Peter MacCallum Cancer Centre

ADULT SEPSIS PATHWAY

WRITE PATIENT DETAILS OR AFFIX PATIENT LABEL

Surname: _____

Given Names: _____

Unit Number: _____

Date of Birth: _____

Does your patient have a known or suspected infection?

Does your patient have any of the following sepsis risk factors, signs or symptoms?

- History of fever or rigors
- Neutropenia or recent chemotherapy
- Indwelling medical devices
- Recent surgery or invasive procedure
- Skin: cellulitis, wounds
- Chest: cough, shortness of breath
- Abdomen: pain, peritonism
- Neuro: decreased mental alertness, headache
- Urine: dysuria, frequency

PLUS

Does your patient have ≥2 signs of SEVERE SEPSIS?

- SBP <100 mmHg
- Altered mental status
- Lactate >2 mmol/L

OR

Early warning signs of sepsis: ≥2 SIRS criteria:

- Temperature <36°C or >38°C
- Heart Rate >90 per minute
- Respiratory Rate >20 per minute
- WCC <4 or >12 x 10^9/L

SIRS = systemic inflammatory response syndrome

YES

YES

NO

This patient is at risk of rapid deterioration / septic shock

Patient may have sepsis

Look for other causes:

- Transfusion reaction
- Myocardial infarct
- Haemorrhage
- Ischaemia
- Pulmonary embolism
- Drug reaction

Patient requires:

- Clinical review
- Repeat observations within 30 minutes and manage accordingly
- Re-evaluation for sepsis

Does your patient have a Goals of Care and/or Advance Care Plan? Review before proceeding

If sepsis most likely then
COMMENCE SEPSIS PATHWAY
Notify the Unit Registrar/Consultant
Consider MET call or ICU review as required

RECOGNISE, RESUSCITATE & REFER

Six key actions in 60 minutes:

1. Oxygen administration
2. Two sets of blood cultures
3. Venous blood lactate
4. Fluid resuscitation
5. Intravenous antibiotics
6. Monitoring observations and fluid balance

Cancer patients currently undergoing systemic chemotherapy require first antibiotic within 30 minutes

Coding statement (medical officer required to complete):
This patient was treated for GENERALISED SEPSIS during this hospital admission:

Name _____ Designation _____ Signature _____ Pager/ph. _____

ADULT SEPSIS PATHWAY

MR63T

Peter MacCallum Cancer Centre

ADULT SEPSIS PATHWAY

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Surname: _____

Given Names: _____

Unit Number: _____

Date of Birth: _____

First 30 minutes from presenting signs/symptoms

Recognise

Location: **Date:** __/__/__ **Time:** ____:____

Has a Goals of Care form (MR/63D) been completed? ☐ **Yes** ☐ **No** ☐ **Unknown**

Call a MET if patient meets MET call criteria at any stage

Signs/ Symptoms

1. Does your patient have two or more SIRS criteria, hypotension or altered mental state?
(check boxes as appropriate)

- ☐ Temperature <36°C or >38°C
- ☐ Heart Rate >90 per minute
- ☐ Resp Rate >20/min Record rate_____
- ☐ WCC <4 or >12 x 10^9/L
- ☐ Systolic BP <100mmHg
- ☐ Altered mental state

2. Does your patient have clinical signs of hypoperfusion?

- ☐ Cool peripheries (hands and feet)
- ☐ Decreased/no urine output (for >8 hrs)

3. Does your patients also have any of the following risk factors, signs or symptoms of infection?

- ☐ Neutropenia or recent chemotherapy
- ☐ Recent surgery/invasive procedure
- ☐ Skin: cellulitis, wound
- ☐ Neuro: decreased mental alertness, headache
- ☐ Urine: dysuria, frequency
- ☐ Abdomen: pain, peritonism
- ☐ Chest: cough, shortness of breath
- ☐ Indwelling medical device
- ☐ History of fever of rigor

Notification using ISBAR

Ward: Doctor_____ **Pager** _____ **Time** _____:_____ ☐ Initials

ISBAR: Identify/**S**ituation/**B**ackground/**A**ssessment/**R**equest

Oxygen administration

Aim SpO_2 ≥95% (or 88-92% for COPD & chronic type II respiratory failure)

Ensure IV access

Large bore peripheral cannula inserted/available for fluid bolus, OR
If central venous access device already available: type (if applicable) _____

Blood cultures

Two sets of blood cultures ☐ Initials

(2 peripheral; or 1 from all lumens of device or port if accessible, plus 1 peripheral)

