



## To Query or Not to Query: A Decision-Tree Approach to Sepsis

**Jillian Mazurek, MSN/Ed, RN, CCDS, CCS**  
*CDI Coordinator*  
Prisma Health  
Greenville, South Carolina

**Heather J. Luton, BSN, RN, CCDS**  
*CDI Supervisor*  
Prisma Health  
Columbia, South Carolina

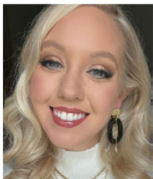


### Presented By



**Jillian Mazurek, MSN/Ed, RN, CCDS, CCS**, is a CDI coordinator at Prisma Health in Greenville, South Carolina. She has more than 17 years of nursing experience in acute care with a background in cardiology and heart and lung transplant care. She has been working in CDI since 2017. In her current role, she serves as orientation lead, query compliance reviewer/query committee head, staff educator, and second-level reviewer. She has written a departmental policy for a systematic approach to query reviews and developed a central communication tool and repository for reference materials in a rapidly expanding remote CDI department. Mazurek is the current social media director for the South Carolina ACDIS local chapter.

## Presented By



**Heather J. Luton, BSN, RN, CCDS**, is CDI supervisor at Prisma Health in Columbia, South Carolina. She has a background in emergency medicine and critical care and started her career in CDI in 2018. As a supervisor, she focuses on education within the CDI department. She gives numerous presentations to the CDI team, coding team, and different physician service lines. She leads and assists with systemwide CDI projects including clinical validation, risk adjustment variables, reconciliation/validation, Patient Safety Indicators, mortalities, and quality monitoring. She is a member of ACDIS, the South Carolina ACDIS local chapter, and the Healthcare Financial Management Association.

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## Learning Outcomes

- At the completion of this educational activity, the learner will be able to:
  - State the difference between Sepsis-2 and Sepsis-3 criteria
  - Define how Prisma Health's CDI department navigated sepsis without a system-wide definition
  - Describe the importance of having an internal policy regarding when to query and when not to query about sepsis
  - Identify query opportunities utilizing the decision tree model

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## Some Background of Our Organization

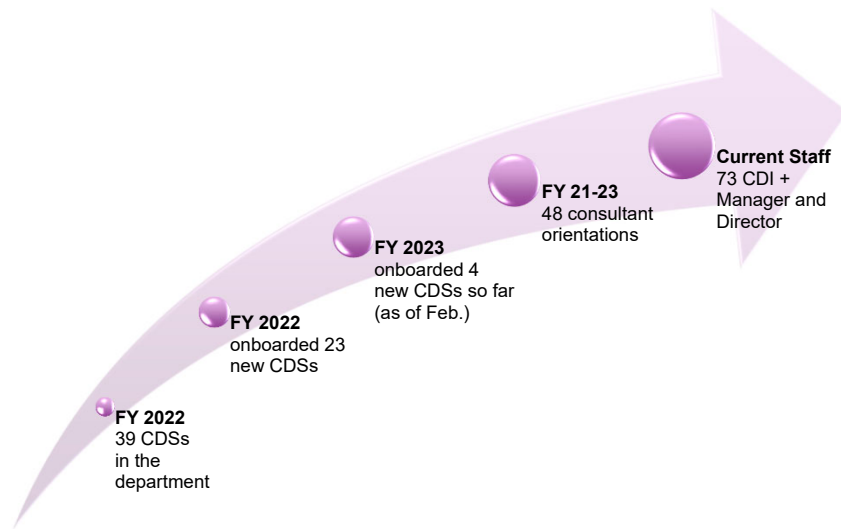
Prisma Health  
South Carolina

## Prisma Health Organizational Background

- Prisma Health serves almost **1.5** million unique patients annually in its 21-county market area that covers 50% of South Carolina
- **18** acute and specialty hospitals
- **2,947** licensed beds
- **112,201** hospital discharges (**15,570** pediatric) in 2021
  - **114,637** (2022 projected)
- **147** affiliated medical, nursing, pharmacy and allied health schools
- **63** residency/fellowship programs with 645 residents/fellows
- **7,677** healthcare students educated and trained

Source: <https://prismahealth.org/about-prisma-health>

## A Rapidly Expanding CDI Department



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## Sepsis

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## Prevalence of Sepsis

- Anyone can get an infection, and almost any infection, including COVID-19, can lead to sepsis. In a typical year:
  - At least **1.7 million** adults in America develop sepsis
  - Nearly **270,000** Americans die as a result of sepsis
  - **1 in 3** patients who dies in a hospital has sepsis
  - Sepsis, or the infection causing sepsis, starts outside of the hospital in nearly **87%** of cases

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

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## Sepsis at Home: South Carolina

- **#6** in Sepsis mortality
- Leading cause of inpatient mortality
- **2<sup>nd</sup>** highest readmission diagnosis
- Sepsis history increases patient risk
  - **26%** of sepsis patients readmitted within 30-days
  - **48%** of sepsis patients readmitted within 180-days

Source: [https://www.cdc.gov/nchs/pressroom/sosmap/septicemia\\_mortality/septicemia.html](https://www.cdc.gov/nchs/pressroom/sosmap/septicemia_mortality/septicemia.html)  
<https://doi.org/10.1097/CCM.0000000000000859>

