Policy Category	BC - Best Care		
Best Care Goals	☒ Safe ☐ Personal ☐ Connected ☒ Effective		
Applies To	National		
Version	**Approval Authority**	**Effective from**	**Review by date**
1	National Medical Director, WA	5/10/2021	5/10/2024

Contents

1 Rationale

The purpose of this Clinical Protocol is to provide a guiding framework for Hospital at the Home services for Medical Practitioners and clinical staff.

The current update of the protocol occurred as a response to an Antimicrobial Stewardship Audit which provided excellent opportunities for improvement in AMS within HATH services, one of which was the need for a review of this protocol against national guidelines

Note that oral therapy is usually adequate for cellulitis and erysipelas **not associated with systemic features** of infection, and is usually suitable for patients with a single systemic feature of infection.

Initial intravenous therapy is usually required for adults with **two or more of the following systemic features** of infection:

- temperature more than 38°C or less than 36°C
- heart rate more than 90 beats/minute
- respiratory rate more than 20 breaths/minute
- white cell count more than 12×10^9/L or less than 4×10^9/L, or more than 10% immature (band) forms.

Intravenous therapy is also used for patients unable to tolerate oral therapy and may be required for immunocompromised patients or patients with comorbidities that increase the risk of rapid disease progression (eg diabetes), even if they do not have two or more systemic features of infection.

2 Scope

The Clinical Protocol applies Nationally for HATH clients treated for cellulitis.

3 Acceptance to HATH Criteria and Pathway

RED Unacceptable for community admission to HATH Refer to ED/ Inpatient management. (May become suitable for HATH after ED or inpatient stabilisation)	• Rapidly progressive soft tissue infection, skin necrosis or impending septic shock (fever >38.5°C, Systolic BP<90mmHg, HR>100/min) • Uncontrolled pain • Necrotic changes to skin or other signs of acute vascular insufficiency • Suspected deep tissue (eg fasciitis, myositis) bone or joint involvement • Co-existing medical conditions requiring hospital admission or likely to affect compliance or creating risk factors for rapid progression of infection (such as poorly controlled diabetes or significant immune compromise). • Pregnancy beyond 22 weeks gestation • A collection or abscess requiring surgical drainage • Limb compromise from swelling is deemed a significant risk

ORANGE
Requires discussion with Medical Governor and/or Infectious Diseases Physician prior to acceptance.
	• Suspected abscess or bursitis
	• Immunocompromised
	• Diabetic foot ulcer
	• Cellulitis post:
	  • Specific marine exposure
	  • Human or animal bite
	  • Burns
	• Obesity. Clarification with Infectious Diseases governor may be required regarding potential need for bd dosing due to poor tissue penetration
	• Underlying lymphoedema or lipo-lymphoedema which may require longer courses of antibiotics to prevent further lymphatic damage
	• Cellulitis involving
	  • Face, neck or perineum
	  • Chronic ulcers (may require investigation for underlying bone involvement and/or vascular insufficiency)
	  • Both legs
	  • Hands
	  • Surgical wound

	• Suspected or confirmed immediate penicillin allergy or hypersensitivity (eg anaphylaxis, angioedema and/or urticaria) or cephalosporin hypersensitivity • Clinical suspicion or laboratory confirmation of multi-resistant organisms (ie previous infection or colonisation with Methicillin Resistant Staphylococcus Aureus [MRSA]) • Aged between 13 and 18, suitable for adult dosing who are not under the care of a paediatrician.

GREEN
Accepted for HATH Cellulitis protocol
	All criteria must be met:
	• Client's medical condition has been assessed as stable, has a clear diagnosis/prognosis and is at low risk of deterioration
	• Patient has failed a trial of oral antibiotics, OR intravenous antibiotics are deemed as the only appropriate choice OR patient unable to take oral medication (noting that oral medication can be given in liquid form).
	• Required pathology has been collected
	  • FBC, U+E, LFT, CRP, BSL
	  • Wound swab (if discharging wound)
	  • Blood Culture (if fever 38.5°C or over)
	• Adults 18 years or over

4 Pathology Work Up

Verify if any recent pathology has been ordered and access results prior to considering if the following are also required:

- Blood cultures if temp ≥ 38.5°C.
- Urea and electrolytes, full blood picture, liver function, and blood glucose level.
- Wound swab if open wound or purulent discharge.
- For cellulitis complicating chronic ulcers, consider imaging to investigate for underlying osteomyelitis and vascular insufficiency, and to assess the need for advanced wound care (nonsurgical/surgical debridement) and optimisation of vascular supply. Note also that bacteria found in chronic ulcers are likely to be colonisers.
- If microbiology investigations indicate organism other than *Streptococcus pyogenes,* or *Methicillin Sensitive Staphylococcus aureus*, consult an Infectious Diseases Physician.

