Vancomycin-resistant enterococci (VRE): Infection Prevention and Control Clinical Guideline

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Contents

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1. Introduction

This guideline describes recommended measures to prevent the spread of vancomycin-resistant enterococci (VRE) in acute inpatient health care facilities and non-inpatient settings including: outpatients, emergency, radiology, dental, perioperative settings, dialysis centres, 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 VRE may receive medical care.

This guideline presents a risk-based approach to the control of antibiotic resistant organisms in healthcare 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.

Note: A person's VRE status should never interfere with the provision of appropriate, high quality care.

No-one in South Australia should be refused admission or care in any health care facility or have their healthcare compromised solely due to being colonised or infected with VRE.

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

2. Background

Enterococci (*Enterococcus* species) are bacteria normally found in the gastrointestinal tract of animals and humans, and in the female genital tract. Although usually harmless, these bacteria can be significant pathogens in immune-compromised patients, and are capable of causing infections such as endocarditis, urinary tract, wound and intra-abdominal infections. Most enterococcal infections are endogenous, but cross-infection between hospitalised patients can occur. The most common species causing outbreaks in hospitals are *Enterococcus faecalis* and *Enterococcus faecium*.

The emergence of enterococci with acquired resistance to vancomycin usually occurs within the context of heavy usage of glycopeptides and broad spectrum antibiotics, for example in renal, liver, haematology, oncology, organ transplant and intensive care units. Vancomycin resistance reduces the therapeutic options for serious enterococcal infections. Vancomycin resistance in enterococci is also important because it can transfer to other Gram-positive bacteria including *Staphylococcus aureus*, although this has occurred infrequently to date.

VRE have spread widely through Europe and the United States since they were first noted in 1988.[1] There appear to be some differences in the epidemiology of VRE in various parts of the world. Infections are now common in hospitals throughout the United States of America, although it appears relatively uncommon for healthy people to carry the bacterium. By contrast, infection with VRE is less common in European hospitals but many healthy Europeans have been shown to carry the bacterium.[2] The first outbreak of VRE colonisation in South Australia occurred in 1997.[3]

The most common resistance phenotypes of VRE found in clinical specimens are *van*A and *van*nB. Other genotypes have been described, e.g. *van*C, *van*D, *van*E and *van*G, but these are infrequent clinical isolates. Most hospital outbreaks due to cross-infection have been associated

with *van*A or *van*B genotypes, most commonly the latter in Australia. The *van*A genotype has acquired high level resistance to both vancomycin and teicoplanin, whilst the *van*B genotype has acquired moderate level resistance to vancomycin and shows *in vitro* susceptibility to teicoplanin.

3. Definitions

In the context of this document:

- **Colonisation** is 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 of illness.
- **Vancomycin-resistant enterococci (VRE)** are specific strains of enterococci that have developed resistance to vancomycin, an antibiotic that is commonly used to treat serious infections caused by enterococci.

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. Reservoirs of VRE

The lower gastrointestinal tract is the most important reservoir, consequently VRE is usually found in the faeces of colonised people. However, VRE can also be found on skin surfaces, particularly in the lower half of the body.

VRE may contaminate the environment around a patient, with the level of environmental contamination increased in patients with diarrhoea. VRE can survive in the environment for several days to weeks. Contaminated surfaces or fomites (including patient equipment such as commodes, shower chairs, patient lockers and over-way trolleys) may also serve as reservoirs if not adequately cleaned or disinfected.

5.2. Mode of transmission

The most likely modes of transmission from patient to patient are either by:

- **direct** contact with contaminated hands of health care personnel or colonised patients, or
- **indirectly** via contaminated medical and patient care equipment or environmental surfaces.

Both modes of transmission can be interrupted by effective hand hygiene. (Refer to SA Health Hand hygiene in the healthcare environment web page.

5.3. Risk factors for VRE carriage

The following risk factors for acquiring VRE carriage are well described in the literature:[4]

- severe underlying disease (e.g. patients requiring long term dialysis)
- admission to an intensive care unit
- recent hospitalisation in any healthcare facility

- prolonged or broad-spectrum antibiotic use, particularly vancomycin
- long duration of hospital stay
- indwelling urinary catheter.

5.4. Patient factors that increase the risk of transmission of VRE

The following factors are known to increase the risk of dissemination of VRE in a healthcare environment:[5]

- diarrhoea or uncontained faecal incontinence
- discharging wounds that cannot be contained by a dressing
- presence of an enterostomy
- poor compliance with, or inability to manage, personal hygiene.

