DOWN THE SINK:
THE LOCAL EXPERIENCE OF A ***BURKHOLDERIA CENOCEPACIA* OUTBREAK** AT THE CANBERRA HOSPITAL

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INTRODUCTION

Burkholderia cenocepacia, a member of the *B. cepacia* complex, is an environmental organism and an unusual isolate from blood. It is a recognised cause of nosocomial outbreaks due to contamination of various fluids [1-3]. In April 2017, two patients in the Canberra Hospital intensive care unit (ICU) had *B. cenocepacia* isolated from blood cultures collected within four hours of each other, prompting an investigation into a common source. Concurrently, *B. cenocepacia* was isolated from the blood of seven patients in two Queensland hospitals.

METHODS

Clinical and epidemiological data were obtained from the patients' medical records and bed management records in an attempt to identify a common source.

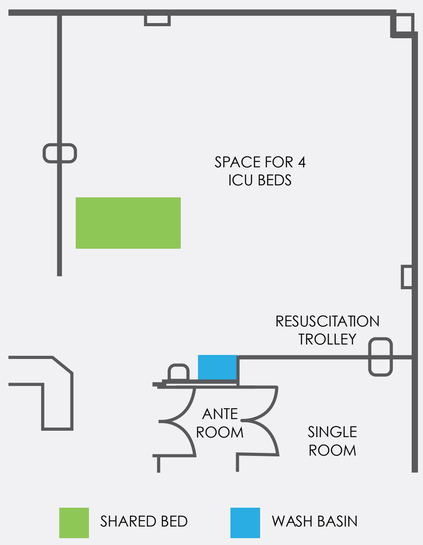
Environmental specimens were cultured on horse blood agar and chocolate agar (Oxoid, UK) at 35°C in an aerobic atmosphere containing 5% carbon dioxide, and MacConkey agar (Oxoid) and brain heart infusion broth at 37°C in air. Growth was identified as *B. cepacia* complex using MALDI-TOF MS (Bruker Daltonics, MA). Isolates were referred to Queensland Pathology for sequencing of the *recA* gene, allowing identification to the species level.

Whole genome sequencing of Canberra Hospital and Queensland clinical and environmental isolates was performed at Queensland Pathology.

RESULTS

The two patients occupied the same ICU bed within hours of having the blood cultures collected. This prompted environmental testing of the local area. *B. cepacia* complex was grown from the plug hole of the wash basin located next to the shared bed (Figure 1). However, *recA* gene sequencing subsequently identified this isolate as *B. contaminans*.

FIGURE 1: Layout of the local ICU area



Clinical review also identified central venous catheter insertion using ultrasound guidance as a common exposure. As a next step, and in collaboration with colleagues in Queensland, culture of three types of sterile ultrasound gel used in the ICU was performed (Table 1). *B. cepacia* complex was cultured from three sachets of the 'sterile' ultrasound gel included with the Meditech Co Ltd sterile ultrasound probe cover (Lot No. 201701) (Figure 2). The concentration of organisms in this gel was approximately 100 CFU/µl (Figure 3). Sequencing of the *recA* gene confirmed growth of *B. cenocepacia* (G-III-B), the same organism that was isolated from the clinical specimens (Table 1).

FIGURE 2. Meditech sterile ultrasound prove cover and gel (Lot No. 201701)

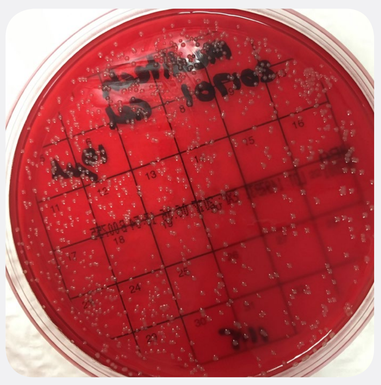


FIGURE 3. Quantitative culture of 'sterile' ultrasound gel. Photo of 10µl of gel on to horse blood agar after 48 hours incubation.

TABLE 1. Summary of testing of clinical and environmental isolates.

	Patient 1	Patient 2	Wash basin	Sterile Gel Supplied with Meditech Sterile Ultrasound Probe Cover		Aquasonic Sterile Ultrasound Gel
				Lot No. 201701	Lot No. 20160701	Lot No. 0716005
CULTURE	GROWTH	GROWTH	GROWTH	GROWTH	NO GROWTH	NO GROWTH
MALDI-TOF MS	*B. cepacia* complex	*B. cepacia* complex	*B. cepacia* complex	*B. cepacia* complex	-	-
***recA* GENE SEQUENCING**	*B. cenocepacia* (G-III-B)	*B. cenocepacia* (G-III-B)	*B. contaminans*	*B. cenocepacia* (G-III-B)	-	-
MLST	1116	1116	-	1116	-	-

MALDI-TOF MS, matrix-assisted laser desorption ionisation time of fluid mass spectroscopy; MLST, multi-locus sequence typing; -, not performed.

Identification of 'sterile' ultrasound gel as the source of *B. cenocepacia* required a broader outbreak containment response across the hospital than if the local ICU environment had been confirmed as the source. Infection prevention and control staff led a coordinated response, involving the supply product manager, quality and safety unit and hospital executive, that resulted in a rapid withdrawal of the contaminated product from the Canberra Hospital.

Whole genome sequencing demonstrated that the isolates from Queensland and Canberra Hospital patients and the 'sterile' ultrasound gel were highly genetically related to each other [4]. The Therapeutic Goods Association issued a safety advisory and notice of recall of the affected gel (RC-2017-RN-00631-1) on May 12th 2017.

There have been no further clinical isolates identified at Canberra Hospital.

CONCLUSIONS

- Heavily contaminated 'sterile' ultrasound gel was identified as the source of the *B. cenocepacia* outbreak.
- Epidemiological review of cases is essential to identify potential common sources.
- Molecular techniques are necessary to identify members of the *B. cepacia* complex to the species level in order to direct the appropriate infection control response.
- Collaborative action allowed early containment of the outbreak.

REFERENCES

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2.Kutty PK et al. Chest 2007; 132: 1825.
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