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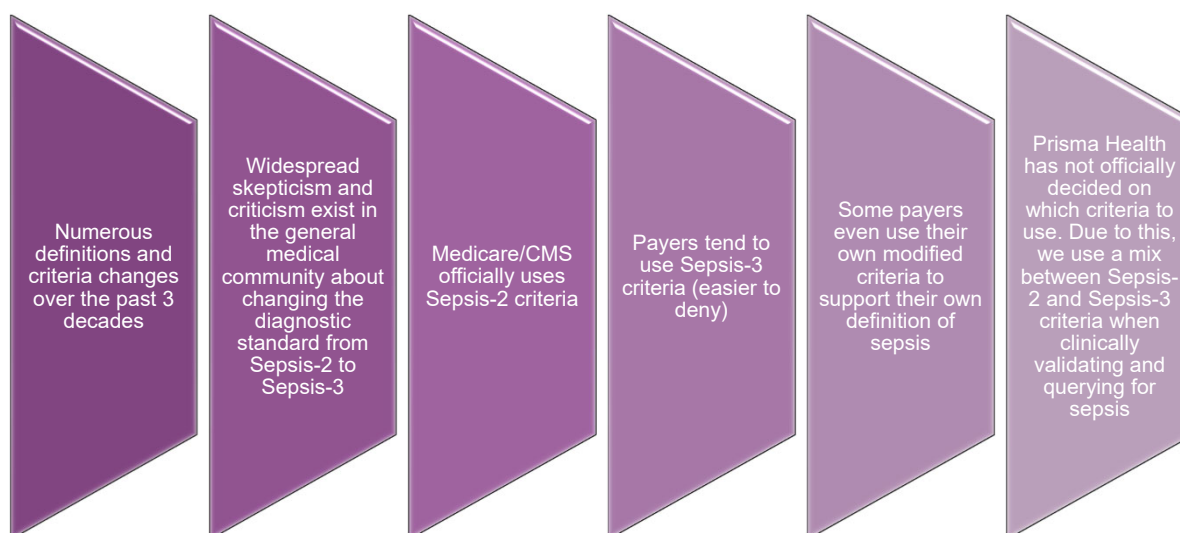
## Sepsis at Prisma Health

- Prisma Health has treated **2,885** separate cases of sepsis since October 1, 2021
- Prisma Health facilities treat over **12 new** cases of sepsis each day
- Prisma Health facilities care for an average of **153** sepsis patients each day
- Over **6%** of all Prisma Health licensed acute care beds have a sepsis patient in them each day

Data Source: Vizient

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## Sepsis: A Challenging Topic



Source: 2022 CDI Pocket Guide

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## The Changing Definitions of Sepsis – History

### Sepsis-1: early 90's

In the early 90s, American College of Chest Physicians (ACCP) and the Society of Critical Care Medicine (SCCM) defined 3 separate definitions for sepsis: Sepsis, Severe Sepsis, and Septic Shock.

### Sepsis-2: early 00's

Second International Sepsis Definitions Conference was convened in the early 00's to better evaluate and define sepsis.

In order to qualify for sepsis, patient must now have a source of infection (either suspected or confirmed) and meet at least 2 SIRS that cannot be explained by another etiology.

### Sepsis-3: 2016

The most recent sepsis definition – was published in the Journal of the American Medical Association (JAMA) in Feb 2016. The Surviving Sepsis Campaign (SSC) officially adopted the Sepsis-3 definition in 2017.

Essentially eliminates “Sepsis” definition, as patients must have an organ dysfunction present to qualify for sepsis.

Source: 2022 CDI Pocket Guide

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5512390/>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6429642/>

<https://www.esicm.org/wp-content/uploads/2018/03/file4.pdf>

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## Sepsis-2 Definitions

**Sepsis:** At least 2 strong SIRS due to an infection (suspected or confirmed). Excludes SIRS due to other causes

**Severe Sepsis (can be with or without septic shock):**

- **Severe Sepsis without septic shock:** Sepsis with associated acute organ dysfunction
  - **Severe Sepsis with septic shock:** Refractory hypotension\* (SBP <90, or MAP <70, or reduction in SBP of >40) and often requiring vasopressor therapy like dopamine **OR** lactate >4.0
- \* *Refractory means persistent hypotension despite effective fluid resuscitation over 1 hour with at least 30 cc/kg of crystalloid (usually normal saline)*

**SIRS/Systemic inflammatory response syndrome:** The body's systemic response to infection or non-infectious cause. Examples include trauma, burns, pancreatitis, major surgery, or other insult/injury

**Non-infectious SIRS:** SIRS due to cause other than infection

Source: 2022 CDI Pocket Guide

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## Sepsis-2 SIRS Criteria



- Criteria defining SIRS expanded greatly and organ dysfunction variables indicative of severe sepsis were defined



- Hypotension criteria for septic shock were specified under hemodynamic variables



- Patient should appear "sick enough" to warrant the diagnosis

### General variables

- Temp > 38.3C ( $\geq 101^{\circ}\text{F}$ ) or < 36C (< 96.8F)
- Heart rate > 90/min
- Tachypnea (RR > 20)
- Altered mental status
- Significant edema or positive fluid balance
- Hyperglycemia > 140 in the absence of diabetes

### Inflammatory variables

- Leukocytosis: WBC > 12K or < 4K or Bands > 10%
- C-reactive protein elevated
- Procalcitonin elevated