5.5. Risk factors for VRE infection in a healthcare setting

Although VRE are generally considered of low pathogenicity, certain patient groups are at increased risk of acquiring infection with VRE.[6] In these patients, infection outcomes can be poor.[7]

- patients with severe neutropenia
- patients undergoing solid organ transplant
- patients requiring admission to intensive care or neonatal units
- presence of indwelling devices (e.g. urinary catheter).

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

5.6. General Principles

The prevention of infection with VRE 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. Although some recent publications suggest that isolation and contact precautions may be of little benefit in the prevention of cross-transmission of VRE, there are insufficient good quality studies to recommend a relaxation of these precautions at this time.[8]

5.7. Surveillance and screening

Routine hospital-wide admission screening is not recommended. However, selective admission and/or interval screening on high-risk inpatient groups should be undertaken. [4; 9; 10]

It is recommended that patients who are admitted or transferred to an acute hospital and meet the criteria outlined below be screened for VRE carriage. (Refer to **Error! Not a valid bookmark self-reference.**).

Table 1 - Screening criteria

Target population	Frequency of screening
Any patient requiring admission to a high risk inpatient unit: > intensive care (adult) > neonatal/paediatric intensive care* > haematology/oncology* > nephrology/renal > solid organ transplant * admission screening in neonatal/ paediatric ICU or paediatric haematology/oncology is determined by local epidemiology	> ICU on admission, weekly and discharge from the unit (if discharged >48hrs after admission). > Other units on admission and periodically depending on local epidemiology.
> Staff screening is not recommended > Routine screening for VRE carriage in other settings is not recommended	

If the patient is being transferred to another unit or facility, results of screening must be communicated to the receiving site.

5.8. Collection of specimens

Prior to collection of a specimen patients must be informed of the procedure and why it is being undertaken, and consent obtained.

> collect a faecal specimen in a clean faecal specimen container (preferred specimen)
OR
> collect a rectal or perianal swab for culture as per current laboratory specimen collection guidelines
> request "VRE screen".

It should be noted that rectal/perianal swabs are less sensitive than faecal samples for detecting low levels of VRE colonisation in the gastrointestinal tract.

Negative screening results are usually available within three (3) days. Confirmation of a positive result may take longer.

Note: Contact precautions should be considered pending VRE screening results only if the patient has any risk factors for transmission, such as diarrhoea or uncontained faecal incontinence, enterostomies or discharging wounds that cannot be contained by a dressing.

5.9. Screening for discontinuation of contact precautions for VRE carriers

This is a controversial area, and the literature does not describe an agreed protocol. Colonisation with VRE may persist for years, and even if the results of rectal or stool cultures are negative, true clearance may be difficult to achieve.[11] Re-emergence of VRE in faecal specimens frequently occurs after antibiotic therapy. For this reason routine clearance screening of VRE colonised patients is not recommended.

The decision to deem a patient "clear" of VRE for the purposes of discontinuation of contact precautions should be made on an individual patient basis according to the presence or not of any risks for transmission together with consideration of the elapsed time since a positive culture. It is essential that senior infection control personnel are consulted about clearance of VRE status.

The procedure below is a reasonable approach to clearance for the purpose of cessation of contact precautions, drawn from consideration of the VRE literature. [9; 10; 11]

1. any infection caused by VRE has resolved
2. more than three months have elapsed since the last positive specimen
3. three consecutive VRE negative faecal samples obtained at least one week apart
4. the patient must have ceased all antibiotics (intravenous or oral) for at least two weeks before specimens are collected.

Clearance can also be considered in a patient who has a history of a single positive VRE faecal or rectal culture followed by multiple negative cultures over a period of 6 months or more.

A recent publication has suggested that in the absence of recent risk factors, such as hospitalisation or antibiotic use, patients with a remote history of colonisation (defined as >4 years) may no longer require contact isolation precautions.[12]

5.10. Alerting of patient records

The National Safety and Quality Health Service Standards require facilities to have mechanisms in place to check for pre-existing healthcare associated infections and to communicate a patient's infectious status. Infection control alerts can be set electronically through either the facility's patient administration system, Oacis-ICIMS or EPAS.

