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Clinical Order Set

Demographics

ED Sepsis MAP Less than 65 Adult

Key: **Req** – Requisition **MAR** – Medication Administration Record **K** – Kardex **Dis** – Discontinued

Key	Phase
	1

ED Sepsis MAP Less than 65 Adult

Instructions for completing this order set:

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ED Sepsis MAP Less than 65 Adult

Inclusion Criteria

- MAP (Mean Arterial Pressure) less than 65 mmHg despite sodium chloride 0.9% 2,000 mL IV infusion ***AND/OR***
- Lactate equal to or greater than 2 mmol/L ***AND/OR***
- Evidence of organ dysfunction

Rural sites: *Prepare for transfer, if not already done; For Interfacility transfers, Patient should be discharged from sending facility and admitted to receiving facility*

NOTE: See "ED Management of Sepsis Algorithm" clinical decision support attached

Patient Care

☑ MAP Goal: 65 or greater **OR** _____
☑ Neurological Assessment, for altered mental status, Q1H for 6 hours **THEN** Q4H for 12 hours
☑ Notify Provider Vital Signs, If SBP less than 100 **AND/OR** Urine Output less than 50 mL in 2 hours
☑ Notify Provider, If MAP less than 65 mmHg
☑ Peripheral IV Insertion, Insert two large bore IV's (18 gauge or larger), if not already done
☐ Arterial Line Insertion
☐ Blood Gases Arterial POC, ONCE
☐ Urinary Catheter Insertion, Indwelling, with urometer
☐ Intake and Output, Q1H

Laboratory

Hematology

☐ Complete Blood Count and Differential, Blood, **STAT**
☐ INR, Blood, **STAT,** Anticoagulant: _____

Chemistry

- Cross out lactate level STAT if already drawn
☑ Lactate Level, Blood, **STAT**
- A repeat lactate in 4 hours is indicated if initial lactate greater than 2 mmol/L
☑ Lactate Level, Blood, Timed Study in 4 hours after intitial lactate
☐ Electrolytes and Creatinine Panel, Blood, **STAT**
☐ Glucose Level Random, Blood, **STAT**
☐ Calcium Ionized Level, Blood, **STAT**
☐ ALT, Blood, **STAT**
☐ GGT, Blood, **STAT**
☐ Lipase Level, Blood, **STAT**
☐ Bilirubin Total, Blood, **STAT**
☐ Venous Blood Gas (VBG), **STAT**
☐ Venous Blood Gas (VBG), **Recurring Q2H for 6 h**

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- HIV Serology, if not done within 5 years

☐ HIV Serology, Blood, ASAP

Microbiology

☐ Urine Culture, Urine, **STAT**

☐ Blood Culture x 2, Blood, **STAT**

Body Fluid and Stool Tests

☐ Macroscopic Urinalysis with Culture if Positive, Urine Midstream, **STAT**

Transfusion Medicine

☐ Group and Screen, Blood, **STAT** *(inc. AbSc Gel & ABORh (D))*

Diagnostic Imaging

☐ HH ECG Electrocardiogram, **STAT,** Suspected sepsis

☐ XR Chest 2 Views, ASAP, Suspected sepsis

- If patient transport is not possible, select portable option

☐ XR Chest AP/PA 1 View, ASAP, Portable, Suspected sepsis

Continuous Infusions

IV FLUID BOLUS

- Balanced crystalloids (Ringers Lactate) is preferred over sodium chloride 0.9%; See American Journal of Respiratory and Critical Care Medicine: Balanced Crystalloids versus Saline in Sepsis. A Secondary Analysis of the SMART Clinical Trial

- "Surviving Sepsis Campaign" guidelines suggest an initial 30 mL/kg fluid bolus then reassessment of volume status

- In case of hyperkalemia, consider changing IV bolus to sodium chloride 0.9%

☐ Ringers Lactate IV Bolus, 30 mL/kg/dose x _____kg = _____ mL/dose, IV, ONCE, INITIAL Dose. **Max Dose: 2,000 mL**
Infuse over 30 minutes then Provider to reassess volume status

OR

☐ Ringers Lactate IV Bolus, _____mL, IV, AS DIRECTED, PRN for MAP less than 65 mmHg, infuse over 15 min

IV MAINTENANCE THERAPY

☐ Ringers Lactate IV at 200 mL/h **OR** ☐ _____ mL/h

CONTINUOUS IV MEDICATIONS

- May use peripheral IV for norepinephrine administration until central line available

