BC Sepsis Network

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 38^0C or less than 36^0C
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 mL/kg) completed within 3 hours for evidence of hypoperfusion with/without shock

2017 Guidelines	2022 Guidelines	Changes & Rationale
All patients with two out of four SIRS (HR greater than 90, RR greater than 20, temperature greater or equal to 38^{o} C or less than 36^{o} C, altered mental state) and suspected infection and one of the following risk factors should be considered at risk of sepsis: • Looks unwell • Age greater than 65 years • Recent surgery • Immunocompromised (AIDS, Chemotherapy, neutropenia, asplenia, transplant, chronic steroids) • Chronic illness (diabetes, renal failure, hepatic failure, cancer, alcoholism, IV drug use)	**All patients with two out of four SIRS (HR greater than 90, RR greater than 20, temperature greater or equal to 38^{o} C or less than 36^{o} C, altered mental state) and suspected infection and one of the following risk factors should be considered at risk of sepsis:** • Looks unwell • Age greater than 65 years • Recent surgery • Immunocompromised (AIDS, Chemotherapy, neutropenia, asplenia, transplant, chronic steroids) • chronic illness (diabetes, renal failure, hepatic failure, cancer, alcohol use disorder, IV drug use)	*No changes.*

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2017 Guidelines	2022 Guidelines	Changes & Rationale
All patients with two out of four SIRS and suspected infection (with above risk factor): • ABG venous lactate measurement within 30 minutes of presentation to triage should be taken with initial blood draw. *This will require access to an ABG machine (or other rapid lactate testing device) with rapid turnaround time (approximately 30 minutes)* • If initial lactate is elevated have a repeat venous lactate measurement drawn in next 2-4 hours	**All patients with two out of four SIRS and suspected infection (with above risk factor):** • 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	✗ ***ABG venous lactate measurement within 30 minutes removed as no longer used as an indication for rapid antibiotic administration.*** *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.

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):
 	
• Blood culture before IV antibiotics
• Broad spectrum IV antibiotics within 1 hour
• Complete crystalloid fluid bolus (30 mL/kg) within first 3 hours (balanced crystalloid preferred)
	If systolic blood pressure (SBP) is less than 90 mmHg or mean arterial pressure (MAP) less than 65 mmHg at presentation:
	
	• Culture before antibiotics
	• Antibiotics within **1 hour**
	• Complete crystalloid fluid bolus (30 mL/kg within first **3 hours** (balanced crystalloid preferred)
	
	If **NOT** in **SHOCK** (SBP less than 90 or MAP less than 65 mmHg) but there is evidence of sepsis induced hypoperfusion:
	
	• Complete crystalloid fluid bolus (30 mL/kg within first **3 hours** (balanced crystalloid preferred)
		✗ **qSOFA criteria removed.**
		
		2021 guidelines de-emphasize the value of qSOFA and ***recommend*** *that:*
		
		• *Patients* ***with suspected septic shock*** *should receive:*
		  ○ *Rapid antibiotic administration within 1 hour*
		  ○ *30 mL/kg of balanced crystalloid within 3 hours*
		
		• *Patients* ***without septic shock****, but have evidence of sepsis induced hypoperfusion, should receive:*
		  ○ *30 mL/kg of balanced crystalloid within 3 hours.*

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If initial lactate result is greater or equal to 4 mmol/L: • Blood culture before IV antibiotics • Broad spectrum IV antibiotics within 1 hour of measurement of elevated lactate • Complete crystalloid fluid bolus (30 mL/kg) within first 3 hours (balanced crystalloid preferred)	For adults with **sepsis** or **septic shock**, we suggest guiding resuscitation to decrease serum lactate in patients with elevated lactate level, over not using serum lactate. 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.	⚔ **Lactate is not recommended as an indicator for rapid antibiotic and fluid administration.** *2021 guidelines **recommend** that for patients with sepsis/septic **shock** that lactate clearance be used to target resuscitation efforts.* *Capillary refill time is suggested to help guide resuscitation. This should be used in conjunction with other markers of perfusion during resuscitation.*
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: • Broad spectrum IV antibiotics within 3 hours • Blood culture before IV antibiotics	For adults in **SHOCK (SBP less than 90 mmHg or MAP less than 65 mmHg)** with **POSSIBLE** infectious cause (septic shock) or a **HIGH** likelihood of sepsis: • Blood culture before IV antibiotics • Broad spectrum IV antibiotics within **1 hour** For adults **NOT** in SHOCK (SBP less than 90 mmHg or MAP less than 65 mmHg) with **POSSIBLE** sepsis, we suggest a *time-limited course of rapid investigation* and if concern for infection persists: • Blood culture before IV antibiotics • Broad spectrum IV antibiotics within **3 hours** For adults with a **LOW LIKELIHOOD** of infection and **NOT** in shock, we suggest deferring antimicrobials while continuing to closely monitor the patient.	⚔ **Lactate is not recommended as an indicator for rapid antibiotic administration.** *2022 guideline recommendations have modified triggers for rapid antibiotics:* • *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.* • *If **shock** is **not present** and sepsis is only **possible,** clinicians may take up to 3 hours to investigate and confirm the etiology is infectious (sepsis) and antibiotics may be deferred.* See Appendix A