Lactate

Venous blood lactate (collect in blood gas syringe & send to Biochemistry on ice) ☐ Initials

Record lactate level _____ mmol/L

Pathology

- Collect FBC, UEC, CRP, LFTs, coags and blood glucose level
- Consider cross match if patient at risk of anaemia or known recent surgery

Don't wait for confirmation of lab tests before commencing fluid resuscitation and first dose of antibiotics

Fluid Resuscitate

If hypotensive (SBP<100mmHg) or lactate >2mmol/L

Fluids must have medical authorisation and be prescribed on the IV Therapy Chart (MR61A)

- **Give RAPID fluid bolus STAT (preferably via rapid infusor)**
- **500mL 0.9% sodium chloride or Hartmann's solution**

1st bolus required and given ☐ ☐ Initials

If no response to initial fluid resuscitation (i.e. no improvement in hypotension)

- **Repeat** fluid bolus once

2nd bolus required and given ☐ ☐ Initials

- Caution if signs of pulmonary oedema, history of cardiac dysfunction or elderly patient
- Increased fluid volumes may be appropriate when administered in RMH ED or ward 7B.

If blood pressure does not improve after fluid boluses – Call a MET

Cancer patients currently undergoing systemic chemotherapy require first antibiotic within 30 minutes

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Surname: _____

Given Names: _____

Unit Number: _____

Date of Birth: _____

First 30 minutes from presenting signs/symptoms

These antibiotics are recommendations for the first dose only and must be prescribed on the medication chart (MR/61) by a medical officer.

1. Clinically examine the patient for a focus e.g. chest, urinary tract infection
For SUSPECTED or KNOWN source of infection:

HMO: Go to empiric antibiotic guide based on presumed site of infection (on next page)
Have you checked the patient's allergy status? ☐
Circle the presumed site of infection and antibiotic on the empiric antibiotic guide. ☐
Have you completed Guidance MS® approval for administration after the 1st dose? ☐
Have antibiotics been administered within 30-60 minutes? ☐

Initials ☐

or, 2. For UNKNOWN source of infection and/or NEUTROPENIC FEVER

No penicillin allergy:
☐ **Piperacillin/tazobactam 4.5g IV** in 50mL 0.9% sodium chloride over 20 min

OR Non-life threatening penicillin allergy (e.g. rash):
☐ **Cefepime 2g IV** in 10mL 0.9% sodium chloride over 5 min

OR Life-threatening penicillin allergy:
☐ **Ciprofloxacin 400 mg IV** in 200mL (undiluted) over 60 min (prior to vancomycin)
PLUS vancomycin IV (see dosing table below) at 10mg/min

Initials ☐

Note: Use MEROPENEM (instead of piperacillin/tazobactam) if unknown focus, severe AND:
- patient is known to be colonised with multidrug resistant Gram-negative bacteria OR
- already been on broad spectrum IV antibiotics (e.g piperacillin/tazobactam) OR
- travelled to area with high rate of multidrug resistant Gram-negative bacteria in last 12 months OR
- CNS infection not excluded eg. unconscious (give 2g for this)

☐ **Meropenem 1g IV** in 20mL 0.9% sodium chloride over 5 min

Initials ☐

First 60 minutes

Plus consider ADDING if SEVERE SEPSIS (SBP <100 mmHg or lactate >2 mmol/L) and unknown source

VANCOMYCIN:

Patient's **actual body weight**	<50kg	50 to 69kg	70 to 100kg	>100kg
Vancomycin loading dose	1g	1.5g	2g	2.5g

Refer to Peter MacCallum vancomycin guidelines for ongoing dosing based on CrCl.
☐ **Vancomycin _____g IV** as loading dose in an appropriate volume and infusion bag.
Concentration: Peripheral 5mg/ml, Central 10mg/ml. Maximum rate: 10mg/minute.

