



**Australian Government**  
**Department of Health  
and Aged Care**

2022 · Volume 46

# **Communicable Diseases Intelligence**

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Nevio Sarmiento, Tessa Oakley, Joana C Belo, Virginia L da Conceição, Carolina da C Maia, Celia G Santos,  
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<https://doi.org/10.33321/cdi.2022.46.65>

Electronic publication date: 26/09/2022

<http://health.gov.au/cdi>

# Communicable Diseases Intelligence

ISSN: 2209-6051 Online

This journal is indexed by Index Medicus and Medline.

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Communicable Diseases Intelligence (CDI) is a peer-reviewed scientific journal published by the Office of Health Protection and Response, Department of Health and Aged Care. The journal aims to disseminate information on the epidemiology, surveillance, prevention and control of communicable diseases of relevance to Australia.

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# First case of NDM-1-producing *Acinetobacter baumannii* isolated in Timor-Leste

Nevio Sarmiento, Tessa Oakley, Joana C Belo, Virginia L da Conceição, Carolina da C Maia, Celia G Santos, Elfiana Amaral, Lucia Toto, Endang S da Silva, Ian Marr, Jennifer Yan, Joshua R Francis

Carbapenem antibiotics are important in the treatment of infections caused by bacteria in the order *Enterobacterales* which are resistant to multiple classes of antibiotics. Due to their high levels of intrinsic resistance, strains of *Acinetobacter baumannii* complex organisms resistant to carbapenems pose an important public health issue.<sup>1,2</sup> Carbapenem-resistant *A. baumannii* (CRAB) is mainly due to acquisition of carbapenem-hydrolysing oxacillinase-encoding class D (OXA) genes which can be either plasmid- or chromosomally-encoded or through modification on the outer membrane protein and efflux pump.<sup>3</sup> Although class B metallo- $\beta$ -lactamases (MBLs) are not the most common mechanism of resistance seen in CRAB isolates, MBL-positive *A. baumannii* are increasingly reported worldwide.<sup>1</sup> While this resistance mechanism was first described in an isolate of *K. pneumoniae* in 2008, many countries have since isolated strains of New Delhi metallo-beta-lactamase 1 (NDM-1) -carrying *A. baumannii*.<sup>4</sup> We describe the first of these strains isolated in Timor-Leste.

At the main referral hospital in Dili (Hospital Nacional Guido Valadares), the capital city of Timor-Leste, a high rate of infections caused by extended spectrum beta lactamase (ESBL) -producing organisms has resulted in frequent use of meropenem as a treatment for bacteraemia and other invasive infections.<sup>5</sup>

In December 2020, an *Acinetobacter baumannii* complex organism was identified in a urine sample culture from a 39-year-old male admitted to hospital in Dili. The patient had no previous healthcare contact or movement outside of Timor-Leste. The organism was

identified by matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry (MALDI-TOF/MS) (Bruker Daltonik, Bremen, Germany) and automated antimicrobial susceptibility testing (AST) performed on BD Phoenix M50 (Becton Dickinson, Berks, United Kingdom). The AST interpretations were performed as per European Committee on Antimicrobial Susceptibility Testing (EUCAST) and the organism was found to be resistant to almost all antibiotics including meropenem (minimum inhibitory concentration, MIC  $\geq$  8  $\mu$ g/L), trimethoprim/sulfamethoxazole (MIC  $\geq$  4/76  $\mu$ g/L), and gentamicin (MIC  $\geq$  4  $\mu$ g/L). The only antibiotic to which the isolate was found to be susceptible was amikacin (MIC = 8  $\mu$ g/L; Table 1). This organism was identified as a class B carbapenemase by BD Phoenix NMIC-502 panel and subsequent molecular testing utilising Xpert® Carba-R (Cepheid, Sunnyvale, USA) confirmed the isolate as an NDM-1 producer.

Recommended treatment options for clinically significant isolates of carbapenem-resistant *A. baumannii* may include minocycline, ampicillin-sulbactam and colistin, and are currently unavailable in Timor-Leste. Meropenem is on the Timor-Leste Essential Medicines List and is usually available. The Essential Medicines List does not currently include amikacin, piperacillin-tazobactam, or any fourth-generation cephalosporin.

This is the first report of an NDM-1-producing multidrug-resistant *A. baumannii* from Timor-Leste. The discovery of this extensively-drug resistant strain is worrying, especially as infections caused by *A. baumannii* complex are often

**Table 1: MIC values of the *A. baumannii* isolate**

Antibiotic	MIC (µg/mL)	Interpretation <sup>a</sup>
Amikacin	8	S
Amoxicillin-clavulanate (f)	> 32/2	R
Ampicillin	> 8	R
Aztreonam	> 16	R
Ceftriaxone	> 4	R
Cefuroxime	> 8	R
Cephalexin	> 16	R
Ciprofloxacin	> 1	R
Ertapenem	> 1	R
Fosfomycin	128	R
Gentamicin	> 4	R
Imipenem	> 8	R
Levofloxacin	> 2	R
Meropenem	> 8	R
Nitrofurantoin	> 64	R
Tobramycin	> 4	R
Trimethoprim-sulfamethoxazole	> 4/76	R

a R: resistant; S: susceptible.

related to prolonged hospitalisation and to death.<sup>6</sup> The identification of an NDM-1-carrying strain in a clinical isolate in Timor-Leste highlights the need for ongoing clinical and laboratory surveillance, and established infection control protocols to limit spread in the national and referral hospitals.

## Funding

This work was made possible through the support of the Fleming Fund Country Grant for Timor-Leste (FF/17/233), which has facilitated significant improvements in laboratory capacity for diagnosis and surveillance of antimicrobial resistance in Timor-Leste. The Fleming Fund is a UK aid investment programme to tackle antimicrobial resistance in low- and middle-income countries around the world and is managed by the UK Department of Health and Social Care.

## Declaration of competing interest

None declared.

## Ethical approval

Not required.

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