

Methicillin-resistant
Staphylococcus aureus
(MRSA): Infection
prevention and control
Clinical Guideline

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Methicillin-resistant *Staphylococcus aureus* (MRSA): Infection Prevention and Control Clinical Guideline

1. Introduction

This guideline describes recommended measures to prevent the spread of methicillin-resistant *Staphylococcus aureus* (MRSA) in acute inpatient health care facilities and non-inpatient settings, including: perioperative settings, outpatients, emergency, radiology, dialysis centres, dental, ambulance and aeromedical transport services, community health care and residential care facilities (e.g. rehabilitation facilities, nursing homes, mental health facilities) and other settings in which people colonised or infected with MRSA may receive medical care.

This guideline presents a risk-based approach to the control of antibiotic resistant organisms in health care settings in line with the approach documented in the [Australian Guidelines for the Prevention and Control of Infection in Healthcare, Canberra: National Health and Medical Research Council \(2019\)](#).

Individual facilities may require specific procedures or protocols relevant to their patient population and clinical setting.

This guideline applies to all SA Health staff (clinical, non-clinical, contract) and volunteers working within SA Health facilities.

2. Background

MRSA are important healthcare associated pathogens that cause significant morbidity and mortality in susceptible patients. Although MRSA is harder to treat than methicillin-sensitive *S. aureus*, it is no more or less virulent than sensitive strains. The outcome of serious infection with any of these strains is likely to be poor.¹

In recent decades, the emergence of MRSA with reduced susceptibility to vancomycin presents an even greater problem for health care.² This emergence is closely linked to the increased use of vancomycin for prophylaxis, and for treating MRSA infections. Fortunately, to date there have been very few isolations of these vancomycin-resistant strains in Australia.

Historically MRSA has been associated with hospital admissions, however in recent years MRSA has emerged as an important cause of community-acquired infection (usually manifested as skin infections, but may include a severe form of pneumonia). These infections have been seen most commonly in groups of people where close contact occurs³ and in Australia amongst indigenous populations.⁴

3. Definitions

In the context of this document:

- > **Colonisation means:** the presence, growth and multiplication of micro-organisms without observable signs or symptoms of infection.
- > **Infection:** refers to invasion of micro-organisms into host tissues with replication of the organism accompanied by signs or symptoms such as: fever, pain, swelling, ooze or discharge.
- > **Methicillin-resistant *Staphylococcus aureus* (MRSA):** means is a bacterium that is resistant to methicillin (a semi-synthetic penicillin) and other closely-related antibiotics (oxacillin, flucloxacillin). They may also be resistant to a number of other antibiotics.

- > **Staphylococcus aureus (S.aureus) means:** is a bacterium that is a major cause of community and healthcare related infections. The pathogenic potential of this organism ranges from mild skin infections (e.g. boils) to serious systemic illness such as sepsis, osteomyelitis and endocarditis. It is a common inhabitant of the human body with approximately 20 - 30% of the adult population having persistent or intermittent carriage.
- > **Vancomycin intermediate-resistant S. aureus (VISA/hVISA/VRSA) means:** are strains of MRSA that have acquired reduced susceptibility to vancomycin. VISA is a strain with reduced susceptibility to vancomycin. Hetero-vancomycin-intermediate-resistant *Staphylococcus aureus* (hVISA) is a strain of VISA which shows variable resistance to vancomycin in the laboratory, making them difficult to detect. VRSA is MRSA that has acquired complete resistance to vancomycin.

4. Principles of the standards

Standard 1 aims to ensure care provided by the clinical workforce is guided by current best practice and the clinical workforce have the right qualifications, skills and approach to provide safe, high quality health care.

Standard 3 aims to prevent patients from acquiring preventable healthcare associated infections and effectively manage infections when they occur by using evidence-based strategies that are based on the risk to both patients and staff.

5. General

5.1. General principles

The prevention of infection with MRSA (or VISA/VRSA) relies on the prompt identification of carriers, appropriate patient placement and use of standard and transmission-based precautions, especially diligent adherence to hand hygiene and decontamination of shared patient equipment.⁸

5.2. Reservoirs of MRSA

The main reservoir of MRSA in health care settings is colonised or infected people (patients, staff or visitors). In asymptomatic carriers MRSA is almost always present in the nose but can also be found on the skin or in the throat. Carriage is commonly persistent at sites of damaged or diseased skin, e.g. chronic wounds, dermatitis or eczema.⁵

Contaminated environmental surfaces or items such as shared patient equipment are also reservoirs for transmission.

5.3. Mode of transmission

Numerous reports of hospital outbreaks of MRSA have shown that patient-to-patient transmission of MRSA is common. The most likely modes of transmission are:

- > **direct** contact - by the contaminated hands of staff and/or visitors
- > **indirect** contact - by contact with contaminated equipment or surfaces.

Note: Colonised patients may also be a source of self-infection.

5.4. Risk factors for MRSA carriage

General risk factors for MRSA carriage are well documented in the literature^{6 7} and include but are not limited to:

- > hospital admission in the previous year
- > admission to a nursing home in the previous year

- > recent or current antibiotic exposure
- > chronic underlying disease (e.g. cancer, renal disease)
- > injecting drug use
- > immune suppression, e.g. transplant patients.

Other factors can be increasing age, working with animals and incarceration.

5.5. Patient factors that increase the risk of transmission of MRSA

These include but are not limited to:

- > the presence of unhealed or chronic wounds
- > shedding skin conditions, e.g. exfoliative dermatitis
- > crowding
- > poor hygienic conditions.

5.6. Risk Factors for MRSA infection in a health care setting

The most frequently identified risk factors for infection are:

- > prior colonisation with MRSA
- > presence of indwelling devices (i.e. long term vascular access, indwelling urinary catheter, percutaneous endoscopic gastrostomy feeding tubes, wound drains)
- > presence of unhealed or chronic wounds
- > admission to a high risk clinical area (e.g. intensive care unit, burns).

Note: Most patients identified with MRSA by routine screening are colonised rather than infected.

5.7. Surveillance and screening for MRSA

Currently there is no consensus nationally or internationally about the most appropriate manner to conduct screening for MRSA.⁹ In South Australia the following guidance is provided.

Routine screening on all patients is not currently recommended. An active surveillance program should be in place that takes into account the factors that increase the risk of acquisition, is based on the prevalence of MRSA within the facility and considers the setting. The goal of an active surveillance program should be to identify patients who are either colonised or infected with MRSA in a timely manner, to enable implementation of transmission-based (contact) precautions. This will minimise the spread of the organism to other patients.

The frequency of active surveillance cultures for MRSA should be based on risk factors for colonisation.^{5; 8} As part of this strategy, hospitals may undertake selective admission and/or interval screening on high risk patient groups (see Table 1 - Screening on admission

Table 1 - Screening on admission

, next page).

Note: The patient should be provided with information explaining the specimen collection process and the significance of the test results. Obtain verbal consent prior to the collection of any swabs and ensure all action has been documented appropriately.

5.8. Screening on admission

The following patients should be considered for routine admission MRSA screening.