Initials ☐

GENTAMICIN: Give STAT dose of gentamicin 5 mg/kg ideal or adjusted body weight up to 480mg
If CrCl<40mL/min gentamicin is not recommended. Discuss with consultant first.
☐ **Gentamicin _____ mg IV** in 100mL 0.9% sodium chloride over 30 min

Initials ☐

Guidance MS© approval is required for administration of antibiotics after the 1st dose

If deteriorating call MET or if NOT improving - request review by High Acuity Team (pager 1110540) and inform treating team ☐ Name of contact: _____ Time: _____:_____

First 6 hours

Monitoring

Has the patient been reviewed by the unit registrar or consultant?
Yes Contact: _____ Time: ____:____ Page again if no review within 1 hour

Monitor vital signs & fluid balance every 30 mins for 2 hours then hourly for 4 hours or more frequently as needed.
Keep oxygen saturation ≥95% (88-92% if at risk of CO_2 retention)
Assess for deterioration which may include one or more of the following:
☐ Increasing respiratory rate (fulfilling MET call criteria)
☐ SBP <100 mmHg
☐ Decreased or no improvement in consciousness
☐ Urine output <0.5 mL/kg/hour
☐ If lactate elevated repeat in 2 hours – if elevated >2 mmol/L contact High Acuity Team

Investigation

Initiate investigations for source of infection (one or more as indicated):
☐ Diagnostic imaging (e.g. CXR) ☐ Sputum for MCS
☐ Urine MSU (or CSU) for MCS ☐ Wound swab for MCS
☐ Throat swab for respiratory multiplex PCR ☐ Stool for *C. difficile* testing (if diarrhoea present)

ALWAYS THINK ABOUT THE NEED FOR EARLY REFERRAL TO ID AND/OR SURGICAL TEAMS

Empiric antibiotic guide based on presumed site of infection

These guidelines **DO NOT replace an Infectious Diseases consult.**
Review antibiotics daily and de-escalate where appropriate (usually at 48-72 hours).
If no microbiology results to guide therapy, switch from empiric antibiotics for severe to moderate to mild as patient improves.
All antibiotic doses recommended in this guideline are for normal renal function with CrCl>50mL/min.
Dose reduction may be required in renal impairment.

	No allergy to penicillin	Non-immediate penicillin hypersensitivity	Immediate penicillin / beta-lactam hypersensitivity
UNKNOWN SOURCE OF INFECTION OR NEUTROPENIC FEVER	**piperacillin/tazobactam 4.5g IV 6-hourly**	**cefepime 2g IV 8-hourly**	**ciprofloxacin 400mg IV 12-hourly** PLUS **vancomycin IV**
Consider adding **stat gentamicin** and **vancomycin** if severe sepsis. Use **meropenem 1g IV 8-hourly instead of piperacillin-tazobactam** if severe sepsis AND known colonisation with resistant bacteria OR high risk travel within 12 months OR if meningitis not excluded (e.g. unconscious) as piperacillin-tazobactam has poor CNS penetration. Consider adding **metronidazole IV 500mg 12-hourly** (to cefepime or ciprofloxacin regimens) if intra-abdominal infection possible.			
High risk travel includes Indian subcontinent, Asia, southern/eastern Europe			
COMMUNITY ACQUIRED PNEUMONIA SEVERE	**ceftriaxone 1g IV 12-hourly** PLUS **azithromycin 500mg IV daily**	**ceftriaxone 1g IV 12-hourly** PLUS **azithromycin 500mg IV daily**	**moxifloxacin 400mg IV daily**
