AUSTRALIAN PATHOGEN GENOMICS PROGRAM

Integrating pathogen genomics into public health

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auspathogen.org.au

Infectious diseases and antimicrobial resistance in Australia

Infectious diseases and antimicrobial resistance (AMR) represent a rapidly growing threat to public health globally. The economic burden of infectious diseases and AMR is increasing, and the international spread of infections through increased travel and food distribution is a threat to national and regional health security, highlighted by the COVID-19 pandemic.

Australia's recent World Health Organisation (WHO) Joint External Evaluation identified the lack of a rapid, nationally coordinated approach to public health pathogen genomics a gap to the national public health system. There is an identified need for standardisation and data integration for disease surveillance, and translation of genomic data to clinicians and public health officials for timely and rapid action.

Precision public health for infectious disease control

Pathogen genomics is revolutionising the diagnosis, surveillance and control of infectious diseases, utilising transformational genomic technology to enable innovative, real-time 'precision public health' for infectious disease control. The Australian Pathogen Genomics (AusPathoGen) Program provides a unique opportunity to utilise pathogen genomics for the rapid, precise, and accurate identification and characterisation of infectious diseases pathogens, to enhance public health action and patient care in Australia, and reduce infectious disease incidence and spread, including AMR.

Australian Pathogen Genomics Program (AusPathoGen)

The COVID-19 pandemic has highlighted the value of nationally integrated pathogen genomic data at the public health interface, supported through a $3.3M MRFF COVID-19 genomics grant. AusPathoGen is a $20M MRFF supported program commencing in 2021 that will build on the success of the COVID-19 genomics response to further implement and evaluate a large-scale integration of pathogen genomics, epidemiological and surveillance data at the public health interface, to reduce the impact of infectious diseases on public health by improving pathogen characterisation and optimising responses.

The program will utilise AusTrakka, a nationally integrated genomic platform, for consistent analysis and reporting. AusTrakka provides a central, secure, and private online location to share, store, analyse and view aggregated national genomic data. The AusTrakka platform is already identifying outbreaks and matching COVID-19 clusters across state and international boundaries, facilitating cooperation between jurisdictions and enhancing national coordination of public health responses.

AusPathoGen will implement national genomics-based responses to major infectious disease of public health importance, focussing on respiratory and vaccine preventable diseases, foodborne diseases, sexually transmitted infections, antimicrobial resistance, and emerging infectious diseases threats with pandemic potential.

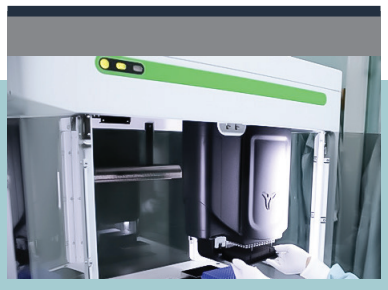
AusPathoGen will demonstrate utility, cost-effectiveness, and capacity for translation of pathogen genomics into public health nationally. The aims of AusPathoGen are outlined below.

OPTIMISE

AUSTRAKKA
Real-time pathogen genomics surveillance

Optimise national genomics-based surveillance and investigation of infectious diseases through a real-time pathogen genomics analysis and alert platform (AusTrakka)

IMPLEMENT



Implement effective, national genomics-based responses to infectious diseases and AMR

EVALUATE

Evaluate the utility and cost-effectiveness of genomics-based public health responses

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Our approach

Implementation of AusPathoGen will be underpinned by four key themes, with a focus on embedding translation into research activities and supporting sustainability of program outcomes:

RESEARCH

AusPathoGen will operate under clear governance and data management frameworks to optimise nationally integrated genomic-based surveillance using AusTrakka, implement and harmonise bioinformatic approaches, explore implementation models and undertake projects to evaluate utility and cost effectiveness.

TRAINING

Workforce development and training relevant to the implementation and translation of pathogen genomics will be integrated into AusPathoGen. The program will support training of public health laboratory staff, health departments, and other stakeholders in the implementation of pathogen genomics and interpretation of genomic data, to enhance utilisation of genomic-based surveillance for public health.

PARTNERSHIPS

AusPathoGen will continue to build partnerships with national advisory committees, training bodies, leading international institutions, industry, and consumers, including across One Health sectors, to add value to research outcomes to support sustainability of the implementation of a nationally integrated pathogen genomics public health program.

TRANSLATION

AusPathoGen will be delivered by an established network of leading experts embedded in Australia's public health surveillance and response system, and is built upon the activities, resources and capacities of the Communicable Diseases Genomics Network (CDGN), a genomics-focused network of public health laboratories across Australia, ensuring rapid translation of research findings into national practice.

Outcomes

AusPathoGen will establish an optimised, nationally coordinated public health pathogen genomics program, and demonstrate the public health utility of pathogen genomics as a revolutionary approach to the control of infectious diseases in Australia. An integrated pathogen genomics program for public health will help avoid disruptions to society and public services arising from infectious diseases outbreaks, epidemics and pandemics, and biosecurity threats.

Partners

AusPathoGen is led by the University of Melbourne, with key project partners from academic institutions (University of Sydney, University of New South Wales, University of Technology Sydney, University of Queensland, Menzies Research Institute, Australian National University, University of Tasmania), all Australian public health laboratories through the Communicable Diseases Genomics Network, and all state and territory Departments of Health across Australia, with Illumina as a key industry partner.

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