5 General Management

- Access pathology results from referral source and if necessary, organise blood cultures, wound swab if indicated, CRP and full blood picture.
- Collaborate with medical governance doctor regarding abnormal pathology results.
- Initiate oral antibiotics if there are no systemic features and or if a trial of oral treatment has not occurred
- If oral treatment has failed or systemic features are present-gain intravenous access and commence intravenous therapy as prescribed.
- Nursing assessment as per *Limb Assessment Tool BC-FRMC-0084*
- Nursing care as per *Clinical Pathway – Cellulitis BC-FRMC-0304*
- Arrange review by medical governance doctor as soon as practicable.
- Advise client to rest with limb elevated.
- Advise client on the use of oral Probenecid if prescribed.
- Advise client on the use of oral analgesia/antipyretic medication as directed.
- Monitor and advise client on psychological wellbeing and refer to other agencies if evidence of de-compensating mental health.

6 Medical Management / Treatment Plan

6.1 Oral Antibiotics

Initiate oral antibiotics if there are no systemic features and/or if a trial of oral treatment has not occurred**.**

- phenoxymethylpenicillin 500 mg (child: 12.5 mg/kg up to 500 mg) orally, 6-hourly for 5 days

For patients with **delayed nonsevere** hypersensitivity to penicillins, cefalexin can be used in most cases

- cefalexin 500 mg (child: 12.5 mg/kg up to 500 mg) orally, 6-hourly for 5 days.

For patients at risk of MRSA (See Appendix A) or with **immediate (non-severe or severe)** or **delayed severe** hypersensitivity to penicillins, use:

- trimethoprim + sulfamethoxazole 160+800 mg (child 1 month or older: 4+20 mg/kg up to 160+800 mg) orally, 12-hourly for 5 days

OR

- Clindamycin 450mg (child 10mg/kg up to 450mg) orally, 8 hourly for 5 days

For **purulent** cellulitis (eg associated abscess), or if ***S. aureus*** is otherwise suspected based on clinical presentation (eg penetrating trauma, associated ulcer), use:

- Dicloxacillin 500 mg (child: 12.5 mg/kg up to 500 mg) orally, 6-hourly for 5 days

OR

- flucloxacillin 500 mg (child: 12.5 mg/kg up to 500 mg) orally, 6-hourly for 5 days.

Cefalexin is often preferred to dicloxacillin or flucloxacillin in children, because the liquid formulation is better tolerated. In most cases, it can also be used for patients with **delayed non-severe** hypersensitivity to penicillins

6.2 Intravenous Therapy at Home

If oral treatment has failed or systemic features are present-gain intravenous access and commence intravenous therapy as prescribed.

For erysipelas or non-purulent cellulitis where Strep pyogenes is suspected, use

- Benzylpenicillin 1.2gm IV 6hrly

**Note that Cefazolin 2 grams IV once daily plus Probenecid 1g orally daily

(or 2gm bd if clients are unsuitable for Probenecid -see 6.3- or Cefazolin 500mg BD may be used if nauseated) is acceptable to be used in a community setting if qid visits are not possible.

For purulent cellulitis

- Flucloxacillin 2gm 6hrly (child: 50mg/kg up to 2gm)

For patients with purulent cellulitis or in whom *S. aureus* is suspected based on clinical presentation, who are at increased risk of methicillin-resistant *S. aureus* (**MRSA**) infection, use

- Vancomycin (see Silver Chain Vancomycin protocol BC-CP-0024)

In some regions, based on local community-associated MRSA (CA-MRSA) susceptibility patterns, clindamycin or lincomycin is a suitable alternative to vancomycin

- Clindamycin 600mg IV 8hrly (child 15mg/kg up to

  OR

- Lincomycin 600mg IV 8hrly (child 15mg/kg

For patients with **immediate nonsevere** or **delayed nonsevere** hypersensitivity to penicillins,

OR

If qid visits are not possible, replace benzylpenicillin or flucloxacillin with **cefazolin**.

Use:

Cefazolin 2 grams IV once daily plus Probenecid 1g orally daily.

or

2gm bd can be given if clients are unsuitable for Probenecid (see 6.3)

500mg BD may be used if nauseated.