A MRO alert should be placed on the patient's record (electronic or paper-based). When a decision has been made to discontinue contact precautions the alert can be retired. Reasons for discontinuation of contact precautions should be documented in a manner that allows other health facilities to risk assess the patient's MRO status upon any subsequent admission.

5.11. Management of patients with VRE in inpatient areas of acute healthcare facilities

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

Infection control procedures for known VRE carriers should concentrate on managing the risk of VRE transmission and take into account the presence of other patients who may be at high risk of infection with VRE (see Risk factors for VRE infection in a healthcare setting on page 5).

The care of a VRE patient in smaller acute healthcare facilities such as those found within the Country Health SA Local Health Network ideally should be the same as in metropolitan areas. However it is recognised that some country health 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 VRE may need to be modified to best suit the unique needs of the population within the facility.

Health care workers responsible for care of VRE 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.

All facilities should develop a comprehensive, institution-specific, infection management plan to detect, prevent and control infection and/or colonisation with VRE. 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.[4] For example, there is no need to place patients at the end of procedure lists, outpatient appointment lists or radiology procedures due solely to their VRE status.

5.11.1. Notification of key personnel

When the laboratory confirms the isolation of a VRE 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 VRE guideline or procedure.

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 on the next working day. In this case the duty nurse manager or equivalent should also be notified.

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

5.11.2. Staffing

To decrease the risk of transmission to other patients within the wards, staff should be well-versed in the application of both standard and contact precautions (i.e. hand hygiene, appropriate PPE and diligent attention to cleaning of the environment).

5.11.3. 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 high risk in-patient settings in a large acute hospital, patients with VRE may be geographically isolated; however, this may not be appropriate or feasible in smaller acute hospitals or other settings.

Where availability of single rooms is limited, priority should be given to patients with risk factors for dissemination (as listed in the 'patient factors that increase the risk of transmission section on page 5). For further information, refer to the relevant sections in this guideline and

Appendix 2: Vancomycin-resistant enterococci (VRE) bed management flow chart).

To decrease the risk of transmission of VRE 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 (especially if the patient has risk factors for transmission as listed on page 5). However, if these facilities are not available then a shared bathroom can be used provided it is cleaned and disinfected more frequently.
- Cohorting of patients with VRE may be considered in certain situations in consultation with the infection control coordinator.
- A contact precautions and/or 'STOP' sign should be clearly visible at the entrance to the room.
- Geographic separation of VRE and methicillin-resistant Staphylococcus aureus (MRSA) patients is highly recommended.
- A non-carpeted area is required.

5.11.4. 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).

5.11.5. Movement of patients within the hospital

VRE status must not compromise patient management:

- Patients may go outside their isolation room provided any lesions/wounds are covered and exudate contained, and any uncontrolled faecal incontinence is contained.
- Patients should be asked not to visit other patients during their hospital admission
- Patients should be encouraged to perform hand hygiene before leaving their rooms. The importance of hand hygiene before leaving their room must be emphasised.
- 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.

5.11.6. Visitors

- Under normal circumstances, there is no requirement for visitors to wear 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 sheet regarding VRE should be provided. (Refer to Appendix 3: Consumer information – Vancomycin-resistant enterococci (VRE) frequently asked questions).

5.11.7. Transfer of patients between facilities

Patients with VRE, 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 VRE status and if they have any risk factors for transmission.
- If the transfer is being conducted by the SA Ambulance Service they should be informed when the transport is booked.
- Transport via clinic car or taxi requires standard precautions only provided all discharging wounds are covered and the patient is not incontinent of faeces.
- A receiving facility that isolates VRE from a patient within 48 hours of transfer should advise the transferring institution of the positive result.

5.11.8. 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 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.

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

5.11.9. Contact precautions

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

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 changed between procedures on the same patient. 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. 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.

PPE 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.

5.11.10. 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 VRE 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.

5.11.11. Cleaning

Prior room occupation by a VRE colonised patient has been shown to be an independent risk factor for VRE acquisition.[13] Therefore, thorough cleaning of the environment is an important strategy to minimise the risk of VRE transmission. 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.

5.11.12. Chlorhexidine body washing

Several recent publications have shown that the incidence of acquisition of multi-resistant organisms such as MRSA and VRE amongst patients in critical care units can be reduced by the routine daily use of chlorhexidine impregnated body wash cloths.14,15 This may be a useful strategy for those high risk units where the prevalence of multi-resistant Gram-positive organisms such as VRE and MRSA is relatively high. If facilities choose to adopt this strategy, weekly surveillance of patients is recommended to continue in order to measure the impact on acquisition rate.

