A Scottish register to tackle One Health and foodborne infections

Nicola J. Holden (1, 2) and Eann Munro (2)
(1) Scotland's Rural College, Craibstone Estate, Aberdeen AB21 9YA
(2) ENRA / Science & Evidence Unit, Scottish Government
Email: Nicola.Holden@sruc.ac.uk; Nicola.Holden@gov.scot

Introduction

Scotland has an international reputation for microbiology in relation to food safety. The work is genuinely within the One Health remit, spanning microbes associated with humans, plants, animals and the wider environment. The question is how do we draw all of the information together so it can be used in a beneficial way to aid with foodborne and other One Health pathogens going forward.

We have secured a UKRI-funded policy fellowship to address this question, working with the Chief Science Adviser, Prof. Julie Fitzpatrick. The work is directly relevant to new and ongoing biosurveillance initiatives including the FSA-led Pathogen Surveillance in Agriculture, Food and Environment (PATH-SAFE) programme for detection and tracking of foodborne disease (FBD) and antimicrobial resistance (AMR). It is developing a genomics platform to support research and epidemiology (Fig. 1). PATH-SAFE aligns with the Biosurveillance Network, part of the National Biosecurity Strategy launched by UK government in June 2023. Parallel initiatives have been established for animal and plant pathogens, and for environmental monitoring. PATH-SAFE is supported by multiple agencies including Food Standards Scotland, supporting use of whole genome sequencing to understand food source attribution, infection threat, and the level of AMR in *E. coli*.

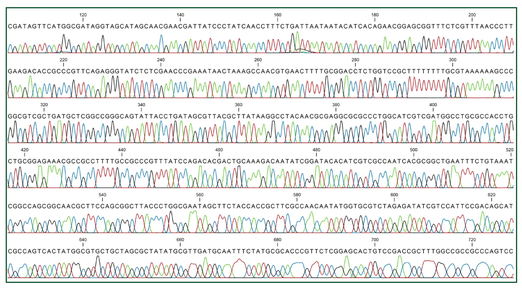

Figure 1A: DNA sequence (SRUC)

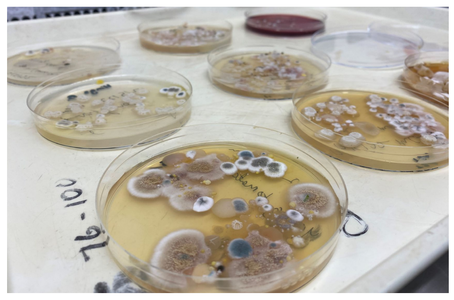

Figure 1B: Microbiology cultures (SRUC)

Approaches

Our aim is to understand Scotland's biological assets of expertise and resources, in relation to One Health-relevant infectious diseases. Where applicable, the resource includes genomic sequence, as it is a key feature for infectious disease investigations.

We are gathering information from across Scotland spanning One Health-relevant areas. These include 71 laboratories and facilities within the public sector (Fig. 2) as well as facilities in the academic and applied research sector, and commercial organisations that generate shareable culture collections.

Figure 3: Locations of public sector laboratories in Scotland (Julie Fitzpatrick)