The following situations may require discussion with an Infectious Diseases Physician prior to acceptance for HATH (see table below for general management approach to these situations):

- Human and animal bites
- Cellulitis following contact with water.
- Cellulitis complicating chronic ulcers.
- Obese patients

- Cellulitis complicating lipo-lymphoedema

6.3 Suitability for Oral Probenecid

- No known allergy to Probenecid.
- Absence of blood dyscrasia, renal urate stones and acute gout.
- Renal function, creatinine clearance >30mL/min.
- Stable liver function.
- Insufficient data to support safe use in pregnancy – avoid.

Drug interactions with probenicid:

- Use of methotrexate concurrently is contraindicated
- Caution with sulphonylureas (monitor blood glucose levels) and benzodiazepines as they will have increased plasma levels

7 Switching to oral therapy

Switch to oral therapy as soon as systemic symptoms resolve.

Note only one or two doses of intravenous therapy may be sufficient. A **total duration of therapy** of 5 to 10 days (intravenous + oral) is recommended.

If improvement in systemic signs of cellulitis and able to tolerate oral antibiotic therapy:

- Commence Flucloxacillin 500mg 6-hourly orally or Cephalexin 500mg 6 hourly (if non-immediate penicillin hypersensitivity), unless alternative antibiotic indicated by swab culture results.

8 Management of Specific Risk Situations

Human and Animal Bites

For bites and clenched-fist injuries that are **not infected**, antibiotic therapy is usually not necessary for otherwise healthy individuals if the risk of wound infection is low (eg small wounds not involving deeper tissues that present within 8 hours and can be adequately debrided and irrigated).

Give presumptive therapy if the risk of wound infection is high, including if:

- presentation to medical care is delayed by 8 hours or more
- the wound is a puncture wound that cannot be debrided adequately
- the wound is on the hands, feet or face
- the wound involves deeper tissues (eg bones, joints, tendons)
- the wound involves an open fracture—see Open fractures for management
- the patient is immunocompromised (eg due to asplenia or immunosuppressive medications), or has alcoholic liver disease or diabetes
- the wound is a cat bite.

For wounds on the hands, feet or face, or if infection progresses despite antibiotic therapy, consider surgical consultation. Surgical advice may also be sought on the appropriateness of primary versus delayed wound closure.

General Management	Recommended Antibiotic Regimen
• Assessment of extent of infection and the possibility of involvement of underlying tendon, joint or bone and or possibility of retained foreign bodies eg small animal teeth • Wound swab to be taken. • Wound debrided and irrigated. • Assessment of tetanus immunisation and need for additional tetanus toxoid/immunoglobulin • Assessment of need for rabies or lyssa virus post exposure prophylaxis eg bat bites • If human bite, consider need for assessment and prevention of blood borne viral diseases (eg HIV, Hep B and C), discuss with medical governance doctor and/or ID Physician.	If infecting organism clearly identified use oral antibiotic based on culture and sensitivity. If antibiotic therapy is indicated but infecting organism is unclear-start with Amoxicillin/Clavulanic acid 875mg/125mg PO twelve hourly. If there is a delay in commencing antibiotics given procaine benzylpenicillin 1.5gm as a single dose whilst awaiting oral antibiotic commencement If immediate penicillin hypersensitivity use Metronidazole 400mg PO twelve hourly **PLUS EITHER** doxycycline 100mg BD PO. **OR** Trimethoprim + sulfamethoxazole 160mg/800mg PO twelve hourly. **OR** **Use combination of** Ciprofloxacin 500mg PO twelve hourly

	PLUS Clindamycin If oral absorption is likely to be impaired (eg following major trauma), use intravenous therapy Amoxicillin 1.0gm plus 0.2gm IV 8hrly If giving IV therapy change to oral therapy as soon as client stable

Cellulitis Following Water Immersion

Preventative antibiotics are not routinely required for wounds that have been immersed in water. Prophylaxis is required for traumatic water-immersed wounds that require surgical management or are significantly contaminated.

General Management	Recommended Antibiotic Regimen
• Assessment of severity of infection, co-morbidities (eg malignancy, iron overload), accurate history of type of water exposure. • Wound swab to be taken. Careful cleaning, and debridement if necessary, of wounds that have been immersed in water is important to prevent infection. For patients with traumatic water-immersed wounds, ensure that tetanus immunisation is up-to-date • Discussion of culture results with ID/Micro specialist.	Liaise with referring Medical governor regarding appropriate antibiotics and/or confer with eTG Consider prolonged duration of therapy (eg 14 days) depending on response.

Cellulitis Complicating Chronic Ulcers

All chronic ulcers and wounds are colonised with bacteria. Do not perform microbiological investigations or start antibiotic therapy unless there are clinical signs of infection (eg systemic features, spreading cellulitis; see also Factors affecting ulcer and wound healing).