### Hemodynamic variables

- SBP < 90 or MAP < 70 or SBP decrease > 40

### Organ dysfunction variables

- P/F ratio < 300
- Creatinine increase > 0.5
- Acute oliguria
- Ileus (absent bowel sounds)
- INR > 1.5, or PTT > 60 secs, or thrombocytopenia < 100K
- Hyperbilirubinemia > 4

### Tissue perfusion variables

- Lactate > 1\*
- Decreased capillary refill or mottling

Source: 2022 CDI Pocket Guide

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## Sepsis-3 Definitions

**Sepsis and severe sepsis are now synonymous terms.**

**Sepsis** now defined as a “life-threatening organ dysfunction” (confirmed or suspected) due to a dysregulated host response to infection

**Septic shock** is a subset of sepsis and is defined as persisting hypotension requiring the administration of vasopressors to maintain a mean arterial pressure of 65 mmHg AND a serum lactate > 2 mmol/L in the setting of adequate hydration

Source: 2022 CDI Pocket Guide

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## Sepsis-3 SOFA Criteria

- **Organ dysfunction is determined by a 2-point increase from baseline SOFA score** (see table)
  - SOFA grades organ dysfunction on a scale of 0 to 4 depending on severity (0 = no dysfunction)
  - The baseline SOFA score for any organ system is assumed to be 0 if the baseline is unknown and the patient has no preexisting dysfunction in that organ system

Organ dysfunction is determined by a two-point increase from baseline of the Sequential (sepsis-related) Organ Failure Assessment (SOFA) score using six defined organ systems:

Respiratory (P/F Ratio <400)  
 Coagulation (Platelets <150k)  
 Hepatic (Bilirubin >1.2)  
 Cardiovascular (MAP <70)  
 Neurologic (GCS <15)  
 Renal (Creatinine >1.2)

Source: 2022 CDI Pocket Guide

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## SOFA Table

SOFA score	1	2	3	4
Respiration PaO <sub>2</sub> /FiO <sub>2</sub> (mm Hg)	<400	<300	<200 (with respiratory support)	<100 (with respiratory support)
Coagulation 10 <sup>-3</sup> /platelets/mm	<150	<100	<50	<50
Liver Bilirubin mg/dL (μM)	1.2–1.9 (20–32)	2–5.9 (33–101)	6–11.9 (102–204)	>12 (>204)
Cardiovascular Hypotension	MAP < 70 mm Hg	Dopamine ≤ 5 <sup>b</sup> or dobutamine (any dose)	Dopamine > 5 or epinephrine ≤ 0.1 or norepinephrine ≤ 0.1	Dopamine > 15 or epinephrine > 0.1 or norepinephrine > 0.1
CNS Glasgow Coma Score	13–14	10–12	6–9	<6
Renal Creatinine, mg/dL (μM) or urine output	1.2–1.9 (110–170)	2–3.4 (171–299)	3.5–4.9 (300–440) Or <500 mL/d	>5 (>440) or <200 mL/d

Abbreviations: CNS, central nervous system; SOFA, Sequential (Sepsis-Related) Organ Failure Assessment.

<sup>a</sup>Based on Vincent et al<sup>53</sup> and shows the potential values that contribute to the SOFA score.

<sup>b</sup>Catecholamine and adrenergic agents administered for at least 1 hour; doses in μg/kg/min.

Source: 2022 CDI Pocket Guide

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## The Struggles With SOFA

Intended to be a mortality prognosticator and not a definition of sepsis

There may be organ dysfunction not found in SOFA—Past literature has explicitly mentioned examples such as: ileus, type II MI, critical illness neuropathy/myopathy, liver dysfunction like transaminitis (without hyperbilirubinemia), etc

“Neither qSOFA nor SOFA is intended to be a stand-alone definition of sepsis. Failure to meet 2 or more qSOFA or SOFA criteria should not lead to a deferral of investigation or treatment of infection or delay in care”

Based on change from baseline—must take into account chronic findings such as CKD

[https://www.uptodate.com/contents/sepsis-syndromes-in-adults-epidemiology-definitions-clinical-presentation-diagnosis-and-prognosis?search=sepsis&source=search\\_result&selectedTitle=1~150&usage\\_type=default&display\\_rank=1#H4127684](https://www.uptodate.com/contents/sepsis-syndromes-in-adults-epidemiology-definitions-clinical-presentation-diagnosis-and-prognosis?search=sepsis&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1#H4127684)  
[https://www.uptodate.com/contents/predictive-scoring-systems-in-the-intensive-care-unit?search=sofa%20score&source=search\\_result&selectedTitle=1~25&usage\\_type=default&display\\_rank=1](https://www.uptodate.com/contents/predictive-scoring-systems-in-the-intensive-care-unit?search=sofa%20score&source=search_result&selectedTitle=1~25&usage_type=default&display_rank=1)  
<https://jamanetwork.com/journals/jama/fullarticle/2492881>

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## Challenges We Faced

### No standardized definition

- Sepsis-2 vs Sepsis-3—Physicians have been unable to come to a consensus on a standard definition for our organization

### No comprehensive organ dysfunction list

- Vendors/sources have different lists (i.e., acidosis)
- Sepsis pathway for severe sepsis in 3M is an "open dictionary" – can code out many inappropriate diagnoses as organ dysfunctions

### Coding & Documentation

- ICD-10 codes are reflective of Sepsis-2. SOFA is rarely documented by providers and poorly understood by CDI

### Analytics

- Sepsis is the #1 DRG downgrade at Prisma Health – Payers base denials on Sepsis-3 and SOFA criteria

