

## Comparison of 2017 & 2022 Emergency Department Sepsis Guidelines

### Emergency Department Guidelines

- This guidance is for adult septic/septic shock patients. If COVID-19 is presumed etiology, refer to [COVID-19 Therapeutics Committee](#)
- qSOFA criteria removed as a screen for sepsis in favor of SIRS (or MEWS/NEWS) as a screening tool
- Elevated lactate is not recommended as an indicator for rapid antibiotic and fluid administration
- For assessment of fluid administration/resuscitation, we suggest using dynamic measures over physical examination or static parameters alone
- Removal of lactate clearance specifically as an INDICATION for vasopressors
  - Recommend for patients with sepsis/septic shock that LACTATE CLEARANCE BE USED to target resuscitation efforts
  - Norepinephrine administered peripherally (ACF or proximal), up to 6 hours (if no IO or CVC)
  - If norepinephrine infusing at 15ug/minute or 0.25 ug/kg/minute, consider adding vasopressin 0.03 units/minute
- Patients in **shock/high suspicion of sepsis** should get antibiotics within **1 hour** & patients **not in shock/some suspicion** should get antibiotics within **3 hours**
- Selection of broad-spectrum antibiotics, including MRSA, MDRO and fungal coverage, should be based on local antibiograms and clinical indication (see SSCG 2021).
- Hydrocortisone 50 mg IV q6h is now recommended if significant vasopressors administered or expected to be administered for more than 4 hours in the Emergency Department
- Formal recommendation AGAINST use of Vitamin C in patients with sepsis

#### Key points to remember if sepsis confirmed/highly suspected:

- Measure lactate within 3 hours, repeat in 2-4 hours if elevated
- Blood cultures before antibiotics
- Antibiotics within 1 hour if in shock
- Antibiotics within 3 hours if **not** in shock

**2/4 SIRS?** HR greater than 90  
RR greater than 20  
Temperature greater or equal to 38<sup>0</sup>C or less than 36<sup>0</sup>C  
Altered mental state

#### Infectious source?

#### Looks unwell?

#### Age greater than 65 years?

#### Recent surgery?

#### Immunocompromised?

(AIDS, chemotherapy, neutropenia, asplenia, transplant, chronic steroids)

#### Chronic illness?

(Diabetes, renal and/or hepatic failure, cancer, alcohol and/or IV drug use disorder)

**...your patient may be septic, investigate early**

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- Balanced crystalloid bolus (30 cc/kg) completed within 3 hours for evidence of hypoperfusion with/without shock

2017 Guidelines	2022 Guidelines	Changes & Rationale
<p>All patients with two out of four SIRS (HR greater than 90, RR greater than 20, temperature greater or equal to 38 ° C or less than 36° C, altered mental state) and suspected infection and one of the following risk factors should be considered at risk of sepsis:</p> <ul style="list-style-type: none"> <li>• Looks unwell</li> <li>• Age greater than 65 yerow in the Comparison document table still said 2021ars</li> <li>• Recent surgery</li> <li>• Immunocompromised (AIDS, Chemotherapy, neutropenia, asplenia, transplant, chronic steroids)</li> <li>• Chronic illness (diabetes, renal failure, hepatic failure, cancer, alcoholism, IV drug use)</li> </ul>	<p><b>All patients with two out of four SIRS (HR greater than 90, RR greater than 20, temperature greater or equal to 38 ° C or less than 36° C, altered mental state) and suspected infection and one of the following risk factors should be considered at risk of sepsis:</b></p> <ul style="list-style-type: none"> <li>• Looks unwell</li> <li>• Age greater than 65 years</li> <li>• Recent surgery</li> <li>• Immunocompromised (AIDS, Chemotherapy, neutropenia, asplenia, transplant, chronic steroids)</li> <li>• chronic illness (diabetes, renal failure, hepatic failure, cancer, alcohol use disorder, IV drug use)</li> </ul>	<p><i>No changes.</i></p>