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Additional Recommendations

2017 Guidelines	2022 Guidelines	Changes & Rationale
ADDITIONAL RECOMMENDATIONS • 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. • 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. • 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). • We suggest guiding resuscitation to normalize lactate in patients with elevated lactate as a marker of tissue hypoperfusion.	**ADDITIONAL RECOMMENDATIONS** • 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. • 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. • For adults with sepsis or septic shock who require ICU admission, we suggest admitting the patients to the ICU within **6 hours**.	⚔ **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.** • *New to 2022 guidelines: For adults with sepsis or septic shock who require ICU admission, we suggest admitting the patients to the ICU within 6 hours.*
If hypotensive despite fluid bolus (30 mL/kg) or lactate fails to improve 10% after 2nd reading (at least 2 hours after initial measurement) we suggest: • Placing central venous catheter and arterial catheter, continue fluid resuscitation while assessing for fluid responsiveness and initiate norepinephrine or epinephrine (+/- vasopressin 0.03 units/min as	• If hypotensive despite fluid bolus (30 mL/kg) initiate norepinephrine targeting MAP of 65 mmHg**.** • We suggest starting norepinephrine peripherally (in or proximal to the antecubital fossa) to restore MAP 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. **Central access and intra-arterial monitoring should be obtained within 6 hours.**	• *Emphasis on the use of early norepinephrine and the allowance of PIVs for up to 6 hours.* • *Central access and intra-arterial monitoring should be obtained by 6 hours.* See Appendix B • *Emphasis on the use of dynamic measures of fluid responsiveness over static measures.*

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2017 Guidelines	2022 Guidelines	Changes & Rationale
vasopressor sparing agent) to maintain MAP of greater than 65 mmHg. • 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. • Using dobutamine as needed if evidence of sepsis induced myocardial suppression (determined by ECHO, low ScvO2 or physical exam). Continue to assess response. • 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. • 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. • Consultation with critical care services or transfer to ICU (either locally or through BC Patient Transfer Network).	• For further assessment of fluid resuscitation, we suggest using dynamic measures over physical examination or static parameters alone. • 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/min fixed dose (1.8 units/hr). • For adults with septic shock and inadequate MAP levels despite norepinephrine and vasopressin, we suggest adding epinephrine. • 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. • 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. • For adults with septic shock and an ongoing requirement for significant vasopressor therapy (**greater than 4 hours or expected to be greater than**	*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.* ⚔ **Removal of lactate clearance specifically as an Indication for vasopressors.** • *Vasopressin 0.03 units/min should be added when norepinephrine is at a dose of 15ug/min or 0.25 ug/kg/min to maintain MAP of greater than 65 mmHg.* *Evidence suggests that earlier vasopressin initiation may reduce the incidence of renal disfunction.* • *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.* • More aggressive recommendations for the use of hydrocortisone for patients with shock. If patients require 4 hours of significant vasopressor support at

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	4 hours) we suggest using IV hydrocortisone at a dose of 50 mg IV q6h.	any dose, hydrocortisone 50 mg IV q6h is now recommended. *Intravenous steroids have been shown to improve patient centered outcomes (liberations for vasopressors, mechanical ventilation, and the ICU).*
	• For adults with sepsis or septic shock we suggest against using IV vitamin C. • Consultation with critical care services or transfer to ICU (either locally or through BC Patient Transfer Network).	✕ **Formal recommendation against the use of vitamin C in patients with sepsis.** • RCTs have shown no benefit to the addition of vitamin C to hydrocortisone.