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## How We Managed These Challenges

### Created Reference Materials

- PowerPoints
- Sepsis query templates
- Sepsis decision tree
- Organ dysfunction list

### Standardized Templates

- CDI review template
- Sepsis clinical validity section
- Severe sepsis section
- Query templates
- Reference material for providers and CDI

### Month-Long Sepsis Focused Education

- Questions of the day (3x a week) with prizes
- Weekly lunch & learn sessions
- Random audits

### Deep-Dive Mortality Reviews

- All mortality cases with sepsis DRGs reviewed
- Review Vizient risk adjustment mortality calculator (even when SOI/ROM is 4/4)

### Collaboration with Other Departments

- Physician advisors
- Quality
- Sepsis navigator workflow (Epic)

### Outside Vendors

- Vendors focused on missed severe sepsis and clinical validity opportunities
- Missed opportunities provided back to CDI team members
- Query audits

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## Review Template Example

### Initial Review Template:

#### **\*\*Summary\*\***

#### **Working PDx:**

#### **DRG/GLOS:**

#### **Clinical Validity:**

- Acute Respiratory Failure –
- AKI –
- Encephalopathy –
- Malnutrition –
- Sepsis –
- Severe Sepsis –

#### **CDI Concepts:**

- PNA (specificity/type) –
- Obesity –
- Pressure Ulcer / Wound –

#### **\*\*Opportunities/Follow-up Needs/Important Notes\*\***

- 1.
- 2.
- 3.

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## Clinical Validity

Sepsis & Severe Sepsis are 2 of 6 diagnoses that Prisma Health CDI **must** clinically validate with each review. This includes every type of review—initial reviews, re-reviews, and retrospective reviews. Our CDI uses the sepsis decision tree to help determine validity and need for a query

At Prisma Health, the CDI/Coding Department are currently using:

**Sepsis-2** criteria to clinically validate **sepsis that is already documented on the record** WITH a strong focus to link organ dysfunction to sepsis

**Sepsis-3** criteria **when introducing sepsis into record** via query WITH a strong focus to link organ dysfunction to sepsis

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## Clinical Validity

### If sepsis documented and not valid...

- CDI are expected to send a clinical validity query (exceptions include: sepsis only documented in ED summary, sepsis as an uncertain diagnosis that was not carried through discharge, sepsis in active problem list only)

### If sepsis documented and valid...

- CDI are expected to properly validate within their review for coders to easily locate. This includes "CLINICALLY VALID" in all caps with their rationale why. CDI are then expected to review for organ dysfunction to determine need for cause/effect query
  - If organ dysfunction is documented, query the provider to link to sepsis
  - If organ dysfunction is not documented but there are clinical indicators to support the diagnosis, query the provider for the diagnosis and to link to sepsis

### If sepsis NOT documented but there is support for the diagnosis...

- CDI are expected to review the chart for sepsis-3 criteria before introducing diagnosis. If sepsis appears to be POA, preference is to have sepsis work-up done and documented in the ED to support core/quality measures. CDI are then expected to link organ dysfunction to sepsis (can be done within same query in which sepsis was introduced)

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## Clinical Validity Examples for Review Template

### Too Soon to Validate/Unsure of Validity:

#### Clinical Validity:

- **Acute Respiratory Failure** – N/A
- **AKI** – N/A
- **Encephalopathy** – N/A
- **Malnutrition** – N/A
- **Sepsis** – FOLLOW; workup ongoing. Sepsis documented in H&P. Watch for potential source.
  - **Severe Sepsis** – FOLLOW; currently no organ dysfunctions noted

### Not Clinically Valid:

#### Clinical Validity:

- **Acute Respiratory Failure** – N/A
- **AKI** – N/A
- **Encephalopathy** – N/A
- **Malnutrition** – N/A
- **Sepsis** – SEPSIS IS NOT VALID. Documented in H&P, but vitals WNL, WBC 7.2, and no SIRS noted to support sepsis. QUERYING.
  - **Severe Sepsis** – N/A; see above.

### Clinically Valid:

#### Clinical Validity:

- **Acute Respiratory Failure** – N/A
- **AKI** – CLINICALLY VALID. Cr 1.87 → 0.89 with IVF. No hx CKD.
- **Encephalopathy** – FOLLOWING; watch for return to baseline.
- **Malnutrition** – N/A
- **Sepsis** – CLINICALLY VALID. PNA/UTI source. WBC 24, LA 3.2, CRP elevated, 130s HR, 27 RR, temp 102.2. Encephalopathy and AKI present.
  - **Severe Sepsis** – CLINICALLY VALID. Per 2/3 PN, "AKI due to sepsis".