Note: Chlorhexidine allergy would be a contraindication to use.

5.11.13. Consumer education

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

5.11.14. Staff colonised or infected with VRE

Staff who are colonised or infected with VRE should not be discriminated against as a result of their condition. Staff who become aware of their VRE positive status are under no legal obligation to inform their employer. However, all staff should be aware of their responsibilities towards patients and not put them at risk of acquiring VRE by practising standard precautions, including aseptic technique and hand hygiene according to the 5 Moments.

5.11.15. 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.

5.11.16. 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 VRE 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 and 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 detection.

If an outbreak is suspected, this may require the implementation of a number of actions to assist with the investigation, e.g. 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.

5.12. Management of patients with VRE in the peri-operative setting

5.12.1. 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.
- 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 (e.g. physical examination) is anticipated gloves and a long-sleeved gown or apron are required with strict attention to hand hygiene.

5.12.2. Theatre environment

- Staff must perform hand hygiene according to the 5 moments for hand hygiene (Refer to the SA Health Hand Hygiene in the healthcare environment webpage).
- 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.

There is no special requirement to place the patient at the end of the operating list, since routine cleaning procedures between patients are sufficient to prevent transmission.

5.12.3. Post-theatre (recovery)

- 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.

5.13. Management of patients with VRE in non-inpatient settings

Management of patients with VRE in non-inpatient settings can generally be managed with standard precautions (hand hygiene, cleaning of shared patient equipment between use 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 5. 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.

5.13.1. Management of patients in outpatient clinics, emergency, radiology, dental, primary care

In this setting, 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 and there are no visible signs of faecal soiling.
- Hand hygiene should be performed by all staff before and after patient contact.
- If close physical contact is required (e.g. complicated wound care or assistance with enterostomies and/or toileting) and the patient has risk factors for transmission such as those listed on page 5, then gloves and a gown or apron are required.
- When the patient leaves, 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.

5.13.2. Management of patients with VRE in dialysis centres

VRE 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.

5.14. Management of patients with VRE in community health care

In this setting, 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.

- Only essential items required for patient care 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 Guideline (before and after patient contact; before and after a procedure and upon leaving the home or environment).
- If close physical contact is required (e.g. complicated wound care or assistance with enterostomies and/or toileting) and the patient has risk factors for transmission such as those listed on page 5, then gloves and a gown or apron are required.
- 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 be thoroughly cleaned between uses or transported to a central cleaning department (if available); 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.

5.15. Management of patients with VRE in ambulance services and aeromedical transport services

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.

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. complicated wound care or assistance with enterostomies and/or toileting) and the patient has risk factors for transmission such as those listed on dissemination, then gloves and a gown or apron are 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 and patient is not incontinent of faeces.

5.16. Management of residents with VRE in residential care facilities

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

5.16.1. 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, mental health facilities and long-term rehabilitation settings to nursing homes for the elderly. RCFs differ from other healthcare 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.[16]

Residents of RCFs may require frequent hospitalisation, in which case they may transfer pathogens between RCFs and healthcare facilities.

5.16.2. Risk factors for VRE carriage in RCFs

The main risk factors for VRE carriage in long term care residents are:

- prolonged hospitalisation
- prolonged or broad-spectrum antibiotic use, particularly vancomycin
- presence of invasive devices (i.e. indwelling urinary catheters, enterostomies, intravascular lines)
- close proximity to a resident colonised or infected with VRE.

5.16.3. Risk factors that increase risk of transmission of VRE in RCFs

These include but are not limited to:

- diarrhoea or uncontained faecal incontinence
- presence of an enterostomy
- discharging wounds that cannot be contained by a dressing.

5.16.4. Screening

Routine admission and ongoing screening for VRE 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.

5.16.5. 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 VRE (colonisation or infection) have conditions that facilitate transmission e.g. uncontained/uncontrolled faecal incontinence, draining wounds unable/difficult to contain, enterostomies, compliance with hygiene is poor or inadequate.

For further information refer to Appendix 2: Vancomycin-resistant enterococci (VRE) 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.