Table 1 - Screening on admission

Patients who have any of these risk factors should be screened	<ul style="list-style-type: none">> history of MRSA carriage or infection> transfers from another acute care facility particularly one known to have a high MRSA prevalence e.g. large metropolitan hospitals> frequent hospital admissions within the last 12 months> transfers from long term care facilities (LTCF)> patients with chronic unhealed wounds or broken skin> patients with indwelling medical devices> selective pre-operative patients - joint replacement, cardiothoracic procedures, prosthetic implants e.g. major vascular implants> high risk patient groups – ICU/high dependency> locales or populations with a high prevalence of community strains e.g. indigenous populations.
<ul style="list-style-type: none">> Staff screening is not recommended> Routine screening of MRSA carriage in non-acute settings is not recommended	

Note: Facilities can decide not to screen patients in certain circumstances, such as:

- > when the patient is expected to be an inpatient for less than 24 hours
- > in community and mental health settings where the risks of infection are generally lower.

This decision should be made in conjunction with the infection control staff of the facility and must be clearly documented. For further information regarding screening in small acute facilities, residential care, community and mental health settings refer to the relevant sections within this document.

Pending the results of admission screening, a high priority should be given to the allocation of a single room with dedicated bathroom facilities for those who pose the greatest risk of MRSA transmission to other patients (Refer to Patient factors that increase the risk of transmission of MRSA, page 5).

(Refer to Appendix 1 – MRSA Screening Flowchart)

5.9. Pre-operative screening for MRSA

To prevent surgical site infections with MRSA, patients undergoing some elective surgical procedures (including some surgeries that involve implantable or prosthetic devices) should be considered for pre-operative screening such as:

- > cardio-thoracic surgery
- > major orthopaedic surgery e.g. joint replacement
- > major vascular surgery.

In these instances it may also be desirable to screen for all types of *Staphylococcus aureus*.^{10;11}

The aim of such screening would be to assess the need for decolonisation procedures and/or suitable antibiotic prophylaxis. (Refer to Decolonisation on page 8).

5.10. On-going surveillance in acute care facilities

Regular surveillance cultures should be performed for high-risk patients such as those in:

- > intensive care units
- > burns units.

In these areas it is suggested that screening of all patients should occur on admission and at regular intervals e.g. weekly, until discharge from the units.^{5; 8; 12}

Do not continue to screen in this admission if a positive result is returned.

(Refer to Appendix 1 - MRSA Screening Flowchart).

5.11. Screening methods

Body sites selected for screening may vary dependent upon the laboratory methods used.¹³

- > Routine culture using blood or chromogenic agar has traditionally been used but requires specimens from several body sites to improve sensitivity, i.e. reduce the number of false-negative results, and final results may take several days.
- > Polymerase chain reaction (PCR) testing for MRSA is more sensitive than culture and involves direct detection from a nasal specimen. Results can be available in 2 – 24 hours. PCR testing has not yet been validated for neonates.

The following principles are recommended for the collection of screening swabs dependent upon laboratory method used:

Table 2 – Sites for screening

Method	Sites for screening
Culture based techniques	> Nose and perineum or groin, plus unhealed wound or indwelling medical device (including umbilical catheter in neonates)
PCR rapid testing	> Nose, plus unhealed wound or indwelling medical device.

5.12. Collection of specimens

For optimum detection of MRSA the method of specimen collection is important:

1. Follow manufacturer's instruction on specimen collection swab, or laboratory instructions
2. Prior to taking wound swabs, clean away surface debris and exudate with saline
3. Swabs must be placed in transport medium
4. Swabs should be clearly labelled, specifying the site of collection
5. Request "MRSA screen" on the lab request form and send to laboratory as soon as possible. If a swab is taken for clinical reasons request "MC&S".

5.13. Clearance protocols

Screening for discontinuation of contact precautions for MRSA (clearance) may be undertaken by individual facilities. Such screening should be outlined in a documented clearance protocol and should be supervised by the infection control staff of the facility. The decision to discontinue contact precautions should always be made in conjunction with infection control staff.

Patients may be considered to be “clear” of MRSA colonisation at the time of testing if the following criteria are met.¹² These criteria constitute a minimum requirement for MRSA clearance; however, individual institutions may apply more stringent criteria according to their patient population:

- > more than **three months** have elapsed since the last positive specimen
- > all wounds are healed (some settings will have patients that always have chronic wounds, making clearance difficult; in these circumstances discussion with an Infection Control Professional or Infectious Diseases Physician is recommended)
- > no indwelling devices are present (perform a risk assessment or consult with Infection Control Professional or Infectious Diseases Physician for patients with permanent indwelling devices)
- > no exposure to specific anti-MRSA antibiotic therapy in the **past three months**, i.e., vancomycin, rifampicin & fusidic acid, linezolid, clindamycin
- > no exposure to antiseptic body washes for at least two weeks prior to screening
- > consecutive sets of **negative screening swabs** (from sites referred to in Table 2 on page 7) on two separate occasions greater than **three weeks apart** (see Collection of Specimens section on page 7).

Note: Do not continue to screen in this admission if a positive result is returned.

Points to consider in clearance are:

- > colonisation with MRSA may persist for an extended period of time
- > one set of screening swabs probably has a sensitivity of less than 80%
- > future antibiotic treatment or hospitalisation may promote the reappearance of MRSA.

Patients who return negative swabs may still have undetectable numbers of the organism present. This may explain why cultures can become MRSA positive again, especially if the patient has had recent antibiotic treatment. Clearance swabs provide information regarding the patient’s MRSA status at the time of testing only and repeat cultures may still be necessary on subsequent admissions, especially to a high risk clinical unit.

5.14. Decolonisation

MRSA decolonisation therapy can be defined as the administration of topical antimicrobial or antiseptic agents, with or without systemic antimicrobial therapy, to MRSA colonised persons for the purpose of eradicating or suppressing carriage.

Although there is no proven long term effectiveness of decolonisation strategies and there are potential reported risks in increasing mupirocin resistance, decolonisation is strongly recommended in certain circumstances including pre-operatively for some surgeries that involve implantable or prosthetic devices,^{10; 14; 15} such as:

- > cardio-thoracic surgery
- > major orthopaedic surgery, i.e. joint replacement
- > major vascular surgery.

5.15. Treatment regime

5.15.1. Nasal decolonisation:

Apply 2% mupirocin ointment (match head size) to the inner surface of each nostril two or three times a day for five days in the week before the procedure.¹⁶

5.15.2. Skin decolonisation:

- > Bathe daily with an antiseptic wash or soap (2% chlorhexidine or 1% triclosan) for at least five days up to the day of surgery. Special attention should be paid to known carriage sites including axilla, groin, perineum and buttock area.
- > Wash hair using one of the antiseptics twice weekly.
- > Change and wash clothing, bedding, towels, etc., at the commencement of treatment and at least twice more throughout the treatment.

Comprehensive information on the procedure must be provided to the patient (Refer to Appendix 2: Consumer information – decolonisation treatment for MRSA carriage).

5.16. General principles when caring for a patient with MRSA

A person should not be refused admission to any health care facility nor should their management be adversely impacted on the basis of their MRSA status. Measures implemented to eliminate or minimise transmission should not interrupt the normal course of treatment required for the patient's recovery.

