Early Identification of Sepsis in Nursing Homes: Opportunities and Hurdles

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Sepsis is a Life-Threatening Medical Emergency

- Sepsis is the body's extreme response to an infection
- Early diagnosis and treatment can reduce morbidity and mortality: **Time Matters/Act Fast**
- Without timely treatment, sepsis can rapidly lead to:
    - **Tissue Damage**
      may result in amputations (limb loss)
    - **Organ Failure**
      and
    - **DEATH**

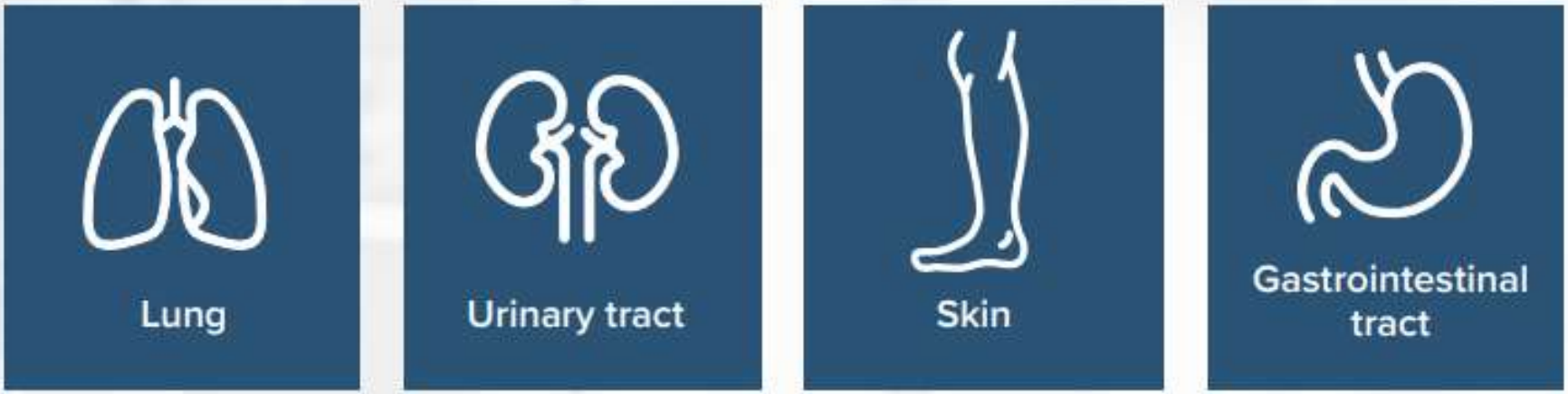
https://www.cdc.gov/sepsis/what-is-sepsis.html

Am J Physiol Regul Integr Comp Physiol 324: R613–R624, 2023.First published March 6, 2023; doi:10.1152/ajpregu.00003.2023

WHAT CAUSES SEPSIS?

Bacterial infections cause most cases of sepsis. Sepsis can also be a result of other infections, including viral infections, such as COVID-19 or influenza, or fungal infections. The most frequently identified pathogens that cause infections that can develop into sepsis include *Staphylococcus aureus* (staph), *Escherichia coli* (*E. coli*), and some types of *Streptococcus*. COVID-19 can have a similar presentation and a similar clinical course to some forms of sepsis. Many residents who require hospitalization for COVID-19 have signs or symptoms that meet the definition of sepsis.

Infections that lead to sepsis most often start in the:

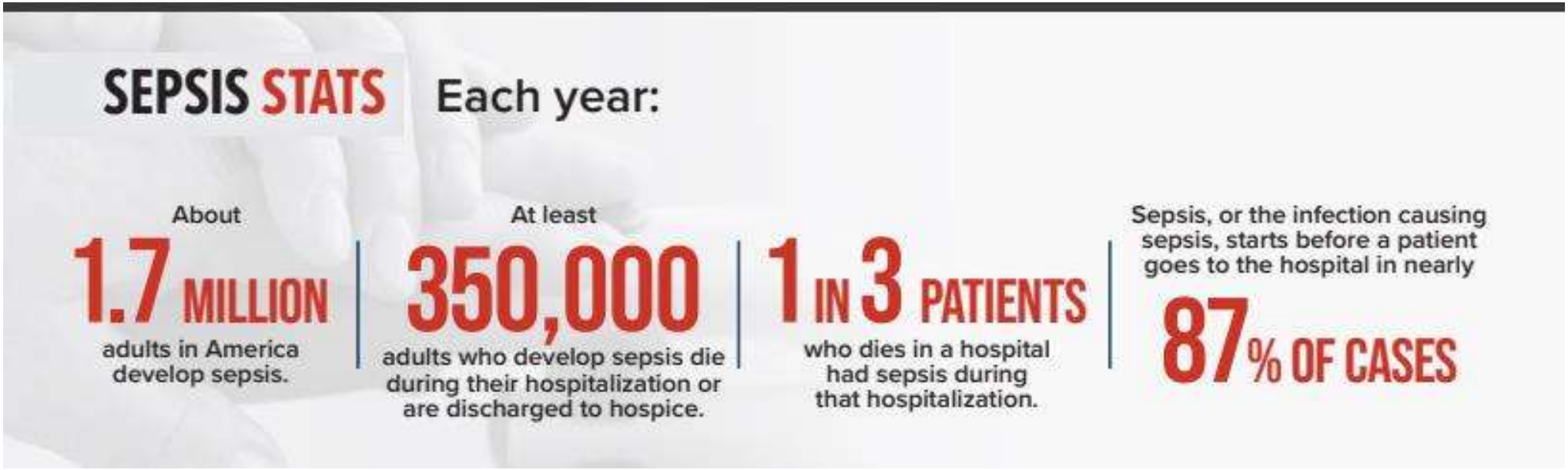


Major takeaway: Sepsis results from infections

This is why your hard work to improve infection prevention and control practices is so critically important

https://www.cdc.gov/sepsis/media/pdfs/Factsheet-Longterm-care-sepsis-nurses-508.pdf

Sepsis is Common



The CDC's *Get Ahead of Sepsis* is a national educational effort that emphasizes the importance of early recognition, timely treatment, reassessment of antibiotic needs, and prevention of infections

https://www.cdc.gov/sepsis/media/pdfs/Factsheet-Longterm-care-sepsis-nurses-508.pdf

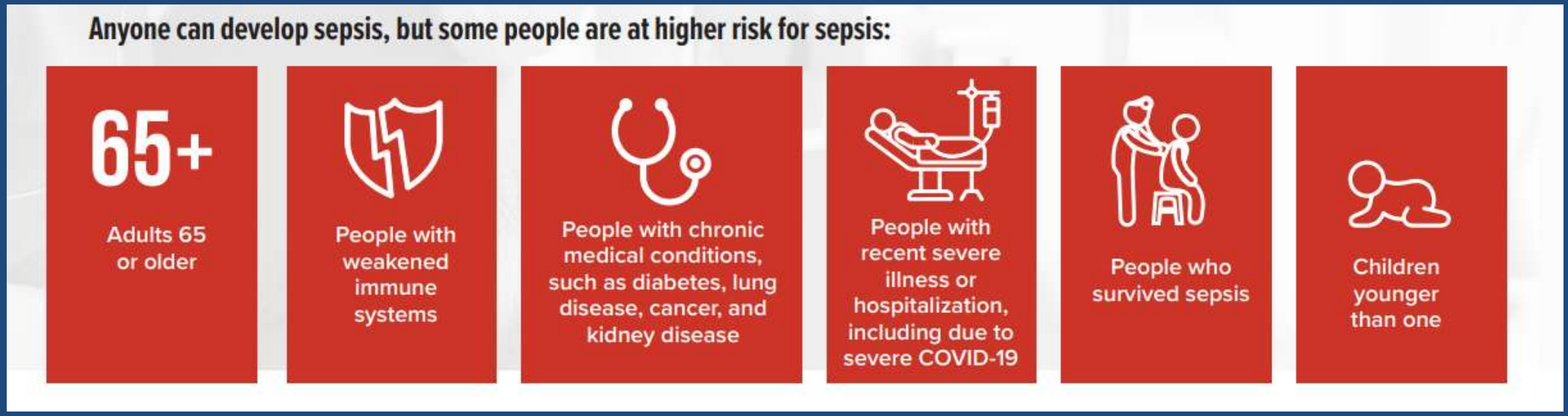
Sepsis is a Leading Cause of Hospital Readmissions

