NHS GG&C Public Health Protection Unit (PHPU)
Standard Operating Procedure
for the investigation and management of
Panton Valentine Leukocidin
Staphylococcus aureus
(PVL-SA)

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INTRODUCTION AND AIM **STATEMENT**	Panton - Valentine Leukocidin (PVL) is a cytotoxin produced by some *Staphylococcus aureus* (SA) which destroys white blood cells and predominantly causes skin and soft tissue infections. Rarely, it can cause septic arthritis, bacteraemia (blood poisoning) necrotising haemorrhagic pneumonia and other invasive infections. There is not a strong evidence base on which to base policy; this policy draws on national guidance and local agreements and aims to prevent and control PVL Staph aureus (PVL-SA/ PVL-MRSA) infections. The epidemiology of PVL SA/ PVL MRSA differs from that of other SA. Cases tend to be younger and, in the UK, associated with community settings rather than hospital. Centers for Disease Control and Prevention (CDC) guidance refers to risk factors for PVL related infection as 5 Cs: ▪ Contaminated items (e.g. towels) ▪ Close contact (e.g. household or contact sports) ▪ Crowding (e.g. closed communities) ▪ Cleanliness ▪ Cuts and other compromised skin integrity Outbreaks or clusters can occur in the community.
TIMING	Rarely urgent as situation usually ongoing for some time before PHPU has been notified. Carefully planned liaison and coordination agreements are usually required between health service professionals and the GP of case prior to active intervention if required.
DEFINITIONS	▪ **Case:** the isolation of a PVL-positive S.aureus/MRSA from a patient with a PVL- like infection including: skin and soft tissue infection, necrotising pneumonia and septic shock. ▪ **Close contact**: contacts from a household-type setting (also residential care/ Care homes/hospital settings or sexual contacts. Contact sports e.g. rugby, wrestling, jiu jitsu. ▪ **High risk groups**: healthcare workers, prisoners, military personnel, residential/care home staff, those involved in contact sport. ▪ **Outbreak**: Two or more confirmed cases of PVL SA within the same household or in a care home setting; or one confirmed case in this setting with others presenting with e.g. similar skin complaints to the confirmed case, within the preceding year.

PROCEDURE SUMMARY

Single sporadic cases (and contacts).

- The HPNS will contact the patient's GP Practice, advise of result and obtain appropriate email address to forward guidance. A template email can be found at appendix 6.
- The HPNS may need to liaise with different specialists, depending on who sent the sample for testing.

N.B. The decolonisation regime and infection control advice for PVL SA are the same as for MRSA and can be found at appendix 1, 2 & 3 of this SOP; Further information available at:
http://www.nhsggc.org.uk/media/245246/mrsa-sop-v6-april-2017-_aide-memoire-included-nov-2017_.pdf

- Assessment and management of single cases in the community should be undertaken by the GP with advice from Microbiologist as required as per flowchart in appendix 1: Risk assessment and Management of adult cases of PVL-SA/MRSA infection (p6).
- Cases in high risk groups or possible clusters/outbreaks should be reported to the Public Health Protection Unit (PHPU) on 0141 201 4917 option 3.
- If a case/contact requiring decolonisation has a pre-existing dermatological condition or is a neonate, this should ideally be discussed with Public Health prior to starting the course of treatment.
- After decolonisation, further screening is not required unless a case or a close household contact is particularly vulnerable to infection or poses a special risk to others (e.g. healthcare worker). If this is the case repeat screening of the case and/or contacts should be undertaken one week after decolonization is completed.
- Healthcare workers should not work whilst they have a confirmed or probable acute infection caused by PVL SA/MRSA. Healthcare workers can return to clinical duties once the acute infection has resolved AND antibiotics completed AND they have had 48 hours worth of a 5 day MRSA decolonization regime. For NHS staff – refer to Occupational Health.
- It may be feasible for the Healthcare worker to carry out non clinical duties whilst this is ongoing – can be discussed with Line Manager/Occupational Health or Public Health if no OH service is available.