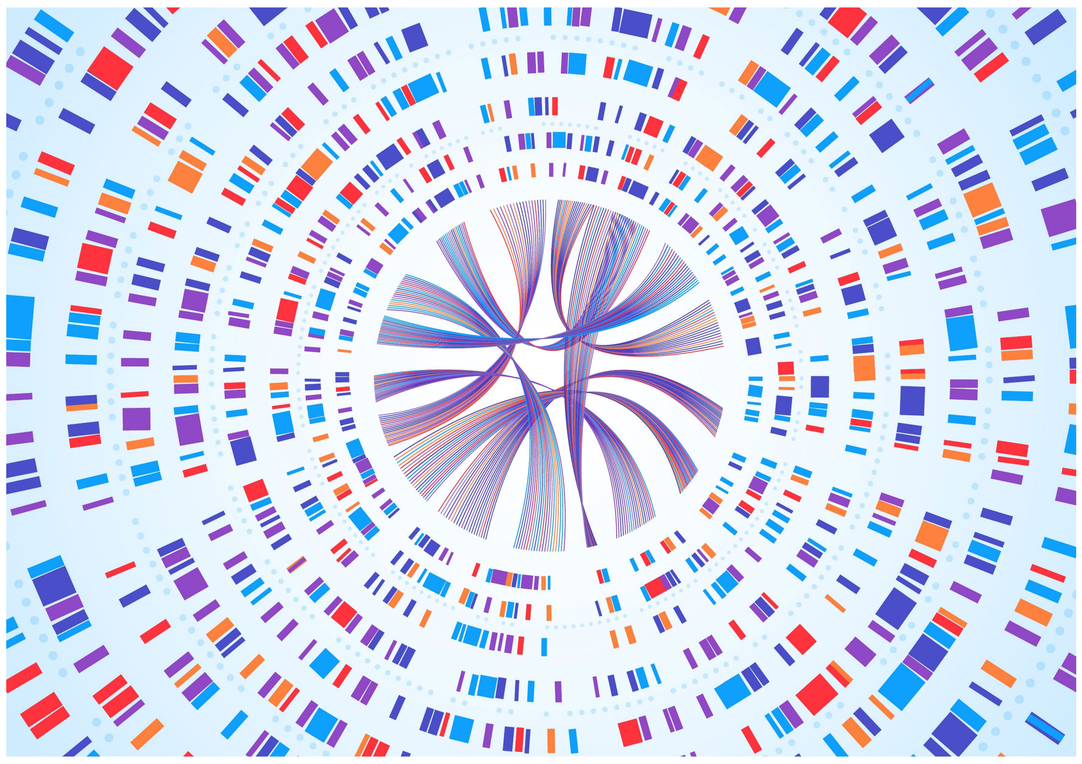

Figure 1C: Representation of pathogen genomic comparison

Data management

A key consideration to generate a centralised and accessible resource is data management. Multiple types of data are provided by multiple users, each with different priorities and requirements. Therefore, a data sharing policy is being implemented to ensure security and trust whilst maintaining accessibility according to the FAIR principles. Our data governance is being advised by data managers who already work with genomics datasets, culture collections and public heath data.

Benefits of a One Health infectious disease register

Agriculture and food production is an economic and strategic strength in Scotland, with global recognition of excellence in Scottish produce. We are able to enjoy a high level of food safety because there is extensive expertise and biological resources on infectious diseases, with strong connectivity between public, animal, plant and environmental health agencies, and biological research. But we need to keep up with the food system changes driven by major challenges like climatic change, geo-political changes, non-communicable disease burdens, coupled with agri-food technological and management innovations.

We have already shown how the infectious disease expertise can pivot to respond to the global threat of the COVID-19 pandemic, providing laboratory facilities and public health expertise. Scottish Government continues to strengthen our resilience against future shocks. Collating the information into a central One Health infectious disease register will improve the response time for emerging disease threats as well as the collective knowledge about the assets. It will help to keep Scotland at the forefront of public heath science for foodborne and One health-relevant threats.

Acknowledgements

This work is funded by UKRI (BBSRC) on the 2023 cohort of policy fellowships, hosted by the Scottish Government Central Analysis Division. It is linked to SRUC projects funded by Scottish Government RESAS Strategic Research Programme on Food Safety (B6), for STEC and AMR. Data governance is linked to a SRUC project funded by BBSRC for a Biological and Bioinformatics Resource on the UK crop microbiomes and cryo-preservation.

If you'd like to find out more or contribute to the resource please contact me:
Nicola Holden
Email SRUC: nicola.holden@sruc.ac.uk or at SG: nicola.holden@gov.scot