MODERATE	**benzylpenicillin 1.2g IV 6-hourly** PLUS **doxycycline 100mg oral 12-hourly**	**ceftriaxone 1g IV daily** PLUS **doxycyline 100mg oral 12-hourly**	**moxifloxacin 400mg oral/IV daily**
MILD	**amoxycillin 1g oral 8-hourly** OR/AND **doxycycline 100mg oral 12-hourly** **7 days**	**cefuroxime 500mg oral 12-hourly** OR/AND **doxycyline 100mg oral 12-hourly** **7 days**	**doxycycline 100mg oral 12-hourly** **7 days**
Add oral **oseltamivir 75mg 12-hourly** if concerned about influenza			
Replace ceftriaxone with **piperacillin-tazobactam 4.5g IV 6-hourly** OR **meropenem 1g IV 8-hourly** if severe AND known respiratory colonisation with resistant bacteria eg. *Pseudomonas*			
Consider additional treatment with **flucloxacillin 2g IV 6-hourly** and **vancomycin** if strongly suspect *Staph. aureus* in severe cases (eg. cavitating pneumonia or rapid clinical deterioration) ☐ **Refer to ID**			
HOSPITAL ACQUIRED PNEUMONIA SEVERE	**piperacillin/tazobactam 4.5g IV 6-hourly** OR **ceftriaxone 1g IV 12-hourly***	**cefepime 2g IV 8-hourly** OR **ceftriaxone 1g IV 12-hourly***	**clindamycin 600mg IV 8-hourly** PLUS **ciprofloxacin 400mg IV 8-hourly**
MODERATE	**ceftriaxone 1g IV daily**	**ceftriaxone 1g IV daily**	**moxifloxacin 400mg IV/oral daily**
MILD	**amoxycillin/clavulanate 875/125mg oral 12-hourly** **7 days**	**cefuroxime 500mg oral 12-hourly** **7 days**	**moxifloxacin 400mg oral daily** **7 days**
*Ceftriaxone can be used for severe HAP if: no shock/organ failure and no additional risk factors for multidrug resistant (MDR) bacteria (e.g. <5 days in ICU, no recent broad spectrum antibiotic use, no known respiratory colonisation with MDR Gram-negative bacteria, no significant immunosuppression).			
Use **meropenem 1g IV 8-hourly** and consider adding **stat gentamicin IV** if severe sepsis and known respiratory colonisation with resistant bacteria e.g. *Pseudomonas* OR high risk travel within 12 months			
Add **vancomycin** if patient has severe sepsis or septic shock			
URINARY TRACT INFECTION SEVERE PYELONEPHRITIS	**piperacillin/tazobactam 4.5g IV 6-hourly** and consider **stat gentamicin IV**	**cefepime 2g IV 8-hourly** and consider **stat gentamicin IV**	**ciprofloxacin 400mg IV 12-hourly** AND/OR **gentamicin IV**
MODERATE PYELONEPHRITIS	**ceftriaxone 1g IV daily** OR **(amoxycillin 2g IV 6-hourly** PLUS ***gentamicin IV)**	**ceftriaxone 1g IV daily** OR ***gentamicin IV**	**ciprofloxacin 400mg IV 12-hourly** OR ***gentamicin IV**
MILD PYELONEPHRITIS	**trimethoprim 300mg oral daily** OR **amoxycillin/clavulanate 875/125mg oral 12-hourly** OR **cephalexin 500mg oral 6-hourly** **10-14 days**	**trimethoprim 300mg oral daily** OR **cephalexin 500mg oral 6-hourly** **10-14 days**	**trimethoprim 300mg oral daily** **10-14 days** OR **ciprofloxacin 500mg oral 12-hourly** **7 days**
Use **meropenem 1g IV 8-hourly** and consider need for **stat gentamicin IV** if severe AND known colonisation with resistant bacteria OR high risk travel within 12 months			
*Gentamicin containing regimen is reasonable if no risk factors for gentamicin toxicity, and likely switch to oral antibiotics within 48 hours			
Add **stat vancomycin** if severe and recent instrumentation (eg. nephrostomy)			

