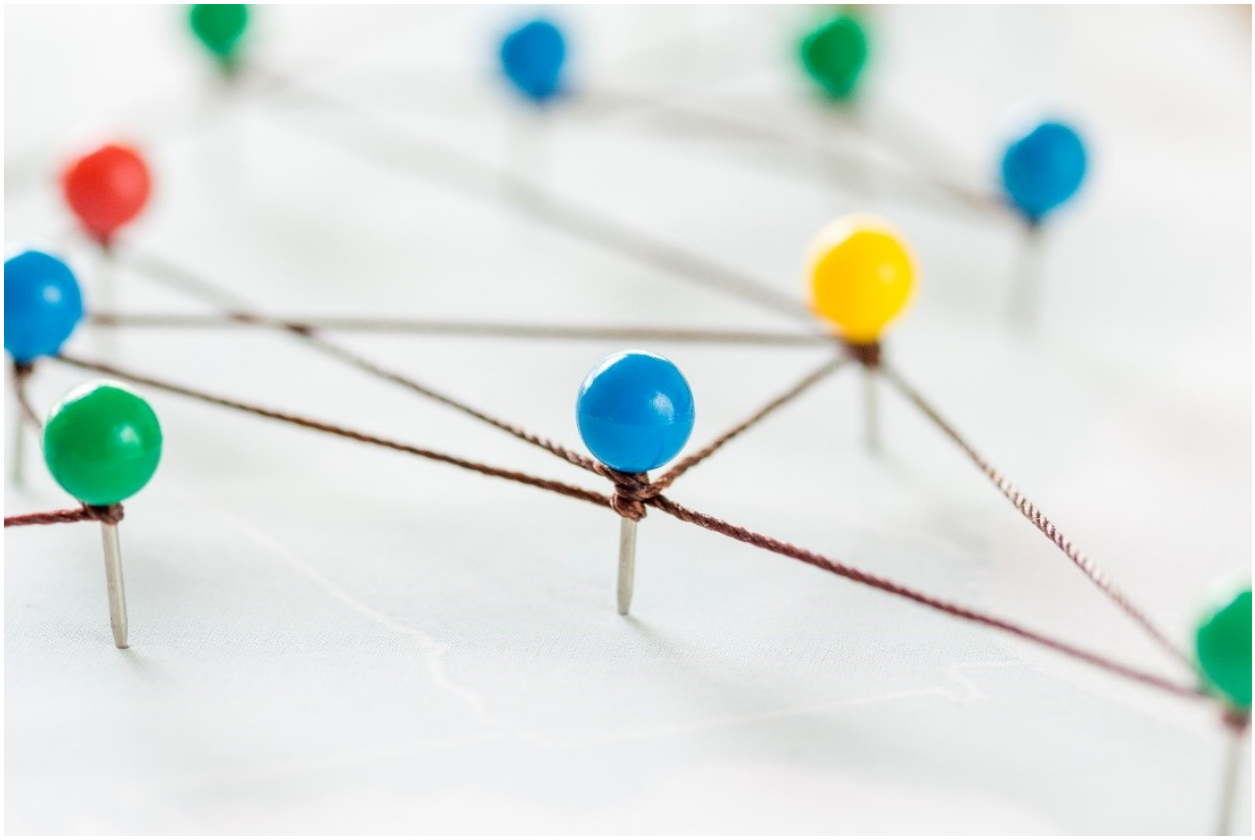
PATH-SAFE – connecting and collaborating to enhance surveillance capabilities across the UK



Foodborne disease (FBD) is a major public health risk with 2.4 million individual illnesses and more than 16,000 hospitalisations per year. Most of this disease in the UK is caused by a handful of pathogens which enter the food chain from farmed animals or the environment. In addition to FBD, the agri-food supply chain also poses a risk for the transmission of antimicrobial resistance (AMR) through food, animals, humans, and water. Government departments already undertake surveillance activities by analysing samples from food, livestock, and humans. Recent advances in diagnostic technology and data management offer the opportunity to create a step change in surveillance, to protect public health.

The Pathogen Surveillance in Agriculture, Food and Environment (PATH-SAFE) programme is a £19.2m Shared Outcomes Fund (SOF) research programme, which aims to develop a national surveillance network, using the latest DNA-sequencing technology and environmental sampling, to improve the detection and tracking of foodborne human pathogens and AMR through the whole agri-food system from farm-to-fork. At the heart of this network, a new data platform will be established, and this will allow for the analysis and sharing of pathogen sequence and source data, collected from multiple locations across the UK by government departments and public

organisations. This single system will enable rapid identification and tracking of FBD and AMR. This will improve public health and minimise the economic and environmental impact of outbreaks.

The programme is made up of four core workstreams (WS), within which over 30 projects are underway:

1. WS1 focusses on the development of a national foodborne disease genomic data platform.
2. WS2 focusses on new surveillance approaches for major FBD and associated AMR in agri-food settings.
3. WS3 focusses on rapid, in-field diagnostic technologies.
4. WS4 focusses on AMR in the environment.