All facilities should develop a comprehensive, institution-specific, infection control guidance to detect, prevent and control infection and/or colonisation with MRSA. The infection control plan should take a risk-based approach that includes institutional as well as specific patient risk factors and ensures that patient care is not compromised. An effective infection control policy should incorporate the basic measures for infection control and include standard and contact precautions.

5.16.1. Standard precautions

All patients regardless of their infectious status will require the use of standard precautions.

Standard precautions include the following practices:

- > hand hygiene according to the [SA Health Hand Hygiene Policy Directive and Hand Hygiene Clinical Guideline](#)
- > personal hygiene (including respiratory hygiene and cough etiquette)
- > use of personal protective equipment (PPE) according to risk of body fluid exposure
- > use of aseptic technique where required
- > appropriate reprocessing of re-useable instruments and equipment
- > safe handling and disposal of sharps and potentially infectious material
- > safe handling of waste and linen
- > environmental controls including cleaning and spills management.

5.16.2. Contact Precautions

Contact precautions should be used when there is a risk of direct or indirect contact transmission and includes the following elements:

- > single room or geographical isolation (Refer also to Appendix 5: Small Health care facility bed management flow chart)
- > infection control signage
- > dedicated patient equipment where possible; if this is not possible, shared patient equipment must be cleaned and disinfected prior to use on another patient
- > appropriate use of PPE for contact precautions (i.e. gown or apron, and gloves)
- > appropriate cleaning measures.

Note: There are no special requirements for laundering of linen, disposal of waste, or cleaning of eating utensils for patients with MRSA colonisation or infection.

5.16.3. Patient placement

Patient placement should be based on a risk management approach and will depend upon the setting of the health care facility. For example, in an acute in-patient setting, patients with MRSA should be geographically isolated; however, this may not be appropriate in other settings. For further information, refer to the relevant sections in this guideline and Appendix 5: Small Health care Facility Bed Management Flow Chart.

5.16.4. Infection control Signage

Signage indicating the need for contact precautions and the use of appropriate PPE should be placed outside of the patient room. Appropriate signage can be accessed from the [Australian Guidelines for the Prevention and Control of Infection in Healthcare, Canberra: National Health and Medical Research Council \(2019\)](#).

5.16.5. Dedicated patient equipment

Minimum amounts of equipment and supplies should be taken into the room. Dedicate the use of non-critical items (e.g. stethoscope, sphygmomanometer etc.) to a single patient or cohort of patients with MRSA where possible. If this is not possible, shared patient equipment must be cleaned and disinfected prior to use on another patient.

Patients can use communal phones; however, the patient should perform hand hygiene using alcohol-based hand rub prior to using the phone and the phone should be decontaminated using a large alcohol wipe prior to returning to general use.

Patients' charts and medical records should be left outside of patients' rooms.

5.16.6. Use of personal protective equipment (PPE)

Gloves

Gloves are used to prevent contamination of healthcare worker hands when having direct contact with patients that are colonised or infected with pathogens transmitted via the contact route. All staff should put on non-sterile gloves when direct contact with either the patient or the patient's environment is anticipated.

Gloves must be removed and hand hygiene performed before leaving the patient's room/area.

Gowns or aprons

Gowns or aprons are used to protect healthcare worker arms and exposed body areas and to prevent contamination of clothing with potentially infectious micro-organisms such as MRSA. The choice of sleeve length depends on the procedure being undertaken and the extent of risk of exposure of the healthcare worker's arms. If an apron is used, it is important to ensure that wrists and forearms are included in the hand hygiene procedure.

All staff should put on an impervious/fluid resistant single use gown or apron before direct contact with either the patient or their environment, and especially when exposure to body fluids is anticipated.

Gowns or aprons should not be worn outside of the room unless disposing of clinical waste.

Masks

If MRSA is present in the sputum AND the patient has respiratory symptoms (i.e. coughing) then staff should wear a surgical mask as per standard precautions.

A patient with respiratory symptoms should also wear a surgical mask when outside the room (providing it can be tolerated).

Cleaning

Routine cleaning should be intensified by the use of a detergent/disinfection solution as per the [SA Health Cleaning Standard for Healthcare Facilities Policy Directive](#).

Key points are:

- > A Therapeutic Goods Authority (TGA) approved hospital grade disinfectant (preferably with label claims against VRE) or a chlorine-based product with 1000 ppm available chlorine should be used.
- > Particular attention should be paid to all frequently touched surfaces, such as bedrails, door handles, commodes, toilet, hand basins and taps.
- > All patient equipment should be cleaned with detergent and water and disinfected prior to use on or by another patient. A large detergent/disinfectant or alcohol wipe may be used to decontaminate small items of patient care equipment which are not visibly soiled. A new wipe should be used for each item of equipment.
- > On discharge, patient bedside curtains (if not a disposable, antimicrobial type) should be changed; disposable antimicrobial curtains should be changed if visibly soiled, damaged or the use-by date has expired.
- > The room may be safely re-used once all steps are completed and all surfaces are dry.
- > Ensure that all cleaning equipment and solutions are changed before moving to the next patient area/room.

5.16.7. Consumer education

Patients and their relatives should be provided with information that clearly explains the importance of MRSA, how to prevent transmission whilst in hospital and how it is managed once discharged. (Refer to Appendix 3: Consumer information – Methicillin-resistant *Staphylococcus aureus* frequently asked questions).

5.16.8. Antimicrobial stewardship

Procedures should be in place to promote judicious antibiotic use, particularly of broad spectrum antibiotics, in order to limit the increased development of antibiotic resistant micro-organisms.¹²

5.16.9. Outbreak management

An outbreak is defined as an increase in the number of cases (colonisations or infections) above the number normally occurring in a particular health care setting over a defined period of time. In a hospital setting, this may be indicated by a cluster of cases occurring in the same bay, ward, or clinical service over a short period of time.

If an outbreak of MRSA infection/colonisation is suspected the Infection Control Professional should liaise with a Clinical Microbiologist/Infectious Diseases Physician and senior nursing and medical personnel of the area involved. Alternatively, the Infection Control Service of the Department for Health & Ageing can be contacted for assistance.

In many health care settings, where routine screening of patients is not commonly undertaken, identification of the index patient may be difficult because of the potential spread of the organism before it is detected.

In the event of an outbreak, this will require the implementation of a number of actions to assist with the investigation, e.g. staff and environmental screening, contact screening, strain typing etc.

For further guidance on suggested actions and investigations refer to the [Australian Guidelines for the Prevention and Control of Infection in Healthcare, Canberra: National Health and Medical Research Council \(2019\)](#), section 3.4.3 – Outbreak investigation and management.

5.17. Management of patients with MRSA in inpatient areas of acute health care facilities

Containment of MRSA in acute health care facilities requires rigorous infection control measures and strict compliance by hospital personnel. Special awareness and education sessions should be provided to all staff.

5.17.1. Notification of key personnel

When the laboratory confirms the isolation of a MRSA strain from a patient (infected or colonised), key personnel should be notified immediately to ensure that appropriate contact precautions are initiated promptly.