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2017 Guidelines	2022 Guidelines	Changes & Rationale
<p><b>All patients with two out of four SIRS and suspected infection (with above risk factor):</b></p> <ul style="list-style-type: none"> <li>• ABG venous lactate measurement within 30 minutes of presentation to triage should be taken with initial blood draw. <i>This will require access to an ABG machine (or other rapid lactate testing device) with rapid turnaround time (approximately 30 minutes)</i></li> <li>• If initial lactate is elevated have a repeat venous lactate measurement drawn in next 2-4 hours</li> </ul>	<p><b>All patients with two out of four SIRS and suspected infection (with above risk factor):</b></p> <ul style="list-style-type: none"> <li>• For adults suspected of having sepsis, we suggest measuring blood lactate within 3 hours. If initial lactate is elevated have a repeat venous lactate measurement drawn in next 2-4 hours</li> </ul>	<p><del>✗</del> <b>ABG venous lactate measurement within 30 minutes removed as no longer used as an indication for rapid antibiotic administration.</b></p> <p><i>An initial lactate should still be measured in patients suspected of having sepsis/septic shock. The association of lactate level with mortality in patients with suspected infection and sepsis is well established.</i></p>
<p><b>If at presentation systolic blood pressure is less than 90 mmHg or patient presents with two out of three qSOFA (altered mental state, respiratory rate greater than 20/min, systolic blood pressure less than 100 mmHg):</b></p> <ul style="list-style-type: none"> <li>• Blood culture before IV antibiotics</li> <li>• Broad spectrum IV antibiotics within 1 hour</li> <li>• Complete crystalloid fluid bolus (30 cc/kg) within first 3 hours (balanced crystalloid preferred)</li> </ul>	<p><b>If systolic blood pressure (SBP) is less than 90 mmHg or mean arterial pressure (MAP) less than 65 mmHg at presentation:</b></p> <ul style="list-style-type: none"> <li>• Culture before antibiotics</li> <li>• Antibiotics within <b>1 hour</b></li> <li>• Complete crystalloid fluid bolus (30 cc/kg within first <b>3 hours</b> (balanced crystalloid preferred)</li> </ul> <p>If <b>NOT</b> in <b>SHOCK</b> (SBP less than 90 or MAP less than 65 mmHg) but there is evidence of sepsis induced hypoperfusion:</p> <ul style="list-style-type: none"> <li>• Complete crystalloid fluid bolus (30 cc/kg within first <b>3 hours</b> (balanced crystalloid preferred)</li> </ul>	<p><del>✗</del> <b>qSOFA criteria removed</b></p> <p><i>2021 guidelines de-emphasize the value of qSOFA and recommend that:</i></p> <ul style="list-style-type: none"> <li>• <b>Patients with suspected septic shock should receive:</b> <ul style="list-style-type: none"> <li>○ <i>Rapid antibiotic administration within 1 hour</i></li> <li>○ <i>30 cc/kg of balanced crystalloid within 3 hours</i></li> </ul> </li> <li>• <b>Patients without septic shock, but have evidence of sepsis induced hypoperfusion, should receive:</b> <ul style="list-style-type: none"> <li>○ <i>30 cc/kg of balanced crystalloid within 3 hours</i></li> </ul> </li> </ul>

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<p><b>If initial lactate result is greater or equal to 4 mmol/L:</b></p> <ul style="list-style-type: none"> <li>Blood culture before IV antibiotics</li> <li>Broad spectrum IV antibiotics within 1 hour of measurement of elevated lactate</li> <li>Complete crystalloid fluid bolus (30 cc/kg) within first 3 hours (balanced crystalloid preferred)</li> </ul>	<p>For adults with <b>sepsis</b> or <b>septic shock</b>, we suggest guiding resuscitation to decrease serum lactate in patients with elevated lactate level, over not using serum lactate.</p> <p>Lactate should be rechecked every 2-4 hours during resuscitation. An elevated lactate, or failure to clear lactate does not imply the patient needs IV fluid. Patients should be assessed for fluid responsiveness, need for vasopressors/inotropes or further imaging.</p>	<p>✗ <b>Lactate is not recommended as an indicator for rapid antibiotic and fluid administration.</b></p> <p><i>2021 guidelines recommend that for patients with sepsis/septic shock that lactate clearance be used to target resuscitation efforts.</i></p> <p><i>Capillary refill time is suggested to help guide resuscitation. This should be used in conjunction with other markers of perfusion during resuscitation.</i></p>
<p><b>If systolic blood pressure greater than 90 mmHg at presentation and initial lactate is less than 4 mmol/L but patient is admitted to the hospital and received IV antibiotics:</b></p> <ul style="list-style-type: none"> <li>Broad spectrum IV antibiotics within 3 hours</li> <li>Blood culture before IV antibiotics</li> </ul>	<p>For adults in <b>SHOCK (SBP less than 90 mmHg or MAP less than 65 mmHg)</b> with <b>POSSIBLE</b> infectious cause (septic shock) or a <b>HIGH</b> likelihood of sepsis:</p> <ul style="list-style-type: none"> <li>Blood culture before IV antibiotics</li> <li>Broad spectrum IV antibiotics within <b>1 hour</b></li> </ul> <p>For adults <b>NOT</b> in SHOCK (SBP less than 90 mmHg or MAP less than 65 mmHg) with <b>POSSIBLE</b> sepsis, we suggest a <i>time-limited course of rapid investigation</i> and if concern for infection persists:</p> <ul style="list-style-type: none"> <li>Blood culture before IV antibiotics</li> <li>Broad spectrum IV antibiotics within <b>3 hours</b></li> </ul> <p>For adults with a <b>LOW LIKELIHOOD</b> of infection and <b>NOT</b> in shock, we suggest deferring antimicrobials while continuing to closely monitor the patient.</p>	<p>✗ <b>Lactate is not recommended as an indicator for rapid antibiotic administration</b></p> <p><i>2021 guideline recommendations have modified triggers for rapid antibiotics:</i></p> <ul style="list-style-type: none"> <li><i>Any patient in shock that may be due to infection (septic shock) OR have a high likelihood of sepsis require antibiotic administration in less than an hour.</i></li> <li><i>If shock is not present and sepsis is only possible, clinicians may take up to three hours to investigate and confirm the etiology is infectious (sepsis) and antibiotics may be deferred.</i></li> </ul> <p>See Appendix A</p>

