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Review Article

Early Recognition and Management of Sepsis in Hospitalized Adults in Canada: A Contemporary Evidence-Based Review

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Abstract

Background: Sepsis remains a major cause of deterioration, intensive care admission, prolonged hospitalization, and death in Canadian acute-care hospitals. Recognition can be delayed because early manifestations are nonspecific and may overlap with the patient's admitting illness.

Objective: To provide a Canada-oriented review of early recognition and management of sepsis in hospitalized adults, emphasizing the 2026 British Columbia adult sepsis guidance, current Canadian health-system considerations, and the 2026 Surviving Sepsis Campaign (SSC).

Methods: Narrative review of contemporary sepsis guidance and major supporting trials, with priority given to Canadian provincial resources, the Canadian Critical Care Society (CCCS), the Canadian Institute for Health Information (CIHI), and the 2026 SSC.

Results: Canada does not currently have one contemporary pan-Canadian adult sepsis clinical practice guideline. In practice, international evidence is implemented through provincial and institutional pathways. The 2026 BC guideline, applicable to adults across acute-care settings, uses modified SIRS criteria plus clinical risk factors for screening, recommends lactate measurement within 3 hours, antibiotics within 1 hour for shock or probable/definite sepsis, and within 3 hours for possible sepsis without shock when concern persists. Balanced crystalloids, early norepinephrine, dynamic assessment of fluid responsiveness, timely source control, and daily antimicrobial reassessment are central principles. Canadian implementation must also account for local antibiograms, rural and remote transfer pathways, critical-care capacity, and stewardship infrastructure.

Conclusion: Canadian sepsis care is best approached as a locally implemented, evidence-based pathway rather than a single national protocol. Early recognition, timely antimicrobials when indicated, individualized resuscitation, rapid source control, and multidisciplinary reassessment remain the core of care.

Keywords: sepsis; septic shock; Canada; British Columbia; antimicrobial therapy; fluid resuscitation; vasopressors; critical care; clinical pharmacy

1. Introduction

Sepsis is life-threatening organ dysfunction caused by a dysregulated host response to infection.[1] In Canada, it remains a major patient-safety and critical-care problem. CIHI continues to report in-hospital sepsis as a national quality indicator across provinces and territories, reflecting its importance to hospital outcomes and resource use.[2] Historical Canadian estimates have also shown substantial mortality and prolonged lengths of stay among patients hospitalized with sepsis.

A specifically Canadian approach requires some nuance. Canada does not currently have a single contemporary pan-Canadian adult sepsis guideline issued by the CCCS. The CCCS guideline repository includes sepsis resources but does not list a current standalone national adult sepsis clinical practice guideline.[3] Consequently, Canadian hospitals generally adapt international evidence, particularly the SSC, through provincial, regional, and institutional pathways. British Columbia provides the clearest current provincial example: its Initial Adult Sepsis Recognition and Management Guidelines were revised in July 2026 and apply to adults across acute-care settings.[4]

This review therefore frames current evidence through a Canadian lens, using the 2026 BC guideline as a practical provincial model while recognizing that antimicrobial choices, transfer processes, and operational details must remain local.

2. Recognition and Screening in Canadian Hospitals

Sepsis should be suspected when infection is accompanied by new physiological instability or organ dysfunction. Clinical clues include altered mental status, increasing oxygen requirement, tachypnea, hypotension, oliguria, rising creatinine, thrombocytopenia, elevated lactate, mottling, delayed capillary refill, or unexplained rapid deterioration. The key bedside principle is change from baseline rather than reliance on one abnormal value.

The 2026 BC guideline uses a pragmatic modified SIRS approach. Adults with suspected infection and at least two of five criteria—heart rate >90/min, respiratory rate >20/min, temperature ≥38°C or <36°C, altered mental status, or white blood cell count <4 or >12 ×10^9/L—are considered at risk when accompanied by clinical risk factors such as frailty or age >65 years, recent surgery, immunocompromise, or major chronic illness.[4] This differs from using qSOFA as a screening rule-out tool. The 2026 SSC similarly favours NEWS, NEWS2, MEWS, or SIRS over qSOFA when a single screening instrument is used.[5]

This approach is especially relevant on Canadian medical and surgical wards, where subtle deterioration may precede hypotension. Screening should trigger clinical reassessment, not automatic labeling of sepsis. Alternative diagnoses such as pulmonary embolism, cardiogenic shock, hemorrhage, adrenal crisis, medication toxicity, or noninfectious inflammation must remain in the differential.

