

**Trust Policy and Procedure for the Diagnosis and Management of
Panton Valentine Leukocidin (PVL)**

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Trust Policy and Procedure for the Diagnosis and Management of Panton Valentine Leukocidin (PVL)

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1.0 Introduction

Staphylococcus aureus (SA) is a bacterium that can colonise healthy skin. About one third of healthy people carry it harmlessly, usually on moist areas such as the nostrils or groins. Panton Valentine Leukocidin (PVL) is a toxin, produced by some strains of SA that destroys white blood cells, making the infected person less able to fight infection.

In the UK, PVL-SA account for less than 2% of clinical SA isolates submitted to the national reference laboratory, including both meticillin sensitive (MSSA) and meticillin resistant (MRSA). PVL-SA is strongly associated epidemiologically with virulence, including community-associated MRSA. To date the majority of isolates causing infection in the UK have been meticillin sensitive. Community acquired MRSA are more likely to produce PVL toxin than hospital associated MRSA.

Like other SA strains, PVL-SA predominantly causes skin and soft tissue infections (SSTI's), such as boils, abscesses or cellulitis, but can also cause invasive infections. The most serious of these is a necrotising haemorrhagic pneumonia, which has a high mortality rate and may affect otherwise healthy young people.

2.0 Purpose and Outcomes

The purpose of this policy is to:

1. Ensure that patients colonised or infected with PVL associated Staphylococcal infections receive effective and appropriate care. This includes in-patients and patients in their own home and in care homes who are visited by District Nursing Services.
2. Minimise the transmission of PVL associated Staphylococcal infections.
3. Assist in the prompt recognition and the safe management of patients.

3.0 Definitions Used

Virulence	The disease-producing ability of a micro-organism
Source Isolation	Isolation of a patient known or suspected to have an infection, or to be colonised with resistant organisms. Isolation is considered necessary to reduce the risk of transmission to others.
Toxin	A poisonous substance produced within living cells or organisms
Colonisation	A micro-organism that establishes itself in a particular environment such as the body surface without producing disease.

4.0 Key Responsibilities

4.1 The Director of Infection Prevention and Control

- Will convene and co-ordinate a PVL incidence / Outbreak meeting as required.

4.2 The Consultant Microbiologist / Infection Control Doctor

- Will advise medical staff on the management and treatment of a known or suspected PVL case.
- Will inform Public Health England of patients from closed institutions (Prisons, boarding school etc.) and the Infection Prevention and Control Team of any patient who is either diagnosed or suspected of having PVL.
- Attend incident / outbreak meeting as required

4.3 Public Health England

- Will advise the Trust on outbreak or incident management
- Will attend outbreak or incident meetings

4.4 Healthcare Staff

- Will alert and liaise with the Consultant Microbiologist / Infection Control Doctor regarding the continuing management of a patient suspected or confirmed as having PVL.
- Will communicate with the Infection Prevention and Control Team to ensure that all relevant staff are informed regarding the infection control precautions to be undertaken.
- Attend incident / outbreak meeting as required
- Will ensure the patient is aware of the PVL diagnosis and treatment options
- Will inform Occupational Health if they have recurrent abscesses or diagnosed as PVL positive.

4.5 The Infection Prevention and Control Team

- Will advise all relevant groups of staff on infection prevention and control precautions.
- Will inform the GP of the PVL positive result if the patient has been discharged before result is reported.
- Will liaise with the Occupational Health Department as required regarding staff screening during outbreaks / incidents.
- Attend incident / outbreak meeting as required

4.6 The Occupational Health Department

- Will conduct staff screening if deemed necessary by the Infection Control Doctor / PVL Outbreak meeting.
- Attend incident / outbreak meeting as required
- Liaise with the Infection Control Doctor regarding individual healthcare workers risk assessments.

5.0 Managing the Policy for PVL-SA Infections

5.1 Skin and Soft Tissue Infections

Risk Factors

Most PVL seen in the UK are with Meticillin Sensitive *Staphylococcus aureus* (MSSA). The risk factors for PVL-SA seen in the UK mirror those described for community acquired MRSA (CA-MRSA) in North America. These include compromised skin integrity, skin to skin contact and sharing of contaminated items such as towels. The worldwide picture suggests that communities with people in close contact result in higher transmission of SA infection. In North America the following settings have been identified as higher risk for transmission from an individual colonised or infected with CA-MRSA.