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### Additional Recommendations

2017 Guidelines	2022 Guidelines	Changes & Rationale
<p><b>ADDITIONAL RECOMMENDATIONS</b></p> <ul style="list-style-type: none"> <li>• Early investigations to determine infectious source (radiologic, surgical, other cultures i.e., CSF, joint aspiration) and early source control within 6-12 hours through appropriate consultation and using the least invasive technique.</li> <li>• Consult ICU early (either locally or through the BC Patient Transfer Network) if you have early knowledge that patient will need higher level of care.</li> <li>• Encourage a ‘culture of lactate’ where any nurse or physician is empowered to check a lactate if concerned. Check early and check often (if lactate elevated or patient unwell).</li> <li>• We suggest guiding resuscitation to normalize lactate in patients with elevated lactate as a marker of tissue hypoperfusion.</li> </ul>	<p><b>ADDITIONAL RECOMMENDATIONS</b></p> <ul style="list-style-type: none"> <li>• Early investigations to determine infectious source (radiologic, surgical, other cultures i.e., CSF, joint aspiration) and early source control within <b>6-12 hours</b> through appropriate consultation and using the least invasive technique.</li> <li>• Consult ICU early (either locally or through the BC Patient Transfer Network) if you have early knowledge that patient will need higher level of care.</li> <li>• For adults with sepsis or septic shock who require ICU admission, we suggest admitting the patients to the ICU within <b>6 hours</b>.</li> </ul>	<p><b>✗ Removal of encouraging a “culture of lactate” due to a relative deemphasis on lactate measurement as an indication for rapid antibiotic administration. Lactate clearance is still recommended as a marker of successful resuscitation.</b></p> <p><i>• New to 2021 guidelines: For adults with sepsis or septic shock who require ICU admission, we suggest admitting the patients to the ICU within 6 hours.</i></p>

