

openFMD: A data sharing and decision-support portal to enhance genomic and epidemiological surveillance of FMD



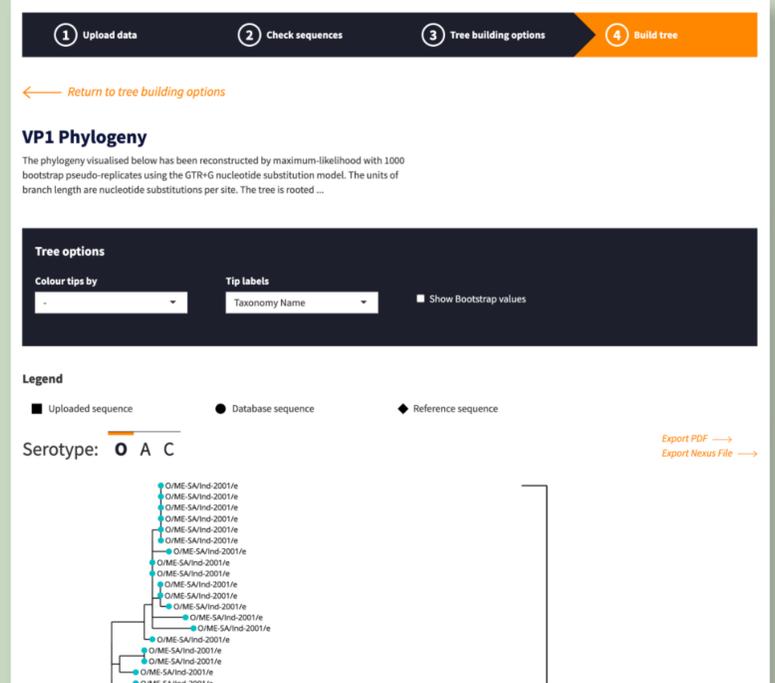
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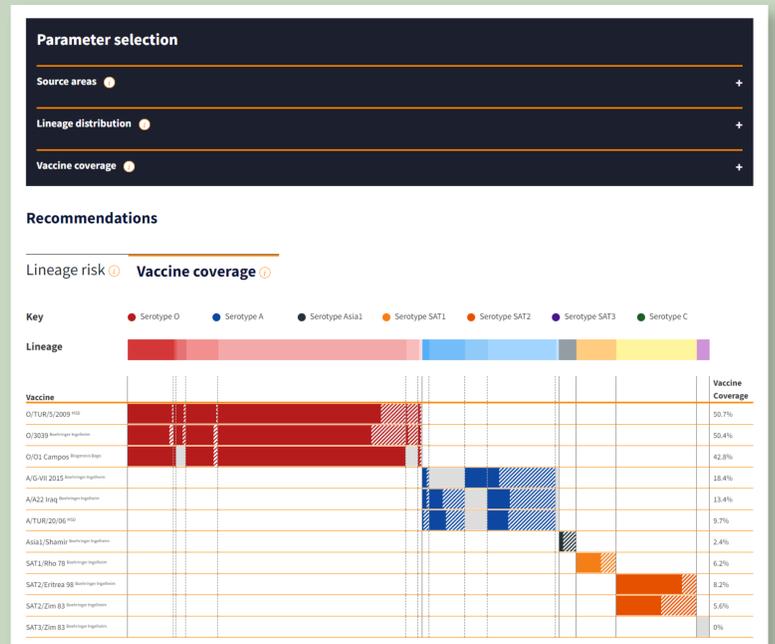
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Introduction

