PATH-SAFE Newsletter March 2024

Welcome to the Pathogen Surveillance in Agriculture, Food and the Environment (PATH-SAFE) programme newsletter for March 2024

PATH-SAFE is a Shared Outcomes Fund (SOF) research programme which aims to pilot a national surveillance programme for foodborne diseases and antimicrobial resistance. PATH-SAFE is a pilot a national surveillance programme for foodborne diseases and antimicrobial resistance.

This newsletter at a glance:

- News and key updates
- Spotlight – PATH-SAFE Biosurveillance conference
- Workstream updates
- Meet the team

News and key updates

Continuation of PATH-SAFE

We are thrilled to share the wonderful news that HMT have approved funding for the 24/25 PATH-SAFE continuation, following submission of our bid to the Shared Outcomes Fund (SOF) continuation funding call in January 2024. We are now working hard to finalise the documentation required to confirm the funding, in line with the deadlines and funding conditions set out by HMT.

The continuation bid focuses on building on what has been achieved so far, taking the pilot approach towards ‘real-world’ deployment, and thus enabling the delivery of improved outcomes and ultimately the intended impacts. This will be achieved by not only taking forward the tools and knowledge delivered so far, but also utilising the strong collaboration established across the partnership and through maintaining our interdisciplinary, One Health approach and working across all four nations.

Continuation will see the delivery structure of the programme shift slightly, taking on a more thematic structure to reflect the evolution and development of the work.

PATH-SAFE Biosurveillance Conference

At the end of February, the PATH-SAFE team hosted a two-day conference which brought together over 200 people working in biosurveillance across government, industry and academia. Read more about the conference in our spotlight feature section.

Evaluation

Synthesis and write up is underway for the draft final evaluation report, which will include the final process and outcome evaluation. This will shortly be followed by the addition of the impact feasibility assessment in April/May. The evaluation will then continue in line with the continuation.

British Science Week

Our Delivery Partners will be showcasing the work they have been undertaken as part of PATH-SAFE; keep an eye on their socials including @vmdgovuk on X (formerly Twitter)

Spotlight: PATH-SAFE Biosurveillance Conference

On Wednesday 28 and Thursday 29 February 2024, we hosted a two-day PATH-SAFE Biosurveillance Conference in London. The aim of the conference was to facilitate knowledge exchange within the biosurveillance community, by showcasing the biosurveillance work that has been undertaken within the PATH-SAFE programme and other initiatives, whilst also creating an opportunity for people to connect and expand their professional networks.

The event brought together over 140 attendees, plus an additional 70 online, working in biosurveillance across government, industry, and academia. There was a packed agenda, with more than 25 speakers taking to the stage over the two days. There was a fantastic buzz of energy and conversation in the room on both days, and we have already received very positive feedback in relation to the conference, and the PATH-SAFE programme more widely:

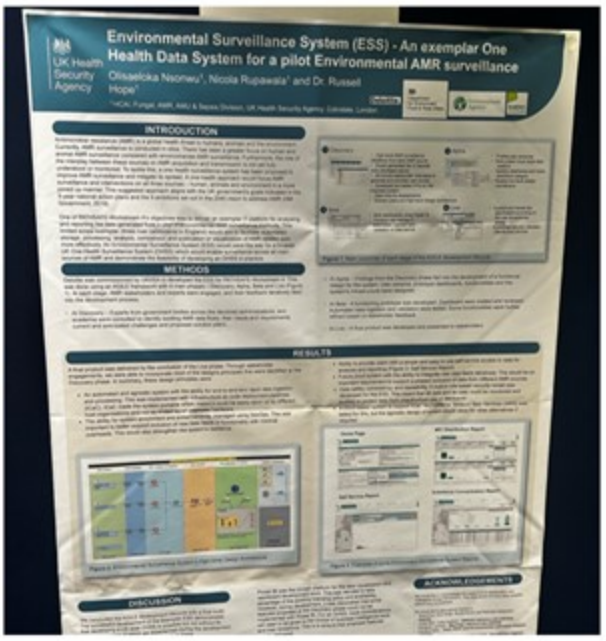
“So impressive to see what the programme has brokered between all the departments and researchers. PATH-SAFE is the lynchpin making this all work, otherwise people would largely be back in their silos or not doing the work at all.”

“PATH-SAFE is an excellent program, great outcomes generated so far and looking forward to seeing what this next year brings.”

“It was great to have the chance to see results of the whole programme and interact with researchers from the different workstreams.”

“It was wonderful to see all the PATH-SAFE projects together in one place - it really struck me as a substantial body of work!”

We would like to say a huge thank you to everyone who attended, in person and online, over the two days. For those that couldn’t attend, posters and recordings of the sessions will be made available via the PATH-SAFE conference webpage.