	Management of potential clusters/outbreaks The HPA "Guidance on the diagnosis and management of PVL SA infections" should be followed : https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/322857/Guidance_on_the_diagnosis_and_management_of_PVL_associated_SA_infections_in_England_2_Ed.pdf An Outbreak Control Team should be established chaired by the Consultant in Public Health Medicine if the community is the main focus or ICD if it is the hospital. The local outbreak control plan should also be used: http://www.nhsggc.org.uk/media/245201/outbreak-sop-final-version-oct-2017-_2_.pdf
AFTER CARE	▪ If there is further acute infection after treatment, specialist advice should be sought from Microbiology/ Infectious diseases. ▪ If an individual has recurrent abscesses consider other alternative underlying conditions, e.g. diabetes, inflammatory disease, immune deficiency.

LITERATURE	

Cunnington et al, (2009), Severe Invasive Panton-Valentine Leukocidin positive Staphylococcus aureus infections in children in London UK, Journal of Infection, Vol 59, pp28-36.
http://www.ncbi.nlm.nih.gov/pubmed/19560210

Health Protection Agency (2008) Guidance on the diagnosis and management of PVL- associated *Staphylococcus aureus* infections in England (2nd edition
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/322857/Guidance_on_the_diagnosis_and_management_of_PVL_associated_SA_infections_in_England_2_Ed.pdf

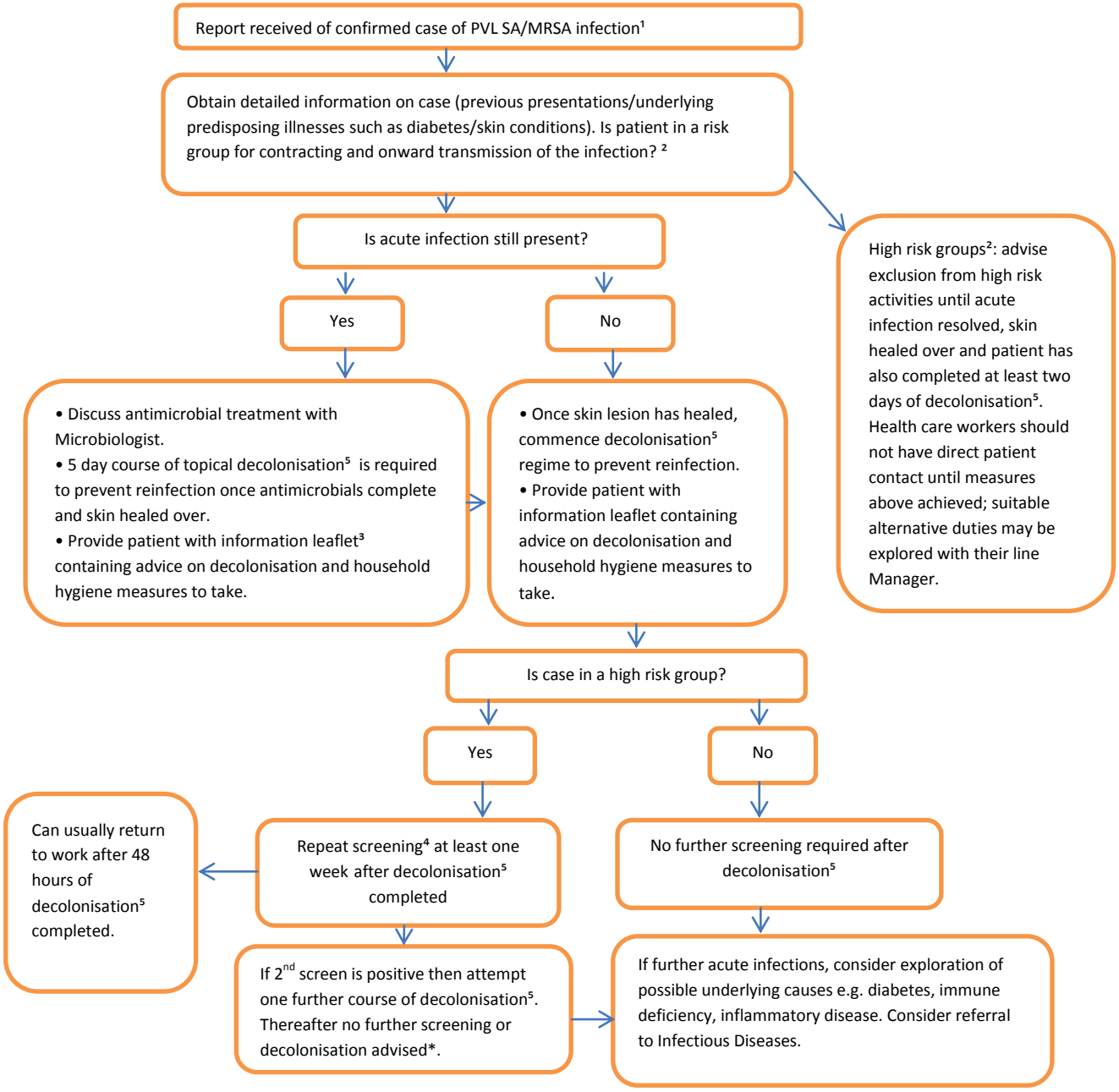
Health Protection Agency (2008) Quick Guide to PVL-SA in Primary Care:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/391168/PVL_guidance_in_primary_care_quick_reference_guide.pdf