- May modify norepinephrine concentration to double strength (8 mg/250 mL) as per site practice where indicated

☐ norepinephrine 16 mg / sodium chloride 0.9% 250 mL, IV, **start at 0.1 mcg/kg/min**
Nurse/Pharmacist to modify ordered diluent and/or concentration as indicated by clinical condition and IV Monograph
RANGE: 0 to 1.5 mcg/kg/min, titrate to MAP Goal; Peripheral IV may be used until central line available

Medications

☑ Sepsis Antibiotics (Module) – **Provider to complete orders, see attached**

Respiratory

☑ Oxygen Therapy, Reason for treatment: Improve oxygenation, Titrate O_2 level to maintain SpO_2 at 92% **OR** 88 – 92% for patients diagnosed with COPD

Consults/Referrals

- Physician to physician communication is required for all consult to specialist orders

☐ Consult to Critical Care, Inpatient, Sepsis with MAP less than 65

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Sepsis Antibiotics (Module)

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Sepsis Antibiotics (Module)

Laboratory

- Order blood cultures STAT, if not already done

☐ Blood Cultures x 2, **STAT**, draw blood cultures before antibiotics are administered

Anti-infectives

☑ Medication Communication, Administer initial antimicrobials AFTER blood cultures have been drawn **AND** within 1 hour of arrival

**** Refer to Vancomycin and Renal Impairment Tables (attached) for doses and frequencies ****

SUSPECTED COMMUNITY-ACQUIRED PNEUMONIA:

*- If pneumonia suspected, choose both cefTRIAXone and azithromycin **OR** cefTRIAXone and doxycycline*

☐ cefTRIAXone, 2 g, Soln-Inj, IV, Q24H, first dose NOW, use separate IV line if Lactated Ringers also infusing **AND** azithromycin inj, 500 mg, Soln-Inj, IV, Q24H, first dose NOW

OR

☐ cefTRIAXone, 2 g, Soln-Inj, IV, Q24H, first dose NOW, use separate IV line if Lactated Ringers also infusing **AND** doxycycline, 100 mg, Cap, oral, BID, first dose NOW

OR

- If community-acquired pneumonia suspected in patients with cephalosporin allergy or severe delayed skin reactions to penicillins (e.g. Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN), DRESS)

☐ moxifloxacin, 400 mg, Soln-Inj, IV, Q24H, first dose NOW

SUSPECTED COMPLICATED PNEUMONIA:

- If health-care associated, immunocompromised or drug resistance risk factors

☐ piperacillin-tazobactam, 4.5 g, Soln-Inj, IV, Q6H, first dose NOW

AND

vancomycin inj, _____mg, Soln-Inj, IV, for 1 dose, NOW, LOADING DOSE **THEN**

vancomycin inj, _____mg, Soln-Inj, IV, **Q_____H**, MAINTENANCE DOSE; High Target Trough; Place order for trough level to be drawn 30 minutes prior to 3rd or 4th dose (prior to morning or mid-day dose preferred)

OR

- If complicated pneumonia suspected in patients with immediate or delayed severe penicillin allergy (e.g. anaphylaxis, Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN), DRESS

☐ meropenem, 1 g, Soln-Inj, IV, Q8H

AND

vancomycin inj, _____mg, Soln-Inj, IV, for 1 dose, NOW, LOADING DOSE **THEN**

vancomycin inj, _____mg, Soln-Inj, IV, **Q_____H**, MAINTENANCE DOSE; High Target Trough; Place order for trough level to be drawn 30 minutes prior to 3rd or 4th dose (prior to morning or mid-day dose preferred)

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Sepsis Antibiotics (Module) 1

Email orderset@viha.ca to provide feedback or report concerns regarding this order set

SUSPECTED NON-PURULENT CELLULITIS:

☐ ceFAZolin, 2 g, Soln-Inj, IV, Q8H, NOW, Refer to table for renal impairment dosing **AND**
clindamycin inj, 900 mg, Soln-Inj, IV, Q8H

OR

- For patients with cephalosporin allergy or severe delayed skin reactions to penicillins e.g. Stevens-Johnson Syndrome (SJS), toxic epidermal necrolysis (TEN), DRESS