Key personnel include:

- > medical practitioner(s) responsible for the care of the patient
- > infection control coordinator
- > nurse in charge of the ward or unit
- > other personnel as may be specified in the facility's MRSA policy.

Note: If the notification occurs outside the normal working hours of the Infection Prevention and Control Unit a system should be in place to ensure that they are informed as soon as possible the next working day. In this case the duty Nurse Manager or equivalent should also be notified.

The organisation's alert mechanism for MRSA should be implemented. Facilities are encouraged to develop a flow chart or protocol for staff to follow, in conjunction with their laboratory services, in order to facilitate this notification process.

5.17.2. Infection control measures

Patient placement

The Infection Control Coordinator, in consultation with the ward manager, should review admissions to the ward and the need to transfer patients, with the aim of preventing transmission of MRSA.

To decrease the risk of transmission to other patients within the wards, it is important to include the following in planning patient placement:

- > A single room with ensuite facilities or dedicated bathroom is preferred. However, if these facilities are not available then a shared bathroom can be used. If this is the case then it must be cleaned and disinfected more frequently.
- > Cohorting of patients with MRSA is not generally recommended but may be considered in certain situations in consultation with the Infection Control Coordinator. If there are limited facilities for isolation, priority should be given to isolating those patients with conditions that may facilitate transmission e.g. presence of chronic wounds, or patients with compromised hygiene practices or exfoliative skin conditions.
- > A contact precautions and/or 'STOP' sign should be clearly visible at the entrance to the room.
- > Geographic separation of vancomycin-resistant enterococci (VRE) and MRSA patients is highly recommended.
- > A non-carpeted area is required.

Note: Small acute hospitals, for example those that do not perform high risk surgery such as joint replacement, cardiothoracic surgery, cardiac implants or vascular surgery, should perform a risk assessment for placement of the patient if a single room is not available. (Refer to Management of patients with MRSA in small acute health care facilities; page 13.)

Staffing

To decrease the risk of transmission to other patients within the wards, it is important to include the following in planning the care of the patient:

- > Staff should be well-versed in the application of contact precautions (e.g. hand hygiene, appropriate PPE and diligent attention to cleaning of the environment).
- > Staff screening may be appropriate in certain circumstances (i.e. outbreak situations) but should only be undertaken in consultation with expert infection control advice, and with the consent of the staff member concerned.

Movement of patients within the hospital

MRSA status must not compromise patient management:

- > Patients may go outside their isolation room provided any lesions/wounds are contained and requested not to visit other patients during their hospital admission. Patients should be encouraged to perform hand hygiene before leaving their rooms.
- > Gowns and gloves need not be worn by accompanying staff if direct patient care is not anticipated however staff should perform hand hygiene after completing the transport task.
- > The patient and his/her family should be informed of their MRSA status as soon as possible and provided with an information leaflet. The importance of hand hygiene before leaving their room must be emphasised.

Visitors

Under normal circumstances, there is no requirement for visitors to wear protective apparel (PPE). However there may be certain situations where PPE may be required e.g. when a visitor is providing direct care and intends to visit another patient in the same facility. All visitors should be instructed to perform hand hygiene prior to leaving the room. Patient's clothing may be taken home in a plastic bag for washing using a normal wash cycle. An information fact sheet regarding MRSA should be provided. (Refer to Appendix 3: Consumer information – Methicillin-resistant *Staphylococcus aureus* frequently asked questions).

Transfer of patients between facilities

Patients with MRSA, or their contacts, should not be refused admission or transfer to any health care facility. Patient management should not be compromised and transfer may be necessary from acute care hospitals to other facilities for convalescence, rehabilitation or long term care.

The following are recommended:

- > The medical/nursing documents accompanying the patient must clearly state details relating to the patient's MRSA status.
- > If the transfer is being conducted by the SA Ambulance Service they should be informed when the booking for transport is made.
- > Transport via clinic car or taxi requires standard precautions only provided all discharging wounds are covered.
- > A receiving facility that isolates MRSA from a patient within 48 hours of transfer should advise the transferring institution of the positive result.

5.18. Management of patients with MRSA in small acute health care facilities

As a general rule, the care of an MRSA patient in small acute health care facilities such as those found within the regional Local Health Networks (LHNs), should be the same as that laid out in the Management of patients with MRSA in inpatient areas of acute health care facilities (page 12). It is recognised, however that some rural settings may face challenges not encountered in metropolitan settings. One example of this is the co-location of both acute care patients and long term care residents within one facility. In this instance the management of MRSA may need to be modified to best suit the unique needs of the population within the facility.

Most rural hospitals do not have the same level of endemicity of MRSA colonisation as occurs in larger metropolitan hospitals and most cases of MRSA are “imported” from other health care facilities interstate or in metropolitan Adelaide. Infection control procedures should therefore concentrate on targeted screening of patient transfers from metropolitan and interstate hospitals, and patients with a recent history of admission to a large metropolitan hospital, with the objective of timely detection of unrecognised MRSA carriage and prompt application of contact precautions.

Health care workers responsible for care of MRSA patients/residents in such settings are advised to seek advice from their Infection Control staff in the first instance, and may contact SA Health’s Infection Control Service for further advice if required. In certain circumstances, it may be advisable to adopt a risk management approach when formulating strategies to manage MRSA within a regional LHN facility.

A bed management decision algorithm has been developed to assist staff when determining placement of patients with MRSA infection / colonisation. (Refer to Appendix 5: Small Health care facility bed management flow chart.)

5.19. Management of patients with MRSA in the peri-operative setting

5.19.1. Pre-theatre

- > All patients, regardless of infectious status, should shower or bathe and put on a clean theatre gown as close as possible to the scheduled procedure time.
- > If the patient is an inpatient, the bed linen should be changed as close as possible to the scheduled procedure time.¹⁷
- > Bed rails and frequently touched surfaces of the bed should be cleaned with detergent/ disinfectant prior to transport to the operating theatre.
- > Patients may wait in a “holding area” provided standard precautions are adhered to; if close physical contact (i.e. physical examination) is anticipated gloves and a long-sleeved gown or apron are required with strict attention to hand hygiene.

5.19.2. Theatre environment

- > Staff must perform hand hygiene according to the [SA Health Hand Hygiene Guideline](#).
- > Staff involved in close physical patient contact (e.g. transferring patient from bed/barouche to operating room table) must wear a long-sleeved gown or apron and gloves over theatre clothes. These must then be discarded immediately after patient contact and hand hygiene must be performed.
- > All routine theatre equipment is to remain in the operating room.
- > Case notes must be available in the theatre. Gloves must be removed and hand hygiene performed before and after writing in the notes.

Designate a “contact” and “non-contact” staff member to decrease the number of staff having direct contact with the patient (Refer to Appendix 4: Contact and non-contact zones for control of MROs in the peri-operative setting).

Electronic equipment, e.g. anaesthetic equipment, should be decontaminated by wiping over with a large alcohol wipe or disinfected according to the manufacturer’s instructions. The bacterial/viral filter used with single use anaesthetic circuits must be changed between each patient. For further information refer to the SA Health Safe Use of Anaesthetic Equipment & Prevention of Cross Infection Fact Sheet available on the [SA Health Reprocessing of medical devices](#) web page.