Health Protection Scotland (2014) Health Protection Network: Interim Advice for the Diagnosis and Management of PVL-associated *Staphylococcus aureus* infections (PVL-*S. aureus*); Scottish Recommendations.
http://www.hps.scot.nhs.uk/resourcedocument.aspx?id=1189

Shallcross LJ, Williams K, Hopkins S, Aldridge RW, Johnson AM, Hayward AC. Panton-Valentine leukocidin associated staphylococcal disease: a cross-sectional study at a London hospital, England. Clin Microbiol Infect 2010;16:1644-8. http://www.ncbi.nlm.nih.gov/pubmed/20969671

NHS Greater Glasgow and Clyde (2015) Meticillin Resistant Staphylococcus Aureus (MRSA) Policy.
http://www.nhsggc.org.uk/media/245246/mrsa-sop-v6-april-2017-_aide-memoire-included-nov-2017_.pdf

Appendix 1: GP/Clinician risk assessment and management of adult case of PVL SA/MRSA infection



[1] Health Protection Units should be informed about patients with PVL SA/MRSA who are in high risk groups, clusters or outbreaks.

[2] High risk groups – those who may be either at risk of infection through work/recreational activity and likewise also at risk of passing infection on through their work or recreational activity, e.g. Healthcare worker/ Social carer. Person who is in a closed community such as prison, Recreational activities which may be considered high risk are contact sports such as rugby, wrestling, judo, jiu jitsu (particularly where rash guards or Gi are not worn).