☐ vancomycin inj, _____mg, Soln-Inj, IV, for 1 dose, NOW, LOADING DOSE **THEN**
vancomycin inj, _____mg, Soln-Inj, IV, **Q_____H**, MAINTENANCE DOSE; High Target Trough; Place order for trough level to be drawn 30 minutes prior to 3rd or 4th dose (prior to morning or mid-day dose preferred)
AND
clindamycin inj, 900 mg, Soln-Inj, IV, Q8H

SUSPECTED COMPLICATED SKIN AND SOFT TISSUE INFECTION:

- For Purulent Cellulitis, Diabetic Foot Infection, or if risk of Antibiotic Resistant Organisms

☐ piperacillin-tazobactam, 3.375 g, Soln-Inj, IV, Q6H, first dose NOW
AND
vancomycin inj, _____mg, Soln-Inj, IV, for 1 dose, NOW, LOADING DOSE **THEN**
vancomycin inj, _____mg, Soln-Inj, IV, **Q_____H**, MAINTENANCE DOSE; High Target Trough; Place order for trough level to be drawn 30 minutes prior to 3rd or 4th dose (prior to morning or mid-day dose preferred)

OR

- For patients with immediate or severe delayed skin reactions to penicillins e.g. Stevens-Johnson Syndrome (SJS), toxic epidermal necrolysis (TEN), DRESS

☐ meropenem, 1 g, Soln-Inj, IV, Q8H
AND
vancomycin inj, _____mg, Soln-Inj, IV, for 1 dose, NOW, LOADING DOSE **THEN**
vancomycin inj, _____mg, Soln-Inj, IV, **Q_____H**, MAINTENANCE DOSE; High Target Trough; Place order for trough level to be drawn 30 minutes prior to 3rd or 4th dose (prior to morning or mid-day dose preferred)

SUSPECTED NECROTIZING SKIN AND SOFT TISSUE INFECTION:

☐ piperacillin-tazobactam, 4.5 g, Soln-Inj, IV, Q6H, first dose NOW **AND**
clindamycin inj, 900 mg, Soln-Inj, IV, Q8H, first dose NOW
AND
vancomycin inj, _____mg, Soln-Inj, IV, for 1 dose, NOW, LOADING DOSE **THEN**
vancomycin inj, _____mg, Soln-Inj, IV, **Q_____H**, MAINTENANCE DOSE; High Target Trough; Place order for trough level to be drawn 30 minutes prior to 3rd or 4th dose (prior to morning or mid-day dose preferred)

OR

- For patients with immediate or severe delayed skin reactions to penicillins e.g. Stevens-Johnson Syndrome (SJS), toxic epidermal necrolysis (TEN), DRESS

☐ meropenem, 1 g, Soln-Inj, IV, Q8H **AND**
clindamycin inj, 900 mg, Soln-Inj, IV, Q8H, first dose NOW
AND
vancomycin inj, _____mg, Soln-Inj, IV, for 1 dose, NOW, LOADING DOSE **THEN**
vancomycin inj, _____mg, Soln-Inj, IV, **Q_____H**, MAINTENANCE DOSE; High Target Trough; Place order for trough level to be drawn 30 minutes prior to 3rd or 4th dose (prior to morning or mid-day dose preferred)

Sepsis Antibiotics (Module)

Key: **Req** – Requisition **MAR** – Medication Administration Record **K** – Kardex **Dis** – Discontinued

Key | **Phase**

Sepsis Antibiotics (Module)

SUSPECTED GI INFECTION:

☐ piperacillin-tazobactam, 3.375 g, Soln-Inj, IV, Q6H, first dose NOW

OR

*- For patients with **risk of antibiotic resistance OR** with immediate Type 1 or severe delayed penicillin allergy (e.g. anaphylaxis, Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN), DRESS*

☐ imipenem-cilastin, 500 mg, Soln-Inj, IV, Q6H, first dose NOW

SUSPECTED URINARY TRACT INFECTION:

☐ cefTRIAXone, 2 g, Soln-Inj, IV, Q24H, first dose NOW, not compatible with Lactated Ringers

OR

*- For patients with **Complicated Urinary Tract Infection** (e.g. recent instrumentation, recurrent infection, immunocompromised, risk of drug resistant bacteria **OR** those with cephalosporin allergy or severe delayed reactions to penicillin e.g. Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN), DRESS*

☐ imipenem-cilastin, 500 mg, Soln-Inj, IV, Q6H, first dose NOW

SUSPECTED MENINGITIS OR ENCEPHALITIS:

- Start dexamethasone PRIOR TO or with first dose of antibiotic; Discontinue if bacterial meningitis is ruled out

☐ dexamethasone inj, 0.15 mg/kg/dose x _____kg = _____mg/dose, Soln-Inj, IV, Q6H, for 8 doses
Start PRIOR to or with first dose of antibiotic

AND

☐ cefTRIAXone, 2 g, Soln-Inj, IV, Q12H, first dose NOW, use separate IV line if Lactated Ringers also infusing

AND

vancomycin inj, _____mg, Soln-Inj, IV, for 1 dose, NOW, LOADING DOSE **THEN**
vancomycin inj, _____mg, Soln-Inj, IV, **Q_____H**, MAINTENANCE DOSE; High Target Trough; Place order for trough level to be drawn 30 minutes prior to 3rd or 4th dose (prior to morning or mid-day dose preferred)

AND

*- If risk factors for Listeria present e.g. pregnancy, age greater than 50, immunocompromised, diabetes, ESRD **then ADD ampicillin***

☐ ampicillin, 2 g, Soln-Inj, IV, Q4H, first dose NOW

OR

- If severe allergy e.g. anaphylaxis to EITHER cephalosporins or ampicillin

☐ meropenem, 2 g, Soln-Inj, IV, Q8H

AND

vancomycin inj, _____mg, Soln-Inj, IV, for 1 dose, NOW, LOADING DOSE **THEN**
vancomycin inj, _____mg, Soln-Inj, IV, **Q_____H**, MAINTENANCE DOSE; High Target Trough; Place order for trough level to be drawn 30 minutes prior to 3rd or 4th dose (prior to morning or mid-day dose preferred)

AND

*- If viral CNS infection suspected **then ADD acyclovir**; Discontinue if viral etiology ruled out*

☐ acyclovir, 10 mg/kg/dose x _____kg = _____mg/dose, Soln-Inj, IV, Q8H

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SUSPECTED COMPLICATED CNS INFECTION

- If recent neurosurgery or shunt-related infection

☐ meropenem, 2 g, Soln-Inj, IV, Q8H

AND

vancomycin inj, _____mg, Soln-Inj, IV, for 1 dose, NOW, LOADING DOSE **THEN**

vancomycin inj, _____mg, Soln-Inj, IV, **Q_____H**, MAINTENANCE DOSE; High Target Trough; Place order for trough level to be drawn 30 minutes prior to 3rd or 4th dose (prior to morning or mid-day dose preferred)

UNKNOWN INFECTION SOURCE:

☐ piperacillin-tazobactam, 4.5 g, Soln-Inj, IV, Q6H, first dose NOW

AND

vancomycin inj, _____mg, Soln-Inj, IV, for 1 dose, NOW, LOADING DOSE **THEN**

vancomycin inj, _____mg, Soln-Inj, IV, **Q_____H**, MAINTENANCE DOSE; High Target Trough; Place order for trough level to be drawn 30 minutes prior to 3rd or 4th dose (prior to morning or mid-day dose preferred)

OR

*- For patients with drug-resistant factors **OR** with severe penicillin allergy e.g. anaphylaxis, Stevens-Johnson Syndrome (SJS), toxic epidermal necrolysis (TEN), DRESS*

☐ meropenem, 1 g, Soln-Inj, IV, Q8H

AND

vancomycin inj, _____mg, Soln-Inj, IV, for 1 dose, NOW, LOADING DOSE **THEN**

vancomycin inj, _____mg, Soln-Inj, IV, **Q_____H**, MAINTENANCE DOSE; High Target Trough; Place order for trough level to be drawn 30 minutes prior to 3rd or 4th dose (prior to morning or mid-day dose preferred)

Consults/Referrals

☐ Consult to Clinical Pharmacist, Inpatient, Vancomycin monitoring and dosing **where available*

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Dosing Guidelines for vancomycin Empiric Intravenous Antibiotic Dosing for Renal Impairment	Clinical Decision Support

Dosing Guidelines for vancomycin

ACTUAL Body Weight (kg)	LOADING DOSE (25 mg/kg)	MAINTENANCE DOSE (15 mg/kg)
45 to 55	1250 mg	750 mg
56 to 65	1500 mg	1000 mg
66 to 75	1750 mg	1000 mg
76 to 85	2000 mg	1250 mg
86 to 95	2250 mg	1250 mg
96 to 105	2500 mg	1500 mg
106 to 115	2750 mg	1500 mg
116 to 125	3000 mg	1750 mg