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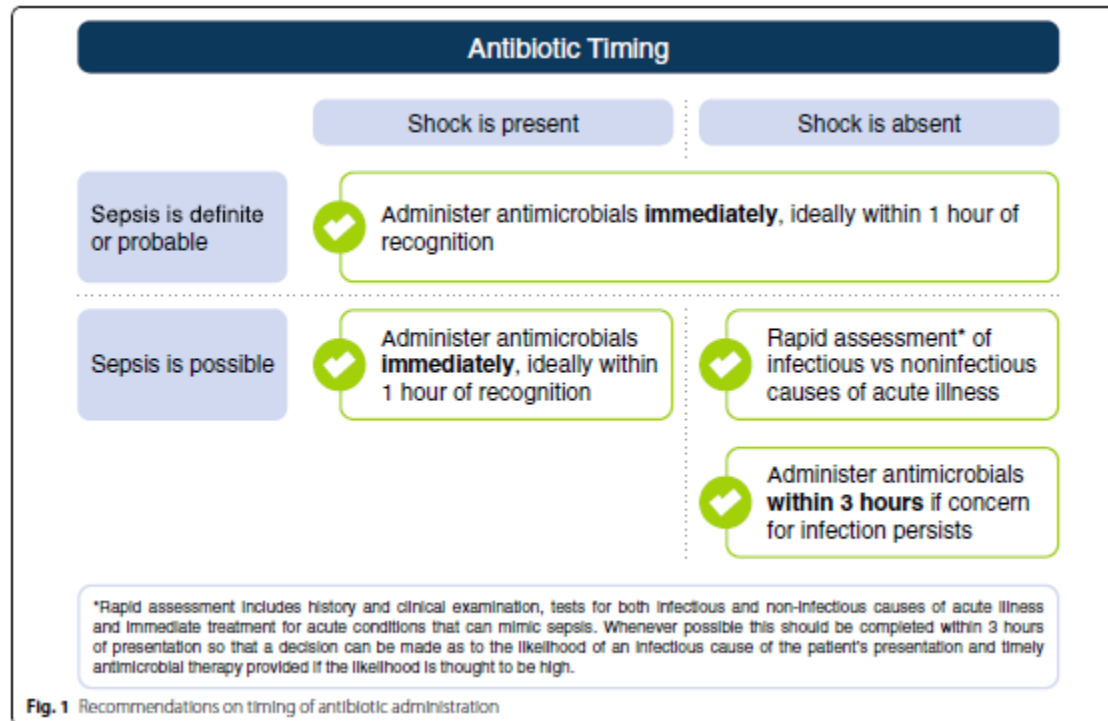
2017 Guidelines	2022 Guidelines	Changes & Rationale
<p><b>If hypotensive despite fluid bolus (30 cc/kg) or lactate fails to improve 10% after 2<sup>nd</sup> reading (at least two hours after initial measurement) we suggest:</b></p> <ul style="list-style-type: none"> <li>Placing central venous catheter and arterial catheter, continue fluid resuscitation while assessing for fluid responsiveness and initiate norepinephrine or epinephrine (+/- vasopressin 0.03 units/minute as vasopressor sparing agent) to maintain mean arterial pressure of greater than 65 mmHg.</li> <li>Using further hemodynamic assessment (such as assessing cardiac function) to determine the type of shock if the physical exam does not lead to a clear diagnosis.</li> <li>Using dobutamine as needed if evidence of sepsis induced myocardial suppression (determined by ECHO, low ScvO<sub>2</sub> or physical exam). Continue to assess response.</li> <li>Using albumin in addition to crystalloids for initial resuscitation and subsequent intravascular volume replacement in patients with sepsis and septic shock when patients require substantial amounts of crystalloids.</li> <li>If you are unable to restore hemodynamic stability with fluid resuscitation and vasopressors, we suggest adding IV hydrocortisone at a dose of 50 mg IV q6h.</li> </ul>	<ul style="list-style-type: none"> <li>If hypotensive despite fluid bolus (30 cc/kg) initiate norepinephrine targeting MAP of 65 mm Hg.</li> <li>We suggest starting norepinephrine peripherally (in or proximal to the antecubital fossa) to restore mean arterial pressure rather than delaying initiation until a central venous access is secured. Peripheral access sites running vasopressors should be checked every hour. Local protocols for extravasation management should be established. <b>Central access and intra-arterial monitoring should be obtained within 6 hours.</b></li> <li>For further assessment of fluid resuscitation, we suggest using dynamic measures over physical examination or static parameters alone.</li> <li>For adults unable to obtain a MAP greater than 65 mmHg with 15 ug/min or 0.25 ug/kg/min of norepinephrine we suggested adding vasopressin 0.03 units/minute fixed dose (1.8 units/hr).</li> <li>For adults with septic shock and inadequate mean arterial pressure levels despite norepinephrine and vasopressin, we suggest adding epinephrine.</li> <li>Using further hemodynamic assessment (such as assessing cardiac function) to determine the type of</li> </ul>	<ul style="list-style-type: none"> <li><i>Emphasis on the use early norepinephrine and the allowance of PIVs for up to 6 hours.</i></li> <li><i>Central access and intra-arterial monitoring should be obtained by 6 hours.</i> <i>See Appendix B</i></li> <li><i>Emphasis on the use of dynamic measures of fluid responsiveness over static measures.</i>  <i>Dynamic measures: passive leg raise or a fluid bolus, using change in heart rate and blood pressure, pulse pressure variation (PPV), echocardiography, temperature of the extremities, skin mottling, capillary refill time, and urine output.</i></li> <li><b>X Removal of lactate clearance specifically as an Indication for vasopressors.</b></li> <li><i>Vasopressin 0.03 units/minute should be added when norepinephrine is at a dose of 15ug/min or 0.25 ug/kg/min to maintain mean arterial pressure of greater than 65 mmHg.</i>  <i>Evidence suggests that earlier vasopressin initiation may reduce the incidence of renal dysfunction.</i></li> </ul>