Day One

Following an introductory PATH-SAFE overview, project teams presented their PATH-SAFE data system development and knowledge gap-addressing projects.?The final session provided information on biosurveillance programmes, strategies and initiatives from across government:

Session 1: Developing Biosurveillance Data Systems

Presentations from the PATH-SAFE teams developing systems to integrate, interrogate and contextualise genomic and surveillance data from a range of sources:

- University of Oxford
- UK Health Security Agency (UKHSA)

Session 2: Addressing Biosurveillance Knowledge Gaps

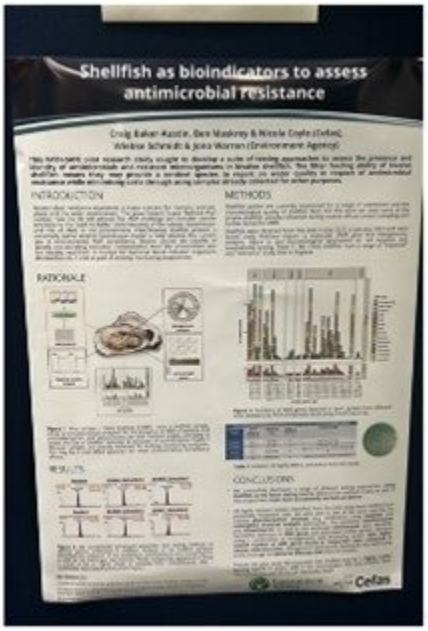
Overviews of the PATH-SAFE AMR surveillance projects undertaken to fill existing knowledge gaps including surveys of AMR in sheep, cattle and animal feed, with presentations from:

- The Veterinary Medicines Directorate (VMD)
- The Animal and Plant Health Agency (APHA)
- Scotland's Rural College (SRUC)

Session 3: Biosurveillance landscape

Biosurveillance programmes, strategies and initiatives overviews from teams across Government, including:

- UK AMR National Action Plan
- Genomics for Animal and Plant Diseases Centre 2 (GAP-DC2)?
- The third Infectious Intestinal Disease study (IID3)
- UKRI Tackling Infections Strategic Theme



Day Two

The second day of the conference focused on how PATH-SAFE projects have been enhancing existing biosurveillance activities and developing novel methods. The day concluded with a look at reflections and lessons learned during the programme to date.

Session 4: Enhancing Existing Biosurveillance

PATH-SAFE projects that have built upon existing biosurveillance sampling programmes, including projects led by:

- Food Standards Scotland (FSS)
- Animal and Plant Health Agency (APHA)

- Oxford University
- Agri-Food and Biosciences Institute (AFBI)

Session 5: Exploring Novel Biosurveillance Methods

PATH-SAFE projects that have developed and piloted novel methods for foodborne disease pathogen and AMR surveillance, including presentations from:

- Centre for Environment, Fisheries and Aquaculture Science (Cefas)
- Environment Agency
- Bangor University
- Queen's University Belfast (QUB)
- Fera Science Ltd.

Session 6: PATH-SAFE Reflections and Lessons Learnt

The PATH-SAFE coordination and evaluation teams provided an overview of the programme Process and Output Evaluations and reflected on lessons learnt.

Workstream (WS) Updates

As we enter the final month of the first phase of PATH-SAFE, and prepare to start the continuation phase next month, great progress continues to be made across the programme. Below are some brief updates but for more detail on each workstream's progress and findings to date,?please see the posters and recordings that have been uploaded to our conference webpage.

WS1 - National foodborne disease genomic data platform?

WS1a Update: User testing sessions were successful completed in January. Feedback continued to be collected and training materials continued to be developed across February. Engagement with local data governance personnel as well as senior stakeholders continues as part of data integration efforts.

WS1b Update: Whole genome sequencing (WGS) of the final isolates from the clinical sampling work package has now completed. WGS of isolates from animal hosts, shellfish, food, water and is complete. Analysis is underway, with the final project report to be delivered in March 2024.

WS2 – New surveillance approaches?

WS2a Update: Following two very successful Taw/Torridge sampling periods (Jan-Mar 2023 and Jun-Aug 2023), more than 2800 isolates recovered of which more than 1200 isolates have been

selected and sequenced. Sample analysis completed and journal article submitted to Water Research for ‘Norovirus quantification in UKHSA COVID-19 archived wastewater samples’ project.

Sequences from ‘Salmonella in Scottish wastewater’ project uploaded to NCBI and being run through Scottish Salmonella Reference Lab bioinformatic pipelines.

Welsh pilot sample collection now complete, analysis ongoing, manuscripts being drafted and metagenome sequences to be submitted to ENA. Contract signed with Autonomous University of Barcelona (UAB) to undertake microbial source tracking using machine learning techniques, and pathogen detection/microbial profiling using 16S techniques.

Northern Ireland historical Listeria isolates received and being processed for sequencing. Successful stakeholder workshop held in London on 31st January, entitled 'Foodborne Disease Risk in water networks', a summary of the workshop is being written for publication.

WS2b Update:? Within the raw meat E. coli isolates project, all analysis complete and report writing underway. Sample collection has successfully concluded for the sheep survey, bulk milk project and animal feed project (raw ingredients and finished feed); bacteriology results follow expected trends, whole genome sequencing complete, analysis and report writing ongoing. GB cattle survey phase 1 sampling complete, additional phase sampling undertaken in February, with one final run of sample collections scheduled in March. Repeat on-site visits successfully undertaken at sheep and pig abattoirs for abattoir environment and wastewater AMR surveillance pilot.