There are no special requirements for the management of waste, linen and instruments used in the theatre environment. These should be managed according to standard precautions and instruments according to AS/NZS 4187 (2014) - *Cleaning, disinfecting and sterilizing reusable medical and surgical instruments and equipment, and maintenance of associated environments in health care facilities*.

5.19.3. Post-theatre

- > Patients should be recovered in a designated area in recovery.
- > Staff involved in close physical patient contact e.g. transferring patient from barouche to bed, physical examination must wear a long sleeved gown or apron and gloves over theatre clothes.
- > Staff may attend to other patients; however they must remove PPE & perform hand hygiene before moving to the next patient.
- > When the patient is discharged from the perioperative setting all surfaces and patient care equipment in the patient zone should be cleaned with an appropriate detergent/disinfectant.
- > Patient privacy curtains do not require changing unless visibly soiled.

5.20. Management of patients with MRSA in non-inpatient settings

Management of patients with MRSA in non-inpatient settings can generally be managed with standard precautions (hand hygiene, cleaning shared patient equipment and cleaning of frequently touched environmental surfaces) as long as the patient does not have risk factors that facilitate transmission, such as those listed on page 4. Patients attending these areas generally do not have the same potential to contaminate the environment as they do whilst an inpatient. The provision of alcohol-based hand rubs at the entrance to all non-inpatient areas and directing all patients to clean their hands before entering will assist in minimising the potential for cross-transmission.

5.21. Management of patients with MRSA in outpatient settings – outpatient clinics, emergency, radiology, dental, primary care

In these settings, strict adherence to Standard Precautions (i.e. hand hygiene, cleaning shared patient equipment and environmental cleaning for **ALL** patients will assist in minimising cross-transmission risks).

- > All patients, regardless of infectious status, should perform hand hygiene on admission to the area.
- > Patients can sit in the waiting area providing all discharging wounds are covered with a clean dressing.
- > Hand hygiene should be performed by all staff before and after patient contact.
- > If close physical contact is required (e.g. complicated wound care) then gloves and a gown or apron will be required.
- > When the patient leaves all surfaces contacted by the patient (e.g. examination table, patient care equipment etc.) should be cleaned with an appropriate detergent/disinfectant. Privacy curtains need not be changed unless they are visibly soiled.

5.22. Management of patients with MRSA in dialysis centres

MRSA colonisation should not prevent inpatient or outpatient treatment in dialysis centres.

Infection control precautions specifically designed for haemodialysis settings are more stringent than the standard precautions routinely used in hospitals and should prevent patient-to-patient transmission of blood borne viruses and pathogenic bacteria.

Regular auditing of compliance with standard precautions in these settings is important.

For more detailed infection control measures refer to the SA Health Vancomycin Resistant Enterococci (VRE) & Methicillin-resistant *Staphylococcus aureus* (MRSA) Screening & Management in the Adult Renal Patient Population Clinical Guidelines (2014); available at: the [SA Health Multidrug-resistant organisms \(MRO\)](#) web page.

5.23. Management of patients with MRSA in community health care

In this setting, strict adherence to Standard Precautions, i.e. hand hygiene and cleaning shared patient equipment for **ALL** patients, will assist in minimising cross-transmission risks, regardless of multi-resistant organism status.

- > Only essential items required for the patient should be taken into the home.
- > Hands must be decontaminated with alcohol-based hand rub or washed with soap and water as per the SA Health Hand Hygiene Policy Directive and Hand Hygiene Clinical Guideline (before and after patient contact; before and after a procedure and upon leaving the home or environment).
- > PPE is only required for close physical contact (close physical contact can be described as skin to skin contact for a period of time e.g. assistance with showering, dressing, complex wound dressings etc.).
- > All re-usable equipment should be cleaned prior to use on or by another patient as per Standard Precautions:
 - if the item is to be used immediately by another patient then a detergent/disinfectant solution or wipe may be used to decontaminate the item
 - if the item is to be returned to a central facility for cleaning it may be placed in a plastic bag for transport
 - larger items such as wheelchairs, commodes etc. should always be transported to a central cleaning department for thorough cleaning between uses; if visibly soiled, these may be spot cleaned with a detergent/disinfectant solution or wipe prior to placing in the vehicle.
 - gloves should be used when handling visibly soiled equipment.
- > Any waste generated in the care of the patient (excluding sharps) may be discarded in the household waste.

5.24. Management of patients with MRSA in ambulance services and aeromedical transport services

Ambulance services and aeromedical transport organisations must be informed in advance when patients with MRSA (infected or colonised) are to be transferred to another facility.

In this setting, strict adherence to Standard Precautions, i.e. hand hygiene and cleaning shared patient equipment for **ALL** patients, will assist in minimising cross-transmission risks, regardless of multi-resistant organism status.

The following procedures should be adhered to:

- > Hand hygiene should be performed by all staff before and after patient contact.
- > Hand hygiene should be performed after removing PPE and on exiting the ambulance or aeroplane.
- > If close physical contact is required, e.g. transferring the patient from bed/barouche, then gloves and a gown or apron will be required.
- > Frequently touched surfaces in the ambulance and aircraft should be thoroughly cleaned with an appropriate detergent/disinfectant between each patient carry.

Note: Transport via clinic car or taxi requires standard precautions only provided all discharging wounds are covered.

5.25. Management of residents with MRSA in residential care facilities

A person should not be refused admission to any residential care facility on the basis of MRSA colonisation or infection.

5.25.1. Background

The term residential care facility (RCF), as used in this document, applies to a diverse group of residential settings ranging from institutions for the developmentally disabled, residential mental health facilities and long-term rehabilitation settings to nursing homes for the elderly. RCFs differ from other health care settings in that clients reside together in one setting; for most residents, it is their home. Since many residents interact freely with each other, controlling transmission of infection is challenging. The psychosocial risks associated with isolation or restriction of residents to their room means that the routine transmission-based precautions applied in hospital settings are not necessarily appropriate and may require adaptation.^{18; 19}

Residents of RCFs may require frequent hospitalisation, in which case they may transfer pathogens between RCFs and health care facilities in which they receive care. Residents are usually screened for multi-resistant organism carriage on admission to hospital.¹⁴

5.25.2. Risk Factors for MRSA acquisition (colonisation or infection) in RCFs:

- > prior prolonged hospitalization
- > preceding antimicrobial therapy
- > presence of unhealed or chronic wounds
- > presence of invasive devices (i.e. indwelling urinary catheters, ostomies, intravascular lines)
- > close proximity to a resident already colonised or infected with MRSA.

5.25.3. Risk factors that increase risk of transmission of MRSA in RCFs:

These include but are not limited to:

- > uncontained wound exudate from unhealed or chronic wounds
- > shedding skin conditions e.g. exfoliative dermatitis
- > crowding
- > poor hygienic conditions.

5.25.4. Screening

Routine admission and ongoing screening for MRSA is not recommended. There may be exceptions when screening is appropriate in an individual resident's management or in the investigation of a facility outbreak. This should occur as part of a facility's infection prevention and control program and when support is available from a specialist infection control professional, infectious disease physician or microbiologist.