- Household contacts
- Close contact sports e.g. wrestling, rugby, judo
- Military training camps
- Gyms
- Prisons

Transmission

The main route of transmission in healthcare settings is by contact via the unwashed hands of healthcare workers. Inadequately decontaminated shared equipment is also a vehicle for transmission.

PVL-SA may be transmitted via the airborne route on skin scales, but this is only a significant risk if the patient has excessive exfoliating skin conditions, such as eczema or psoriasis. The organism can remain viable in the environment for a long period of time, thus keeping dust to a minimum is crucial.

When to Suspect a PVL-SA Skin and Soft Tissue Infection (SSTI)

PVL associated SA infection should be suspected if:

- A patient has recurrent boils or abscesses, especially if they are in a high risk group, as outlined above
- There is a cluster of SSTI's within a household or social group.

Screening

Patients

The screening method is the same as that for *Staphylococcus aureus*/MRSA and involves swabbing:

- Both anterior nares (one swab for both nostrils)
- Any wound, ulcer or other area of broken skin / skin lesions
- Invasive device sites (e.g. intravascular catheters, tracheostomies)

In addition obtain

- Catheter specimen of urine – if catheterised
- Sputum – if productive

Swabs must be labelled with the patient details and sent to microbiology with a completed microbiology request form. **The investigation required is PVL screen.**

Staff

Healthcare workers who have had contact with PVL-SA skin and soft tissue infections do not require screening unless they have active lesions or dermatological conditions.

Decolonisation

Decolonisation is used in the hospital environment to promote clearance of the organism from a specific individual and also minimise the infection risks to other patients by reducing bacterial loading.

Decolonisation therapy should be administered only when the primary skin or soft tissue infection has resolved.

Decolonisation is the same as for *Staphylococcus aureus* / MRSA.

Treatment

Patients with a PVL-SA skin or soft tissue infection should be medically managed as a *Staphylococcus aureus* / MRSA infection. Incision and drainage may be necessary if the patient does not respond to treatment. Advice should be sought from a Consultant Microbiologist / Consultant Surgeon.

Infection Prevention and Control Precautions for Hospital Patients

- Source isolation applies to all known or suspected cases of PVL-SA whilst an in-patient in University Hospitals of Derby and Burton.
- Source isolation will only be discontinued after consultation with the Infection Prevention and Control Team.
- Patients can be transferred from one ward to another ward or unit, if clinical need dictates. The receiving area must be informed, in advance, of the PVL-SA status to ensure that the appropriate facilities are available and the required precautions applied.
- If mobilisation is required when a patient is isolated, the patient can leave the room to allow mobilisation in an area away from the ward, e.g. main corridor. This does not mean that the patient can wander freely around the ward, where close contact with other patients is inevitable.

Control measures should not compromise standards of care or the need for urgent specialised care. The patient's overall needs takes precedence. Patients can undergo investigations in other departments,

provided the department has been informed in advance. It is recommended that patients are dealt with promptly to minimise delay in returning to the ward.

5.2 Necrotising Pneumonia

Transmission

The risk of transmission exists in patients with PVL pneumonia who are ventilated or requiring airway suctioning. Transmission of PVL-SA skin infection to staff has been documented following contact with respiratory secretions during intubation of a patient with necrotising pneumonia, where PPE was not worn. Therefore, the need for appropriate PPE is paramount.

When to Suspect a PVL-SA Necrotising Pneumonia

Necrotising pneumonia PVL-SA infection should be suspected if there is evidence of invasive infection in immunocompetent people, particularly community acquired necrotising / haemorrhagic pneumonia in young, previously fit people.

Microbiological Investigations

Patient

The following Microbiological Investigations are required for all suspected PVL pneumonia patients. The Consultant Microbiologist on call must be informed of all possible PVL pneumonia patients. Gram stain and urinary antigen will be done urgently.