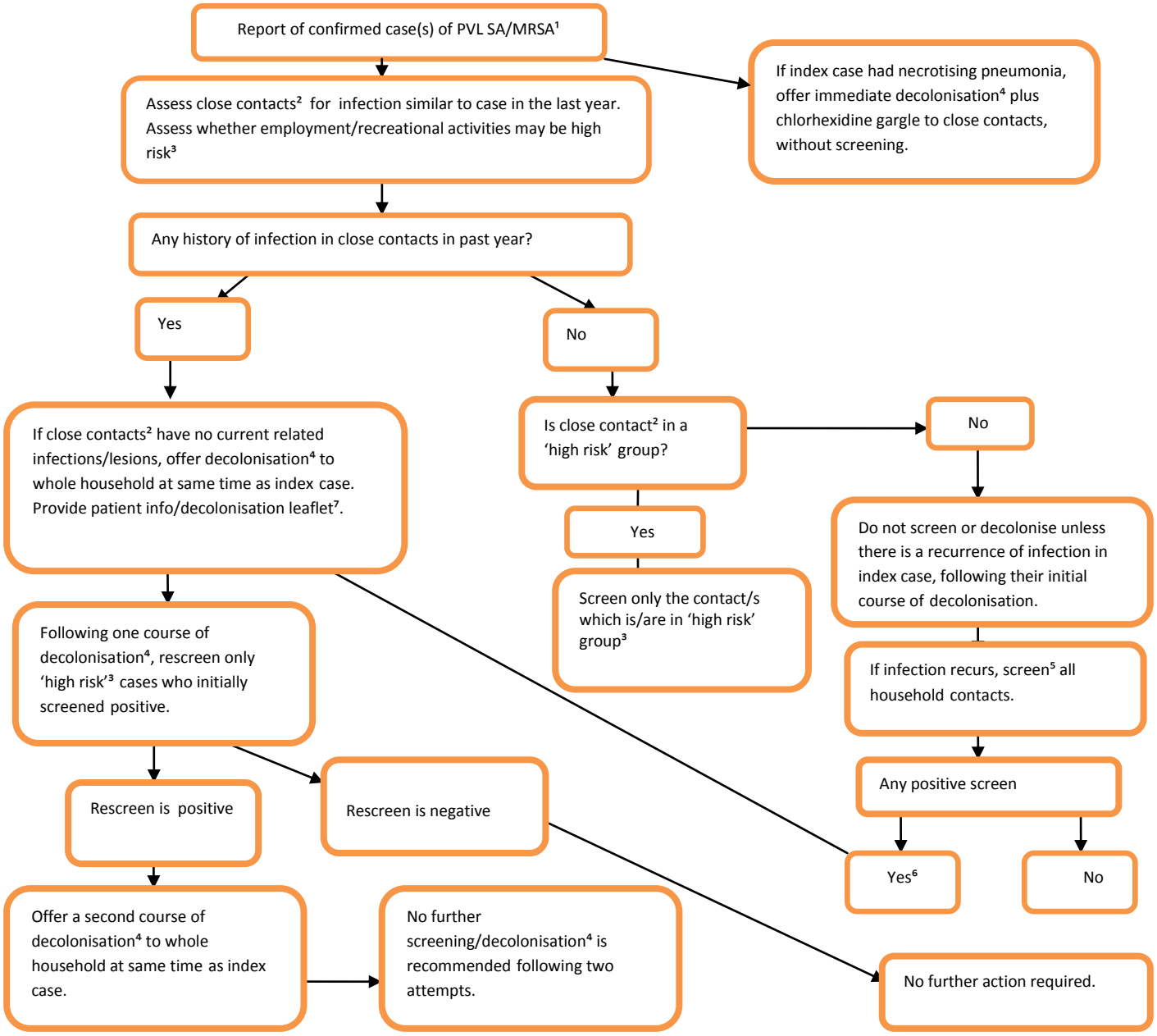
[3] See appendix 4+5 for patient information/decolonisation leaflets.

[4] Screening should include swabs (charcoal) of nostrils, throat, any lesions and any topical sites which previously tested positive for PVL SA/MRSA.

[5] Decolonisation aims to eradicate the presence of SA/MRSA bacteria from the skin and nasopharynx, in order to reduce the opportunity for these to cause soft tissue or more invasive infections. This treatment is most effective if given once acute infection has resolved and the lesion has dried/healed. Where wounds are chronic (e.g. ulcers relating to diabetes; commence treatment once acute infection has resolved). One course of decolonisation consists of 5 days of mupirocin (bactroban) ointment inserted into the nostril x3 daily (in times of shortage, naseptin 0.1% may be used instead x4 daily for 10 days). In addition Patient will require to use chlorhexidine 4% as a full bodywash for 5 days. If patient has a skin condition, an alternative such as Oilatum Plus may be used. If the contact is a child, please discuss with Health Protection team on 0141 201 4917 option 3.

