Genomics, Informatics and Ethics research
for more effective Public Health Action and Policy

CREID
PROTECTING THE PUBLIC FROM EMERGING INFECTIOUS DISEASES

An NHMRC Centre of Research Excellence
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ASID AMR Resistance Summit June, 2017

AMR R&D priorities

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THE UNIVERSITY OF SYDNEY · THE UNIVERSITY OF MELBOURNE · THE UNIVERSITY OF WESTERN AUSTRALIA · MONASH University · MACQUARIE University · Australian National University

CREID Research Themes

Theme 1
Pre/early outbreak risk prediction

PRE DICT
Pathogen behaviour

Pathogen discovery, evolution, risk profiles

- transmissibility
- virulence
- mobile genetic elements

Theme 2
Rapid, targeted public health responses

EARLY WARNING
PRECISION TRACKING

Integrated information systems (for action)

- Clinical/Syndromic
- Lab/Genomic
- Digital/epi

Theme 3
Ethics-based policy frameworks

RAPID EFFECTIVE
RES PONSE

Surveillance ethics & behavioural research

- Professional, public
- Communication
- Data safety/security

PathogenOmics

Emergent "high-risk" bacterial clones:
Transmission dynamics, virulence, AMR profiles & evolutionary drivers
Translating pathogenOmics into practice/new Rx approaches

- *Kleb pneumoniae:* Transmissible AMR and adaptive virulence
- MRSA, VRE: Nosocomial and community pathogens
- *S.* Typhimurium: Food-borne pathogen
- *Strep pneumoniae:* Versatile, evolving under vaccine pressure

AMR Research & Development priorities

AMR pathogens– application of pathogenOmics to improve transmission prevention/control

- "Outbreaks/slow burns"; community, HAIs, VPDs (eg pneumovax/vaccine composition
- One health surveillance national network

Genetic/genomic epidemiology of mobile genetic elements (Enterobacteriaceae, Salmonella, Staph

- New diagnostics, novel therapies/interventions

Meeting the challenge of culture independent diagnosis with pathogenOmics

- Identify gene targets that correlate with phenotypic [R] – GNR, TB, *S. pneumo, Candida*

Socio-behavioural research in AMS and transmission prevention – practitioners and communities

- Strategies to reduce unnecessary demand & inappropriate use *(via community juries: patients & carers; farmers & animal owners; doctors, vets, dentists)*
- Engage hospital staff & patients in infection prevention & control: *self protection against MRO acquisition; protection of others from transmission*