



Otago Global Health Institute

Te Pūtahi Hauora-ā-Ao ki Ōtākou

## **Global Health Bytes webinar**

Wednesday 22 September 2021, 4.00-4.30 pm NZ time

Dunedin: Room AVC1, Disability Information & Support, Student Learning Centre Offices (Central Library/Information Services Building), Albany Street (*capacity limited to 8 persons under current COVID-19 alert level*)

Remote participation by Zoom:

<https://otago.zoom.us/j/486443663?pwd=WGgyUkEyQm13djlPRDRhWFVmWUZZUT09</h4>>

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### **The threat of carbapenem resistant *Acinetobacter baumannii* in Fiji**

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*Acinetobacter baumannii* is a gram-negative opportunistic pathogen that is commonly associated with life threatening nosocomial infections particularly in critical care settings(1). Their ability to colonise hospital environments, including dry surfaces, and human skin for extended periods of time, to develop or acquire resistance to multiple classes of antibiotics including carbapenems (last resort antibiotics), and intrinsic resistance to desiccation and disinfectants, has contributed to their success in causing nosocomial outbreaks(2). As a result, infections are associated with increased healthcare costs, high morbidity, and mortality.

Little is known about the transmission and mechanism of carbapenem resistance in *A. baumannii* (CR-Ab) in Fiji. Here, we sought to investigate the phylogenetic relatedness of 35 nonduplicate CR-Ab strains isolated from the intensive care unit (ICU) at the Colonial War Memorial Hospital (CWMH) in Fiji in 2019. Using whole genome sequencing (WGS) and Nullarbor bioinformatics pipeline, we confirmed a prolonged outbreak of nosocomial infection associated with international high risk clone CR-Ab (ST2) within the adult ICU. All the CR-Ab (ST2) demonstrated minimal genetic diversification between isolates with  $\leq 11$  single nucleotide polymorphisms (SNPs) differences in their core genome. This is the first time that the CR-Ab (ST2) outbreak has been reported from any adult ICU within Fiji hospitals. Furthermore, we found that these CR-Ab (ST2) strains harboured a wide range of resistance



genes, with carbapenem resistance being predominantly mediated by carbapenem-hydrolysing class D  $\beta$ -lactamases encoded by blaOXA-23, blaOXA-66 and blaOXA-69 genes. We also demonstrated that these ST2 strains shared a common ancestral linkage to the CR-Ab (ST2) isolated from the neonatal ICU outbreak at CWMH in the 2017.

These findings underscore the need for extra infection prevention and control precautions and antimicrobial stewardship practices to prevent the spread of antibiotic resistant infections.

Keywords: Carbapenem resistance, *Acinetobacter baumannii*, blaOXA-23, international high-risk clone, ST2, nosocomial infections.

1. A. Howard, M. O'Donoghue, A. Feeney, R. D. Sleator, *Acinetobacter baumannii* An emerging opportunistic pathogen. *Virulence* **3**, 5 (2012).
2. L. W. Roberts, *et al.*, Genomic surveillance, characterization and intervention of a polymicrobial multidrug-resistant outbreak in critical care. *Microb. Genomics* **7** (2021).

*Sakiusa is from Fiji. He is currently undertaking his PhD in Microbiology, funded by the University of Otago Pacific Doctoral scholarship. His research is focused on the use of molecular epidemiology to track transmission pathways of carbapenem resistant gram-negative pathogens in Fiji.*

*This research work was funded by Otago Global Health Institute.*

## Instructions for attendees

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