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Appendix A

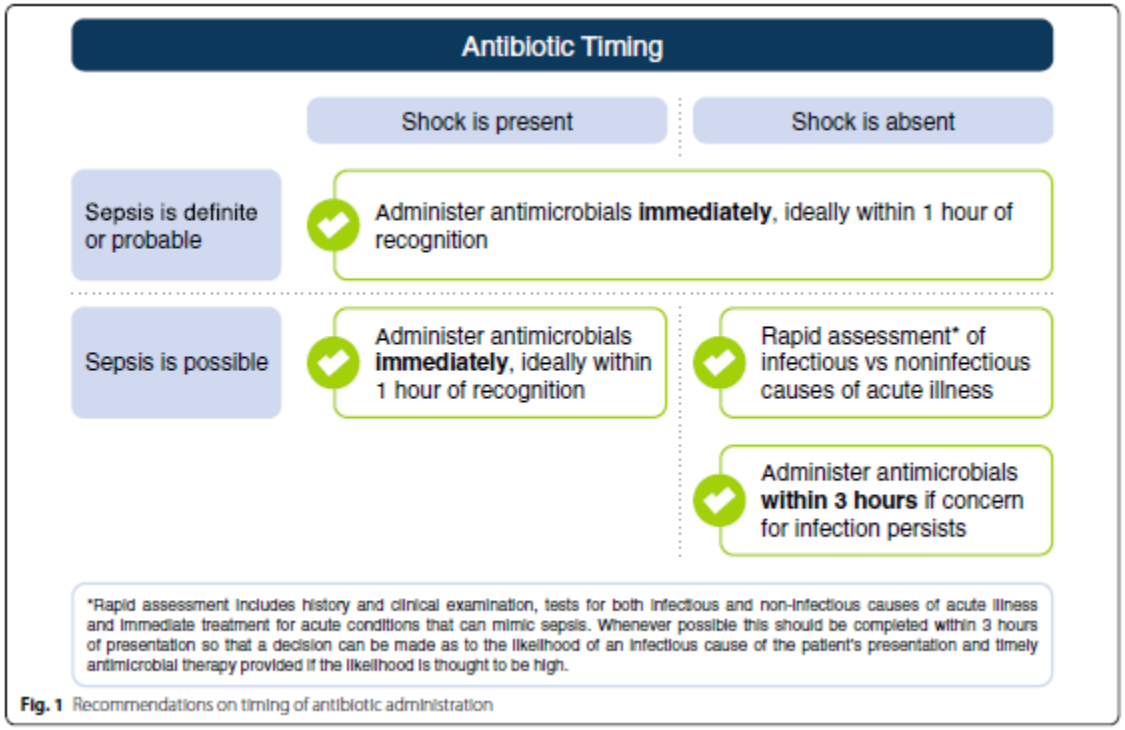

Fig. 1 Recommendations on timing of antibiotic administration

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Appendix B

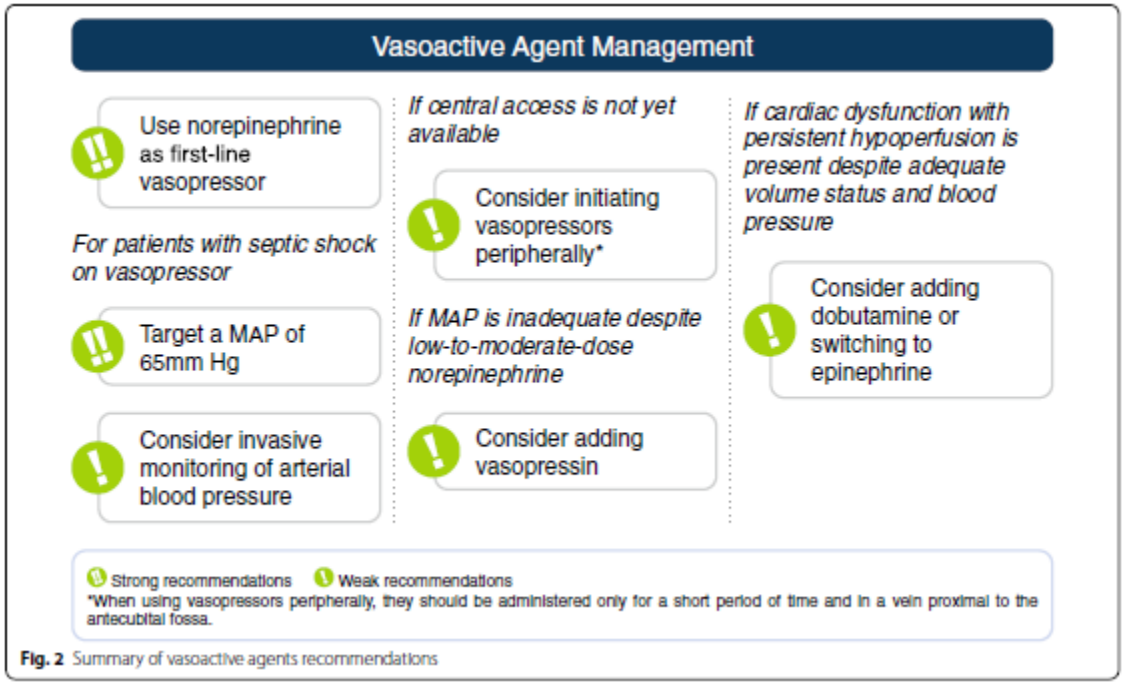

Fig. 2 Summary of vasoactive agents recommendations

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