3. Lactate, Cultures, and Initial Investigation

The BC 2026 guideline recommends venous lactate measurement within 3 hours in adults meeting its screening criteria, with repeat measurement within the next 3 hours if the initial lactate is elevated.[4] Lactate is a marker of risk and impaired

physiology, not a diagnostic test for sepsis. Elevated values may reflect adrenergic stimulation, reduced hepatic clearance, seizures, β2-agonist exposure, or other causes in addition to hypoperfusion.

Blood cultures should be obtained before intravenous antibiotics when this can be done promptly, together with source-specific cultures and appropriate imaging. However, cultures should not materially delay treatment in shock or high-probability sepsis. [4,5] Canadian hospitals should integrate rapid blood-culture workflows with local microbiology capacity, especially after hours and in smaller centres.

4. Antimicrobial Timing and Selection

The 2026 BC pathway closely mirrors the current SSC probability-based approach. For adults in shock with a possible infectious cause, or for probable or definite sepsis, broad-spectrum intravenous antibiotics should be administered within 1 hour.[4] For possible sepsis without shock, a short period of focused diagnostic assessment is appropriate; if infection remains a concern, antibiotics should be given within 3 hours. If sepsis is unlikely and the patient is not in shock, antimicrobials may be deferred while close monitoring continues.[4,5]

Empiric therapy must be Canadian-site specific rather than copied from a generic international table. Selection should reflect the suspected source, illness severity, prior microbiology, recent antibiotics, health-care exposure, immune status, device history, and the local antibiogram. The BC guideline explicitly states that MRSA, multidrug-resistant organism, and fungal coverage should be based on local epidemiology and clinical indication.[4] This principle is critical because resistance patterns differ substantially between hospitals and regions.

Initial antimicrobial dosing must also account for critical-illness pharmacokinetics. Appropriate loading doses should generally not be reduced solely because acute kidney injury is present; maintenance dosing can then be adjusted as renal function evolves. The 2026 SSC recommends prolonged β-lactam infusion after an initial loading dose in adults with sepsis or septic shock.[5] Clinical pharmacists can support allergy assessment, loading and maintenance dosing, extended infusions, vancomycin AUC monitoring, drug interactions, and de-escalation.

5. Source Control

Antibiotics cannot compensate for an uncontrolled focus. Abscesses, obstructed infected urinary systems, empyema, perforated viscus, necrotizing infection, infected devices, septic arthritis, and biliary obstruction require early procedural assessment. The 2026 BC guideline recommends early investigation and source control through the appropriate service within 6 hours when feasible, using the least invasive effective technique.[4] In Canadian practice, this may require early coordination with surgery, interventional radiology, gastroenterology, urology, or transfer to a higher-level centre.

6. Fluid Resuscitation and Hemodynamic Assessment

For sepsis-induced hypoperfusion or septic shock, the BC guideline recommends at least 30 mL/kg of balanced crystalloid within the first 3 hours.[4] This should be interpreted as an initial resuscitation framework rather than a mandate for repeated fixed-volume boluses. Patients with heart failure, advanced kidney disease, pulmonary edema, or other fluid-intolerant states require especially close reassessment.

The emphasis after initial fluid is responsiveness, not volume delivered. Dynamic measures are preferred over static parameters alone. Passive leg raise, change in stroke volume or pulse pressure after a small bolus, capillary refill, urine output, mental state, and bedside cardiac assessment can help determine whether additional fluid is likely to improve perfusion.[4,5] Large trials such as CLASSIC and CLOVERS found no mortality advantage to a uniformly liberal strategy after initial resuscitation, supporting individualized fluid decisions. [6,7]

7. Vasopressors and Corticosteroids

Norepinephrine remains first-line vasopressor therapy. The BC guideline supports starting norepinephrine through a suitable peripheral IV in the upper extremity when hypotension persists, rather than delaying treatment for central venous access; the site should be checked frequently and local extravasation policies followed.[4] An initial MAP target of approximately 65 mm Hg is appropriate for most adults, with subsequent individualization.

If norepinephrine requirements rise, the BC guideline recommends adding vasopressin at a fixed dose of 0.04 units/min in patients who remain below target MAP despite approximately 10–15 micrograms/min or 0.25 micrograms/kg/min of norepinephrine; vasopressin should not be infused peripherally.[4] Epinephrine may be added when MAP remains inadequate. When sepsis-induced myocardial dysfunction causes persistent hypoperfusion, dobutamine plus norepinephrine or epinephrine may be considered.