5.25.5. Principles of Management

Strict adherence to Standard Precautions, i.e. hand hygiene, cleaning shared patient equipment and environmental cleaning, for **ALL** residents will assist in minimising cross-transmission risks

Resident placement

Single rooms are recommended when residents with MRSA (colonisation or infection) have conditions that facilitate transmission e.g. draining wounds unable to be contained, exfoliating skin conditions e.g. psoriasis.¹⁸

If single rooms are not available, residents with MRSA can be placed in a shared room with residents who are at low risk of acquisition (i.e. no draining wounds, not on antibiotic therapy, no indwelling invasive devices).

For further information refer to Appendix 5: Small Health Care Facility Bed Management Flow Chart.

Standard Precautions

Standard precautions should be applied to all residents as this is the basic infection control strategy required for care. Particular attention should be paid to hand hygiene and where practicable residents should be requested/assisted to perform hand hygiene prior to communal activities. There are no special requirements for general or clinical waste, linen handling or catering.

For further information, refer to General Principles – Standard Precautions on page 4.

Contact precautions

Contact precautions should be considered for residents that present a risk of MRSA transmission to others (refer to previous page), or if they have an active MRSA infection at any site.

- > All staff should put on non-sterile gloves and an impervious/fluid resistant single use gown or apron when close physical contact is required or anticipated, i.e. assistance with activities of daily living, complicated wound care etc.
- > Gowns or aprons should not be worn outside of the room unless disposing of clinical waste, in which case they must be removed immediately after disposal of the waste and care must be taken not to contaminate the environment during the disposal process.
- > Hand hygiene must be performed before and after any close contact resident care.

For further information, refer to General Principles - Contact Precautions on page 4).

Routine Cleaning

When MRSA infection or colonisation is suspected or known to be present, routine cleaning should be intensified. This includes the addition of a TGA approved hospital grade disinfectant (preferably with label claims against MRSA) OR a chlorine-based product, paying particular attention to all frequently touched surfaces, such as bedrails, door handles, commodes, bathroom, toilet, hand basins and taps.

Detergent solution may be used on all other surfaces in the room, including the floor.

Antibiotic Control

Multi-resistant organisms can pose a significant risk for residents in RCFs and this resistance has been strongly associated with antibiotic use. A common problem leading to overuse of antibiotics is the failure to distinguish between infection and colonisation, for example, prescribing antibiotics for a positive swab culture from a pressure ulcer or urine culture without signs and symptoms of infection (i.e. represents colonisation only). Antibiotics may also be prescribed over the telephone without the Medical Officer physically reviewing the resident, which will compound issues with inappropriate antibiotic use.

Policies and procedures should be in place to promote judicious antibiotic use, particularly of broad spectrum antibiotics, in order to limit the increase and spread of antibiotic resistant micro-organisms such as MRSA within RCFs.^{12; 18; 19}

6. Workforce implications

Staff Colonised or Infected with MRSA

Staff who are colonised or infected with MRSA should not be discriminated against as a result of their condition. They should be referred for expert medical advice and management of their condition. Following such consultation the following may be advised:

- > Staff may possibly require redeployment from their usual patient care activities, depending on the area in which they work, the nature of their colonisation/infection and whether they can perform hand hygiene effectively.
- > Decolonisation treatment may be considered as an option for MRSA positive staff (See Decolonisation section on page 8). Clearance swabs may be required following any MRSA treatment to determine its effectiveness, so that they may be assessed for resumption of usual work activities.
- > Staff who become aware of their MRSA positive status are under no legal obligation to inform their employer of this fact. However, all staff should be aware of their responsibilities towards patients and not put them at risk of acquiring MRSA.

7. Safety, quality and risk management

							
National Standard 1	National Standard 2	National Standard 3	National Standard 4	National Standard 5	National Standard 6	National Standard 7	National Standard 8
Clinical Governance	Partnering with Consumers	Preventing & Controlling Healthcare-Associated Infection	Medication Safety	Comprehensive Care	Communicating for Safety	Blood Management	Recognising & Responding to Acute Deterioration
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Appendices

- Appendix 1: MRSA screening flow chart
- Appendix 2: Consumer information – decolonisation treatment for MRSA carriage
- Appendix 3: Consumer information – Methicillin-resistant *Staphylococcus aureus* frequently asked questions
- Appendix 4: Contact and non-contact zone for control of MROs in the peri-operative setting
- Appendix 5: Small health care facility bed management flow chart

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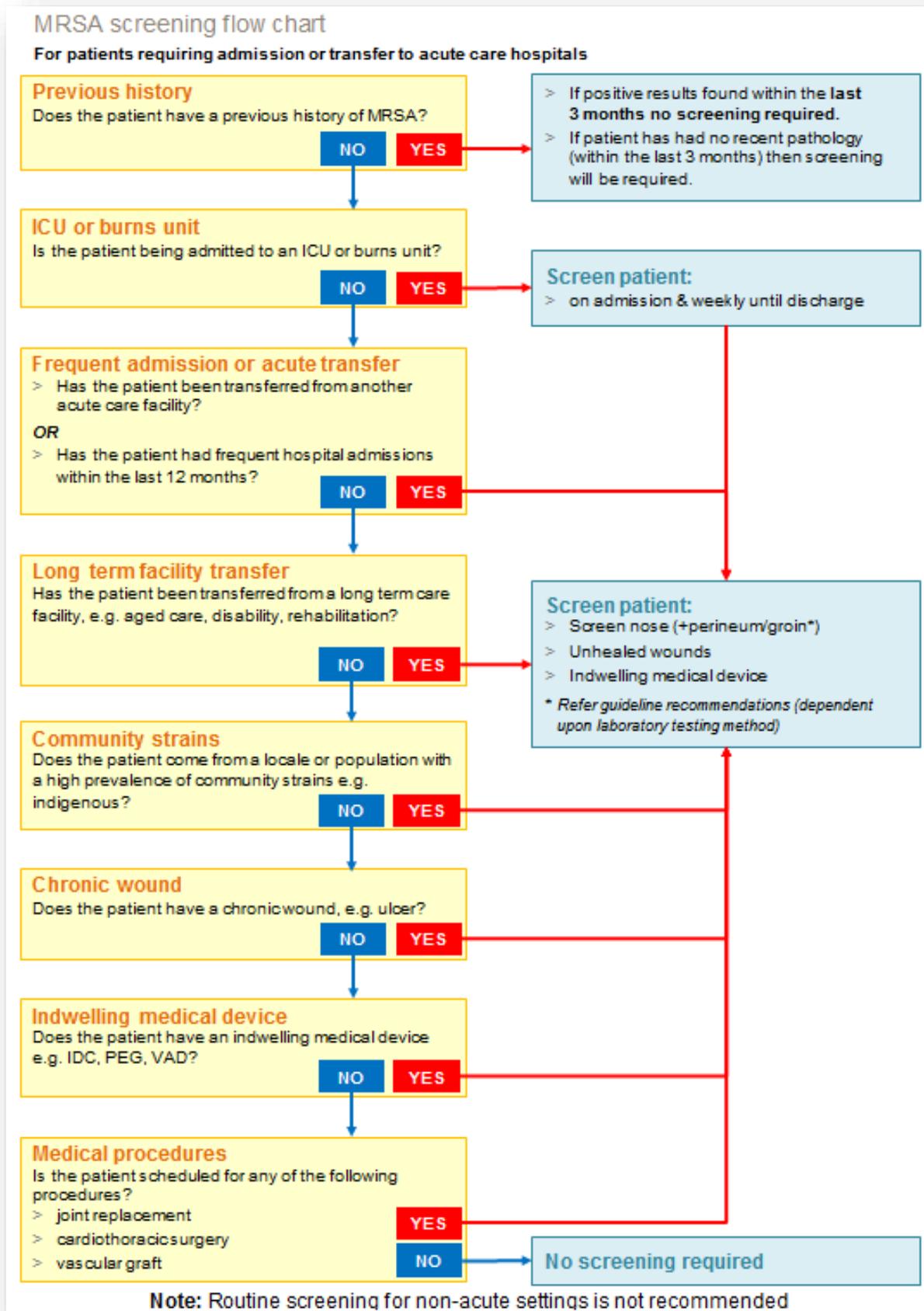
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23/06/15	V2.3	SA Health Safety & Quality Strategic Governance Committee	Minor updates and insertion into new guideline template
20/11/14	V2.2	SA Health Safety & Quality Strategic Governance Committee	Convert to the clinical guideline template
16/04/14	V2.1	SA Health Safety & Quality Strategic Governance Committee	Minor alteration
10/12/13	V2	SA Health Safety & Quality Strategic Governance Committee	Revised
30/04/05	V1	Director, Communicable Disease Control Branch	Original approved version.