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<ul style="list-style-type: none"> <li>• Consultation with critical care services or transfer to ICU (either locally or through BC Patient Transfer Network).</li> </ul>	<p>shock if the physical exam does not lead to a clear diagnosis.</p> <ul style="list-style-type: none"> <li>• Using dobutamine and norepinephrine OR epinephrine as needed if evidence of sepsis induced myocardial suppression (determined by ECHO, low ScvO2 or physical exam). Continue to assess response.</li> <li>• For adults with septic shock and an ongoing requirement for significant vasopressor therapy (<b>greater than 4 hours or expected to be greater than 4 hours</b>) we suggest using IV hydrocortisone at a dose of 50 mg IV q6h.</li> <li>• For adults with sepsis or septic shock we suggest against using IV vitamin C.</li> <li>• Consultation with critical care services or transfer to ICU (either locally or through BC Patient Transfer Network).</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Using dobutamine with norepinephrine OR epinephrine as needed if evidence of sepsis induced myocardial suppression (determined by ECHO, low ScvO2 or physical exam). Continue to assess response.</i></li> <li>• <i>More aggressive recommendations for the use of hydrocortisone for patients with shock. If patients require 4 hours of significant vasopressor support at any dose, hydrocortisone 50 mg IV q6h is now recommended.</i></li> </ul> <p><i>Intravenous steroids have been shown to improve patient centered outcomes (liberations for vasopressors, mechanical ventilation, and the ICU).</i></p> <p><b>✗ Formal recommendation against the use of vitamin C in patients with sepsis.</b></p> <ul style="list-style-type: none"> <li>• <i>RCTs have shown no benefit to the addition of vitamin C to hydrocortisone.</i></li> </ul>

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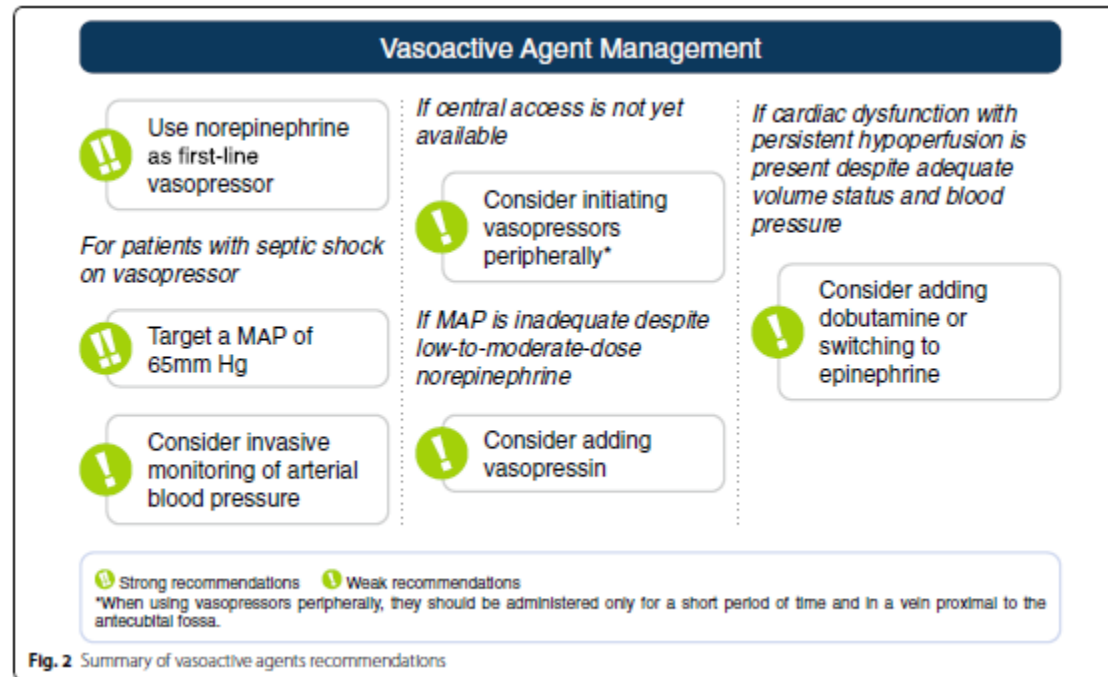
## Appendix A





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### Appendix B



### References

- Evans, Laura; et al. Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock 2021, Critical Care Medicine: November 2021 - Volume 49 – Issue 11 - p 1063-1143doi: 10.1097/CCM.0000000000005337
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