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CADTH RAPID RESPONSE REPORT: REFERENCE LIST

Screening Triage Tools and Management Algorithms for Adult Sepsis Patients: Clinical Utility and Guidelines

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About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada's health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.

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Research Questions

1. What is the clinical utility of screening triage tools and/or management algorithms in adult patients in the emergency department with suspected sepsis?
2. What is the clinical utility of screening triage tools and/or management algorithms in adult inpatients with suspected sepsis?
3. What are the evidence-based guidelines regarding the use of screening triage tools and/or management algorithms in adult inpatients with suspected sepsis?

Key Findings

One health technology assessment, six systematic reviews (two with meta-analyses), one randomized controlled trial, and 11 non-randomized controlled studies were identified regarding the clinical utility of screening triage tools and management algorithms in adult patients with suspected sepsis. Six evidence-based guidelines were identified regarding the use of screening triage tools and management algorithms in adult patients with suspected sepsis.

Methods

A limited literature search was conducted by an information specialist on key resources including Medline, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were sepsis diagnosis/treatment and hospitalized adult patients. No filters were applied to limit the search results for research questions 1 and 2. A methodological filter was applied to limit retrieval to clinical practice guidelines for question 3. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2014 and August 7, 2019. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Q1: Adult patients presenting in the emergency department with suspected sepsis Q2-3: Adult inpatients with suspected sepsis
Intervention	Q1-3: Screening triage tools and/or management algorithms
Comparator	No screening tools and/or algorithm management

Outcomes	Q1-2: Clinical utility (i.e., patient management [e.g., time to treatment], patient direct outcomes [e.g., sepsis-related mortality, length of hospital stay, readmission]) Q3: Guidelines
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized-controlled trials, non-randomized studies, and evidence-based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

One health technology assessment,[1] three systematic reviews (two with meta-analyses),[2,6,7] one randomized controlled trial,[8] and nine non-randomized controlled studies[10-13,15-19] were identified regarding the clinical utility of screening triage tools and management algorithms in adult patients in the emergency department with suspected sepsis. Three systematic reviews[3-5] and two non-randomized controlled studies[9,14] were identified regarding the clinical utility of screening triage tools and management algorithms in adult inpatients with suspected sepsis. Six evidence-based guidelines were identified regarding the use of screening triage tools and management algorithms in adult inpatients with suspected sepsis.[20-25]

Additional references of potential interest are provided in the appendix.

Health Technology Assessments

1. Westwood M, Ramaekers B, Whiting P, et al. Procalcitonin testing to guide antibiotic therapy for the treatment of sepsis in intensive care settings and for suspected bacterial infection in emergency department settings: a systematic review and cost-effectiveness analysis. *Health Technol Assess*. 2015 Nov;19(96):v-xxv, 1-236. PubMed: PM26569153

Systematic Reviews and Meta-analyses

2. Sungkar Y, Considine J, Hutchinson A. Implementation of guidelines for sepsis management in emergency departments: a systematic review. *Australas Emerg Care*. 2018 Nov;21(4):111-120. PubMed: PM30998886

3. Warttig S, Alderson P, Evans DJ, Lewis SR, Kourbeti IS, Smith AF. Automated monitoring compared to standard care for the early detection of sepsis in critically ill patients. *Cochrane Database Syst Rev*. 2018 06 25;6:CD012404. PubMed: PM29938790

4. Alberto L, Marshall AP, Walker R, Aitken LM. Screening for sepsis in general hospitalized patients: a systematic review. *J Hosp Infect*. 2017 Aug;96(4):305-315. PubMed: PM28506711

5. Andriolo BN, Andriolo RB, Salomao R, Atallah AN. Effectiveness and safety of procalcitonin evaluation for reducing mortality in adults with sepsis, severe sepsis or septic shock. *Cochrane Database Syst Rev*. 2017 Jan 18;1:CD010959. PubMed: PM28099689

6. Coccolini F, Sartelli M, Catena F, Ceresoli M, Montori G, Ansaloni L. Early goal-directed treatment versus standard care in management of early septic shock: meta-analysis of randomized trials. *J Trauma Acute Care Surg*. 2016 11;81(5):971-978. PubMed: PM27602898

7. Wira CR, Dodge K, Sather J, Dziura J. Meta-analysis of protocolized goal-directed hemodynamic optimization for the management of severe sepsis and septic shock in the emergency department. *West J Emerg Med.* 2014 Feb;15(1):51-59. PubMed: PM24696750

Randomized Controlled Trials

8. Kuan WS, Ibrahim I, Leong BS, et al. Emergency department management of sepsis patients: a randomized, goal-oriented, noninvasive sepsis trial. *Ann Emerg Med*. 2016 Mar;67(3):367-378.e363. PubMed: PM26475246

Non-Randomized Studies

9. Gluck E, Nguyen HB, Yalamanchili K, et al. Real-world use of procalcitonin and other biomarkers among sepsis hospitalizations in the United States: a retrospective, observational study. *PLoS ONE*. 2018;13(10):e0205924. PubMed: PM30332466

10. Machado SM, Wilson EH, Elliott JO, Jordan K. Impact of a telemedicine eICU cart on sepsis management in a community hospital emergency department. *J Telemed Telecare*. 2018 Apr;24(3):202-208. PubMed: PM29278979