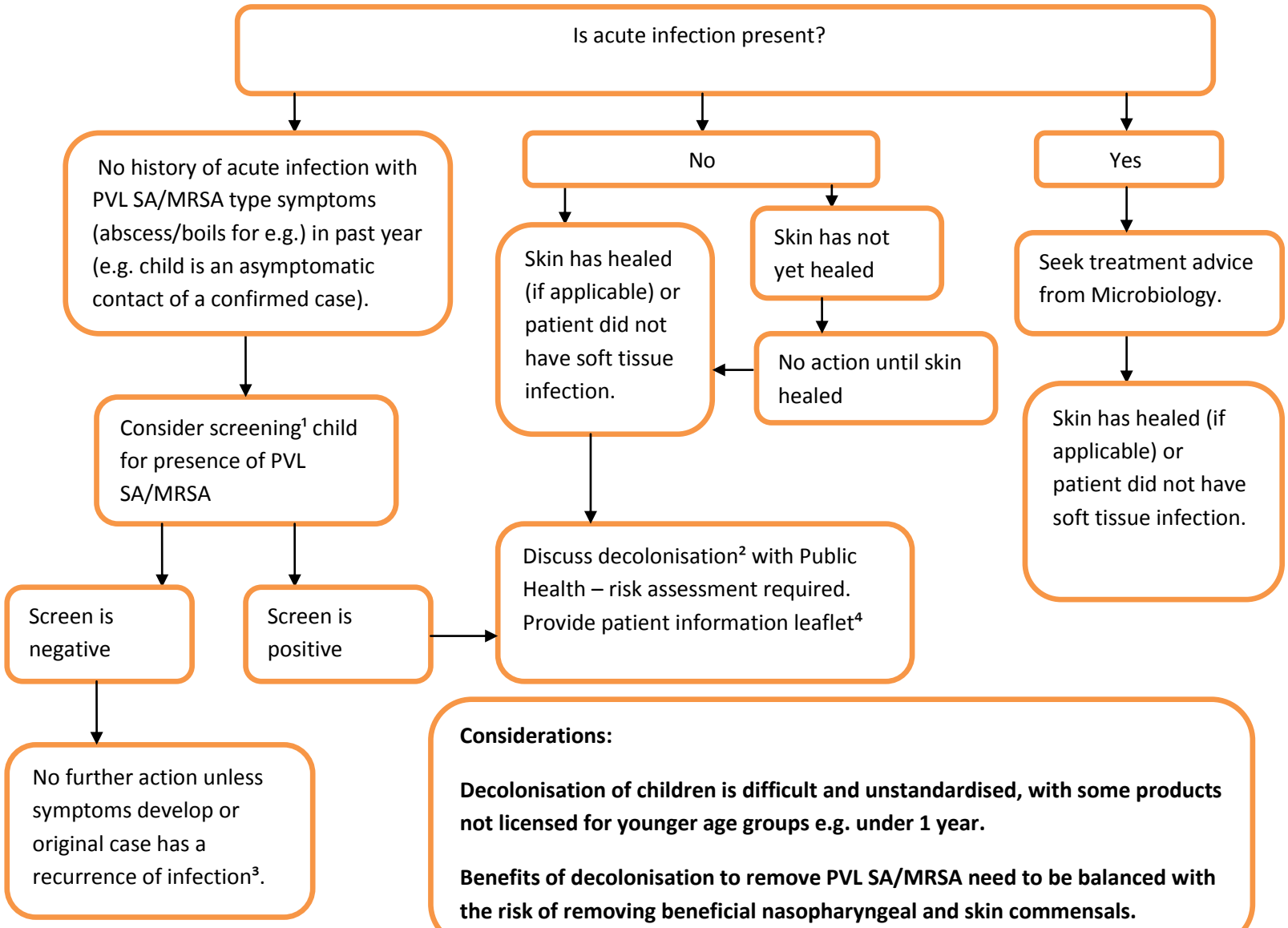
* Repeated attempts at decolonisation are unlikely to succeed.

