

Sepsis

Date

May 27, 2025 (updated to ignore eSituation.10 - Other Associated Symptoms if it has a Pertinent Negative, "Symptom Not Present")
June 27, 2023

Definition

The patient has suspected sepsis.

Criteria Description

Patient care reports where:

- any symptom or impression is sepsis
or
- a sepsis destination team pre-arrival alert or activation is performed.

Pseudocode

Patient care reports where:

- eSituation.09 - Primary Symptom
- eSituation.10 - Other Associated Symptoms (without Pertinent Negative)
- eSituation.11 - Provider's Primary Impression
- eSituation.12 - Provider's Secondary Impressions
 - A40* Streptococcal sepsis
 - A41* Other sepsis
 - P36* Bacterial sepsis of newborn
 - R65.2* Severe sepsis

OR

- eDisposition.24 - Destination Team Pre-Arrival Alert or Activation
 - Yes-Sepsis

XPath Code

```
/EMSDataset/Header/PatientCareReport
[
  eSituation/(eSituation.09, eSituation.10[not(@PN)], eSituation.11, eSituation.12)
  [matches(., '^(A40)|(A41)|(P36)|(R65\.2)')]
or
  eDisposition/eDisposition.HospitalTeamActivationGroup/eDisposition.24 = '4224019'
]
```

SAS Code

The NEMESIS public release research dataset does not include the Pertinent Negative attribute on eSituation.10 - Other Associated Symptoms, which was added in NEMESIS version 3.5, so the SAS code will select some records where a symptom was actually documented as “Symptom Not Present.” This is estimated to affect less than 3% of v3.5 records.

```
proc sql;
  create table SepsisKey as
  select distinct pcrKey from
  (
    select pcrKey from nemsis.factPcrPrimarySymptom where
      substr(eSituation_09, 1, 3) in ('A40', 'A41', 'P36') or
      substr(eSituation_09, 1, 5) = 'R65.2'
    union
    select pcrKey from nemsis.factPcrAdditionalSymptom where
      substr(eSituation_10, 1, 3) in ('A40', 'A41', 'P36') or
      substr(eSituation_10, 1, 5) = 'R65.2'
    union
    select pcrKey from nemsis.factPcrPrimaryImpression where
      substr(eSituation_11, 1, 3) in ('A40', 'A41', 'P36') or
      substr(eSituation_11, 1, 5) = 'R65.2'
    union
    select pcrKey from nemsis.factPcrSecondaryImpression where
      substr(eSituation_12, 1, 3) in ('A40', 'A41', 'P36') or
      substr(eSituation_12, 1, 5) = 'R65.2'
    union
    select pcrKey from nemsis.factPcrDestinationTeam where
      eDisposition_24 = '4224019'
  )
;
quit;
```

Discussion

Sepsis is a “life-threatening organ dysfunction due to a dysregulated host response to infection” (Seymour CW et al) or a “life threatening condition that arises when the body's response to an infection injures its own tissues and organs” (qSOFA).

There are two commonly used sepsis evaluations: Systemic Inflammatory Response Syndrome (SIRS) uses temperature, heart rate, respiratory rate, and white blood cell count. SIRS is unlikely to be used in EMS due to the inclusion of white blood cell count. Quick Sepsis Related Organ Failure Assessment (qSOFA) uses Glasgow Coma Scale, respiratory rate, and systolic blood pressure. The qSOFA criteria could potentially be used to identify sepsis patients in NEMSIS data. However, patients could meet the physiological criteria of qSOFA for causes other than sepsis, such as traumatic injury and non-septic shock. Thus, this case definition does not include those criteria. Instead, it relies on symptoms, impressions, or hospital activations recorded by the EMS providers, which indicate that the providers had reason to suspect sepsis.

“National variation in United States sepsis mortality: a descriptive study” included all infection-related ICD-10 diagnosis codes, because it used death records as its data source. Since this case definition applies to EMS records, in which most patients do not die as a result of their condition, the presence of an infection-related symptom or impression does not necessarily mean the patient has sepsis. Therefore, this case definition is limited to symptoms and impressions that specifically indicate sepsis.

NEMSQA draft measures for sepsis (which have not yet been published) include R56.2 Severe sepsis and R65.21 Severe sepsis with septic shock but not R65.20 Severe sepsis without septic shock. This case definition includes all three values.

This case definition may select a greater percentage of PCRs in NEMSIS 3.5 than in previous versions due to the use of the Destination Team Pre-Arrival Alert or Activation value of “Yes-Sepsis,” which was added in version 3.5.0.

References

qSOFA: Quick Sepsis Related Organ Failure Assessment. UPMC and University of Pittsburgh Schools of the Health Sciences. qsofa.org.

Seymour CW, Liu VX, Iwashyna TJ, et al. Assessment of Clinical Criteria for Sepsis: For the Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). *JAMA*. 2016;315(8):762–774. doi.org/10.1001/jama.2016.0288.

SIRS Criteria (Systemic Inflammatory Response Syndrome). Medscape. reference.medscape.com/calculator/522/sirs-criteria-systemic-inflammatory-response-syndrome.

Wang, H. E., Devereaux, R. S., Yealy, D. M., Safford, M. M., & Howard, G. (2010). National variation in United States sepsis mortality: a descriptive study. *International journal of health geographics*, 9, 9. doi.org/10.1186/1476-072X-9-9.