- Sepsis: The most common admitting diagnosis for patients/residents transferred to the hospital from skilled nursing facilities
- Nursing home (NH) residents with severe sepsis, compared to non-NH residents had:
  - significantly higher rates of ICU admission (40% vs. 21%)
  - longer hospital length of stay (median 7 vs. 5 days)
  - **higher in-hospital mortality (37% vs. 15%)**

Sloane PD, et al. Can Sepsis Be Detected in the Nursing Home Prior to the Need for Hospital Transfer? JAMDA 19 (2018) 492-496.

Ginde AA, et al. Impact of Older Age and Nursing Home Residence on Clinical Outcomes of U.S. Emergency Department Visits for Severe Sepsis. **J Crit Care** 2013, Oct; 28(5): 606-611

Who is at Risk?



A study by Baggs identified another risk group:

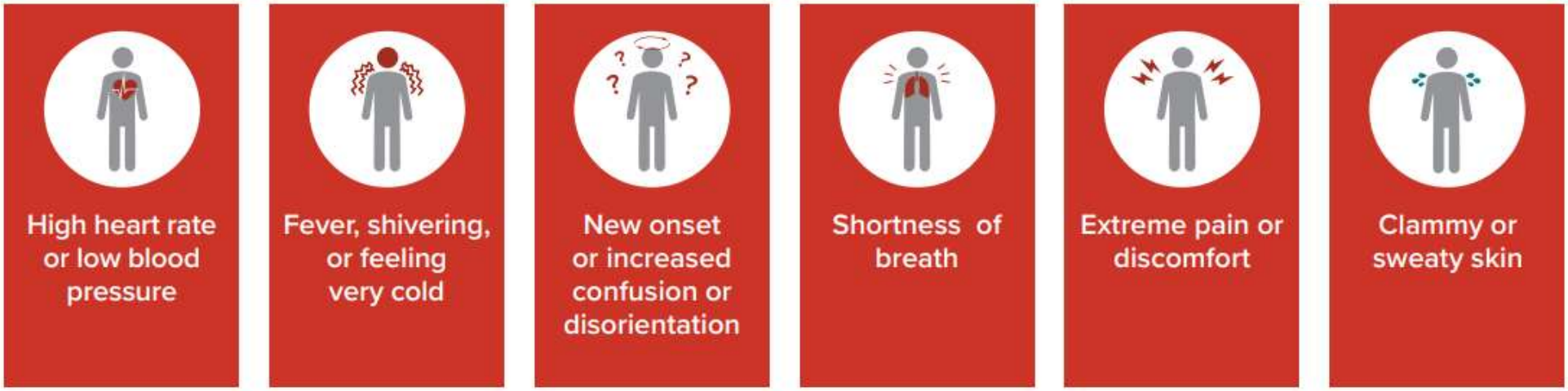
- "Our study identified an increased risk of sepsis within 90 days of discharge among patients with exposure to high-risk antibiotics or increased quantities of antibiotics during hospitalization."
  - People with sepsis during the index stay were excluded
- Could be secondary to microbiome disruption

https://www.cdc.gov/sepsis/media/pdfs/Factsheet-Longterm-care-sepsis-nurses-508.pdf

Baggs et al, Clin Infect Dis. 2018 Mar 19;66(7):1004-1012

Signs and Symptoms of Sepsis

Residents with sepsis may have one or more of the following signs or symptoms:



Encourage staff, residents, and families to ask, **“Could this be sepsis?”**

https://www.cdc.gov/sepsis/media/pdfs/Factsheet-Longterm-care-sepsis-nurses-508 pdf
https://www.safetyandquality.gov.au/sites/default/files/2024-08/patients_and_families_may_ask_could_it_be_sepsis_generic.pdf

Improving Sepsis Care is Part of Antibiotic Stewardship

- Antibiotic Stewardship is about treating:
  - With the right antibiotic and right dose,
  - For the right duration
  - At the right time
  - For the right reason
- Therefore, the appropriate treatment of suspected infection or sepsis is part of antibiotic stewardship

https://www.cdc.gov/antibiotic-use/hcp/core-elements/nursing-homes-antibiotic-stewardship.html

 https://www.ahrq.gov/antibiotic-use/long-term-care/four-moments/index.html

Don’t Forget to Take a Time-Out

https://www.telligenqiconnect.com/resource/antibiotic-time-out-checklist/

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Antibiotic Time-Out Instructions

