ADULT SEPSIS PATHWAY

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 10⁹/L

SIRS = systemic inflammatory response syndrome

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

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

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

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

**Peter MacCallum Cancer Centre**

**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?**
   - [ ] Temperature <36°C or >38°C
   - [ ] Heart Rate >90 per minute
   - [ ] Resp Rate >20/min Record rate
   - [ ] WCC <4 or >12 x 10⁹/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/Situation/Background/Assessment/Request

## Oxygen administration

- Aim SpO₂ ≥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
  - [ ] (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 Resuscitation

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

- **If hypotensive (SBP<100mmHg) or lactate >2mmol/L**
  - 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*
ADULT SEPSIS PATHWAY

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 an empirical 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 empirical antibiotic guide.
- Have you completed Guidance for approval for administration after the 1st dose?
- Have antibiotics been administered within 30-60 minutes?

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

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

First 30 minutes from presenting signs/symptoms

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

Guidance for 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/min.

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

First 60 minutes

Guidance MSO 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: 

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 CO2 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

First 6 hours

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.

<table>
<thead>
<tr>
<th>Unknown source of infection or neutropenic fever</th>
<th>No allergy to penicillin</th>
<th>Non-immediate penicillin hypersensitivity</th>
<th>Immediate penicillin / beta-lactam hypersensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piperacillin/tazobactam 4.5g IV 6-hourly</td>
<td>Cefepime 2g IV 8-hourly</td>
<td>Ciprofloxacin 400mg IV 12-hourly PLUS vancomycin IV</td>
<td></td>
</tr>
</tbody>
</table>

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 is 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

<table>
<thead>
<tr>
<th>Community acquired pneumonia severe</th>
<th>Ceftriaxone 1g IV 12-hourly PLUS azithromycin 500mg IV daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
<td>Ceftriaxone 1g IV 12-hourly PLUS azithromycin 500mg IV daily</td>
</tr>
<tr>
<td>Mild</td>
<td>Cefuroxime 500mg oral 12-hourly OR/AND doxycycline 100mg oral 7 days</td>
</tr>
</tbody>
</table>

Add oral oseltamivir 75mg 12-hourly if concerned about influenza.

Replace ceftriaxone with piperacillin-tazobactam 4.5g IV 8-hourly OR meropenem 1g IV 8-hourly if severe AND known respiratory colonisation with resistant bacteria eg. *Pseudomonas.*

Consider additional treatment with fluconazole 2g IV 6-hourly and vancomycin if strongly suspect *Staph. aureus* in severe cases (eg. cavitating pneumonia or rapid clinical deterioration) **Refer to ID**

<table>
<thead>
<tr>
<th>Hospital acquired pneumonia severe</th>
<th>Piperacillin/tazobactam 4.5g IV 6-hourly OR ceftriaxone 1g IV 12-hourly*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
<td>Ceftriaxone 1g IV 12-hourly OR ceftriaxone 1g IV 12-hourly* OR ceftriaxone 1g IV daily</td>
</tr>
<tr>
<td>Mild</td>
<td>Cefuroxime 500mg oral 12-hourly OR/AND doxycycline 100mg oral 12-hourly OR/AND doxycycline 100mg oral 7 days</td>
</tr>
</tbody>
</table>

*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 eg. *Pseudomonas* OR high risk travel within 12 months.

Add vancomycin if patient has severe sepsis or septic shock.

<table>
<thead>
<tr>
<th>Urinary tract infection severe pyelonephritis</th>
<th>Piperacillin/tazobactam 4.5g IV 6-hourly and consider stat gentamicin IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate pyelonephritis</td>
<td>Ceftriaxone 1g IV daily OR (amoxicillin 2g IV 6-hourly PLUS <em>gentamicin IV)</em></td>
</tr>
<tr>
<td>Mild pyelonephritis</td>
<td>Ceftriaxone 1g IV daily OR *gentamicin IV</td>
</tr>
</tbody>
</table>

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).
<table>
<thead>
<tr>
<th>WOMEN - cystitis</th>
<th>Non-immediate penicillin hypersensitivity</th>
<th>Immediate penicillin / beta-lactam hypersensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>trithromoprim 300mg oral daily 3 days OR amoxycillin/clavulenate 500/125mg oral 12-hourly OR cephalaxin 600mg oral 12-hourly</td>
<td>trimethoprim 300mg oral daily 3 days OR cephalaxin 500mg oral 12-hourly</td>
<td>trimethoprim 300mg oral daily 3 days OR norfloxacin 400mg oral 12-hourly OR nitrofurantoin 100mg oral 12-hourly</td>
</tr>
</tbody>
</table>

**MEN - cystitis**

*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.

