

K02: Sepsis

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Introduction

Sepsis is a syndrome of life-threatening organ dysfunction resulting from a dysregulated host response to an infection. In Canada, 1 in 18 deaths are directly related to or complicated by sepsis, with the condition having long lasting psychosocial effects on survivors. Sepsis disproportionately affects the very young (below 1 year of age) and older adults (above 50). Paramedics must recognize the potential for sepsis, and provide care to protect a patient's airway and ensure adequate oxygenation, ventilation, and end-organ perfusion.

Essentials

- The National Early Warning Score-2 (NEWS2) is a screening tool designed to identify patients at high risk for deterioration from all causes, including sepsis. Paramedics should routinely obtain a NEWS2 score on all patients and use these findings to help guide management, including transport methods, pre-arrival notification, and in-hospital advocacy.
- Use appropriate personal protective equipment. For patients with suspected respiratory infections, paramedics should use droplet precautions.
- Patients with chronic fluid-retention (e.g., congestive heart failure or chronic renal failure) may also be fluid depleted and require fluid resuscitation. Assess for signs of volume overload continually throughout patient contact and stop infusion if edema becomes apparent.
- Lactated Ringers is the fluid of choice in sepsis, as it is less likely to worsen or provoke acidosis, and has fewer effects on renal perfusion.

Additional Treatment Information

- Sepsis can cause increased capillary permeability. All patients receiving fluid administration must be continually monitored for signs of volume overload, such as the development of pulmonary edema.
- If available, Lactated Ringers is the crystalloid fluid of choice over normal saline in sepsis. It is less likely to provoke or worsen acidosis, and has fewer effects on renal perfusion. If unavailable, normal saline remains an acceptable choice for fluid replacement.
- Administration of vasopressors through peripheral IV lines carries a risk of significant extravasation injury. If vasopressors are used, they must be given through a 20G or larger IV catheter placed above the wrist. Paramedics must continually monitor for signs of extravasation; if swelling or pain around the IV site are present, the receiving facility must be notified immediately.
- Capillary blood glucose levels should be assessed in all patients with suspected sepsis. A measurement of > 6.7 mmol/L, in absence of diabetes, suggestive of underlying hypermetabolic state which may be a sign of sepsis.
- Notify receiving facilities early for immunocompromised patients who are suspected of having sepsis. These patients often require isolation on arrival.

General Information

- NEWS2 relies on several physiological parameters already measured by paramedics in their practice:
 - Respiratory rate
 - Oxygen saturation
 - Systolic blood pressure
 - Pulse rate
 - Level of consciousness or new-onset confusion
 - Temperature
- Primary risk factors for sepsis include:
 - Age > 65

- Immunosuppression
- Diabetes
- Obesity
- Current diagnosis of cancer
- Hospitalisation within the preceding 90 days
- In isolation, malodorous urine is not associated with a urinary tract infection.
- Elderly individuals with sepsis frequently do not have fever. Patients should be asked about antipyretic medications, as these may mask fever. In all patients, the absence of fever does not exclude sepsis. Hypothermia, where it is present, is an ominous sign in sepsis.
- Paramedics should consider the possibility of meningococcal septicemia, and invasive group A streptococcus (necrotizing fasciitis).

National Early Warning Score-2

BC Emergency Health Services advocates the use of the National Early Warning Score (NEWS2) to identify patients at risk of sudden deterioration. NEWS2 scores should be obtained on all patients, and used to guide clinical decision-making, particularly in the areas of transport, destination selection, pre-arrival notification, ongoing monitoring, and emergency department advocacy.

Physiological Parameter	Score						
	3	2	1	0	1	2	3
Respiratory rate	≤ 8		9 – 11	12 – 20		21 – 24	≥ 25
SpO2 %	≤ 91	92 – 93	94 – 95	≥ 96			
Air or oxygen?		Oxygen		Air			
Systolic blood pressure (mmHg)	≤ 90	91 – 100	101 – 110	111 – 219			≥ 220
Pulse per minute	≤ 40		41 – 50	51 – 90	91 – 110	111 – 130	≥ 131
Consciousness				Alert			Altered
Temperature	≤ 35.0		35.1 – 36.0	36.1 – 38.0	38.1 – 39.0	≥ 39.1	

Score	Clinical Risk	Practitioner Response
Aggregate score 0 – 4	Low	Routine monitoring Routine transport or referral pathway as required
Score of 3 in any individual parameter	Low-medium	Monitor carefully Routine transport as required
Aggregate score 5 – 6	Medium	Monitor carefully Attempt to optimize oxygenation, ventilation, and perfusion Consider advanced care intercept where available Consider emergent transport to hospital Consider pre-arrival notification Consider ClinlCall consultation
Aggregate score ≥ 7	High	Monitor continuously Maximize oxygenation, ventilation, and perfusion Seek advanced care intercept but do not delay for Emergent transport to hospital Pre-arrival notification

NEWS2 is not intended to replace sound clinical judgment. Its purpose is to alert practitioners to the risk of sudden deterioration, and to help identify those patients who require more aggressive monitoring, treatment, and advocacy, and is particularly valuable in the context of infectious diseases and suspected sepsis.

Interventions

First Responder

- Position supine to improve blood pressure if not in respiratory distress
- Do not walk the patient
- Supplemental oxygen as required

- → [A07: Oxygen and Drug Administration](#)

Emergency Medical Responder – All FR interventions, plus:

- Obtain and document NEWS2 score
- Provide supplemental oxygen to maintain SpO₂ ≥ 94%
 - → [A07: Oxygen and Drug Administration](#)
- Perform full-body assessment to examine for presence of mottling or non-blanching rash. Consider meningococcal septicemia.

Primary Care Paramedic – All FR and EMR interventions, plus:

- Obtain vascular access and correct hypotension or hypoperfusion:
 - → [D03: Vascular Access](#)
- Correct hypotension and/or hypoperfusion:
- Consider CPAP if necessary to support oxygenation in cases of respiratory infection

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Concurrent use of vasopressors and fluid resuscitation is patient specific. Consider Clini-Call for consultation.
- [KetAMINE](#) is the preferred induction agent if advanced airway management is required to maintain airway patency, oxygenation or ventilation
 - → [PR18: Anesthesia Induction](#)

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Consider norepinephrine

Evidence Based Practice

[Sepsis Syndrome](#)

[Septic Shock](#)

References

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