Contact precautions

Contact precautions are required for residents that have risk factors for transmission (such as those listed on page 5 or if they have a VRE 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.), if an apron is used, it is important to ensure that wrists and forearms are included in the hand hygiene procedure.
- PPE 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.
- A TGA approved hospital grade disinfectant (preferably with label claims against VRE) OR a chlorine-based product should be used in addition to the routine detergent clean (a combined detergent/disinfectant can be used), paying particular attention to all frequently touched surfaces, such as bedrails, door handles, commodes, bathroom, toilet, hand basins and taps.

For further information, refer to Management of patients with VRE in inpatient acute (small and large) healthcare facilities on page 8.

Antibiotic control

Multi-resistant organisms can pose a significant risk for residents in RCFs and this resistance has been strongly associated with antibiotic use.16 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 VRE within RCFs.

6. Safety, quality and risk Management

 National Standard 1 Clinical Governance	 National Standard 2 Partnering with Consumers	 National Standard 3 Preventing & Controlling Healthcare-Associated Infection	 National Standard 4 Medication Safety	 National Standard 5 Comprehensive Care	 National Standard 6 Communicating for Safety	 National Standard 7 Blood Management	 National Standard 8 Recognising & Responding to Acute Deterioration
☒	☐	☒	☐	☐	☐	☐	☐

7. General considerations

7.1. Staff colonised or infected with VRE

Staff who are colonised or infected with VRE should not be discriminated against. Staff who become aware their VRE positive status are under no legal obligation to inform their employer. However, all staff should be aware of their responsibilities towards patients including not putting them at risk of acquiring VRE.

8. Appendices

Appendix 1: Vancomycin-resistant enterococci (VRE) screening flow chart

Appendix 2: Vancomycin-resistant enterococci (VRE) bed management flow chart

Appendix 3: Consumer information - Vancomycin-resistant enterococci (VRE) frequently asked questions

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

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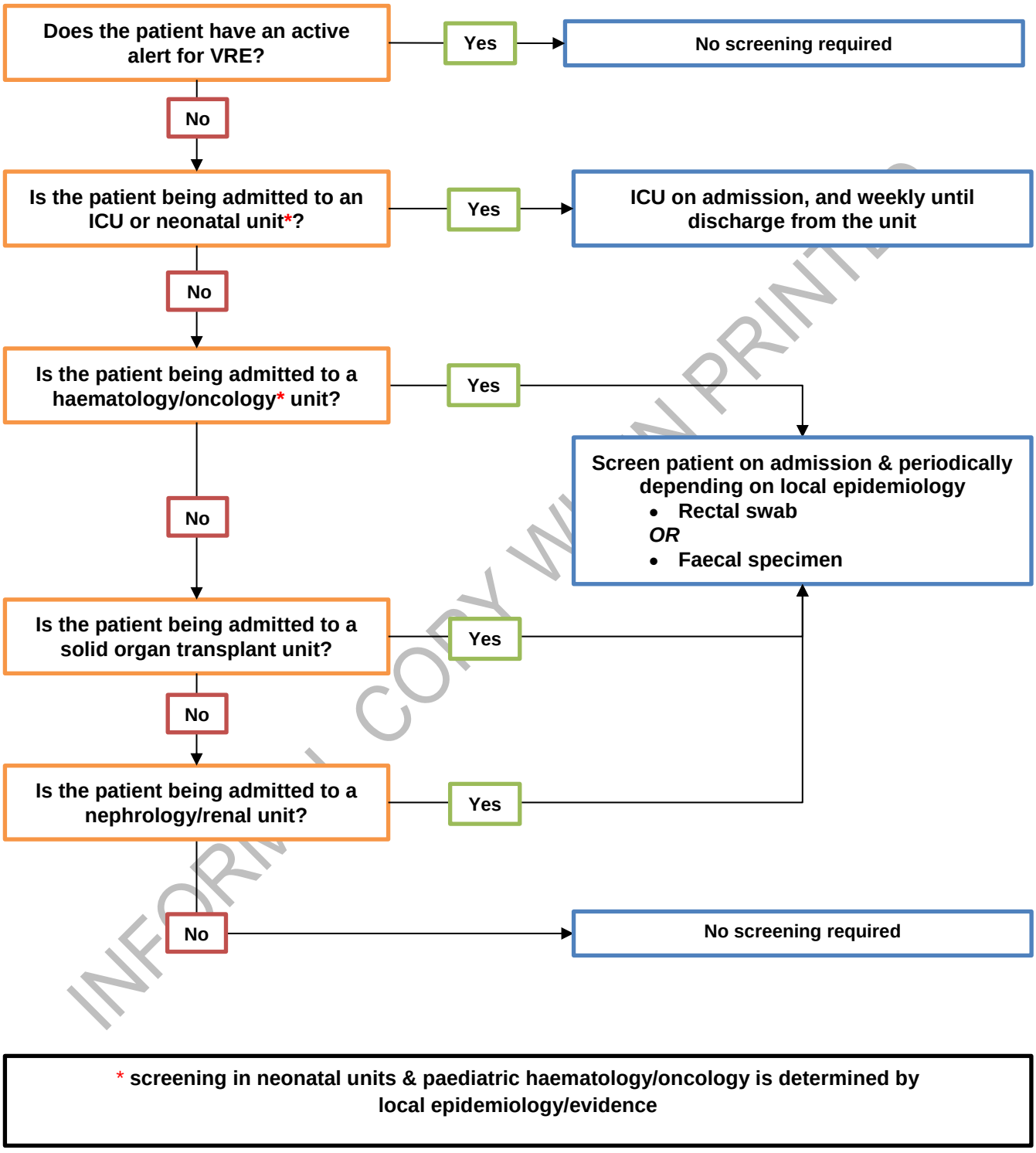
2009	V2	Director, Communicable Disease Control Branch	Revised
2006	V1	Director, Communicable Disease Control Branch	Original approved version.