Appendix 1: MRSA screening flowchart



Appendix 2: Consumer information – decolonisation treatment for MRSA carriage



Consumer information

Decolonisation treatment for MRSA carriage

Staphylococcus aureus (also known as Golden Staph) is a type of bacteria (germ) that can be commonly found on human skin and often in the nose. It can sometimes cause infection and may require treatment with antibiotics. Some *Staphylococcus aureus* bacteria have developed resistance to many antibiotics and these are known as methicillin-resistant *Staphylococcus aureus* (MRSA). The use of medicines to reduce or eliminate the carriage of MRSA is known as "decolonisation" treatment.

Why do you need to have a decolonisation treatment?

The purpose of decolonisation treatment is to reduce the number of MRSA bacteria on your skin and/or in your nose, which then decreases the risk of spreading the MRSA to others or developing an infection. If the presence of MRSA bacteria is identified prior to surgery it gives the medical staff an opportunity to provide suitable treatment to lower the risk of getting an infection.

When is decolonisation treatment given?

In order to reduce the burden of MRSA on your skin, medical staff may suggest decolonisation treatment particularly for elective surgery such as:

- > cardiothoracic surgery
- > major orthopaedic surgery e.g. hip or knee replacement
- > major vascular surgery e.g. surgery requiring grafts.

Occasionally, there is a need to treat an entire family or household, especially if there is a history of repeated episodes of skin infections within the household. If so, the medical team and/or the Infection Prevention and Control Unit staff should discuss this further with you and your family.

What is the decolonisation treatment?

There are two parts to the decolonisation treatment:

1. chlorhexidine or triclosan body wash, and
2. mupirocin nasal ointment (antibiotic cream).

The decolonisation treatment takes approximately one week to complete.

What do you need to do?

You will be instructed when to commence the treatment. On this day and subsequent days, instead of using your regular soap in the shower/bath, substitute with the medicated body wash for as many days as prescribed by your doctor. You will also be instructed to wash your hair twice during the treatment period with the same product.



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Note: This fact sheet can be downloaded via the SA Health MRSA clinical page:
<https://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/conditions/hospital+infections/hospital+infections>

On each day, you will also be instructed to use the mupirocin nasal ointment. To do this, wash your hands, apply a small amount (about the size of a match head) to the inside of each nostril, and massage the outside of your nostrils to spread the ointment around. Alternatively, you can use a small cotton bud to apply the ointment. After applying the mupirocin, wash your hands again. The mupirocin ointment needs to be put inside of each nostril three times each day, for the duration of the decolonisation treatment period.

What else can you do to help?

Once you have started the treatment, we recommend that you:

- > change your clothing, bedding, towels and other linen at the commencement of treatment and at least twice more throughout the treatment
- > wash your linen using a normal cycle in hot or cold water with detergent
- > wash your hands once you have handled the linen.

After decolonisation, will MRSA come back again?

There is always the possibility that even with decolonisation you could still have MRSA. Further swabs will be required to determine this.

Where can I find more information on MRSA?

If you would like more information on MRSA, the treatment, or have concerns that you need to talk to someone about, please speak to the Infection Prevention and Control staff of your hospital, or you can access information from the following SA Health web pages:

- > Infection prevention and control: www.sahealth.sa.gov.au/hospitalinfections
- > "You've Got What?": www.sahealth.sa.gov.au/youvegotwhat

For more information

Infection Control Service
Communicable Disease Control Branch
11 Hindmarsh Square
Adelaide SA 5000
Telephone: 1300 232 272
www.sahealth.sa.gov.au/HospitalInfections
Public -I1-A2

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Consumer information

Methicillin-resistant *Staphylococcus aureus* (MRSA)

Frequently Asked Questions

What is *Staphylococcus aureus* and MRSA?

Staphylococcus aureus is a type of bacteria (germ) that can be commonly found on human skin, and is sometimes referred to as "golden staph". Most of the time, it lives in our nose or on our skin without causing any problems. However, under some circumstances, it can enter the body through broken skin (for example through wounds, surgery, or intravenous drips) and cause infection that requires treatment with antibiotics. Some strains of *Staphylococcus aureus* have developed resistance to the usual antibiotics used for treatment of infections and these are known as methicillin-resistant *Staphylococcus aureus* (MRSA). Infections caused by MRSA are usually more difficult to treat due to the reduced number of effective antibiotics available.

How did I get MRSA?

Some people have MRSA in their nose or on their skin with no apparent ill effects. This is called colonisation. People colonised with MRSA who show no signs or symptoms of illness are known as carriers. However, if the MRSA enters a wound or broken skin, it can cause an infection. MRSA infections that occur in the community usually appear as skin infections, such as pimples and boils, and may occur in otherwise healthy people who have not been in hospital. Some infections may require treatment in hospital.

How is MRSA spread?

MRSA is usually spread from person to person through direct contact (usually via your hands) with a person who is infected or colonised, or by contact with contaminated shared items such as towels and frequently touched surfaces such as door handles, taps and benches. It is therefore important that people who are known to have MRSA are placed under special precautions whilst in hospital in order to prevent spread to other patients.

What does it mean to have MRSA?

People may not know that they are carrying MRSA and may never develop an infection. However, if people who are colonised with MRSA have an operation or a medical device inserted such as an intravenous drip or wound drain, they become at risk of getting an infection. Treatment choices are then limited because of the resistance to antibiotics usually used to treat the infection.

