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Case Report

Successfully clearing discharged patients of methicillin-resistant *Staphylococcus aureus*: Opportunities for the prevention and containment of antimicrobial resistance

Curt Werner [a,*], **Ramon Z. Shaban** [b,c]

[a] *Pindara Private Hospital, Allchurch Avenue, Benowa 4212, Gold Coast, QLD, Australia*
[b] *Infection Control Department, Division of Infectious Diseases and Immunology, Gold Coast Hospital and Health Service & Griffith University, Level 2, Block E Gold Coast University Hospital, Southport, QLD 4215, Australia*
[c] *Marie Bashir Institute for Infectious Diseases and Biosecurity, University of Sydeny and Western Sydney Local Health District, Westmead, NSW 2145, Australia*

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Multi-resistant organisms;
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MRSA;
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Antimicrobial resistance

Abstract *Background:* Australian hospitals routinely screen for multi-resistant organisms (MRO) to prevent the spread of healthcare-associated infection. The results of positive MRSA screening typically include: informing patient of their MRSA, single accommodation and contact precautions within the health care facility. These actions are associated with both negative and positive psychosocial effects, but also bring economic and human resource costs. MRSA clearance, however, is a less routine practice, and it is typically conducted only while patients are admitted. This paper reports the results of a study implementing a MRSA clearance program that included giving patients the opportunity to continue the clearance swabbing regime once discharged from hospital.
Methods: Retrospective cohort study of MRSA clearance between 2013 and 2016 at a private hospital in Australia.
Results: The MRSA clearance program was successful in increasing the MRSA clearance rate from 0 patients in 2013 to 13% (n12) in 2014, 11% (n10) in 2015, and 18% (n14) in 2016.
Conclusion: Allowing patients to continuing participation in MRSA clearance following discharge has increased the clearance rate of MRSA. Clearing patients of MRSAs is advantageous to patients, the health system and society, reducing health economic costs and the negative psychosocial effects associated with contact precautions.

* Corresponding author.
E-mail address: wernerc@ramsayhealth.com.au (C. Werner).

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Highlights

- MRSA Clearance Program successfully reduced the burden of contact precautions linked with MRSA colonisation and infection.
- Patients can be active participants in process to enable MRO clearance.
- Antibiotic usage can decrease by reducing burden of MRO colonisation within patients.
- MRO clearance programs yield economic savings for the healthcare facilities.
- MRO clearance programs could yield psycho-social benefits for patients.

Introduction

Background

The prevention of healthcare-associated infections (HAIs) is a leading global health priority. The prevention and containment of antimicrobial resistance [1,2] and the spread of multi-resistant organisms (MRO) are a major aspects of contemporary infection prevention and control practice. Acute healthcare facilities are encouraged to routinely screen patients for MRO carriage [3,4]. The aim of screening is to, among other things, determine the MRO burden and facilitate appropriate management of the patient in the clinical setting, including single room accommodation. It also enables the identification of patients for the possibility of MRSA clearance. The literature is rich with guidance on MRO screening, including who to screen, how to screen, when to screen and what to do with positive MRO results, predominately placing the patient in isolation or contact precautions [5,6]. MRO screening typically includes, but is not limited to, Carbapenem-resistant *Enterobacteriaceae* (CRE), Vancomycin resistant *enterococcus* (VRE), Extended-spectrum beta-lactamase (ESBL) any species, and Methicillin-resistant *Staphylococcus aureus* (MRSA).

Recognised benefits of MRO clearance include a better patient experience with subsequent hospital admission without the need for contact precautions, as outlined in Table 1.

Several studies of the patient experience of contact precautions associated with the management of MRSA colonisation or infection document negative consequences including developing pressure injuries, increased falls and psychological effects including loneliness, anger and neglect [7,8]. The same studies, however, report positive consequence to contact precautions including guaranteed single room with associated privacy and greater access to education and health information [7,8]. The use of contact precautions for managing patients with MRSAs bring other non-patient related consequences including human workforce time and the cost of PPE and associated waste removal [9]. Therefore, clearing patients who are no longer colonised or infected with a MRSA can afford economic benefits to hospitals.

The *Australian Guidelines for the Prevention and Control of Infection in Healthcare* [3] provide criteria for satisfactory MRSA clearance. Australian states have largely adopted the National Health and Medical Research Council (NHMRC) [3] clearance guidelines for MRSA clearance with the exception of sample time between MRSA swabbing, which is summarised in Table 2.

The current NHMRC recommendation is that two separate samples are collected more than three weeks apart however, separation time between swabs differs between each state. The Australian Capital Territory (ACT) requires 4 weeks between swabs and South Australia (SA) requiring greater than 3 weeks align the closest to the NHMRC guidelines. Whereas New South Wales (NSW) requires 3 days, Queensland requires a minimum of one week, Tasmania (TAS) requires one day, Victoria (VIC) and Western Australia (WA) have no recommended timeframe, and the Northern Territory (NT) has 12 months separation. According to Australian Hospital Statistics [18], the average length of stay in Queensland between 2014 and 2015, regardless of the diagnosed related group was 2.8 days in a public hospital and 2.3 in a private hospital, during the same timeframe the national average was 2.8 days. With the majority of a patients' length of stay in a hospital being less than one week this variability in MRSA clearance requirements makes clearing patients difficult. The wide variation in MRSA clearance practises may also be a source of patient concern and confusion.

Table 1 Benefits for MRSA clearance [7–10].

Benefits for Hospital or health care facility	Benefits for Patients cleared of MRSA
Reduced costs for extra personal protection equipment (PPE)	No contact precautions signage on the door with possible negative psychosocial effects
No need for a single room for the MRSA patient	Patient does not have any stigma associated with MRSA colonisation
Reduced time for clinical staff to don and doff PPE	Reduced fear of contracting further infections
Reduced need for patient placement including on theatre lists	No antibiotics required associated with MRSA colonisation
Terminal cleaning of theatre/room post MRSA patient leaving	Patients perceive better quality of care

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