Appendix 1: Vancomycin-resistant enterococci (VRE) screening flow chart

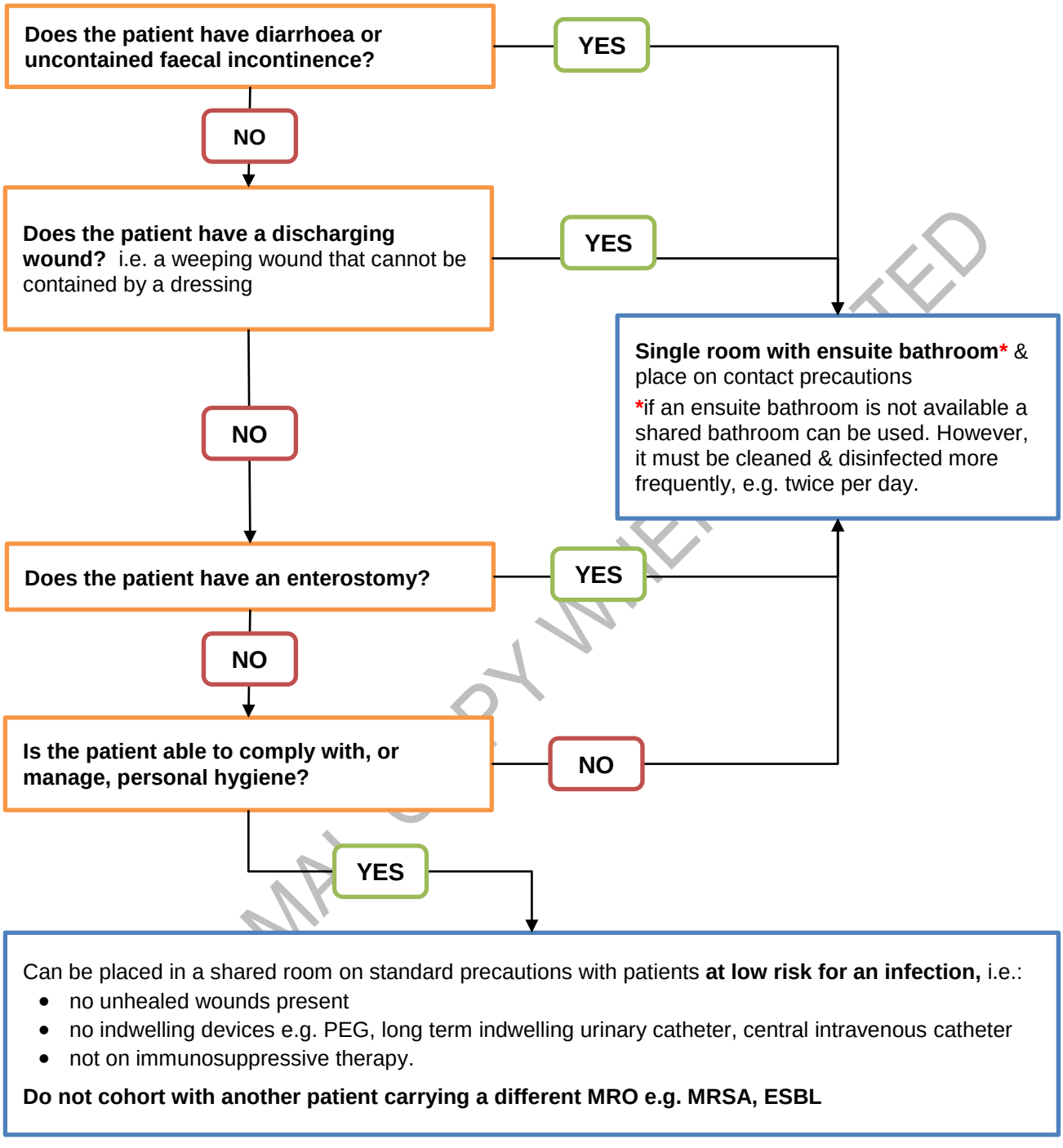
For patients requiring admission or transfer to an acute care hospital