If there are clinical signs of infection, collect samples of pus (which must be distinguished from ulcer exudate) or infected tissue for culture.

Note culture of a superficial swab may identify organisms that are colonising the wound rather than causing infection (eg *Pseudomonas aeruginosa* identified by culture of a superficial swab of a lower limb ulcer).	
General Management	**Recommended Antibiotic Regimen**
• Assessment of underlying cause of ulcer (eg arterial/venous/lymphatic dysfunction), possibility of involvement of underlying muscle, tendon, joint or bone. • May require appropriate imaging. • Wound swab to be taken • Wounds/chronic oedema/venous insufficiency/lipo-lymphoedema to be managed as per Silver Chain wound care guidelines.	Antibiotic therapy should ideally be guided by culture results; however, wound swab cultures often indicate bacterial colonisation rather than causative pathogen. Empiric therapy: Cephazolin 2g IV daily PLUS Probenecid 1g PO daily

9 Monitoring

- As soon as clinical improvement occurs (resolution of systemic features, fever, pain) – start oral therapy.
- Note that redness may persist
- If Clinical deterioration (see below) – discuss with medical governor and consider hospital transfer.
- Indicators for urgent medical re-assessment or hospital admission:
  - Persistent fever > 37.8^0C after 72 hours of IV antibiotic therapy
  - Tachycardia, HR > 100/min
  - Hypotension (systolic BP < 90, and/or diastolic BP <60)
  - Extension of skin erythema or development of skin necrosis
  - Increasing pain uncontrolled by prescribed analgesia.
  - Evidence of fluctuation or a collection suggestive of an abscess

10 Medical Governance

- The client must have access to medical governance support for 24 hours per day, 7 days per week.

- Primary medical governance can be by referring medical specialists, credentialed referring GPs or by Silver Chain medical staff.
- Care delivery is planned and provided in consultation with the client, medical officer/specialist holding medical governance and nursing staff.
- Where the primary medical governor is unavailable the Silver Chain medical officer will provide the medical governance.
- In the instance when a client's condition deteriorates the Silver Chain medical officer or nursing staff will confer with the referring doctor or an emergency department medical officer.
- When governance is retained by a Silver Chain medical officer the client will have a medical review within 24 hours of admission and the medical officer will determine when the scheduled follow up and discharge will occur.
- A summary of the episode of care is sent to the referrer or the client's GP at discharge.
- The discharge summary is to highlight any clinical risks that have been identified during the admission and include any significant investigation results

11 Discharge Planning

- Refer back to client's GP.
- Ensure a follow up appt has been made with the usual GP for review and that any clinical risks or concerns are handed over.

12 Supporting Documents

Silver Chain Group documents that directly relate to and inform this Clinical Protocol are available with this document in the Policy Document Management System (PDMS).

Other documents that directly relate to and inform this Clinical Protocol are as follows:

- Skin and Soft Tissue Infections: Published April 2019. Amended December 2019. © Therapeutic Guidelines Ltd (eTG March 2021 edition)

13 Document Details

Document Owner	Executive Medical Director, East Coast
Document Type	CP – Clinical Protocol
Consumer Participation	☐ Yes ☒ Not Applicable
Functional Area	Acute
Risk Rating	Moderate
Periodic Review	36 months

Silver Chain Group's policies align with relevant legislation and standards and are based on providing a fair, inclusive and safe working environment free from bullying and discrimination and one that enables equal opportunity for all Silver Chain staff. Our policies embody our values of Care, Community, Integrity and Excellence.

Appendix A: Risk factors for infection with methicillin-resistant *Staphylococcus aureus*

A patient with one or more of the risk factors below is at increased risk of methicillin-resistant *Staphylococcus aureus* (MRSA) infection. However, patients at increased risk will not necessarily be colonised or infected with MRSA.

Consider whether to modify empirical therapy on an individual patient basis, taking into account the severity of infection.

Risk factors for infection with MRSA include:

- residence in an area with a high prevalence of MRSA (eg Northern Territory; remote communities in northern Queensland; regions north of metropolitan Perth in Western Australia, especially the Kimberly and Pilbara)
- previous colonisation or infection with MRSA, particularly if recent or associated with the current episode of care [NB1]
- frequent stays, or a current prolonged stay, in a hospital with a high prevalence of MRSA, particularly if associated with antibiotic exposure or recent surgery
- residence in an aged-care facility with a high prevalence of MRSA, particularly if the patient has had multiple courses of antibiotics.

If modifying empirical therapy based on the presence of risk factors, consider local MRSA epidemiology and susceptibility patterns (particularly of community-associated MRSA).