ACTION TOOL

- ☐ **IDENTIFY RESIDENTS.** Antibiotic stewardship champion will identify residents who have taken a new antibiotic for 48-72 hours.
- ☐ **GATHER INFORMATION.** Antibiotic stewardship champion (or designee) will complete an **Antibiotic Time-Out SBAR.**
- ☐ **CONDUCT THE ANTIBIOTIC TIME-OUT.** Complete the Antibiotic Time-Out Checklist (*see reverse*) with the prescribing clinician and ensure appropriate documentation.

SAMPLE ANTIBIOTIC TIME-OUT SBAR

Situation

“Resident on antibiotic therapy for 48-72 hours; new clinical assessment, laboratory test results (including culture and sensitivity testing, if available), and/or other diagnostic test results available for review”

Background

Include details about:

- The initial order and reason for antibiotic
- The drug, dose, duration and route
- Any known drug allergies
- Vital signs
- Clinical assessment
- Culture and sensitivity laboratory results
- Other diagnostic test results

Assessment

Include details about:

- Whether the resident is tolerating the antibiotic
- How the resident’s signs and symptoms have changed since starting the antibiotic

Recommendation

Complete the Antibiotic Time-Out Checklist (*see reverse*) with prescribing clinician to determine whether antibiotic should be continued, modified or stopped.

Antibiotic Time-Out

Purpose

Ensure antibiotics are prescribed for the right reason and with the right drug, dose, duration, route and documentation.

Rationale

Establish parameters for performance of an Antibiotic Time-Out and thereby optimize antibiotic selection and use based on clinical response and laboratory findings within 48-72 hours of antibiotic initiation.

References: 1) CDC Core Elements for Antibiotic Stewardship https://www.cdc.gov/longtermcare/pdfs/core-elements-antibiotic-stewardship-appendix-a.pdf 2) Barlam, Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America.

c|h|a Colorado Hospital Association · COLORADO Department of Public Health & Environment · CHCA

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Antibiotic Time-Out Checklist

ACTION TOOL

Use this checklist to take a Time-Out to reassess every antibiotic within 48-72 hours after antibiotic start. Refer to practice guidelines and/or facility-specific treatment recommendations, when appropriate.

Resident name or ID _____ Date of review _____

Prescriber (MD, DO, NP, PA) participating in Time-Out _____

Checklist completed by _____

Antibiotic name _____ Start date _____ Stop date _____

Antibiotic indication, dose, route _____

Yes	No	Antibiotic Time-Out	Comments
		Based on review of the clinical assessment, laboratory test results (including culture and sensitivity testing, if available), and/or other diagnostic test results, does this resident have a bacterial infection that will respond to antibiotics?	
		If so, is the resident on the most appropriate antibiotic(s)? Can the spectrum of the antibiotic be narrowed (de-escalation)?	
		Is the antibiotic being given in the correct dose?	
		Is the antibiotic being given by the most appropriate route (example: IV vs PO)?	
		How long will the antibiotic be needed? Can the duration of therapy be shortened?	
		Is the necessary documentation present to support the clinical team’s assessment and decisions?	

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12SOW-QIN-QIN-03/01/21-4006

Early Identification of Sepsis: Opportunities

- Surviving Sepsis Campaign (SSC) guidelines recommend that all hospitals and health systems have sepsis performance improvement programs
  - includes sepsis screening for acutely ill, high-risk patients and standard operating procedures for treatment
- If your facility does not have one, consider designing and implementing a **Sepsis Performance Improvement Project (PIP)** using the QAPI framework
  - Goal: Standardize and improve early recognition of sepsis, communication, and initial management
- **Key Components:**
  - Planning and implementing process changes for standardized communication, care pathways and workflows, including use of sepsis screening tools
    - Use of machine learning algorithms for sepsis prediction?