Screening for VRE carriage is only required for patients being admitted to specific high risk units (i.e. intensive care solid organ transplant, haematology/oncology or nephrology).



Appendix 2: Vancomycin-resistant enterococci (VRE) bed management flow chart

Ideally known VRE carriers should be placed in a single room with ensuite facilities. If isolation rooms are limited the following questions will assist to identify any risk factors for transmission.



NOTE: Major risk factors for transmission of VRE in any setting are poor hand hygiene and poor environmental cleaning.

Appendix 3: Consumer information - Vancomycin-resistant enterococci (VRE) frequently asked questions

What are enterococci and VRE?

Enterococci are micro-organisms (bacteria) that normally live in the human intestine without causing any illness. Sometimes, in people who have serious illnesses associated with an immune deficiency (e.g. kidney dialysis or cancer patients), enterococci can invade other parts of the body and cause an infection. The most common sites of enterococcal infection are the urinary tract, wounds, or endocarditis (heart). In seriously ill patients the organism can cause infection of the blood (septicaemia).

Vancomycin is an antibiotic used to treat infections caused by enterococci. Some enterococci have become resistant to vancomycin and these are known as VRE. Infections by VRE are harder to treat because of their increased antibiotic resistance.

How do people get VRE?

The development of VRE is generally associated with long term use of multiple antibiotics in hospital, especially those in intensive care and other specialised units where people are usually sicker and require intensive medical treatment. Most people who have VRE have no ill effects; this is called colonisation. VRE does not cause diarrhoea.

How does the hospital prevent the spread of VRE?

Hospitals have several strategies in place to identify patients with VRE and to help stop the spread of VRE to others within the hospital. The hospital will use special precautions to minimise the risk of spreading VRE to other patients such as:

- placing you in a single room
- using personal protective equipment (gloves and gowns or aprons) while caring for you
- performing hand hygiene using soap and water or an alcohol-based hand rub before and after caring for you.
- thorough cleaning and disinfection of patient rooms and bathrooms.

How can you prevent the spread of VRE?

The most important thing you can do to prevent the spread of VRE to others is to clean your hands frequently using soap and water and then dry them thoroughly. It is important for you to:

- clean your hands after using the toilet
- clean your hands before leaving your room
- avoid touching any wound dressings or drip sites
- follow instructions and advice given by the healthcare worker looking after you on how to manage any wounds or devices.

What happens if you have a VRE infection?

If you have an infection caused by VRE, you will be treated with the appropriate antibiotics

as prescribed by your doctor. People who are only colonised with VRE don't require treatment.

If you have VRE can you have visitors?

Your visitors will be asked to wash their hands or use alcohol-based hand rub after visiting you so that they do not spread VRE to others. You should also encourage visitors to wash their hands before and after visiting you.

Visitors may also be asked to wear gloves or gowns if they are going to have close contact with you e.g. assisting in your care.

What happens when I go home from hospital?

As long as you follow the steps to prevent the spread of VRE there is little risk of spread to your family, work colleagues or people in the community. General advice is to:

- wash your hands often or use an alcohol-based hand rub when a sink is not available
- practice good personal hygiene, especially after using a toilet
- keep environmental surfaces clean
- all eating utensils, dishes, clothing and linen can be washed as normal.