APPENDIX 2: RISK ASSESSMENT AND MANAGEMENT OF CLOSE CONTACTS OF PVL-SA/MRSA INFECTION



1. Health Protection Units should be informed of new cases of PVL SA/MRSA in high risk groups, closed communities and clusters/outbreaks.
2. Close contacts are defined as people who have had prolonged close contact with the index case in a household type setting (also consider intimate contact -boy/girlfriend), including e.g. flatmates sharing a bathroom in halls of residence.
3. High risk groups – those who may be either at risk of infection through work/recreational activity and likewise also at risk of passing infection on through their work or recreational activity, e.g. Healthcare worker/ Social carer. Person who is in a closed community such as prison, Recreational activities which may be considered high risk are contact sport s such as rugby, wrestling, judo, jiu jitsu (particularly where rash guards or Gi are not worn).
4. Decolonisation aims to eradicate the presence of SA/MRSA bacteria from the skin and nasopharynx, in order to reduce the opportunity for these to cause soft tissue or more invasive infections. This treatment is most effective if given once acute infection has resolved and the lesion has dried/healed. Where wounds are chronic (e.g. ulcers relating to diabetes; commence treatment once acute infection has resolved). One course of decolonisation consists of 5 days of mupirocin (bactroban) ointment inserted into the nostril x3 daily (in times of shortage, naseptin 0.1% may be used instead x4 daily for 10 days). In addition Patient will require to use chlorhexidine 4% as a full bodywash for 5 days. If patient has a skin condition, an alternative such as Oilatum Plus may be used. If the contact is a child, please discuss with Health Protection team on 0141 201 4917 option 3.
5. Screening should include swabs (charcoal) of nostrils, throat, any lesions and any topical sites which previously tested positive for PVL SA/MRSA.
6. Please advise the Health Protection team on 0141 201 4917 option 3, if there are other probable cases linked to the index case which are out with their household; we can then notify other GPs or Health Boards as *required.*
7. See appendix 4+5 for patient information/decolonisation leaflets.

Appendix 3: GP/Clinician risk assessment and management of paediatric case or contact of PVL SA/MRSA infection



Considerations:

Decolonisation of children is difficult and unstandardised, with some products not licensed for younger age groups e.g. under 1 year.

Benefits of decolonisation to remove PVL SA/MRSA need to be balanced with the risk of removing beneficial nasopharyngeal and skin commensals.

1. Screening should include swabs (charcoal) of nostrils, throat, any lesions and any topical sites which previously tested positive for PVL SA/MRSA.
2. Decolonisation aims to eradicate the presence of SA/MRSA bacteria from the skin and nasopharynx, in order to reduce the opportunity for these to cause soft tissue or more invasive infections. This treatment is most effective if given once acute infection has resolved and the lesion has dried/healed. Where wounds are chronic (e.g. ulcers relating to diabetes; commence treatment once acute infection has resolved). One course of decolonisation consists of 5 days of mupirocin (bactroban) ointment inserted into the nostril x3 daily (in times of shortage, naseptin 0.1% may be used instead x4 daily for 10 days). In addition, patient will require to use Oilatum Plus as a bodywash for 5 days (and as a shampoo on alternate days). If the contact is a child, please discuss with Health Protection team on 0141 201 4917 option 3.
3. see appendix 2 and Discuss with Public Health.
4 Patient information/decolonisation- see appendices 4+5

Appendix 4:
Patient Information - PVL-*Staphylococcus aureus*

What is PVL-*Staphylococcus aureus* (PVL-*S. aureus*)?

Staphylococcus aureus is a germ that commonly lives on healthy skin. About one third of healthy people carry it quite harmlessly, usually sites are moist areas of the body, such as nose, armpits and groin, this is known as colonisation. A small number of *S. aureus* can produce a toxin called Panton-Valentine Leucocidin (PVL) and they are known as PVL-*S. aureus*.

PVL-S.aureus is mainly found in people who live in the community rather than in hospitals.

What type of illness does it cause?

PVL-S.aureus may cause no infection (carriers) or they may cause infections like boils or abscesses – these may well occur several times. Very rarely they can cause more serious infection of the lungs or bones which may require hospital treatment.