For septic shock with an ongoing significant vasopressor requirement expected to persist beyond approximately 4 hours, the BC guideline recommends hydrocortisone 50 mg IV every 6 hours.[4] This is consistent with contemporary evidence that corticosteroids accelerate shock resolution and may improve selected outcomes in vasopressor-dependent septic shock.[8,9]

8. Critical Care Escalation, Rural and Remote Context

Canada's geography makes escalation pathways clinically important. The BC guideline recommends consultation with critical care services and, when indicated, transfer to critical care within 6 hours, using the provincial transfer process.[4] Similar principles apply elsewhere in Canada: smaller community and rural hospitals should initiate time-sensitive treatment locally while arranging transport rather than waiting for transfer before starting antimicrobials, fluids, or vasopressors when indicated.

This has practical implications for protocol design. Hospitals should define who activates a sepsis response, how urgent antibiotics are accessed after hours, when peripheral vasopressors may be initiated, how source-control consultations are escalated, and how inter-facility transport is triggered. The pathway must fit the resources of the local health system.

9. Reassessment, Stewardship, and the Clinical Pharmacist

Broad-spectrum therapy should be reassessed every day. Microbiology, clinical response, source control, organ function, imaging, and alternative diagnoses should guide narrowing or discontinuation. The BC guideline explicitly advises stopping empiric antimicrobials when an alternative cause is demonstrated or strongly suspected.[4] This is particularly important in Canadian hospitals seeking to balance sepsis timeliness metrics with antimicrobial stewardship.

Clinical pharmacists can contribute by expediting antibiotic access, verifying allergy histories, optimizing dosing, supporting prolonged β-lactam infusion, monitoring renal function and drug levels, reviewing vasopressor and corticosteroid regimens,

and prompting de-escalation. Evidence from multidisciplinary sepsis response programs suggests that pharmacist involvement can shorten time to antimicrobial administration and improve bundle adherence, although mortality benefits are less consistently demonstrated.[10]

10. A Practical Canadian Bedside Approach

1. Recognize deterioration: suspect infection when new organ dysfunction or physiological instability develops.

2. Escalate early: activate the local sepsis or rapid-response pathway and involve critical care when shock or worsening organ dysfunction is present.

3. Investigate in parallel: obtain lactate, blood cultures, source-specific cultures, routine laboratory studies, and source-directed imaging.

4. Classify urgency: shock or probable/definite sepsis requires antibiotics within 1 hour; possible sepsis without shock allows rapid evaluation with treatment within 3 hours if concern persists.

5. Use local empiric therapy: select antibiotics according to the syndrome, local antibiogram, prior microbiology, and patient-specific resistance risks.

6. Restore perfusion: use balanced crystalloids for initial hypoperfusion and reassess dynamically before additional fluid.

7. Start norepinephrine early when needed: peripheral initiation is acceptable when appropriately monitored and should not be delayed for central access.

8. Control the source: involve procedural services early and aim for intervention within about 6 hours when feasible.

9. Arrange transfer when required: do not postpone initial treatment while awaiting an ICU bed or transport.

10. Reassess and de-escalate: review diagnosis, perfusion, organ support, cultures, antimicrobial spectrum, and duration every day.

11. Canadian Quality Improvement Priorities

CIHI reports in-hospital sepsis as a national patient-safety indicator with results available by province/territory, region, facility, age, sex or gender, income quintile, and rural versus urban/remote status.[2] This creates an opportunity for Canadian hospitals to connect bedside sepsis protocols with quality-improvement measurement. Useful process measures include time to lactate, time to antibiotics in appropriate patients, time to vasopressor initiation, source-control delay, ICU escalation, antimicrobial de-escalation, and fluid balance after initial resuscitation.

British Columbia also provides evidence that coordinated system improvement can have measurable impact. Health Quality BC reports that its province-wide sepsis work was associated with hundreds of hospital-acquired sepsis cases and deaths averted and substantial estimated net savings between 2014 and 2018.[11] Although such estimates should not be assumed to generalize directly to every province, they illustrate the potential value of standardized recognition, education, measurement, and multidisciplinary implementation.

12. Conclusion

Contemporary sepsis care in Canada is built from international evidence translated through provincial and institutional systems. The 2026 BC guideline provides a useful current Canadian model: structured screening, lactate measurement, probability-based antimicrobial timing, balanced crystalloids, dynamic reassessment, early norepinephrine, rapid source control, and timely critical-care escalation.[4] The absence of a single contemporary national adult sepsis guideline makes local implementation especially important.

For Canadian clinicians, the central principle is not rigid protocolization but rapid, repeated clinical synthesis. Recognition should be early; antimicrobials should be timely when infection is probable, definite, or associated with shock; resuscitation should be individualized; and therapy should be narrowed as diagnostic certainty improves. Effective care depends on coordination among physicians, nurses, pharmacists, microbiology, critical care, and procedural services across the full continuum from ward recognition to ICU transfer and recovery.

Declarations

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