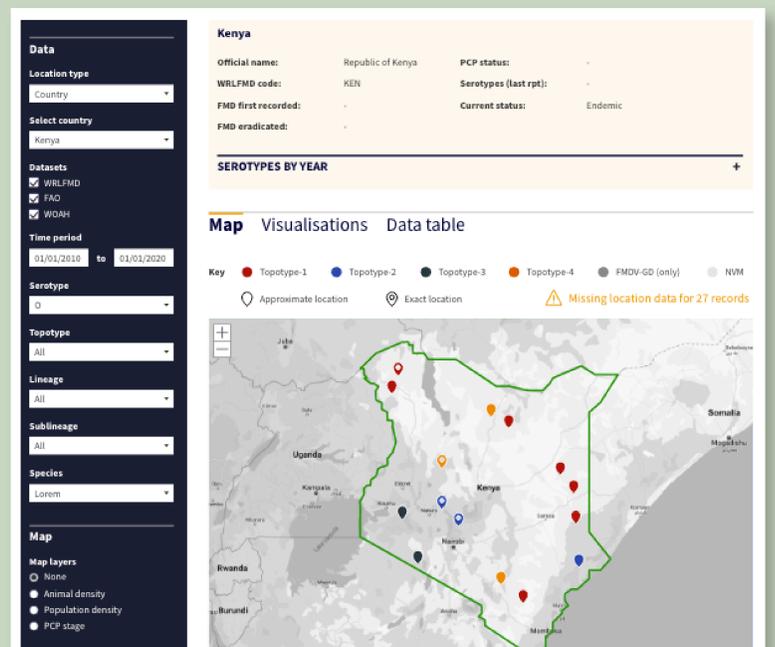
The rapid and open dissemination of genomic and epidemiological data provide critical support to trace Food and Mouth Disease Virus (FMDV) lineages circulating globally. FMD is an important, high-impact transboundary disease and incursions to free countries occur regularly and potentially from long distances. The global FMD epidemiological situation is dynamic, and international surveillance and information sharing is crucial to mitigate the risk of introduction and ensure that the vaccine bank holdings reflect the current risks. We present an open-access portal maintained by the FAO World Reference Laboratory for Foot and Mouth Disease Virus (WRLFMD) at the The Pirbright Institute, UK, to support global pathogen surveillance and stimulate the real-time exchange of data between FMD reference laboratories and disease control initiatives. Users can interactively query and visualise historical and recent FMD trends and generate customised epidemiological and genotyping reports through the portal interface.



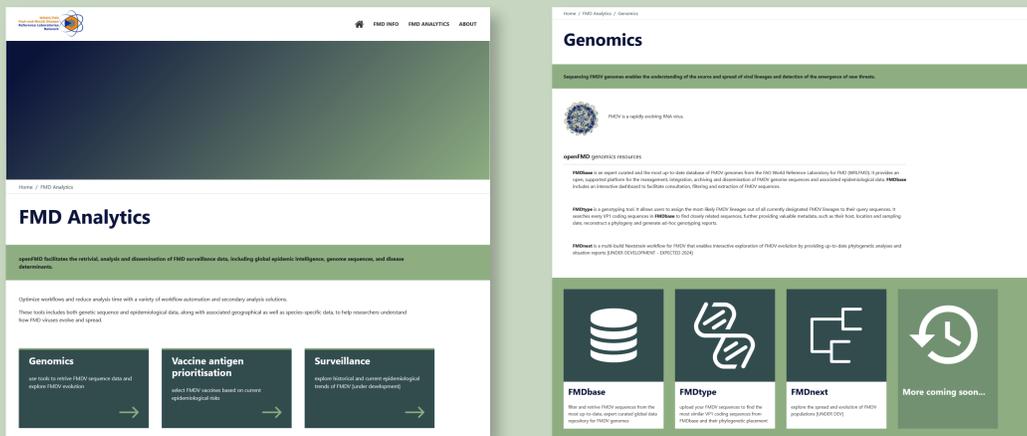
Screenshot of the FMDtype genotyping tool



Screenshot of PRAGMATIST Tool



Mock-up of Mapping Tool (currently in development)



Web portal for FMD analytics (to be launched)

Project summary

A dedicated web portal for users offers access to a suite of analytical tools. This include the FMDtype, a genome annotator and genotyping tool which allows user to create customised genotyping reports, including the ability to upload sequences and compare these to VP1 coding sequences held in the FMDbase. The PRAGMATIST¹ tool can be used to prioritise antigens held in vaccine banks for FMD. Vaccine bank holdings may be crucial to enable a swift and effective response to an incursion of FMD into a free country, such as New Zealand, and can also be useful for FMD-endemic countries in planning both preventive and emergency vaccination strategies. The PRAGMATIST tool was developed to support vaccine bank managers in this critical decision-making process, which is likely to have different outcomes depending on the geographical location as well as the ever-changing dynamics of FMD virus circulation in endemic areas. Recent EufMD funding will see the portal's functionality be further extended with a FMD surveillance and mapping tool currently under development.

The openFMD initiative will not only promote the vital role of the WOAH/FAO Reference Laboratory Network for FMD as leading the global surveillance of FMD, but it will further improve timely analysis and communication of FMD data, identification of surveillance gaps and emerging disease trends to support evidence-based decision-making for FMD control.

¹ Ludi A, McLaws M, Armson B, Clark J, Di Nardo A, Parekh K, Henstock M, Muellner P, Muellner U, Rosso F, Prada J, Horton D, Paton D, Sumption K, King D. PRAGMATIST: A tool to prioritize foot-and-mouth disease virus antigens held in vaccine banks. *Frontiers in Veterinary Science*, 9, doi: 10.3389/fvets.2022.1029075, 2022.

Acknowledgements