	No allergy to penicillin	Non-immediate penicillin hypersensitivity	Immediate penicillin / beta-lactam hypersensitivity
WOMEN - cystitis	**trimethoprim 300mg oral daily** **3 days** OR **amoxycillin/clavulanate 500/125mg oral 12-hourly** OR **cephalexin 500mg oral 12-hourly** **5 days**	**trimethoprim300mg oral daily** **3 days** OR **cephalexin 500mg oral 12-hourly** **5 days**	**trimethoprim 300mg oral daily** **3 days** OR **norfloxacin 400mg oral 12-hourly** **3 days** OR **nitrofurantoin 100mg oral 12-hourly** **5 days**
MEN - cystitis	**As above but for 7 days duration**		
INTRA-ABDOMINAL INFECTION SEVERE	**piperacillin/tazobactam 4.5g IV 6-hourly**	**cefepime 2g IV 8-hourly** PLUS **metronidazole 500mg IV 12-hourly**	**ciprofloxacin 400mg IV 12-hourly** PLUS **metronidazole 500mg IV 12-hourly**
MODERATE	**ceftriaxone 1g IV daily** PLUS **metronidazole 500mg IV 12-hourly** OR (**amoxycillin** PLUS **gentamicin** PLUS **metronidazole***)	**ceftriaxone 1g IV daily** PLUS **metronidazole 500mg IV 12-hourly**	**ciprofloxacin 400mg IV 12-hourly** PLUS **metronidazole 500mg IV 12-hourly**
MILD	**amoxycillin/clavulanate 875/125mg oral 12-hourly** **7 days**	**trimethoprim/sulfamethoxazole 160/800mg oral 12-hourly** PLUS **metronidazole 400mg oral 12-hourly** **7 days**	**trimethoprim/sulfamethoxazole 160/800mg oral 12-hourly** PLUS **metronidazole 400mg oral 12-hourly** **7 days**
***Amoxycillin 2g IV 6-hourly plus gentamicin 5mg/kg IV daily plus metronidazole 500mg IV 12-hourly** is reasonable if no risk factors for gentamicin toxicity, and likely switch to oral antibiotics within 48 hours			
Use **meropenem 1g IV 8-hourly** and consider adding **stat gentamicin IV** if severe sepsis and either known colonisation with resistant bacteria OR high risk travel within 12 months			
Consider adding antifungal treatment if severe sepsis and high risk patient, eg. extensive antibiotic use, *Candida* colonisation, parenteral nutrition, or prolonged ICU stay ☐ **Refer to ID**			
SKIN AND SOFT TISSUE INFECTION SEVERE	**piperacillin/tazobactam 4.5g IV 6-hourly** PLUS **vancomycin IV**	**cefepime 2g IV 8-hourly** PLUS **vancomycin IV**	**clindamycin 600mg IV 8-hourly** PLUS **ciprofloxacin 400mg IV 12-hourly** PLUS **vancomycin IV**
MODERATE	**flucloxacillin 2g IV 6-hourly**	**cephazolin 2g IV 8-hourly**	**clindamycin 600mg IV 8-hourly** OR **vancomycin IV**
MILD	**flucloxacillin 500mg-1g oral 6-hourly** **7-10 days**	**cephalexin 500mg-1g oral 6-hourly** **7-10 days**	**clindamycin 450mg oral 8-hourly** **7-10 days**
	Add **clindamycin 600mg IV** 8-hourly if suspected toxic shock syndrome and discuss IVIg with ID		
NECROTISING FASCIITIS	**meropenem 1g IV 8-hourly** PLUS **clindamycin 600mg IV 8-hourly** PLUS **vancomycin IV** Consider need for IVIg, discuss with ID. Early referral to surgery.		
INTRAVASCULAR CATHETER RELATED SEPSIS ***remove line** **De-escalate as for skin & soft tissue infection if no pathogen**	**piperacillin/tazobactam 4.5g IV 6-hourly** PLUS **vancomycin IV**	**cefepime 2g IV 8-hourly** PLUS **vancomycin IV**	**vancomycin IV** PLUS **stat gentamicin IV**
	Use **meropenem 1g IV 8-hourly** PLUS **vancomycin** and consider **stat gentamicin** if known colonisation with resistant bacteria eg. *Pseudomonas* OR high risk travel within 12 months OR deterioration despite broad spectrum antibiotics		
	Consider adding antifungal cover if severe sepsis and high risk (eg. prolonged prior antibiotic exposure or prolonged intravenous access (eg. for parenteral nutrition) or known *Candida* colonisation ☐ **Refer to ID**		
MENINGITIS **not associated with shunts / neurosurgical procedure** **Always contact ID**	**ceftriaxone 2g IV 12-hourly**	**ceftriaxone 2g IV 12-hourly**	**moxifloxacin 400mg IV daily**
	Add **dexamethasone 10mg IV 6-hourly** for 4 days		
	Add **benzylpenicillin 2.4g IV 4-hourly** if risk factors for ***Listeria*****;** (eg. >50 years old, alcohol abuse, pregnant or immunocompromised). Trimethoprim/sulfamethoxazole can replace benzylpenicllin if penicillin allergy. Add **aciclovir 10mg/kg IV 8-hourly** (ideal body weight) if viral encephalitis suspected.		
	Add vancomycin if: *Gram-positive cocci in CSF, LP not done, pneumococcal Ag positive, recent sinusitis/ otitis media or recent beta lactam antibiotics. PMCC and RMH also endorses empiric use until pathogen identified*		

Vancomycin dose: Load **25-30mg/kg** IV (up to 2.5g), refer to PMCC vancomycin guideline; Use **actual body weight.** Reduce frequency in renal impairment. Higher doses may be used with expert advice.
Gentamicin dose: Give **5mg/kg IV stat**. *Higher doses up to 7mg/kg may be used in selected cases with expert advice.* Not recommended in renal impairment (CrCl<40mL/min). Use **ideal or adjusted body weight** to calculate dose. Use >24 hours requires ID approval.

For more information refer to guidelines on iPolicy for vancomycin and gentamicin.

Where possible, recommendations are based on TG = *Therapeutic Guidelines: Antibiotic* The Antimicrobial Stewardship Team, January 2018