

## Sepsis – Hospital Onset

These guidelines are intended for patients with onset of sepsis in the hospital. Please refer to the ASP Handbook where applicable for further condition-specific guidance.

**Note:** Empiric antibiotics should be reassessed after 48 hours in light of clinical progress, investigations, and microbiology results.

Considerations		
<i>MRSA risk factors:</i>	Prior MRSA colonization/infection, presence of intravascular or urinary catheter, prolonged hospitalization, recent broad-spectrum antibiotic exposure.	
<i>ESBL risk factors:</i>	Prior ESBL colonization/infection, recent broad-spectrum antibiotic exposure, recent travel.	
<i>Penicillin allergy:</i>	The risk of serious cross-reaction in penicillin/cephalosporin allergic patients given carbapenems is very low. In most patients with sepsis or septic shock, the potential benefits of carbapenem therapy outweigh the low risk of anaphylaxis.	
Source	POTENTIAL SEPSIS without life-threatening organ dysfunction	SEPSIS with life-threatening organ dysfunction (qSOFA ≥2 or lactate >4mmol/L)
<b>Unknown Source</b>	piperacillin-tazobactam 3.375 g IV q6h <i>Penicillin allergy:</i> meropenem 500 mg IV q6h <i>MRSA risk factors:</i> <b>ADD</b> vancomycin <sup>1</sup>	meropenem 500 mg IV q6h <b>AND</b> vancomycin <sup>1</sup> <i>Alternative:</i> gentamicin 7 mg/kg IV q24h <sup>2</sup> <b>AND</b> vancomycin <sup>1</sup> <b>AND</b> metronidazole 500 mg IV q12h
<b>Febrile Neutropenia</b>	piperacillin-tazobactam 4.5 g IV q6h <b>AND</b> vancomycin <sup>1</sup>	meropenem 500 mg IV q6h <b>AND</b> vancomycin <sup>1</sup>
<b>Intra-Abdominal or Hepatobiliary</b>	piperacillin-tazobactam 3.375 g IV q6h <i>ESBL risk factors:</i> meropenem 500 mg IV q6h	meropenem 500 mg IV q6h <b>AND</b> vancomycin <sup>1</sup>
<b>Pneumonia</b>	<i>Community-acquired (onset &lt;48h after admission):</i>	
	ceftriaxone 1 g IV q24h <b>AND</b> azithromycin 500 mg IV q24h <i>Penicillin allergy:</i> moxifloxacin 400 mg IV q24h	ceftriaxone 1 g IV q24h <b>AND</b> azithromycin 500 mg IV q24h <i>Penicillin allergy:</i> moxifloxacin 400 mg IV q24h <i>MRSA risk factors:</i> <b>ADD</b> vancomycin <sup>1</sup>
	<i>Hospital-acquired (onset ≥48h after admission):</i>	
	piperacillin-tazobactam 4.5 g IV q6h <i>Penicillin allergy:</i> meropenem 500 mg IV q6h <i>MRSA risk factors:</i> <b>ADD</b> vancomycin <sup>1</sup>	meropenem 500 mg IV q6h <b>AND</b> vancomycin <sup>1</sup> <b>+/-</b> gentamicin 7 mg/kg IV q24h <sup>2</sup>
<b>Urinary Tract</b>	piperacillin-tazobactam 3.375 g IV q6h <i>ESBL risk factors:</i> meropenem 500 mg IV q6h	meropenem 500 mg IV q6h <b>+/-</b> vancomycin <sup>1</sup> <i>Alternative:</i> gentamicin 7 mg/kg IV q24h <sup>2</sup>
<b>Wound Infection</b>	cefazolin 2 g IV q8h	meropenem 500 mg IV q6h <b>AND</b> vancomycin <sup>1</sup>
<i>Surgical (Ortho)</i>	<i>MRSA risk factors:</i> vancomycin <sup>1</sup>	
<i>Surgical (GI, GU, Vascular, Thoracic) OR Ulcer OR Diabetic Foot</i>	piperacillin-tazobactam 3.375 g IV q6h <i>Penicillin allergy:</i> meropenem 500 mg IV q6h <i>MRSA risk factors:</i> <b>ADD</b> vancomycin <sup>1</sup>	meropenem 500 mg IV q6h <b>AND</b> vancomycin <sup>1</sup>
<i>Surgical (Neuro)</i>	meropenem 2 g IV q8h <b>AND</b> vancomycin <sup>1</sup>	meropenem 2 g IV q8h <b>AND</b> vancomycin <sup>1</sup>

Doses may require adjustment for renal insufficiency

<sup>1</sup> For vancomycin dosing, refer to "Vancomycin Dosing and Therapeutic Monitoring"

<sup>2</sup> For aminoglycoside dosing, refer to dosing reference (such as Lexicomp) or discuss with clinical pharmacist

Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)

The definitions of Sepsis and Septic Shock were revised in February 2016:

	<b>New Definition</b>	<b>Clinical Identification</b>
<b>Sepsis</b>	Life-threatening organ dysfunction caused by dysregulated host response to infection.	Organ dysfunction as identified as change in Sequential Organ Failure Assessment (SOFA) score of $\geq 2$ points due to infection.
<b>Septic Shock</b>	Subset of sepsis in which underlying circulatory and cellular/metabolic abnormalities are profound enough to substantially increase mortality.	Sepsis with persisting hypotension requiring vasopressors to maintain mean arterial pressure $\geq 65$ mmHg and having a serum lactate level $> 2$ mmol/L despite adequate volume resuscitation.

The previous definition of sepsis as two or more SIRS criteria plus suspected infection are no longer felt to reflect sepsis pathobiology. SIRS is often an appropriate host response and is frequently adaptive. The new definition of sepsis replaces the previous definition of severe sepsis.

SEPSIS with life-threatening organ dysfunction - Quick SOFA (qSOFA)

The Quick SOFA (qSOFA) is a rapid bedside screening tool that can identify adult patients with sepsis at high risk of clinical deterioration. Patients with suspected infection and **two or more** of the following criteria should be followed closely and treated as **“SEPSIS with life-threatening organ dysfunction”** in the guidance above.

1. Respiratory rate  $\geq 22$ /min
2. Altered mentation
3. Systolic blood pressure  $\leq 100$  mmHg

POTENTIAL SEPSIS without life-threatening organ dysfunction

Features of the Systemic Inflammatory Response Syndrome (SIRS) may help identify new infections in adult patients. However, the presence of SIRS alone is non-specific for infection or sepsis. Patients who have SIRS criteria should be assessed for a potential source of infection. Patients with a potential infection and no evidence of life-threatening organ dysfunction can be treated as per the **“POTENTIAL SEPSIS without life-threatening organ dysfunction”** in the guidance above.

SIRS is defined as **two or more** of:

1. Temperature  $> 38^{\circ}\text{C}$  or  $< 36^{\circ}\text{C}$
2. Heart rate  $> 90$ /min
3. Respiratory rate  $> 20$ /min or  $\text{PaCO}_2 < 32$  mmHg
4. White blood cell count  $> 12,000/\text{mm}^3$  or  $< 4,000/\text{mm}^3$  or  $> 10\%$  immature bands

References:

1. Singer M. et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). JAMA 2016;315:801-810.
2. Surviving Sepsis Campaign. Surviving Sepsis Campaign Response to Sepsis-3. March 2016. <http://www.survivingsepsis.org/>
3. BC Sepsis Network. BC Sepsis Network special communication on the third international consensus definitions for sepsis and septic shock (Sepsis-3). April 2016. <https://bcpsqc.ca/documents/2012/09/SepsisLetter.pdf>