How do you catch PVL-*S. aureus*?

Anyone can get a PVL-*S. aureus* infection. Infection can also occur in fit, healthy people during skin-to-skin contact with someone who has the germ, for example within a family, during contact sports like rugby, or from contaminated surfaces for example shared gym equipment, razors, towels etc. Damaged skin can be more prone to infection with any *S. aureus*, including PVL.

How is PVL-*S. aureus* treated?

Boils and abscesses should be drained of pus where possible. Some infections may be treated with a course of antibiotic tablets and there are several different choices available.

In certain cases the doctor may suggest the use of antiseptic washes and nose ointments to reduce the number of germs present on the skin after infection has healed. This may help reduce the chance of repeated infection or break a cycle of infection occurring in different household members. It may not get rid of the germ completely. In cases where there are other household or close contacts suffering infections, the antiseptic wash and nose ointment may be suggested for everyone.

How do I prevent passing PVL-*S. aureus* to other people?

Keep the infected areas covered with clean, dry dressings or plasters. Change these regularly or as soon as you see seepage to the surface of the dressing/ plaster. Wash your hands before and after changing the dressings.

Do not touch, poke or squeeze infected skin. This transfers the germs to your hands and can push them deeper into the skin.

Cover your nose and mouth with a tissue when you cough or sneeze, particularly if you have a cold, because the germs can live in your nose. Throw the tissue in the bin at once and then wash your hands.

Try and keep personal items like towels, razors, toothbrushes, etc for your own use. Wash towels frequently at the highest temperate the materials will allow.

Can I go to work or school when I have a PVL-*S. aureus* infection?

You should not work as a carer in a nursery, hospital, residential or care home or similar place until your skin has healed and you have permission to return to work from your local Occupational Health Department, GP or manager.

You should not work in the food industry, e.g. waitress, chef, food production, until your skin has healed and you have permission to return to work from your local Occupational Health Department, GP or manager.

You may carry on with other types of work, provided you keep infected skin areas covered with clean, dry dressings. If you are not sure about working, contact your local Occupational Health Department or GP.

Children can go to school if they are old enough to understand the importance of good hand hygiene, and if their infected skin is covered with a clean dry dressing which will stay dry and in place until the end of the school day. Children should not take part in contact sports, or use communal gym equipment until their skin is healed. The GP's advice is essential and school management should be informed.

People with eczema or a more generalised skin condition should take advice from their GP whether to remain off work or school. You need to continue treating your skin to keep it in good condition. In the long term this helps to reduce the risk of spread of PVL-*S. aureus*.

Can I go to swimming pools, gyms or sports facilities when I have a PVL-*S. aureus* infection?

You should not use communal facilities for example gym equipment, saunas, swimming pools, or have a massage, manicure or similar until your skin has healed.

How do I prevent becoming infected again?

If you are found to carry PVL-*S. aureus* persistently on your skin or nose, or if you suffer from repeated infections, you may be given a course of skin and nose decolonisation treatment. Sometimes the skin treatment will be extended to your household or close contacts. In these circumstances it is important that all affected people in a household or social group are treated at the same time.

If you have a further infection of any type, if you are admitted to hospital unexpectedly, or if you are going to be admitted to hospital for an operation, always tell the doctor or nurse looking after you that you have had a PVL-*S. aureus* infection. This will ensure that you receive appropriate treatment.

Further advice:

- Those who work in occupations where they might pose a risk of infection to others, such as healthcare workers; carers in nurseries, residential or care homes or similar; or food handlers, should not attend work until wounds have healed;
- Those who have eczema or a more generalised skin condition should remain off work or school until treatment has been completed;

- Children can go to school if they can understand the importance of good hand hygiene, and can keep their infected skin covered with a clean dry dressing which will stay dry and in place until the end of the school day.
- Children attending nurseries will require individual assessment in terms of suitability to return to nursery.