What happens when I am in hospital?

If you are scheduled for certain operations such as a hip or knee replacement, major heart or vascular surgery, then specimens will be required for laboratory testing to determine whether you are a carrier. This will involve taking a swab from your nose, groin or axilla (arm-pit) and any wounds or indwelling medical devices, such as a urinary or intravenous catheter.

If you are found to have MRSA you may be cared for in a single room and health care staff will wear gloves and a gown when caring for you. You will be asked to regularly wash your hands with soap and water, or use alcohol-based hand rub, and to stay in your room whenever possible unless you need to be transferred for special tests or treatment. Hospital staff will advise you if different instructions are necessary.



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Note: This fact sheet can be downloaded via the SA Health Hospital infections page:

<https://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/conditions/hospital+infections/hospital+infections>

What about family and visitors when I am in hospital?

It is quite safe for family and friends to visit you whilst in hospital. However, visitors are strongly advised to wash their hands after visiting you, and if they have any wounds they should be covered. Hand washing is the most important way to prevent the spread of MRSA (and other infectious diseases such as the flu and gastro).

If visitors or family help you with care such as assistance with dressing or showering then they may be asked to wear gloves and a gown.

How can I prevent the spread of MRSA when I go home?

To prevent the spread of MRSA to other people when you are at home, it is important that you follow these precautions:

- > Wash your hands with soap and water and dry thoroughly after going to the toilet or before preparing food.
- > Keep wounds, cuts and abrasions clean and covered until healed.
- > Keep surfaces such as benchtops, bathrooms and toilets clean.
- > Use your own towels and face cloths. Do not share these items with other people.
- > Avoid sharing grooming items e.g. nail scissors, tweezers, razors and toothbrushes.
- > If you are in a sporting team it is advisable not to share towels or drink bottles with team mates.
- > Make sure you follow instructions and advice provided by your doctor or healthcare provider on how to care for wounds or manage medical devices.

No special requirements are needed for your clothing and towels, eating utensils and dishes. They can be washed in the normal way using detergent or laundry powder. Extra disinfectant is not needed.

You do not have to tell anyone (other than health professionals) of your MRSA status.

What should I do if I have to go into hospital or receive health care in the community?

You should always inform the health care worker that you have had a MRSA infection or colonisation in the past. This will assist them to ensure that they provide the appropriate care for you. This may mean being allocated a single room, having some swabs taken to see if you still have MRSA, and you may also be asked to use a special soap and nasal ointment for a few days prior to any surgery.

Where can I find more information on MRSA?

You can speak with your Doctor or Health Professional or access more information from the following SA Health web pages:

- > Infection prevention and control: www.sahealth.sa.gov.au/hospitalinfections
- > "You've Got What?": www.sahealth.sa.gov.au/youvegotwhat

For more information

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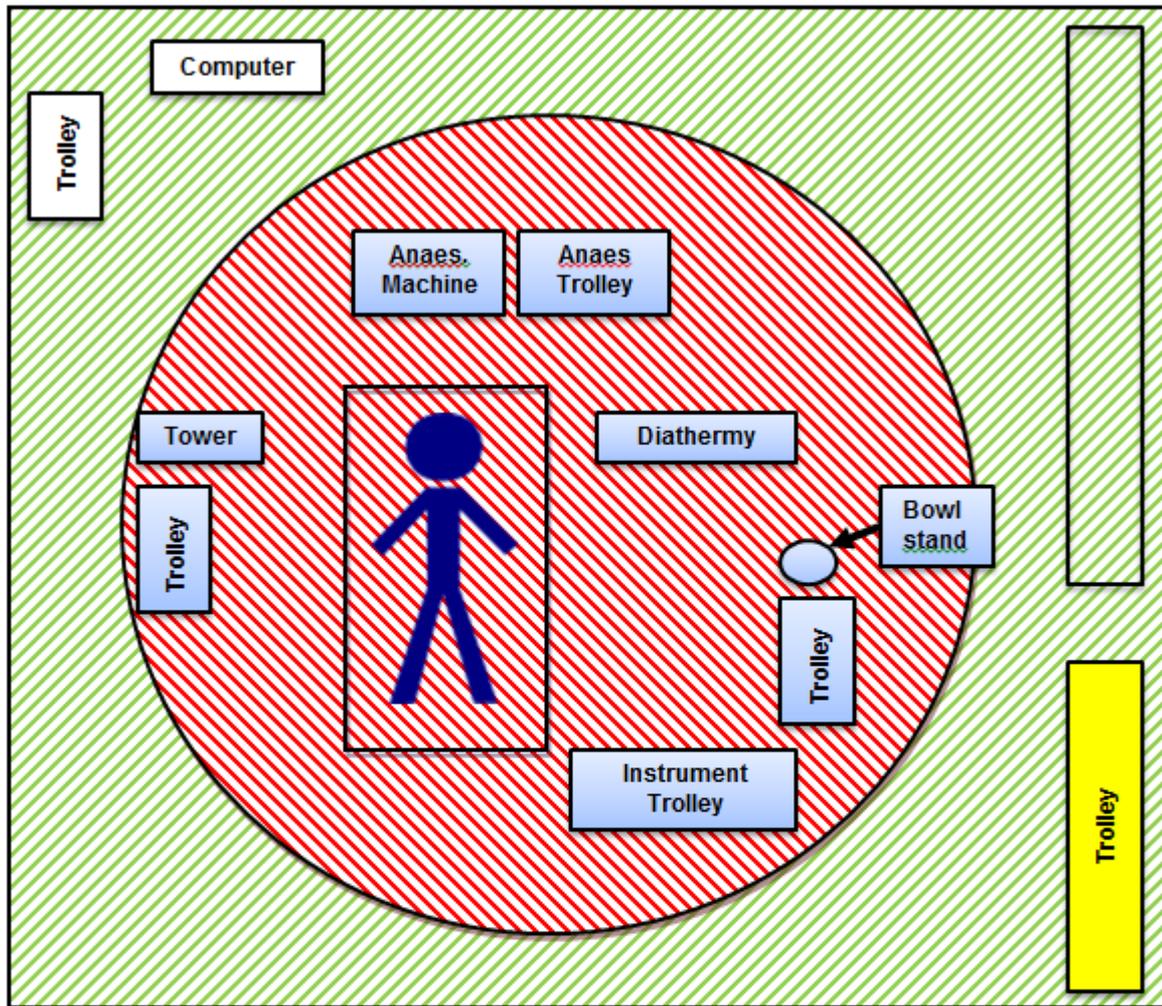
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Appendix 4: Contact and non-contact zones for control of MROs in the peri-operative setting



-  Non-contact Zone
-  Contact Zone
-  May convert into a "Contact Zone"
-  Equipment in "Contact Zone"
-  Equipment in "Non-contact Zone"

INFC

Appendix 5: Small Health care facility bed management flow chart

For patients identified with MRSA or VRE requiring admission or transfer to small hospitals (includes residential aged care or rehabilitation beds) OR hospitals that do not perform high risk surgery such as joint replacement, cardiothoracic, cardiac implant or vascular surgery