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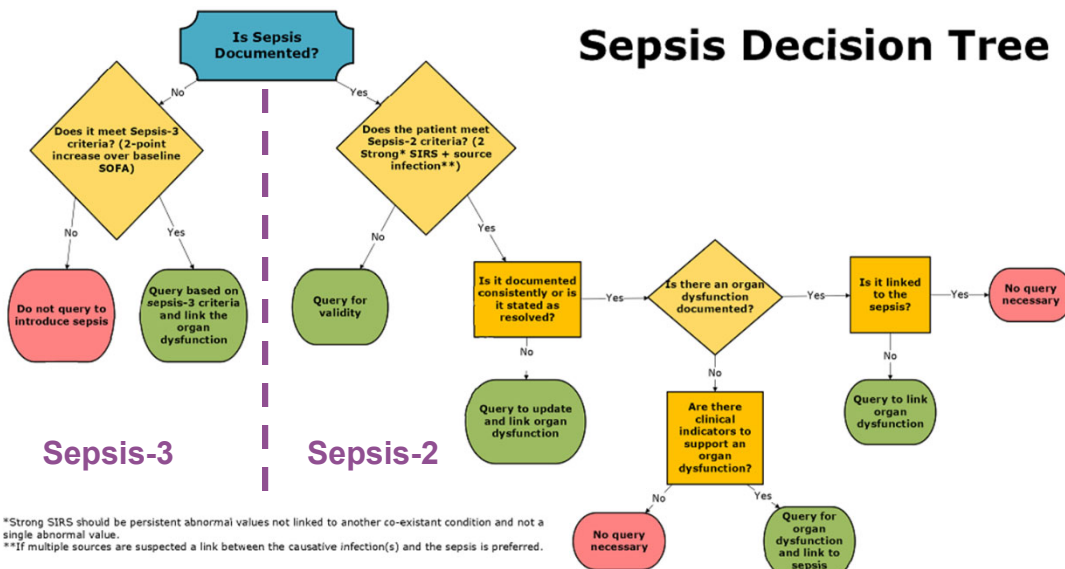


## Sepsis Decision Tree

Our strategy to the sepsis dilemma

## Prisma Health Sepsis Query Decision Tree

### Sepsis Decision Tree



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## Practice Scenarios

## Scenario #1

**A concurrent review of the record revealed...**

**ED Summary:** AMS, lethargy, fever.

- Vitals: Temp 102.8, HR 127, RR 12, BP 98/59, 96% on RA.
- Labs: WBC 22.0, bands 12%, lactic acid 2.3, Procal 3.8, Cr= 2.07, and (+)UA
- Sepsis protocol initiated - given 2L IVF bolus and started on IV Zosyn, Rocephin, and Vancomycin.

**Hx:** DM, HTN

**H&P:** Urine cx (+) for E. Coli.

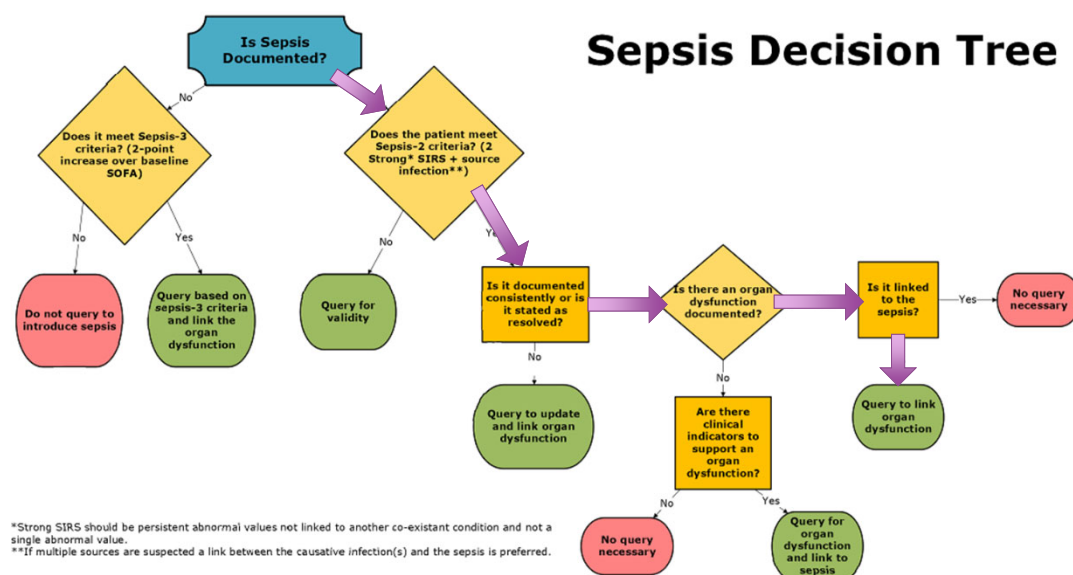
- Dx: Sepsis due to UTI. Also documented is AKI, acidosis, and metabolic encephalopathy.

**Based on the above documentation and using the sepsis decision tree, what are our next steps?**

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## Scenario #1

### Sepsis Decision Tree



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## Scenario #1 Continued

### Recommendations for this case:

**We would take sepsis on this case as CLINICALLY VALID.**

- Rationale: 2+ strong SIRS (Temp, HR, AMS, WBC's w/ bands, lactate, procal) + source (UTI).

### **Query provider for organ dysfunction link.**

- Link the AKI AND/OR Acute Metabolic Encephalopathy to the sepsis = code R65.20 (severe sepsis without septic shock).

**Questions?**

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## Scenario #2

### **Retrospective review of the record revealed...**

**ED Summary:** AMS w/ intermittent declining PO intake, activity, and responsiveness over last several days. "mildly hypotensive here and tachycardic concerning for sepsis".

- Vitals: Temp 100.0, HR 125, RR 12, BP 95/66, 98% on RA.
- Labs: WBC 13.2, lactate 0.3, and procal 0.03.
- Sepsis protocol/work-up initiated. Blood cx drawn. IVF given and Zosyn/Vancomycin started.

**Hx:** MS, HTN, DM, and schizophrenia.

**H&P:** Sepsis, AKI 2/2 Sepsis, and Acute metabolic encephalopathy likely related to sepsis.

- Unknown source.
- Urinalysis clear. CXR clear.