Connecting people

Whilst the key aim of our programme is to pilot a better national surveillance system for the monitoring and tracking of FBD and AMR, the programme also focusses on collaboration, shared outcomes and developing connections across communities. The programme, led by the FSA (Food Standards Agency), brings together a collaboration of over 40 partners in delivery and advisory capacities. Collaborations and forming ongoing connections are a daily part of PATH-SAFE work. The programme has grown rapidly, and it is vital that we not only keep stakeholders informed, but also create spaces for technical discussions, sharing of best practice and lessons learned. One avenue we have pursued to support the sharing of knowledge, across the broad landscape of our collaboration, is the development of **Communities of Interest**.

What is a Community of Interest?

Communities of Interests (CoI) can be defined as networks of people who share the same interests, knowledge, and understanding of best practices. The peer-to-peer interaction of a CoI builds trusted connections and lends itself to many knowledge-sharing opportunities. These communities have the autonomy to define their focus areas, size, method/frequency of communication, objectives, and rules for engagement.

Characteristics of Communities of Interest:

- **Domain**:?Community members have a shared domain of interest, competence, and commitment that distinguishes them from others.
- **Community**:?Members pursue this interest through discussions, problem-solving opportunities, information sharing and relationship building, enabling collective learning.
- **Application**:?Community members build a shared repertoire of resources and ideas. While the domain provides the general area of interest, the application of the interest is the specific focus around which the community develops, shares, and maintains its core of collective knowledge.

How have PATH-SAFE used this concept?

Having identified the need to cultivate a space for technical discussion, the PATH-SAFE CoI's have been designed to bring together collaborators who not only deliver within their own workstream, but also have considerable knowledge to share across the programme. Feedback from the programme partners when scoping the potential of CoIs has been incredibly positive ("This looks like a good idea - thanks - and happy to be involved," "This is a great idea and keen to be involved" and "a great initiative" so there was clear support for the approach. We have identified several "golden threads" of complementarity running through the programme that would benefit from dedicated CoIs:

- Wastewater for FBD and AMR Surveillance (WaFAS)
- Bioinformatics and analysis
- Lab work
- River catchments
- Data interpretation
- Stakeholder/Policy/Public Health utility

We are working through the suggested list, identifying synergies to make the best use of each community.

The **WaFAS CoI** has been established with representation from FSS (Food Standards Scotland), FSA, Cefas (Centre for Environment Fisheries and Aquaculture Science), UKHSA (UK Health Security Agency), EA (Environment Agency), APHA (Animal and Plant Health Agency), VMD (Veterinary Medicines Directorate), Defra (Department for Environment, Food & Rural Affairs), Queens University Belfast and Bangor University. The community, meeting bi-monthly, had its inaugural meeting in October 2022. At this meeting, the technical leads presented their work to date, agreed the scope and terms of reference, and planned for next steps to take the CoI forward. Subsequently, the community has come together to discuss things like assay development, isolate numbers per sample taken, isolate diversity per sample, strain replacement and data access. Community members have openly shared their expertise to help troubleshoot issues, provide advice, and offer opportunities to increase awareness of the work undertaken across the programme, as well as across wider government.

The next CoI to be established this Spring will be the **Bioinformatics and Analysis CoI**. The CoI will open in March with a presentation from Dr Adriana Vallejo-Trujillo, titled “Understanding source attribution, infection threat and level of AMR of E. coli in Scotland using whole genome sequencing.” Dr Vallejo-Trujillo is a post-doctoral research fellow (bioinformatician) for the PATH-SAFE Scottish pilot project and the Roslin Institute. She has undertaken the curation and genomic analyses of the whole genome sequence data produced throughout the project. The analyses included the phylogeny analyses, genetic characterisation analyses, and production of host attribution models using Machine Learning. Current analysis includes more than 1700 E. coli genomes collected from different animal hosts (livestock, poultry, dogs, and deer), as well as humans. The next aim of the project is to complete the same analyses for around 3500 genomes including other sources such as wastewater, shellfish, and food products. Once completed, this information will represent the biggest and most comprehensive collection of E. coli genomes using a One Health approach in Scotland and the UK.

Monitoring impact

As part of the PATH-SAFE Monitoring and Evaluation plan the programme will be recording indicators of success not only with regards to the innovation in science but also in terms of cross government alignment, stakeholder engagement and collaboration. The delivery of the CoIs going forward will be a key indicator of success for collaboration, whilst also supporting key indicators in terms of science innovation by providing a space for collaborators to come together and use their collective knowledge to resolve issues.

Forward look

PATH-SAFE is designed to deliver innovation whilst build on existing initiatives, priming capabilities, and supporting communities to collaborate effectively. The programme continues to look for ways to ensure our collaborators feel connected across the programme, cultivating a lasting sense of community that can continue far beyond the lifetime of the programme.

To find out more about the PATH-SAFE Programme please visit our website or contact us on path-safe@food.gov.uk.