11. Quinten VM, van Meurs M, Wolffensperger AE, Ter Maaten JC, Ligtenberg JJM. Sepsis patients in the emergency department: stratification using the Clinical Impression Score, Predisposition, Infection, Response and Organ dysfunction score or quick Sequential Organ Failure Assessment score? *Eur J Emerg Med*. 2018 Oct;25(5):328-334. PubMed: PM28338533

12. Shah T, Sterk E, Rech MA. Emergency department sepsis screening tool decreases time to antibiotics in patients with sepsis. *Am J Emerg Med*. 2018 10;36(10):1745-1748. PubMed: PM29395762

13. McColl T, Gatien M, Calder L, et al. Implementation of an emergency department sepsis bundle and system redesign: a process improvement initiative. *CJEM*. 2017 Mar;19(2):112-121. PubMed: PM27608524

14. Prasad PA, Shea ER, Shiboski S, Sullivan MC, Gonzales R, Shimabukuro D. Relationship between a sepsis intervention bundle and in-hospital mortality among hospitalized patients: a retrospective analysis of real-world ata. *Anesth Analg*. 2017 08;125(2):507-513.
PubMed: PM28514322

15. Romero B, Fry M, Roche M. The impact of evidence-based sepsis guidelines on emergency department clinical practice: a pre-post medical record audit. *J Clin Nurs*. 2017 Nov;26(21-22):3588-3596.
PubMed: PM28071865

16. Rosenqvist M, Fagerstrand E, Lanbeck P, Melander O, Akesson P. Sepsis Alert - a triage model that reduces time to antibiotics and length of hospital stay. *Infect Dis*. 2017 Jul;49(7):507-513.
PubMed: PM28276800

17. Idrees M, Macdonald SP, Kodali K. Sepsis Early Alert Tool: early recognition and timely management in the emergency department. *Emerg Med Australas*. 2016 Aug;28(4):399-403.
PubMed: PM27147126

18. Narayanan N, Gross AK, Pintens M, Fee C, MacDougall C. Effect of an electronic medical record alert for severe sepsis among ED patients. *Am J Emerg Med*. 2016 Feb;34(2):185-188.
PubMed: PM26573784

19. Gatewood MO, Wemple M, Greco S, Kritek PA, Durvasula R. A quality improvement project to improve early sepsis care in the emergency department. *BMJ Qual Saf*. 2015 Dec;24(12):787-795.
PubMed: PM26251506

Guidelines and Recommendations

20. Lamontagne F, Rochwerg B, Lytvyn L, et al. Corticosteroid therapy for sepsis: a clinical practice guideline. *BMJ*. 2018 Aug 10;362:k3284.
PubMed: PM30097460

21. Levy MM, Evans LE, Rhodes A. The Surviving Sepsis Campaign bundle: 2018 update. *Crit Care Med*. 2018;46(6):997-1000. Available from: http://www.survivingsepsis.org/SiteCollectionDocuments/Surviving-Sepsis-Campaign-Hour-1-Bundle-2018.pdf. Accessed 2019 Aug 12
PubMed: PM29767636

Recommendations Not Specified in Abstract

22. Rhodes A, Evans LE, Alhazzani W, et al. Surviving sepsis campaign: international guidelines for management of sepsis and septic shock: 2016. *Crit Care Med*. 2017 Mar;45(3):486-552.
PubMed: PM28098591

All Settings

23. Tavare A, O'Flynn N. Recognition, diagnosis, and early management of sepsis: NICE guideline. *Br J Gen Pract*. 2017 04;67(657):185-186.
PubMed: PM28360070
See: "Initial assessment", "Management"

24. Howell MD, Davis AM. Management of sepsis and septic shock. *JAMA*. 2017;317(8):847-848. Available from: https://jamanetwork.com/journals/jama/fullarticle/2598892?resultClick=1 Accessed 2019 Aug 12
PubMed:PM28114603
See: Managing infection

25. Oda S, Aibiki M, Ikeda T, et al. The Japanese guidelines for the management of sepsis. *J Intensive Care*. 2014;2(1):55.
PubMed: PM25705413

Appendix — Further Information

Previous CADTH Reports

26. Recognition and diagnosis of sepsis in adults: evidence-based guidelines. Ottawa (ON): CADTH; 2018: https://cadth.ca/recognition-and-diagnosis-sepsis-adults-evidence-based-guidelines-0. Accessed 2019 Aug 12

Non-Randomized Studies

Alternative Setting

27. Haydar S, Spanier M, Weems P, Wood S, Strout T. Comparison of QSOFA score and SIRS criteria as screening mechanisms for emergency department sepsis. *Am J Emerg Med*. 2017 Nov;35(11):1730-1733.
PubMed: PM28712645

Review Articles

28. Makic MBF, Bridges E. CE: Managing sepsis and septic shock: current guidelines and definitions. *Am J Nurs*. 2018 Feb;118(2):34-39.
PubMed: PM29329118:

29. Shetty A, Macdonald SP, Keijzers G, et al. Review article: sepsis in the emergency department - Part 2: Investigations and monitoring. *Emerg Med Australas*. 2018 02;30(1):4-12.
PubMed: PM29341498