Diagnosis and Management of PVL-*Staphylococcus aureus* Infections
Quick Reference Guide for Primary Care[1]

Association of Medical Microbiologists

Health Protection Agency

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- Panton-Valentine Leukocidin (PVL) is a toxin produced by less than 2% of *S. aureus,* including MRSA[1,2].
- PVL-SA cause recurrent skin and soft tissue infections, but can also cause invasive infections, including necrotising haemorrhagic pneumonia in otherwise healthy young people in the community.

B- CHARACTERISTICS OF INFECTIONS WITH PVL[1-3]

Recurrent skin infections:
- Boils (furunculosis), carbuncles, folliculitis, cellulitis
- Cutaneous lesions can be >5cm
- Pain/erythema out of proportion to severity of signs
- With necrosis

Invasive infections:
- Necrotising pneumonia often after flu-like illness
- Necrotising fasciitis
- Osteomyelitis, septic arthritis and pyomyositis
- Purpura fulminans[3]

B- RISK FACTORS & GROUPS[3,4]

Risk factors: Remember the "5 Cs";
- **C**ontaminated items shared – eg: towels, razors
- **C**lose contact
- **C**rowding
- **C**leanliness: poor hygiene
- **C**uts and other compromised skin integrity

Risk groups often young and healthy :
- Closed communities with close contact
- Close contact sports eg: wrestling, rugby, judo
- Military training camps
- Gyms
- Prisons

C WHEN AND HOW SHOULD I INVESTIGATE FOR PVL *S. aureus*?[5]

When should I take a specimen?
- Recurrent boils/abscesses
- Necrotising skin and soft tissue infections
- If ≥ 1 case in a home or closed community

} Swab

Community-acquired necrotising/haemorrhagic pneumonia: **sputum and swabs & refer immediately**

On form state risk factors and request PVL.

What swabs should I take?
- Skin lesions & anterior nares
- Use swab moistened with water or saline
- Place swab in transport medium

How should I take an anterior nares swab?
- Wipe a moistened swab around inside rim of both nostrils of the patient for 5 seconds

C HOW CAN PATIENTS REDUCE SPREAD IN CARE HOMES OR HOUSEHOLDS?

- Cover infected skin with dressing, change regularly
- Do not touch or squeeze skin lesions
- Regularly wash hands
- Avoid bar soap; use pump action liquid soap
- Clean sink and bath after use with a disposable cloth and detergent, and then rinse clean
- Cough or sneeze into a tissue then wash hands after immediate disposal.
- Use individual personal towels and face cloths, washing daily in hot wash, or use paper towels.
- Regularly vacuum & damp dust, especially bedrooms
- If colonisation persists consider further treatment and hygiene measures eg. change sheets daily

C WHEN AND HOW DO I TREAT WITH ANTIBIOTICS?[1,3]

This advice is mainly based on clinical outcome in the treatment of non-PVL-MRSA.
If immunocompromised or deteriorating clinically seek advice

Infection	*Antibiotic[6]	Adult Dosage	Duration
Minor furunculosis, folliculitis and small abscesses without cellulitis	NO antibiotics; Perform incision and drainage if necessary		
Other non-suppurative minor skin & soft tissue infections.	Flucloxacillin	Oral 500 mg qds	5-7days
As resistance is increasing reserve topical antibiotics for very localised lesions. Only use mupirocin for MRSA.	*Fusidic acid* / *Mupirocin* } *Second line*	*Topically tds*	*5 days*
Moderate SSTIs eg cellulitis or abscesses >5cm with Meticillin-**sensitive** PVL	Flucloxacillin or Clindamycin – *stop if diarrhoea develops*	500 mg qds 450 mg qds	5-7days
If PVL is likely to be MRSA Treat empirically with 2 agents and then be guided by antibiotic susceptibility results. On advice of microbiologist/hospital	Rifampicin PLUS Doxycycline (not children) or Sodium fusidate or Trimethoprim OR Clindamycin alone *Third line* Linezolid	300 mg bd 100 mg bd 500 mg tds 200 mg bd 450 mg qds 600 mg bd	5-7days
Severe SSTIs with systemic symptoms or pneumonia.	Refer immediately		

***Refer to BNF for details of any side-effects**

This guidance is a summary for primary care based on the Guidance on the diagnosis and management of PVL-associated *Staphylococcus aureus* infections (PVL-SA) in England produced by the Department of Health Steering Group on Healthcare-associated Infections in 2008 PVL Guidance No further searches were undertaken. Produced 18th May 2009 For review December 2010

C WHEN SHOULD I ADVISE SUPPRESSION OF PVL IN PATIENTS AND THEIR CLOSE CONTACTS?

- When considering decolonization of patients and close contacts, discuss risk factors, risk groups, employment settings and compliance with Health Protection Unit/Microbiology.
- Offer decolonisation to all primary cases.
- Suppression of PVL is ineffective if skin lesions still leaking.
- Start suppression after primary infection resolved.