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

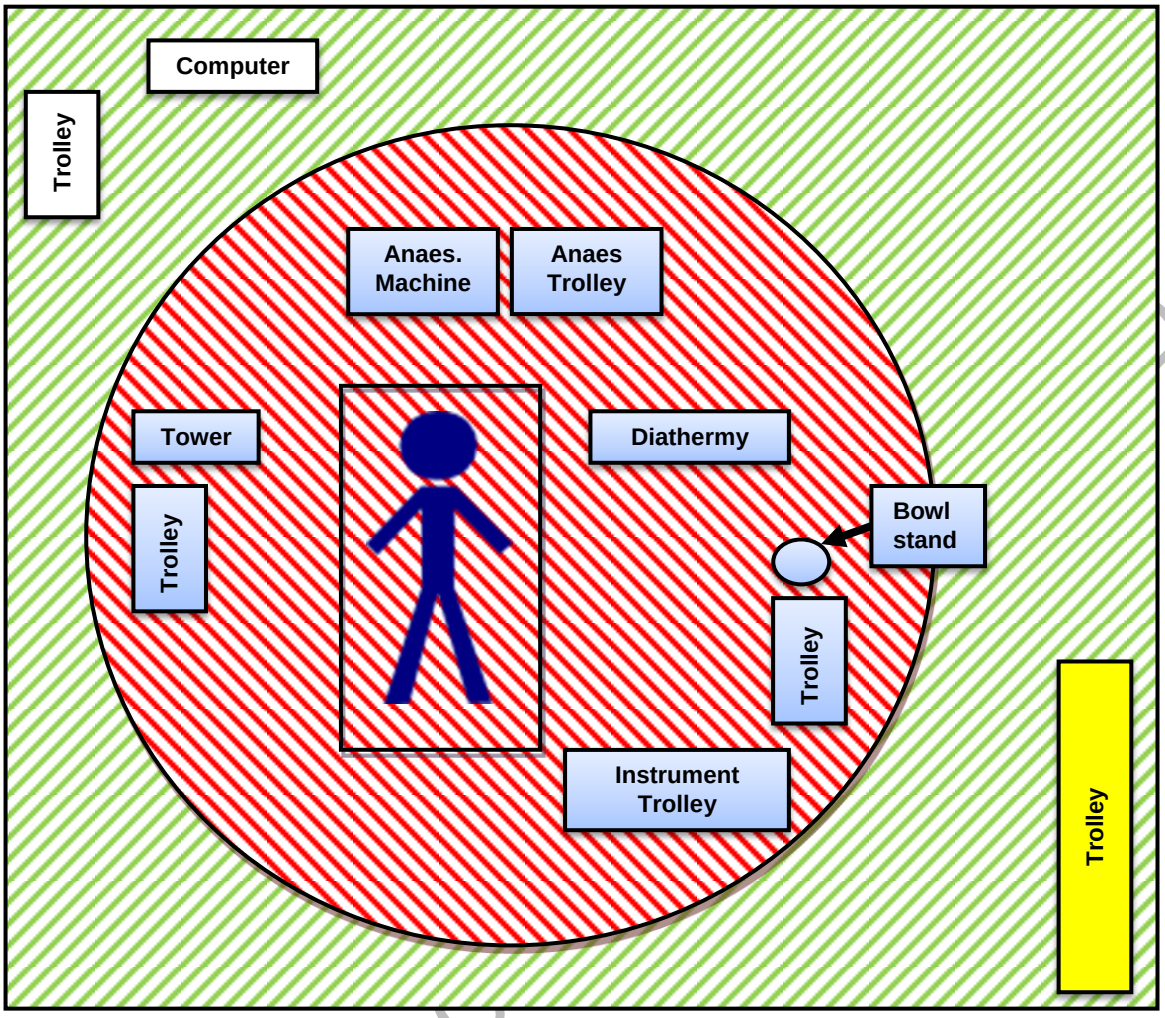
For more information:

If you would like more information on VRE or have concerns that you need to talk to someone about, please speak to your treating doctor or contact the Infection Control Service at the Department for Health and Ageing:

Infection Control Service
Department for Health and Ageing
11 Hindmarsh Square
Adelaide SA 5000

Telephone: 1300 232 272
Email: HealthICS@sa.gov.au
www.sahealth.sa.gov.au/infectionprevention

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"

For more information

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Public-I1-A2