Greater than 125 kg: see "Obesity" below; max recommended loading dose 3000 mg; max recommended maintenance dose 2000 mg

- Use algorithm to determine initial dosing **interval** based on clinical indication, age, and serum creatinine
- For the following infections a higher trough should be targeted **(15 to 20 mg/L)**: bacteremia, central nervous system infection, deep-seated or sequestered infection (eg abscess), endocarditis, osteomyelitis, MRSA pneumonia

LOW-TARGET 10 to 15 mg/L

INITIAL DOSING INTERVAL (hours)

SCr mcmol/L	Age Group (years)					
	20 - 29	30-39	40-49	50-59	60-69[b]	70-79[b]
40-60	8	8	12	12	12	18
61-80	8	12	12	12	18	18
81-100	12	12	12	18	18	18
101-120	12	12	18	18	18	24
121-140	12	18	18	18	24	
141-160	18	24	24	24		
161-180	24	24				
181-200	24					

HIGH-TARGET 15 to 20 mg/L

INITIAL DOSING INTERVAL (hours)

SCr mcmol/L	Age Group (years)						
	20-29	30-39	40-49	50-59	60-69[b]	70-79[b]	80-89[b]
40-60	6	6–8[a]	8	8	8-12[a]	12	12
61-80	8	8	8-12[a]	12	12	12	12-18[a]
81-100	12	12	12	12	12-18[a]	18	18
101-120	12	12	12-18[a]	18	18	18	18
121-140	12	18	18	18	18	18-24[a]	
141-160	18	18	18	18-24[a]	24		
161-180	18-24[a]	24	24	24			

[a] If more aggressive therapy is desired, select more frequent dosing interval

[b] Use clinical judgment as SCr may not accurately reflect renal function in elderly patients with low muscle mass

- Intervals of q18h are acceptable, and may be required in some pt to achieve appropriate trough concentrations. In some situations it may be easier to dose every 24h and increase the dose accordingly (eg 1g IV q18h may be changed to 1.25 to 1.5g IV q24h)
- Shaded boxes: patients have unstable and/or reduced renal function, and the nomogram may not be as predictive; recommend contacting a clinical pharmacist for assistance with dosing and interpretation of levels

Obesity:

- Recommend max loading dose 3000 mg; recommend max empiric maintenance dose 2000 mg
- Consider shortening dosing interval due to increased clearance in obese patients
- Consider trough before 3rd dose (may not be at steady state yet, but monitoring for possible accumulation)

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Dosing Guidelines for vancomycin Empiric Intravenous Antibiotic Dosing for Renal Impairment	Clinical Decision Support

Empiric Intravenous Antibiotic Dosing for Severe Sepsis/Septic Shock with Renal Impairment

Calculate first dose as per normal kidney function rather than waiting to calculate creatinine clearance or review eGFR.

Subsequent doses should be based on renal function as below

DRUG	eGFR greater than 50 mL/min		eGFR between 10 to 50 mL/min		eGFR less than 10 mL/min	
	Dose	**Interval**	**Dose**	**Interval**	**Dose**	**Interval**
ampicillin	2 g	q4h	2 g	q4 to 6h	2g	q6 to 8h
ceFAZolin	2 g	q8h	2 g	q8 to 12h	2g	q24h
ciprofloxacin	400 mg	q12h	200 to 400 mg	q12 to 24h	200 mg	q24h
cotrimoxazole (Doses based on trimethoprim component)	20 mg/kg/day	Divided q6h	10 to 20 mg/kg/day	Divided q12h	10 mg/kg	q24h
imipenem	500 mg	q6h	250 to 500 mg	q6 to 8h	250 mg	q12h
meropenem	1 g	q8h	1 g	q12h	500 mg	q24h
piperacillin-tazobactam	4.5 g	q6h	3.375 to 4.5 g	q6 to 8h	2.25 g	q6 to 8h

The following antibiotics do not require an adjustment for renal function: azithromycin; cefTRIAXone; clindamycin; metroNIDAZOLE; moxifloxacin

- This guide is a companion reference to the Sepsis antibiotic dosing guideline
- This guide is not a general reference on dosing antibiotics for renal impairment
- This guide does not include dosing for dialysis patients – please call pharmacy or contact nephrologist
- This guide is intended for use in adults only
- Where a range of dose or interval is provided, the regimen decided should be based on patient severity and degree of renal impairment within that range. Please dose to the closest available vial size
- This is a guide only based on commonly referenced sources – the clinician may elect to be more or less aggressive based on other patient factors