A- 5 DAY TOPICAL TREATMENT PROCEDURE FOR SUPPRESSION OF PVL-*STAPHYLOCOCCUS AUREUS*[7]

Topical treatment aims to reduce colonisation and may prevent further infections and interrupt transmission
A patient information leaflet is available at (Patient leaflet)[8,9]

BODY[10]

A- Use Chlorhexidine 4% bodywash/shampoo or Triclosan 1 - 2% (Skinsan or Oilatum Plus). Use daily as liquid soap in the bath, shower or bowl for 5 days. Use as a shampoo on day 1, day 3 and day 5

- Do NOT dilute product in water as this reduces efficacy
- Apply product directly to wet skin as soap on a disposable cloth or on hand
- Do NOT use other bath soap/shower gel in addition during baths/showers
- Pay particular attention to armpits, groins, under breasts, hands and buttocks
- It should remain in contact with the skin for about a minute
- Rinse off before drying thoroughly, especially if skin conditions
- Patients with skin conditions/delicate skin – Dermol should be considered
- Dermatological opinion may be necessary in patients with skin conditions eg eczema.

A- NOSE[10]

- Use matchstick head-sized amount (less for small child) of Mupirocin.
- Apply 3 times day for 5 days with cotton bud to inner surface of each nostril.
- Massage gently upwards.
- If applied correctly, patient can taste Mupirocin at back of throat.

C FOLLOW-UP

- Advise patient to return if infection persists or recurs.
- Patients with recurrent infections or persistent colonization should maintain sensible precautions to prevent transmission (as outlined above) Appendix 1
- Only undertake repeated screening/decolonization if patient:
  - immunosuppressed
  - poses a special risk to others (e.g. healthcare worker, carer, food handler)
  - spread of infection is ongoing in close contacts. Guidance

C WHO AND WHEN SHOULD I INFORM ABOUT A CASE OF PVL?

WHO

- The local Health Protection Unit
  Tel: ……
- Inform hospital before any admissions

WHEN

- Where there has been one case of PVL-related infection in a closed community.
- Suspicion of spread of PVL-associated infection in families, nurseries, schools and sports facilities

KEY A B C D indicates grade of recommendation (A highest, C formal opinion)

References

1. Department of Health PVL subgroup of the steering group on healthcare associated infection. Guidance and management of PVL associated staphylococcus aureus infections (PVL-SA) in England.
2. Holmes A, Ganner M, McGuane S, Pitt TL, Cookson BD, Kearns AM. *Staphylococcus aureus* isolates carrying Panton-Valentine leucocidin genes in England and Wales: frequency, characterization, and association with clinical disease. *J Clin Microbiol* 2005 May;**43(5)**:2384-90.
3. Gorwitz RJ, Jernigan DB, Powers JH, Jernigan JA and participants in the Centers for Disease Control and Prevention-Convened Experts' Meeting on Management of MRSA in the community. Strategies for clinical management of MRSA in the Community: Summary of an Experts' Meeting convened by the Centers for Disease Control and Prevention. 2006. Available at http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca.html Accessed 27th January 2009. *Comprehensive guidance from CDC with references to original epidemiological & treatment studiesf.*
4. Hawkes M, Barton M, Conly J, Nicolle L, Barry C *et al*. Community-associated MRSA: superbug at our doorstep. *CMAJ* 2007;**176(1)**:54-6.
5. Kearns A. Staphylococcal Reference Unit, Health Protection Agency 2007.
6. Refer to BNF for details of treatment and side-effects. http://www.bnf.org/bnf/bnf/current/104945.htm
7. Loeb M, Main C, Walker-Dilks C *et al.* Antimicrobial drugs for treating methicillin-resistant *Staphylococcus aureus* colonization (Review) *The Cochrane Library* 2004; **4.**
8. Patient leaflet PVL *Staphylococcus aureus* information for patients document Appendix 1 of Reference 1(PVL-SA).
9. Patient leaflet decolonization procedure for PVC *Staphylococcus aureus*: Appendix 2 of Reference 1(PVL-SA).
10. Simor AE, Philp I, McGeer A *et al.* Randomized controlled trial of chlorhexidine gluconate for washing, intranasal mupirocin, and rifampicin and doxycycline versus no treatment for the eradication of methicillin-resistant *Staphylococcus aureus* colonization *Clin Infect Dis* 2007; **44:**178-185. *References 7 and 10 are for non-PVL-MRSA, but we have assumed similar outcomes.*

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Grading of guidance is based on the strength of the evidence and study design of the research papers referenced and those other papers referenced within the CDC and DH PVL Guidance

The strength of each recommendation is qualified by a letter in the left hand margin.

Study design	Recommendation Grade
Good recent systematic review of studies	A+
One or more rigorous studies, not combined	A-
One or more prospective studies	B+
One or more retrospective studies	B-
Formal combination of expert opinion	C
Informal opinion, other information	D