Evans, L. et al. Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock 2021. Critical Care Medicine 49(11):p e1063-e1143, November 2021. | DOI: 10.1097/CCM.0000000000005337

Schinkel M, et al. Sepsis Performance Improvement Programs: From Evidence Toward Clinical Implementation. Crit Care. 2022 Mar 22;26(1):77. doi: 10.1186/s13054-022-03917-1. PMID: 35337358; PMCID: PMC8951662.

Early Identification of Sepsis: Opportunities

- **Key Components (continued):**
  - Measuring, monitoring, and documenting changes, using a structured performance improvement approach and iterative Plan-Do-Study-Act cycles
  - Retrospective review of residents admitted to the hospital with sepsis to identify opportunities for improvement and earlier identification
  - Training on INTERACT® or other preferred tools (e.g., **Stop and Watch, Change in Condition, SBAR**, Care Paths, Guidance on Possible Sepsis, Quality Improvement Tool for Review of Acute Care Transfers, others)
  - Education on these new processes and care pathways, and on sepsis syndrome, early signs and symptoms, the importance of vital signs, and use of sepsis screening tool(s)
    - Role for simulation training?

https://www.cms.gov/medicare/provider-enrollment-and-certification/qapi/downloads/processtoolframework.pdf

Early Identification of Sepsis: Hurdles

Signs of Sepsis in Older Adults May be Difficult to Detect

Mental status changes

- Many factors can affect: dementia diagnosis, medication side effects, other causes

Respiratory rate changes

- Respiratory symptoms may be due to common conditions such as COPD, asthma

Hypotension (low blood pressure)

- May be due to cardiovascular medications, poor oral intake, other causes

Tachycardia (increased heart rate)

- Older adults may not exhibit due to cardiac conduction disease, beta-blockers, other causes

Fever may be absent

Reyes BJ, et al. JAMDA 19 (2018) 465-471

Early Identification of Sepsis: Hurdles

- Recommendations in the SSC guidelines for management of sepsis and septic shock are intended "…for the clinician caring for adult patients with sepsis or septic shock **in the hospital setting."**
  - Specific recommendations for long-term care settings are lacking
- In the nursing home setting, early identification of sepsis and early interventions for sepsis have not been well studied
- No sepsis screening tool specifically validated for nursing home setting and all sepsis screening tools have limitations to consider
- Rapid diagnostic testing and result availability varies considerably among nursing homes
- Clinician may not be immediately available on-site

Evans, L. et al. Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock 2021. Critical Care Medicine 49(11):p e1063-e1143, November 2021. | DOI: 10.1097/CCM.0000000000005337

INTERACT Guidance on Management of Possible Sepsis http://www.pathway-interact.com/

JAMDA

journal homepage: www.jamda.com

Original Study

Can Sepsis Be Detected in the Nursing Home Prior to the Need for Hospital Transfer?

Philip D. Sloane MD, MPH [a,b,c,*], Kimberly Ward BA [a], David J. Weber MD, MPH [c,d], Christine E. Kistler MD, MASc [a,b], Benjamin Brown BS [c], Katherine Davis BS [c], Sheryl Zimmerman PhD [a,e]

Evaluated 5 screening tools for their ability to detect residents with early sepsis during the 0-12 and 13-72 hours prior to hospitalization.

Systemic Inflammatory Response Syndrome (SIRS) Criteria

Sequential Organ Failure Assessment (SOFA) and the quick, qSOFA, criterion

100-100-100 Early Detection Tool

Presence or absence of fever, with thresholds of 99.0 F and 100.2 F

Sloane PD, MPH et al. Journal of the American Medical Directors Association, 2018-06-01, Volume 19, Issue 6, Pages 492-496.e1

Among the Findings:

Documentation of 1 or more vital signs was absent in up to 34% of cases.

During the 12 hours prior to transfer, only 19% of the sepsis admissions had a medical note.

The authors observed that screening criteria for sepsis commonly used in hospital settings appear to perform poorly in the identification of evolving sepsis in this sample.

No tool adequately screens for early sepsis in the NH population but several show promise.

The 100-100-100 Early Detection Tool and a temp ≥ 99.0 F performed better than the other criteria & screening tools studied; further research is needed to confirm these results.