**Neurology consult:** concern for meningitis

- LP (-)

**Progress Note:** Given no source of infection, will stop antibiotics completely today

**Discharge Summary:** Sepsis

- CSF cx and meningitis panel (-)
- Hypotension and AKI likely due to volume depletion
- Encephalopathy/excessive somnolence – recurrent. Work-up negative. Depakote was d/c'd and patient is more alert.

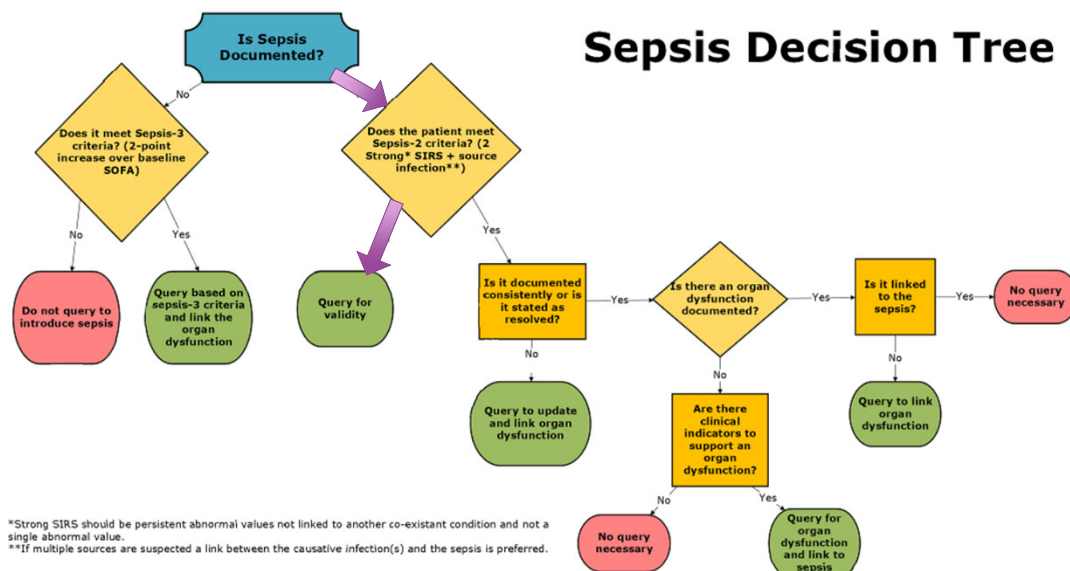
**Based on the above documentation and using the sepsis decision tree, what are our next steps?**

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## Scenario #2

### Sepsis Decision Tree



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## Scenario #2 Continued

### Recommendations for this case:

**We would consider sepsis on this case as NOT CLINICALLY VALID.**

- Rationale: Sepsis documented and meets 2 SIRS criteria but **no source** (all suspected sources ruled out after study)
  - All cultures negative.
  - Antibiotics were discontinued shortly after no source found.
  - Hypotension, AKI, and metabolic encephalopathy were linked to other etiologies in the discharge summary.

**Query for clinical validation of sepsis.**

**Questions?**

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## Scenario #3

A retrospective chart review of a 9-day admission revealed...

**ED Summary:** SOB, labored breathing, abdominal discomfort, fever, and cough.

- Vitals: Temp 102.2, HR 140s, BP 100/77(65), RR 32, and 89% on 6 L on BiPAP.
- Labs: WBC 23.5, Cr=1.62 (baseline 0.8), procal=0.22, lactate 2.7 →2.19.
- GCS 14 due to drowsiness w/ eye opening to sound (baseline A&O x 4).
- CXR: infiltrate c/w PNA. UA (+).
- Sepsis protocol/work-up initiated. Blood cx drawn. Was started on Zosyn and IVF bolus.

**Hx:** pAfib, chronic respiratory failure (2L O2), DM, chronic systolic CHF, obesity

**H&P:** Pneumonia, UTI, AKI, and Acute on chronic respiratory failure with hypoxia.

**Discharge Summary:** Pneumonia, UTI, AKI, and Acute on chronic respiratory failure.

- Blood cx (-), Urine cx (+) ESBL E. Coli, Merrem added.

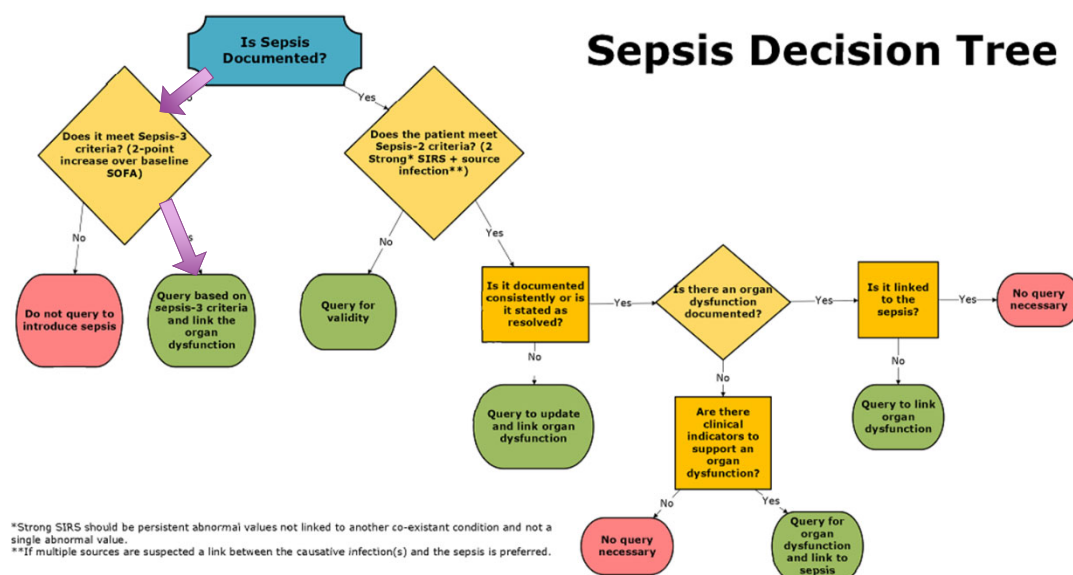
**No diagnosis of sepsis noted within the record.**