**INTRA-ABDOMINAL INFECTION SEVERE**

<table>
<thead>
<tr>
<th>Piperacillin/tazobactam 4.5g IV 6-hourly</th>
<th>Cefepime 2g IV 8-hourly PLUS metronidazole 500mg IV 12-hourly</th>
<th>Ciprofloxacin 400mg IV 12-hourly PLUS metronidazole 500mg IV 12-hourly</th>
</tr>
</thead>
</table>

**MEN - cystitis**

As above but for 7 days duration.

**MODERATE**

<table>
<thead>
<tr>
<th>Ceftriaxone 1g IV daily PLUS metronidazole 500mg IV 12-hourly OR (amoxycillin PLUS gentamicin PLUS metronidazole)*</th>
<th>Ceftriaxone 1g IV daily PLUS metronidazole 500mg IV 12-hourly</th>
<th>Cefetiraxone 400mg PLUS metronidazole 500mg IV 12-hourly</th>
</tr>
</thead>
</table>

**MILD**

<table>
<thead>
<tr>
<th>Amoxycillin/clavulenate 875/125mg oral 12-hourly 7 days</th>
<th>Trimethoprim/sulfamethoxazole 160/800mg oral 12-hourly PLUS metronidazole 500mg oral 12-hourly 7 days</th>
<th>Trimethoprim/sulfamethoxazole 160/800mg oral 12-hourly PLUS metronidazole 500mg oral 12-hourly 7 days</th>
</tr>
</thead>
</table>

**SKIN AND SOFT TISSUE INFECTION**

**SEVERE**

<table>
<thead>
<tr>
<th>Piperacillin/tazobactam 4.5g IV 6-hourly PLUS vancomycin IV</th>
<th>Cefepime 2g IV 8-hourly PLUS vancomycin IV</th>
<th>Clindamycin 600mg IV 8-hourly PLUS ciprofloxacin 400mg IV 12-hourly PLUS vancomycin IV</th>
</tr>
</thead>
</table>

**MODERATE**

<table>
<thead>
<tr>
<th>Flucloxacillin 2g IV 6-hourly</th>
<th>Cefazolin 2g IV 8-hourly</th>
<th>Clindamycin 600mg IV 8-hourly OR vancomycin IV</th>
</tr>
</thead>
</table>

**MILD**

<table>
<thead>
<tr>
<th>Ceftriaxone 500mg-1g oral 6-hourly 7-10 days</th>
<th>Ceftriaxone 500mg-1g oral 6-hourly 7-10 days</th>
<th>Clindamycin 450mg oral 8-hourly 7-10 days</th>
</tr>
</thead>
</table>

Add clindamycin 600mg IV 8-hourly if suspected toxic shock syndrome and discuss IVg with ID.

**NECROTISING FASCITIS**

<table>
<thead>
<tr>
<th>Meropenem 1g IV 8-hourly PLUS clindamycin 600mg IV 8-hourly PLUS vancomycin IV</th>
<th>Consider need for IVg, discuss with ID. Early referral to surgery.</th>
</tr>
</thead>
</table>

**INTRAVASCULAR CATHETER RELATED SEPSIS**

**SEVERE**

<table>
<thead>
<tr>
<th>Piperacillin/tazobactam 4.5g IV 6-hourly PLUS vancomycin IV</th>
<th>Cefepime 2g IV 8-hourly PLUS vancomycin IV</th>
<th>Vancomycin IV PLUS stat gentamicin IV</th>
</tr>
</thead>
</table>

*remove line De-escalate as for skin & soft tissue infection if no pathogen

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.

**MENINGITIS**

<table>
<thead>
<tr>
<th>Ceftriaxone 2g IV 12-hourly</th>
<th>Ceftriaxone 2g IV 12-hourly</th>
<th>Meropenem 10mg IV 6-hourly for 4 days</th>
</tr>
</thead>
</table>

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 benzylpenicillin 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.