Examples of Sepsis Screening Tools: SIRS

Nursing home setting requires tools with high sensitivity (minimize false negatives). Why? **We don't want to miss sepsis.**

In the setting of suspected infection, **Systemic Inflammatory Response Syndrome** (SIRS) criteria are met if ≥ 2 are present:

- **Heart Rate >90 beats/min**
- **Respiratory Rate >20 breaths/min**
- **Temperature >38 or <36 degrees Celsius**
- **White Blood Cells >12,000 or <4,000 cells/microliter or ≥10% bands**

SIRS performance (Sloan)	≤12 Hours Prior to Hospitalization
Sensitivity for sepsis	**36%**
Specificity for sepsis	86%

Bone RC, et al. *Crit Care Med*.1992;20(6):864-87

Sloane PD, MPH et al. Journal of the American Medical Directors Association, 2018-06-01, Volume 19, Issue 6, Pages 492-496.e1

Examples of Sepsis Screening Tools: qSOFA

Quick Sequential Organ Failure Assessment score (qSOFA) criteria are met if the patient has ≥2 of the following:

- **Respiratory Rate >22 breaths/min**
- **Altered Mental Status (Glasgow Coma Scale <15)**
- **Systolic Blood Pressure ≤ 100 mm**

Note: The 2021 SSC guidelines recommend **against** using qSOFA as a single screening tool for sepsis or septic shock due to poor sensitivity

qSOFA with sensitivity for sepsis of 27% in Sloan article

Singer M, et al. JAMA. 2016 Feb 23; 315(8): 801–810

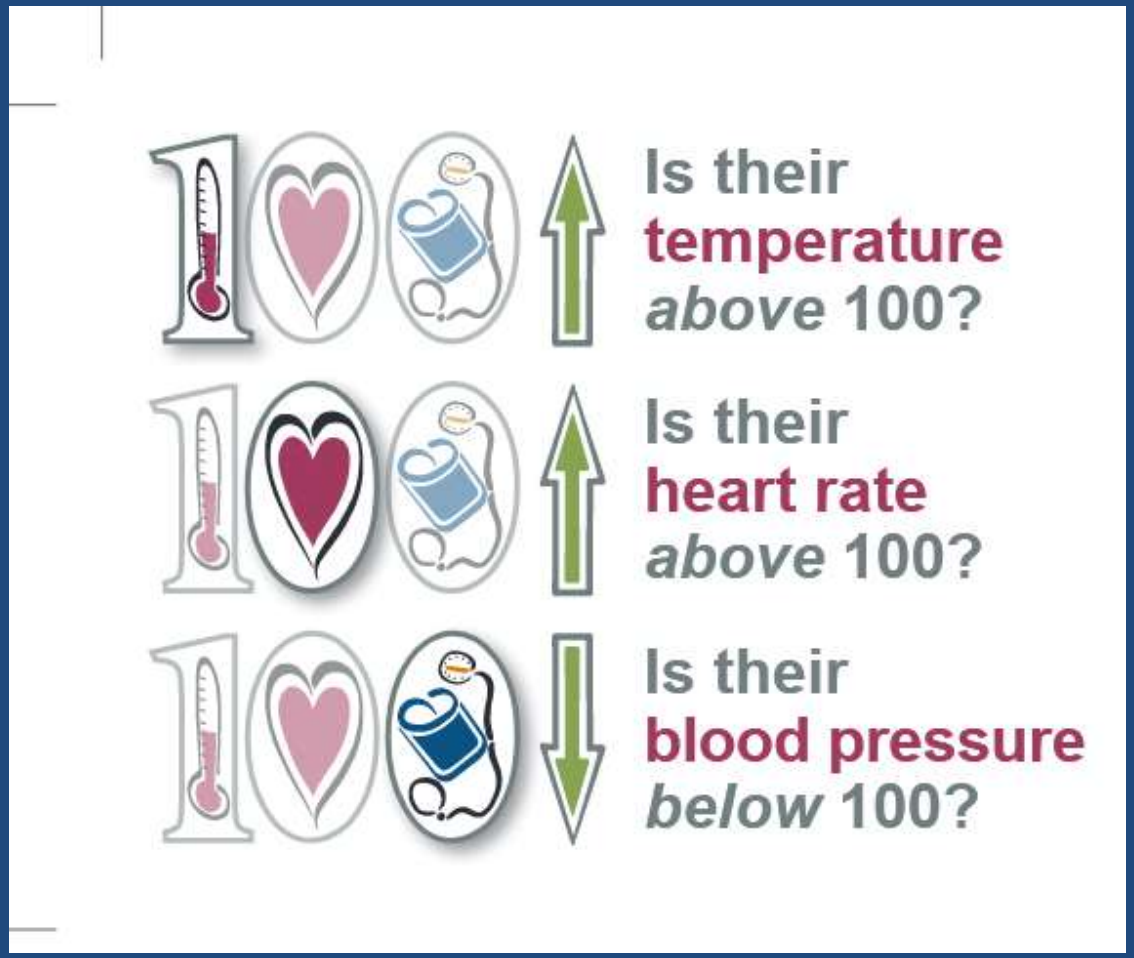
Evans, L. et al. Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock 2021. Critical Care Medicine 49(11):p e1063-e1143, November 2021. | DOI: 10.1097/CCM.0000000000005337