References:

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Drug Prescribing in Renal Failure: Dosing Guidelines for Adults and Children, 5th Ed (2007)
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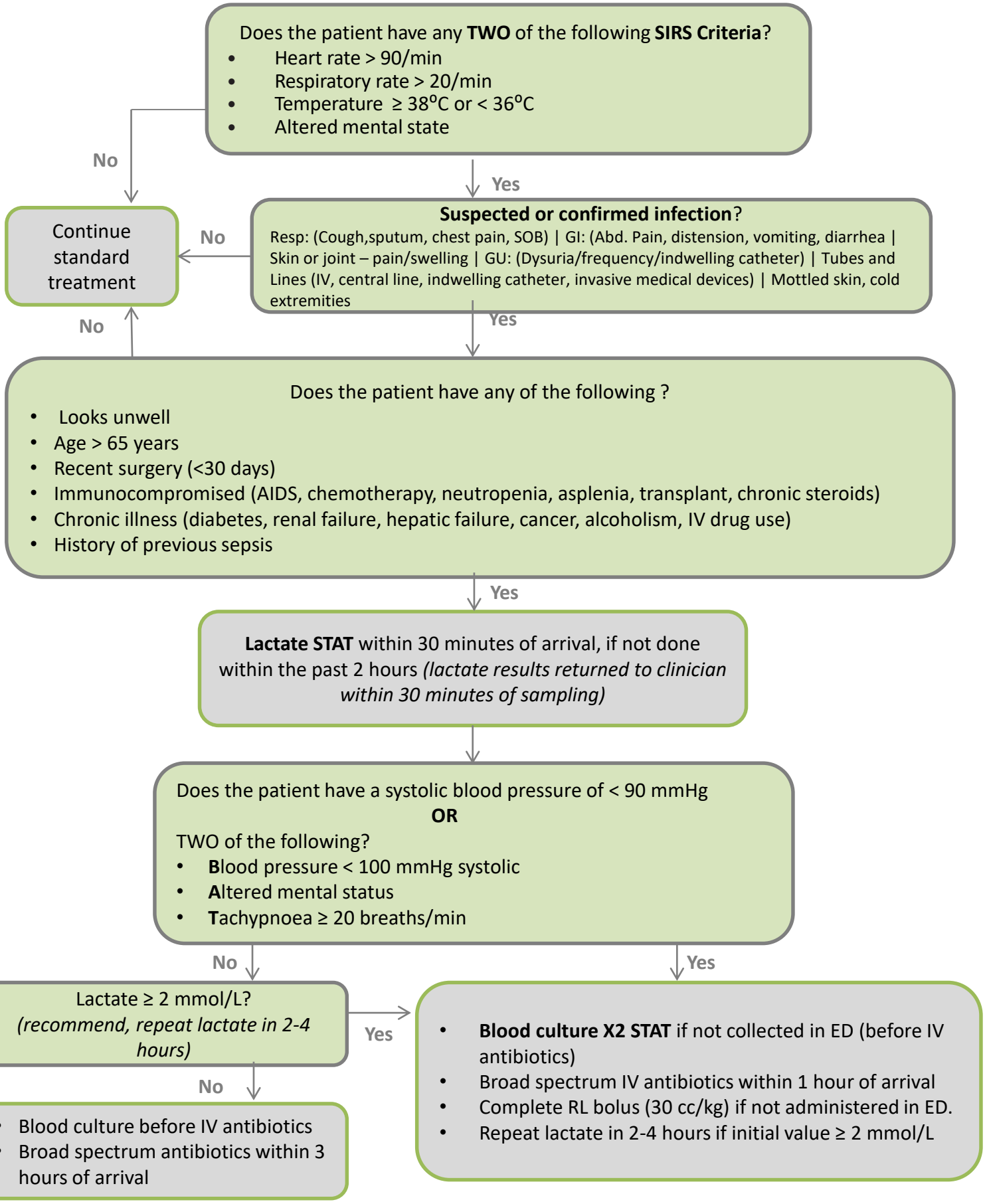
Adult sepsis guideline algorithm – ED and Inpatient



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BC Sepsis Network
BC PATIENT SAFETY & QUALITY COUNCIL