WS2c Update: Air and wastewater sampling have progressed well at nursing home and control site, with high throughput culturing of both sample types undertaken and minimum inhibitory concentration determined for 16 antibiotics. Sample collection winding down to ensure end of March milestones met. Solubilities of the individual antibiotics and antifungals were determined, and mass spectrometry controls and standards prepared. Qualitative questionnaire aspect of the project, reaching final stages. Analysis of shotgun metagenomic data from wastewater and air samples being finalised and whole genome sequencing underway for pure culture isolates showing antibiotic resistance.

WS2d Update: Whole genome sequencing of final human disease and agri-food isolates is in progress. By mid-February, sequence data were around 88% complete. Data continues to be made available on PubMLST as it is reviewed and analysis continues.

WS2e Update: Phase 1 (WS2e): Sequencing Project Complete 31/03/2023 –100 historical salmonella isolates (culture, extraction, and sequencing), and uploaded the sequences to Enterobase.? PATH-SAFE has been noted in comment field on uploaded sequences in Enterobase to allow identification.???

Phase 2:? (WS2e.1): Bioinformatic analysis of sequences ongoing, data visualisation and report writing to be finalised by end of March 2024.?

(WS2e.2): Sequencing Project Complete 07/12/2023 - A further 200 historical isolates, 152 salmonella and 48 listeria, have been processed (culture, extraction and sequencing); Salmonella sequences uploaded to Enterobase (with PATH-SAFE_23_24 noted in the comment field) and Listeria sequencing uploaded to SRA (Study noted as PATH-SAFE 2023/24, BioProject PRJNA1049374).?

WS3 – Rapid, in-field diagnostic technologies?

WS3a Update: Following a number of very successful training sessions conducted at Fera Sciences, in-field testing has successfully been undertaken by end users in both scenarios; Port

Health Authority staff tested multiple sesame seed shipments for Salmonella and both an agronomist and a farmer testing irrigation water for the presence of E. coli. Feedback questionnaires have been developed and shared with end users who piloted the selected technologies. Final report writing underway.

WS3b Update: ? Project Complete 31/03/2023 - 20/30 Labs completed the proof of concept and optimisation work on utilising?LAMP on 7 target pathogen - Salmonella spp, Listeria monocytogenes, Norovirus, adenovirus, astrovirus, rotavirus and sapovirus.?

WS4 - Environment AMR surveillance system pilot?

WS4 Update: Final reports from the projects?continue to come in. See the Outputs section of the website for reports published to date.??

Meet the team!

Each quarter we will spotlight people working across the programme. In this issue we are focussing on colleagues from Queen's University, Belfast who are working on WS2c.

Professor John McGrath is a microbiologist with over 20 years research experience in environmental microbiology. Much of his research effort has been devoted to waste treatment systems, to understand how microbial communities can be managed to remove and recycle value added products from waste, enhance agricultural productivity, make renewable energy sustainable, and improve human health. In the latter context Professor McGrath currently leads both the Northern Ireland SARS-CoV-2 wastewater monitoring programme and the region's PATH-SAFE project.

Professor McGrath is also the founder and a Director of the Irish Nutrient Sustainability Platform, a member of the European Sustainable Phosphorus Platform, and was the UK's Foreign and Commonwealth Office representative on the United States National Science Foundation's Sustainable Phosphorus Research Coordination Network. He is also an Editor of mSystems and sits on Northern Ireland's Lough Neagh Scientific Advisory Committee.

Dr Deirdre Gilpin is a microbiologist working in the School of Pharmacy, Queen's University, with extensive experience in chronic respiratory infection, particularly Cystic Fibrosis. She has worked on several international collaborations investigating the characterisation of bacteria isolated from CF patients using both next generation sequencing, shotgun metagenomics and traditional culture based and phenotypic analysis.? She has interest in the domestic microbiome and how that affects clinical outcomes.

During COVID, she established an NHS Lantern lab, which used LAMP for asymptomatic COVID testing in healthcare workers and students and staff in SEND schools. More recently, she has been involved as CoPI on the Northern Ireland Wastewater Surveillance project, which monitors wastewater water across NI and at near source sites, for a range of pathogens and other biomarkers of clinical significance.?

Dr. Andrew Lee is a Senior Research Fellow within the QUB Wastewater Epidemiology Research group with more than 13 years' research experience in the field of molecular microbiology. He is involved with both Northern Irelands wastewater monitoring programme for SARS-CoV-2 and presently its PATH-SAFE workstream 2c project, which seeks to investigate how culture dependent and independent sampling of air, surfaces and wastewater can help track foodborne pathogens and AMR within the care home setting. He gained his PhD in environmental microbiology from QUB studying the bioremediation potential of extremely halophilic microorganisms.

Prior to the pandemic he was involved with numerous projects that focused on molecular analysis of the gut, lung, and skin microbiomes, helping develop molecular metagenomic methods to aid understanding of AMR and the importance of antibiotic stewardship.

For further information

For any questions or feedback please contact the team at pathsafe@food.gov.uk.

Sign up to the SERD newsletter which contains PATH-SAFE news and link to our full newsletter.