2017
The Scottish Diet: It needs to change (2015)	The report brings together current evidence on diet and health statistics using info-graphics to provide information for policy makers, stakeholders (including the food and drink industry), health professionals and consumers to and shows how far we are from meeting the current Scottish Dietary Goals.	Used to update the SG Obesity Monitoring indicators for dietary goals Used in Board papers in Jan 2016, Oct 2016, and Mar 2017. Updated in January 2018
Attitudes to Diet and Health in Scotland 2015 (2015)	This survey complements our on-going dietary monitoring and surveillance work by providing information on the consumer understanding of a healthy diet, and why it is difficult to change.	Used for The Scottish Diet: It needs to change Questions incorporated and used to provide the evidence for consumer questions on diet and health from wave 2 onwards in the FSS Food in Scotland Consumer Tracking Survey Used in Board papers in June and Oct 2016.
Monitoring progress towards the Scottish Dietary Goals 2001 to 2012 - Report 2* (2015)	This report provides SG with progress towards meeting the Scottish dietary goals (SDG). Using Living Costs and Food Survey data it reports which foods and drinks are the main contributors to intakes of energy, fat, saturated fat, added sugars and fibre in the Scottish diet from 2001-2012.	Used for The Scottish Diet: It needs to change Part of rolling program to monitor Scottish food and Drink consumption and Progress towards the SDG Used in Board papers in Dec 2015, Jan 2016 and Oct 2016 1 peer reviewed publication
Food and drink purchasing by secondary school pupils - Beyond the school gate (2015)	The Scottish Government (SG) guidance document- Beyond the school gate informs the food environment outside of school. This study was used to confirm the appropriateness of SG continuing to implement this guidance.	The Scottish Government (SG) guidance document- Beyond the school gate 3 peer reviewed publications

STRATEGIC OUTCOME 5 – FSS IS TRUSTED AND INFLUENTIAL

CONSUMER RESEARCH AND CAMPAIGNS

CONSUMER TRACKERS AND FORUMS

FSS is a trusted organisation /FSS is efficient and effective	Purpose	Outputs and translation into policy
Food in Scotland consumer tracking Surveys (publication dates): Wave 11 (June 2021) Wave 10 (October 2020) Wave 9 (June 2020) Wave 8 (November 2019) Wave 7 (October 2019) Wave 6 (June 2018) Wave 5 (May 2018) Wave 4 (October 2017) Wave 3 (September 2017) Wave 2 (July 2017) Wave 1 (May 2016)	This on-going survey measures changes in Scotland's attitudes, behaviours and knowledge in relation to food over time. The survey is undertaken biannually and comprises a set of consistent questions at each wave, with modules focusing on food safety and authenticity, and diet and nutrition, running annually.	Used as evidence for the FSS board six monthly outcomes tracker, FSS campaigns and media lines
Covid-19 Consumer Trackers (2020/21) Wave 1 (June 2020) Wave 2 (July 2020) Wave 3 (August 2020) Wave 4 (October 2020) Wave 5 (December 2020) Wave 6 (February 2021)	FSS has undertaken this consumer study to monitor attitudes, knowledge and reported behaviours relating to food specifically during the Covid-19 period. The survey draws from a representative sample of Scotland's population and is being done in conjunction with the FSA who are covering the rest of the UK with the same questions.	Used as evidence to assess changes in diet and food safety behaviours during the COVID-19 pandemic

Wave 7 (May 2021)		
COVID-19 Handwashing Trackers Wave 1 (August 2020) Wave 2 (November 2020)	Survey to track handwashing attitudes and behaviours during the COVID-19 pandemic and afterwards.	News article reminding public of important of handwashing. Used as evidence to assess changes in hygiene behaviours during 2020.
Food allergies survey results (2020)	The results of a survey we conducted in partnership with Young Scot to understand the experiences and opinions of young people in Scotland relating to food allergies.	Used to support FSS Strategy on allergies and hypersensitivity
BREXIT consumer forums (2017)	Collected Scottish consumer views on BREXIT via qualitative citizen forum	Used in Board paper in Mar 2017.
Consumers Forums to collect views on the FSS Strategic plan (2015)	In January 2016 consumers views were collected via qualitative citizen forums on the draft FSS strategy and strategic plan	Used in Board papers in Jan and June 2016.

CAMPAIGNS

Campaign Title	Purpose	Promotion and Evaluation
Festive food safety campaign: *Aunty May's Christmas Kitchen* (2020)	Festive food safety campaign development, media and marketing costs.	Social media and website material for consumers. Reference to Christmas food safety checklist and turkey cooking guide.
Food Safety Campaign: What's your kitchen crime? (2018 and 19)	A food safety social marketing campaign aimed at shaking consumers out of complacency in regard to the potential for getting or giving food poisoning from poor food safety practices in the home. The campaign reframes the 4Cs in a more consumer-friendly and understandable way, and highlights 20 common 'kitchen crimes' which could potentially lead to food poisoning.	Integrated consumer marketing campaign Pre and post campaign evaluation using questions based on behavioural models to assess motivation to change alongside claimed action
Summer BBQ food safety campaign: *Nothing spoils summer like pink chicken** **(2016, 17 and 18)**	Pink chicken marketing campaign developed and run to encourage ABC1 18-24yo males (predominantly) to barbecue chicken thoroughly to avoid campylobacter poisoning.	Evaluation of campaign Re-run of Summer BBQ campaign* in 2017 and evaluation
Festive food safety campaign: *Don't let food poisoning spoil Christmas** **(2015, 2016 and 2017)**	Festive food safety campaign development, media and marketing costs.	Media and website material for consumers. Used in Board paper in Sept 2015. Evaluation of pre and post campaign
Look at the label Campaign (2015)	The #lookatthelabel marketing campaign encourages people in Scotland to make safer, healthier and more informed choices when buying food and drink. It aims to increase understanding of the importance of 'use by' dates, colour-coded nutrition labelling, storage advice and allergens information.	Integrated consumer marketing campaign Pre and post campaign evaluation. Case study
Vitamin D campaign (2021)	Digital marketing campaign aimed at increasing awareness of current advice to encourage consumers in Scotland to take vitamin D supplements during winter months.	Campaign was promoted on Social media, including by official SG accounts and various local authority accounts in Scotland.

		Campaign creatives and evaluation will form the basis and inform development of new Vitamin D campaign in late 2021.
Healthy Eating Campaign Toolkit #NoToUpsizing (2019)	Campaign from 5th - 31st March 2019. FSS encouraged improved eating behaviours when out and about, by empowering the people of Scotland to say no thanks to offers of upsizing.	Campaign support material for supporters.
Healthy eating campaign*: It's time to say no to upsizing* (2018)	Social marketing (behaviour change) campaign targeting 16-34 yo C1C2DE female consumers who are most frequently upsold to when eating out of home. The campaign aimed to raise consciousness of the issue of upsizing, and to empower consumers to say no more often and was based on qualitative insight undertaken amongst the target audience, alongside quantitative evidence form the tracking survey.	Consumer focussed media and guidance. Independent pre and post campaign evaluation using questions based on behavioural models to assess motivation to change alongside claimed action to provide evidence for future campaigns and interventions.
Healthy eating campaign evaluation : Let's change our future (2016)	Social marketing (behaviour change) campaign to persuade parents not to treat their children with HFSS foods- Drop it, Swap it, Share it. Campaign based on qualitative insight and tracking survey.	Nominated and shortlisted for Civil service 2017 Communications Team and Marketing Society Scotland award for effectiveness. Independent pre- and post- quantitative campaign evaluation provided evidence for future behaviour change work.