

PATH-SAFE programme National foodborne disease genomic data platform

At the heart of PATH-SAFE programme is the Genomic Data Platform, a user-friendly platform for the analysis and visualisation of bacterial genomes and associated metadata.

Overview

The UK is recognised global leader in genomic database systems. We are utilising this existing expertise, working with academic colleagues and major 'big data' stakeholders, to create a user-friendly platform for the rapid interrogation and contextualisation of genomic data.

While the rapid detection, identification and tracking of pathogens has always been fundamental to public health, it is only in recent years, with advances in DNA-based methods, that we now have the means to do this. As noted in the UK National Data Strategy, innovation has brought with it an exponential growth in data; in its generation and use, and in the world's increasing reliance upon it.

By embracing data and the benefits its use brings, the UK now faces tangible opportunities to improve our society and grow our economy. It can transform our public services and dramatically improve health outcomes nationally. Modern genome sequencing offers the potential to do just that; by identifying pathogen strains rapidly and cheaply with a high resolution and from this reconstruct chains of transmission and trace outbreaks to their source. However, we need the data infrastructure to properly enable this.

The PATH-SAFE genomic data platform ultimately seeks to address this need at a national level by providing a cross-government genomics capability which can perform analysis of genomic data and associated metadata to facilitate rapid identification of pathogen strains of interest and support elucidation of transmission pathways.

The platform aims to realise the following benefits:

- improve the tracking of FBD pathogens and associated AMR through faster identification of variants of interest, thereby increasing outbreak investigation efficiency
- through analysis, bring together currently unconnected government and public genomic pathogen data to maximise the use of available FBD biosurveillance data and thereby expedite variant identification
- create efficiencies in cross-government working in FBD biosurveillance through data sharing and collaboration via the platform
- reduce public health risks associated with foodborne disease outbreaks by tracing sources of infection faster, potentially facilitating faster removal of those sources
- reduce economic losses associated with FBD by reducing the number of missed, slow or inaccurate assessments of outbreak cause, thereby reducing the costs/resources associated for people affected by FBD (e.g. sick days required) and by businesses (e.g. additional administrative costs of dealing with an outbreak)

Delivery Partners

Our delivery partners for this platform are:

- Digital Epidemiology Services
- University of Oxford
- University of Warwick
- University of Birmingham

Status

Data sharing discussions continue with key partners (UKHSA, APHA, FSS, PHS and FSA) with a further workshop held in November. Discussions focused on considering the barriers to sharing, such as sensitivity of data and resource required, and how they can be overcome.

Analyses of historical Salmonella data using the platform's existing analytics have shown its utility and value in identifying outbreak clusters at pace. Development of the platform to incorporate new analytics for E.coli and Listeria continues to progress well.

Key successes

Key success of this work include:

- following a 15-month development period, the first iteration of the genomic data platform was made live in March 2024, ready for submission and analysis of Salmonella genomes by participating government partner agencies
- the platform and its functionality has built upon existing and proven surveillance tools and infrastructure, with [CLIMB-BIG-DATA](#) providing the cloud infrastructure used by the platform, [Pathogenwatch](#) tools supplying the platform's analytics capability and a call-out feature to [Enterobase](#) supporting the platform's context genome search functions
- a discovery phase was completed prior to development being initiated which sought to elucidate existing surveillance infrastructure and processes to inform platform design
- extensive end user engagement undertaken during platform development, ahead of release of the first iteration of the platform (another opportunity will be provided ahead of release of the second iteration)
- set-up of four advisory groups (Technical, AMR, Data Standards and International) which provided recommendations on the design and capabilities of the platform and on the application, technical requirements of and best practices for WGS in Salmonella FBD surveillance in general - a white paper summarising the recommendations has been collated and is due for publication in Q3 2024

Outputs

All projects were presented at the PATH-SAFE Biosurveillance Conference on 28 and 29 February 2024 in London. [Recordings, slides and posters are available on the conference webpage.](#)