Adapted from: Health Protection Scotland Interim Advice for the Diagnosis and Management of PVL-associated *Staphylococcus aureus* infections (PVL-*S. Aureus).*

APPENDIX 5 : PVL STAPHYLOCOCCUS AUREUS – INFORMATION FOR PATIENTS

HOW TO USE THE PVL-SA DECOLONIZATION PREPARATIONS.

The purpose of decolonization is to try to rid the body of the bacteria that have caused boils or other infections. Preparations must be used as detailed below.

General notes on skin treatment:

As with all treatments to be applied to the skin, avoid contact with the eyes. Those who are pregnant, have eczema, or are under a year old should be screened first to see if they are carrying the bacteria (the doctor or nurse who is arranging your treatment will explain how this is done). The doctor will then decide whether treatment is appropriate. This treatment should not be used if there are any boils or skin lesions that are still leaking. Wait until boils or lesions are dry. Whilst the skin treatments are being used the following will help reduce spread of the bacteria within the care home or household:

- Sheets/towels should be changed daily if possible.
- Regular vacuuming and dusting, particularly the bedrooms
- If possible avoid bar soap and use pump action liquid soap
- Use individual personal towels and facecloths. Wash them frequently in a
- hot wash.
- Clean sink and bath with a disposable cloth and detergent after use, and
- then rinse clean.

Chlorhexidine 4% bodywash/shampoo or Oilatum Plus or skinsan- children)

- Use once a day for 5 days.
- Use daily as liquid soap in the bath, shower or bowl and as a shampoo on days 1, 3 and 5.
- Follow manufacturer's instructions on product leaflet carefully.
- Do not use regular soap in addition during baths/showers.
- Do **NOT** apply to dry skin.
- 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 well before drying skin thoroughly. This is particularly important in
- people with skin conditions (e.g. eczema).
- Towels should be for individual personal use and, if possible, changed daily.

Plus either:

Mupirocin 2% (Bactroban Nasal):

- Use three times a day for 5 days.
- Apply a matchstick head-sized amount (less for a small child) on the end of a cotton bud to the inner surface of each nostril. Press the sides of the nose together and massage gently to spread the ointment inside the nostrils.

Or:

Chlorhexidine hydrochloride 0.1% (Naseptin):

- Use four times a day for 10 days.
- Apply a matchstick head-sized amount (less for a small child) on the end of a cotton bud to the inner surface of each nostril. Press the sides of the nose together and massage gently to spread the ointment inside the nostrils.

You might also be asked to gargle with an antiseptic solution.
For individual concerns or further advice please contact your GP or your local Health Protection Unit on 0141 201 4917

APPENDIX 6: Template email/letter to GP

Dear Dr……

Re: Patient ……..

We have been notified that your patient has a Staphylococcus aureus / MRSA PVL infection (SOP with background information attached) site: date of specimen:…..

Once any acute infection has been treated and the skin has healed (if applicable, usually this will be boils or abscesses which tend to keep recurring and are not always sensitive to Flucloxacillin) we would normally request a course of topical decolonisation/eradication of skin and nasal carriage, which would be a 5 day course of (either) Chlorhexidine 4% or Oilatum plus (paediatric cases) to be used as a full body wash x1 daily, plus Mupirocin (Bactroban) 2% ointment inserted into the nostrils x3 daily (or in times of shortage, naseptin 0.1% (Chlorhexidine hydrochloride ointment inserted into the nostrils x 4 daily for 10 days).

Could I impose on you to please prescribe this treatment for this patient once his/her skin has healed following the recent excision and drainage/antibiotic treatment (delete as applicable).

This regime should be carried out in tandem with additional hygiene measures (patient information leaflet attached) and ensuring that anyone else with symptoms of recurrent boils/skin infections or a similar clinical presentation to your patient within the household (in the preceding year) has also been assessed. The appendices at the end of the SOP have flowcharts on what to do – and I am happy to get involved if you need any help or clarification.

I hope this helps,

Kind Regards and thanks,

Public Health 0141 201 4917 option 3.