Examples of Sepsis Screening Tools: The 100-100-100 Early Detection Tool

Minnesota Hospital Association Seeing Sepsis Long Term Care Resources

Criteria are met if 2 or more of the following are present:

- Temperature above 100 degrees Fahrenheit
- Heart rate above 100 beats per minute
- Systolic blood pressure below 100 mm Hg



100-100-100 (Sloan article)	≤12 Hours Prior to Hospitalization
Sensitivity for sepsis	**79%**
Specificity for sepsis	69%

Sloane PD, MPH et al. Journal of the American Medical Directors Association, 2018-06-01, Volume 19, Issue 6, Pages 492-496.e1
100-100-100 Tool reproduced with permission
https://www.mnhospitals.org/Portals/0/Documents/ptsafety/SeeingSepsisLTC/5.%20Seeing%20Sepsis%20-%20ACT%20FAST%20-%20for%20LTC.pdf

Until Further Research is Available, Consider Combining Sepsis Screening Tools

CHANGE IN CONDITION IDENTIFIED

- using the INTERACT® Stop and Watch early warning tool and Change in Condition Decision Support tools or other change in condition alert

COMBINED WITH

- the 100-100-100 Early Detection Tool

AND

- Elements from SIRS and qSOFA criteria

So, what might this look like?

Reyes BJ, et al. JAMDA 19 (2018) 465-471
De Silva M, et al. Scand J Trauma Resusc Emerg Med. 2023 Nov 9;31(1):74. doi: 10.1186/s13049-023-01111-y.
https://pathway-interact.com/interact-tools/interact-tools-library/

Minnesota Hospital Association

If resident has suspected infection AND two or more:

- Temperature >100°F or <96.8°F
- Pulse >100
- SBP <100 mmHg or >40 mmHg from baseline
- Respiratory rate >20 / SpO2 <90%
- Altered mental status

Plan for:

- Review advance directives
- Contact clinician/physician
- Contact the family

If transferring resident to hospital:

- Prepare transfer sheet
- Call ambulance
- Call in report to hospital
- Report positive sepsis screen

NOT tested or validated in the long-term care setting

https://www.mnhospitals.org/Portals/0/Documents/ptsafety/SeeingSepsisLTC/5.%20Seeing%20Sepsis%20-%20ACT%20FAST%20-%20for%20LTC.pdf

ACT FAST!

Early detection of SEPSIS requires fast action

If resident has suspected infection AND two or more:

- Temperature >100°F or <96.8°F
- Pulse >100
- SBP <100 mmHg or >40 mmHg from baseline
- Respiratory rate >20/SpO2 <90%
- Altered mental status

Plan for:

- Review advance directive
- Contact the physician
- Contact the family

If transferring resident to hospital:

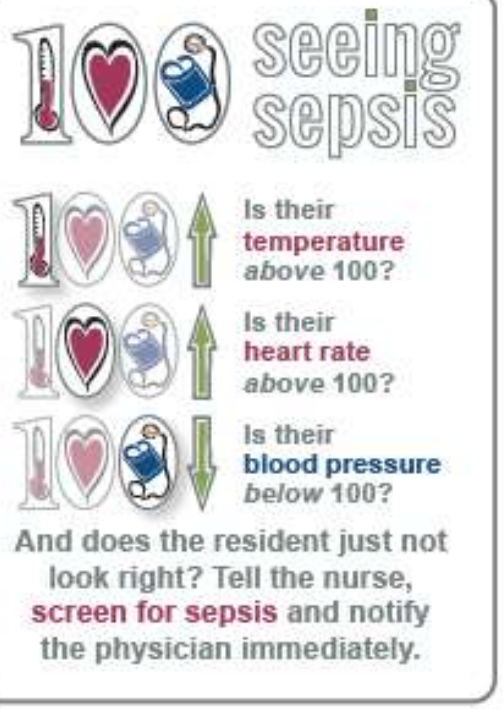
- Prepare transfer sheet
- Call ambulance
- Call in report to hospital
- Report positive sepsis screen

If resident stays in facility, consider options below that are in agreement with resident's advance directives:

- Labs: CBC w/diff, lactate level (if able)
- UA/UC, blood cultures, as able from 2 sites, not from lines
- Establish IV access for IV 0.9% @ 30ml/kg
- Administer IV, PO or IM antibiotics
- Monitor for worsening in spite of treatment, such as:
  - Urine output <400ml in 24 hours
  - SBP <90 despite IV fluids
  - Altered mental status
- Comfort care:
  - Pain control
  - Analgesic for fever
  - Reposition every 2-3 hrs
  - Oral care every 2 hrs
  - Offer fluids every 2 hrs
  - Keep family informed
  - Adjust care plan as needed
- Consider transferring to another level of care such as palliative care, hospice or hospital

Every hour a resident in septic shock doesn't receive antibiotics, the risk of death increases 7.6%

Call the doctor!



From INTERACT Guidance on Management of Possible Sepsis

"The INTERACT® team **recommends that all patients/residents with a suspected or confirmed infection and possible sepsis <u>be considered for transfer</u> to an acute care hospital,** unless

a. the patient/resident has a "do not hospitalize" order, is on or placed on a comfort or palliative care plan, or is on hospice; or

b. the patient/resident or decision maker wants the condition treated, but not in the acute hospital, and understands the risks of not being treated in the hospital; and the facility has the capability of managing sepsis according to recommended interventions."

Pathway Health INTERACT Version 4.5 tool
https://pathway-interact.com/

Take Aways

- Sepsis is the body's extreme response to an infection
  - **Therefore, improving infection prevention and control practices is critically important for preventing sepsis**
- A well designed and implemented Sepsis Performance Improvement Project (PIP) using INTERACT tools and/or other resources can help nursing home teams standardize and improve early recognition of sepsis, communication, and initial management
  - Emphasized education, use of the STOP and Watch Early Warning tool, Acute Change in Condition tools, SBAR communication, obtaining vital signs, and identifying changes in vital signs
- In the absence of a "best" early sepsis screening tool in the nursing home population, and until further research is available, consider combining sepsis screening tools

References and Resources

- **INTERACT Guidance on Management of Possible Sepsis** http://www.pathway-interact.com/
- **The Centers for Disease Control** http://www.cdc.gov/sepsis/index.html
- **Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock 2021**, *Critical Care Medicine* 49(11):p e1063-e1143, November 2021. | *DOI:* 10.1097/CCM.0000000000005337
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- **Heather Young, CDC** https://blogs.cdc.gov/safehealthcare/protecting-ltc-residents-from-sepsis/
- Schinkel M, Nanayakkara PWB, Wiersinga WJ. Sepsis Performance Improvement Programs: From Evidence Toward Clinical Implementation. Crit Care. 2022 Mar 22;26(1):77. doi: 10.1186/s13054-022-03917-1. PMID: 35337358; PMCID: PMC8951662.
- **Sloane PD,** et al. Journal of the American Medical Directors Association, 2018-06-01, Volume 19, Issue 6, Pages 492-496.e1
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- **Mylotte JM**. What is the Role of Nursing Homes in the Surviving Sepsis Campaign? J Am Med Dir Assoc. 2020 Jan;21(1):41-45. doi: 10.1016/j.jamda.2019.07.022. Epub 2019 Sep 16. PMID: 31537482.

Questions?

Thank You!

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https://www.telligenqiconnect.com/