PATH-SAFE programme National foodborne disease genomic data platform

At the heart of the 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 a 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.

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

By embracing data and its benefits, 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, 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 seeks to address this need at a national level, by providing a cross-government genomics capability that can perform analysis of genomic data and associated metadata. This can 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 foodborne disease (FBD) pathogens and associated antimicrobial resistance (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 and resources associated for people affected by FBD (such as sick days) and by businesses (such as 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

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 clarify 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 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 and best practices for whole genome sequencing (WGS) in Salmonella
- FBD surveillance in general - a recommendations paper has been collated and is due for publication in 2025

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.?