Based on the above documentation and using the sepsis decision tree, what are our next steps?

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## Scenario #3

### Sepsis Decision Tree



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## Scenario #3 Continued

### Recommendations for this case:

#### **Sepsis is not documented, but we meet Sepsis-3 criteria**

- Rationale: Infection (UTI, PNA) with SOFA score of at least 2 above baseline.
  - GCS=14 (1-point)
  - Cr=1.62 (1-point)
  - Calc P/F ratio of 127 w/ BiPAP@6L O2 (3-points)
  - Multiple organ dysfunction diagnoses (AKI, acute respiratory failure) are documented.

#### **Query to introduce the diagnosis of sepsis and to link associated organ dysfunction**

### Questions?

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## Scenario #4

#### **A retrospective review of the chart revealed...**

**ED Summary:** SOB and cough, Noted altered at baseline.

- Vitals: Temp 101.1, HR 109, RR 13, BP 120/80, 97% on RA.
- Labs: WBC 9.0, PLT=251, lactic acid 0.3, procal 0.03, Cr= 0.87, T.bili=0.5
- CXR: bilateral opacities.
- Sepsis protocol initiated in ED, Blood cx drawn, IVF bolus and started on IV Rocephin and Azithromycin

**Hx:** Dementia, recurrent UTIs, and CVA w/ residual L-sided hemiplegia.

**H&P:** Admitted for PNA.

**Discharge Summary:** Patient's SOB, cough, fever, and tachycardia improved within 24 hours of admission and was discharged home.

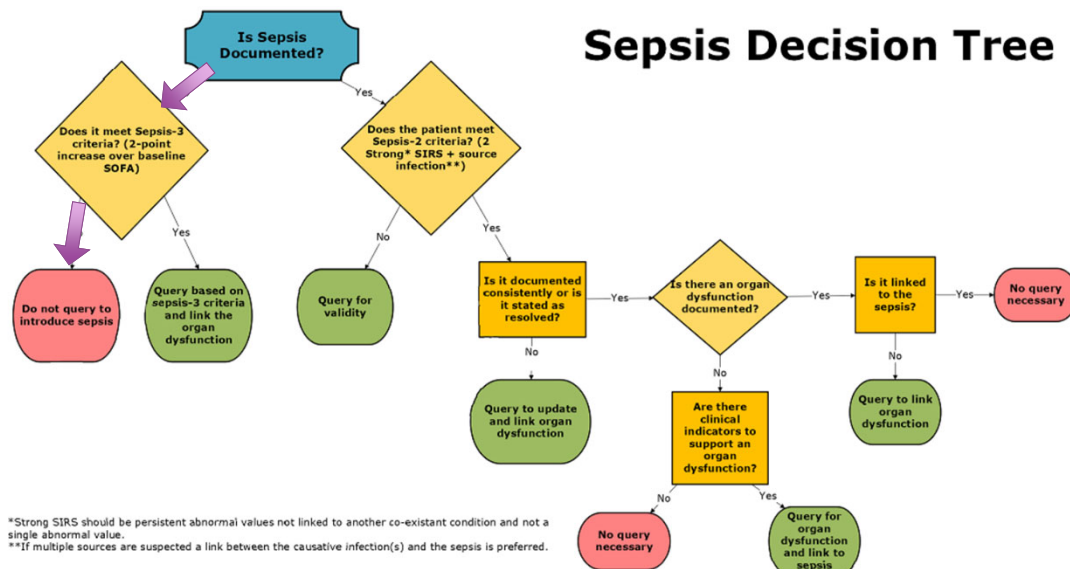
**Even though a sepsis protocol was initiated in ED, there is no official documentation of sepsis within the record.**

**Based on the above documentation and using the sepsis decision tree, what are our next steps?**

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## Scenario #4

### Sepsis Decision Tree



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## Scenario #4 Continued

### Recommendations for this case:

#### Sepsis is NOT documented, and we do not meet sepsis-3 criteria.

- Rationale: No hypotension, GCS likely baseline due to dementia, and PLT, T.bili, and Cr all WNL.
  - Sepsis-3 does not look at SIRS but still pay attention to SIRS on all cases. In this case, SIRS were weak and just one-time reading of elevated temp and HR.

#### Do not recommend to query to introduce sepsis

- Does not meet SOFA score  $\geq 2$  from baseline and the organ dysfunction (AMS) is easily explained by another co-existing condition (dementia).

