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NATIONAL HEALTH SECURITY NEEDS WHOLE GENOME SEQUENCING

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AUSTRALIA'S capacity to detect, respond to and control infectious threats, and to improve regional health security is hampered by the lack of a national approach to whole genome sequencing resources, and data sharing, according to the authors of a Perspective published in the *Medical Journal of Australia*.

Whole genome sequencing involves parsing out the entire genome of a pathogen, the data from which can be used to determine the pathogen's identity, predict its resistance to antimicrobials and its virulence traits and understand the relationships between pathogens.

University of Melbourne Associate Professor Deborah Williamson, Deputy Director of the Microbiological Diagnostic Unit Public Health Laboratory at the Doherty Institute, and colleagues wrote that the use of whole genome sequencing "has the potential to transform the investigation and surveillance of communicable diseases by providing the highest possible characterisation of pathogens, enabling earlier and accurate detection of outbreaks and a timely and targeted public health response" by providing a "one-stop shop" for microbiological testing of a pathogen.

A national approach is required, wrote Williamson and colleagues.

"To ensure the best health outcomes and keep pace internationally, implementation of a practical national strategy for microbial genomics is required," they wrote.

"In the absence of a national communicable disease agency, Australia has developed a complex series of networks and committees for epidemiological and laboratory investigation of communicable diseases. However, there remain considerable constraints in sharing epidemiological and laboratory data at a national level (eg, privacy concerns about sharing data across state borders), along with jurisdictional differences in laboratory testing and reporting. Further, smaller jurisdictions often do not have access to timely whole genome sequencing and associated bioinformatic expertise, leading to an inequity of resource and infrastructure across the country."

The US (GenomeTrakr) and the UK (Public Health England) have successfully implemented national strategies.

In Australia microbiology laboratories recently established the Communicable Diseases Genomic Network, "a collaborative public health, clinical microbiology and infectious diseases partnership that aims to facilitate the implementation of whole genome sequencing into infectious diseases surveillance and response".

The authors called for "national resourcing, coordination and transparent collaboration between state and territory microbial genomics systems".

"[This] is critical to increase Australia's capacity to detect, respond to and control infectious threats, and to improve regional health security," Williamson and colleagues concluded.

Please remember to credit *The MJA*.

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CONTACTS: Catherine Somerville
Senior Media and Communications Officer
Doherty Institute
Ph: (030 8344 8378 or (0422) 043 498
Email: catherine.somerville@unimelb.edu.au