- Urinary Pneumococcal and legionella antigen
- Flu serology
- Cultures – see screening method below

The screening method is the same as that for *Staphylococcus aureus* / MRSA and involves swabbing:

- Both anterior nares (one swab for both nostrils)
- Any wound, ulcer or other area of broken skin / skin lesions
- Manipulated sites (e.g. intravascular catheters, tracheostomies)

In addition obtain

- Catheter specimen of urine – if catheterised
- Sputum – if productive

Swabs must be labelled with the patient details and sent to microbiology with a completed microbiology request form. **The investigation required is PVL screen.**

Initial Treatment

Treatment should be commenced using empiric antibiotics that will cover *Staphylococcus aureus* toxin production

5.5 Decolonisation

Decolonisation is used in the hospital environment to promote clearance of the organism from a specific individual and also minimise the infection risks to other patients by reducing bacterial loading.

Decolonisation is the same as for *Staphylococcus aureus*/MRSA

Infection Control Precautions for Hospital Patients with a PVL-SA Necrotising Pneumonia

- Personal Protective Equipment (PPE), disposable gloves and aprons, eye protection and a fluid repellent surgical face mask must be worn for direct contact and meticulous hand hygiene performed.
- Source isolation applies to all known or suspected cases of PVL-SA necrotising pneumonia patients. The isolation door room must be kept closed.
- Source isolation precautions can be discontinued if PVL screening is negative.
- If PVL screening is positive source isolation must continue until a minimum of 7 days antimicrobial treatment and 48 hours of decolonisation treatment has been completed. The decision to discontinue isolation will be made by the infection prevention and control team and patient's clinical team.
- Control measures should not compromise standards of care or the need for urgent specialised care. The patient's overall needs takes precedence. Patients can undergo investigations in other departments, provided the department has been informed in advance. It is recommended that patients are dealt with promptly to minimise delay in returning to the ward.
- Patients can be transferred from one ward to another ward or unit, if clinical need dictates. The receiving area must be informed, in advance, of the PVL-SA status to ensure that the appropriate facilities are available and the required precautions applied.

Staff

Healthcare workers exposed to respiratory secretions, (particularly during intubation or mouth-to-mouth resuscitation), who did not wear the appropriate PPE, including surgical face masks and eye protection, should be screened three to seven days after the exposure and advised to report to Occupational Health should symptoms of infection develop subsequently. Screening, when required, will be arranged through the Occupational Health Department in liaison with infection prevention and control.

Healthcare workers who have had contact but did wear appropriate PPE do not require screening. Healthcare workers not in direct contact with respiratory secretions should not be screened.

Appropriate clinical samples (e.g. pus, swab of exudates, sputum) from suspected cases should be sent to the microbiology laboratory

Management of Hospital Staff Colonised / Infected with PVL-SA

Staff found to be colonised or infected with PVL-SA will be treated in collaboration with their GP, specialist and Occupational Health. Exclusion from work may be necessary if skin lesions are present. In this instance an individual risk assessment will be undertaken by the manager, taking into account area of work, nature of duties and previous history of infection.

6.0 Monitoring Compliance and Effectiveness

Monitoring Requirement :	<ul style="list-style-type: none"> • The IPCT will monitor compliance with the management of all patients with diagnosed as PVL positive. • Any non-compliance issues will be reported to the division Matron or the site manager as appropriate.
Monitoring Method:	<ul style="list-style-type: none"> • Monthly isolation room audits undertaken by clinical areas • Following an outbreak the monitoring will be undertaken by the Outbreak Control Group. At the conclusion of the outbreak the Outbreak Control Group will hold a debrief meeting, the report from which will be presented to Infection Control Committee
Report Prepared by:	Lead Nurse Infection Prevention and Control Divisional Nursing Director / Matron
Monitoring Report presented to:	Infection Control Operational Group / Infection Control Committee
Frequency of Report	Monthly / As required

7.0 Reference

Health Protection Agency, 2008. Guidance on the diagnosis and management of PVL-associated *Staphylococcus aureus* infections (PVL-SA), 2nd edition. Health Protection Agency. London

Health Protection Scotland, 2014. Interim Advice for the Diagnosis and Management of PVL-associated *Staphylococcus aureus* infections. Scottish Recommendations. Health Protection Network: Glasgow.

Management of Patient with suspected PVL-related pneumonia