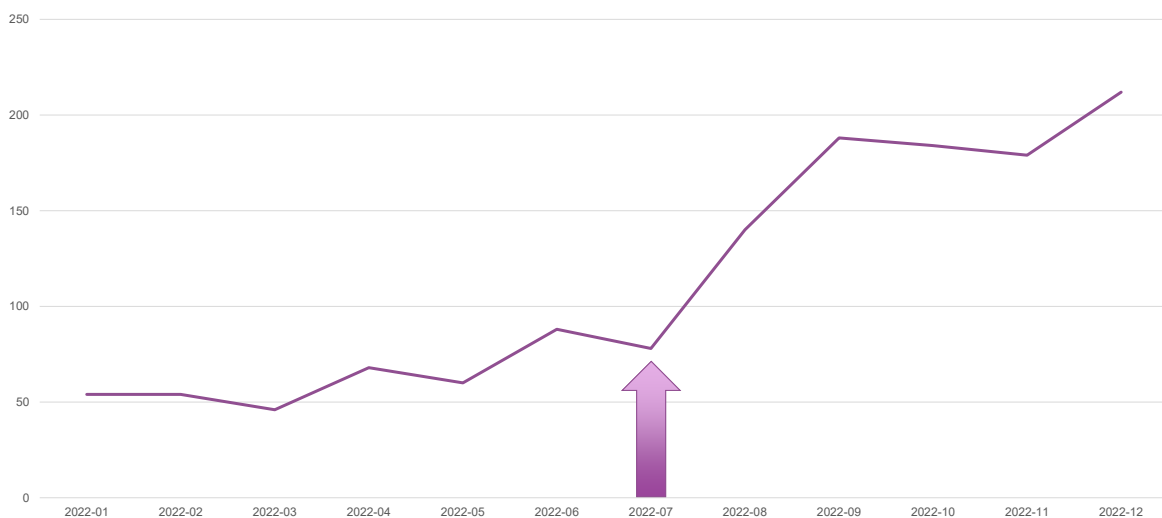
### Questions?

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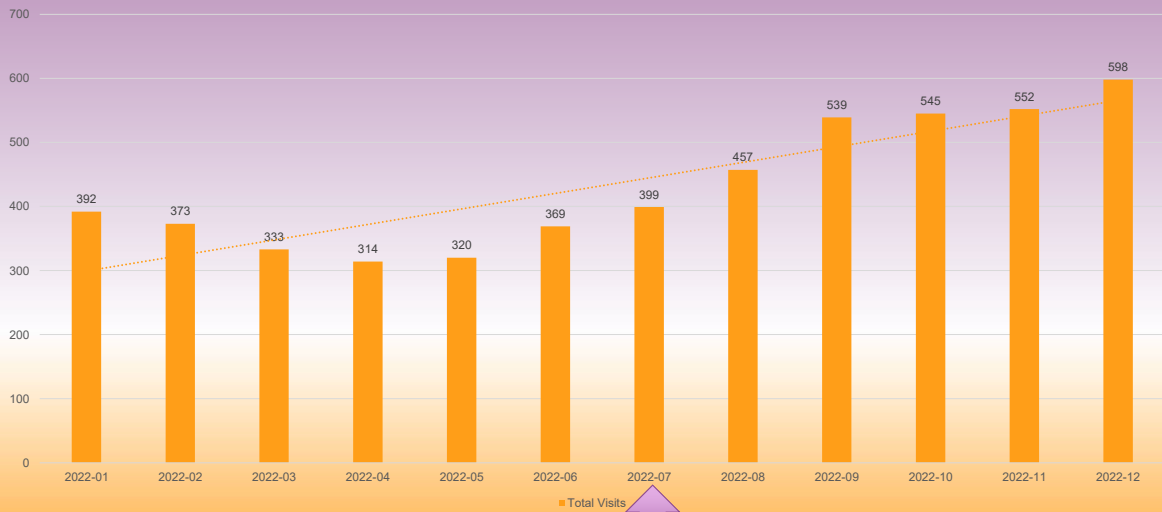
## Outcomes After Implementation of Sepsis Decision Tree

### Sepsis Queries



Source: 3M Report

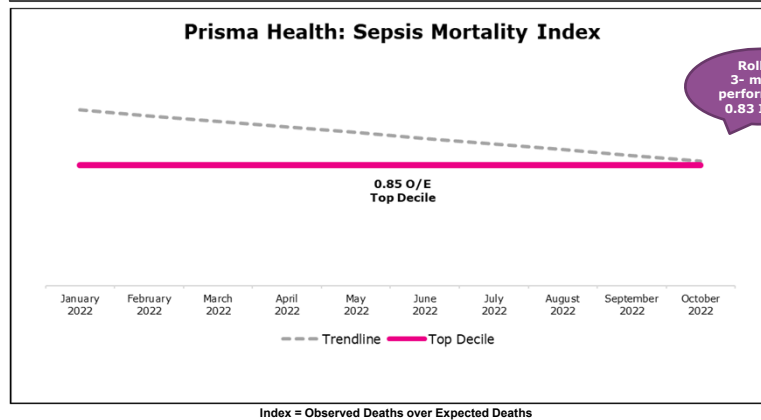
## Cases With Severe Sepsis (With or Without Septic Shock) Coded



## Mortality Data – O/E



**We are saving more lives**



Data Source: Vizient

## References

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## Thank you. Questions?

Jill.Mazurek@prismahealth.org  
Heather.Luton@prismahealth.org

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