SEPSIS DEFINITIONS IN 2017

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Changes: Sepsis 3 (February 2016)

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Key Points about Sepsis

- Primary cause of death from infection especially where recognition and/or treatment is delayed
- Syndrome influenced by pathogen and host factors identified by dysregulated response and organ dysfunction
- Should be considered in any patient with infection or with unexplained organ dysfunction

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Previous Guideline Limitations

- Excessive focus on inflammation
- Misleading model that sepsis follows a continuum
- Lack of sensitivity and specificity of SIRS criteria

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Sepsis

A life-threatening organ dysfunction caused by a dysregulated host response to infection.

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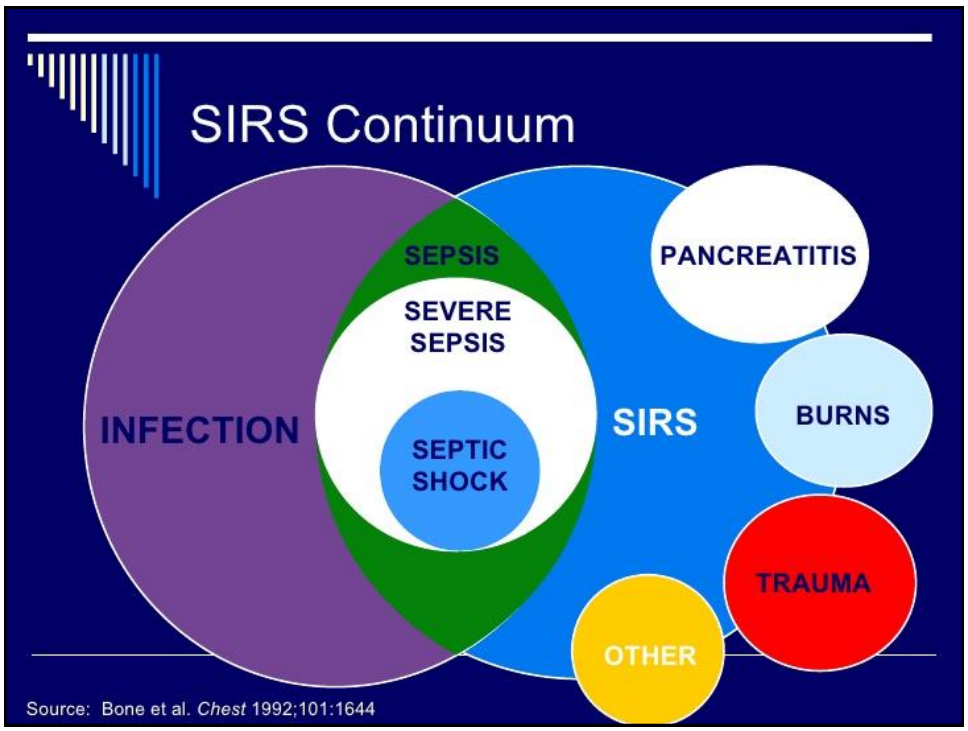

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Recall SIRS

Systemic Inflammatory Response Syndrome
"S.I.R.S."

2 or more of the following due to injury

- heart rate > 90
- respiratory rate > 20 or $PaCO_2$ < 32
- T > 38.3 C or < 36 C
- WBC >12,000 or < 4,000
  or >10% immature (bands)

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Sepsis: 2001 to 2016

2001 to 2016

- 2 or more criteria of Systemic Inflammatory Response Syndrome (SIRS)
  - ✓HR > 90
  - ✓RR > 22 or PCO2 < 35
  - ✓WBC (or increased bands)
  - ✓Temp

Due to infection

February 2016

- Organ dysfunction due to infection (defined by SOFA Score?)

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Septic Shock

2001 to 2016

Severe Sepsis:

- Organ dysfunction due to sepsis that responds to fluid

Septic Shock:

- Hypotension due to sepsis that persists despite adequate fluid replacement requiring vasopressors

2016

Septic Shock:

Despite correction of hypovolemia:

- Vasopressors required to maintain MAP $\geq$ 65 mmHg *and*
- Serum lactate > 2 mmolL in

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Organ Dysfunction

Defined by an increase in the Sequential [Sepsis-related] Organ Failure Assessment (SOFA) of $\geq$ 2 points (assumed to be zero at baseline in patients not known to have preexisting organ dysfunction)*

*this means that a score of 2 or greater in a patient with no known baseline organ dysfunction would indicate organ dysfunction is present.

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Sequential [Sepsis-Related] Organ Failure Assessment (SOFA)

http://clincalc.com/IcuMortality/SOFA.aspx

An increase in the score ≥ 2 points associated with in-hospital mortality >10%

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Sequential [Sepsis-Related] Organ Failure Assessment Score

	0	1	2	3	4
P/F ratio	≥400	<400	<300	<200 with respiratory support	<100 with respiratory support
Platelets	≥150	<150	<100	<50	<20
Bilirubin	<20	20-32	33-101	102-204	> 204
MAP	≥70	<70	Dopamine <5 or dobutamine (any dose)*	Dopamine 5.1-15 or epinephrine ≤ 0.1 or norepinephrine ≤ 0.1*	Dopamine > 15 or epinephrine > 0.1 or norepinephrine > 0.1*
GCS	15	13-14	10-12	6-9	<6
Creatinine	<110	110-170	171-299	300-440	440
Urine Volume				<500 ml/day	<200 ml/day

*Catecholamines in μ/kg/min for at least one hour

Record the worst score for each physiological variable in 24 hours

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CCIS Organ Dysfunction
Multiple Organ Dysfunction (MODS) Scale

MODS Calculator

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Multiple Organ Dysfunction (MODS) Score					
	0	1	2	3	4
P/F ratio	300-1000	226-300	151-225	76-150	0-75
Platelets	>120	81-120	51-80	21-50	≤20
Bilirubin	≤20	21-60	61-120	121-240	>240
Pressure adjusted HR (HR*CVP/MAP)	0-10	10.1-15	15.1-20	20.1-30	30.1-300
GCS	15	13-14	10-12	7-9	≤6
Creatinine	≤100	101-200	201-350	351-500	>500

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MODS Score

0 points:	ICU Mort 0%, Hosp Mort 0%, ICU Stay 2 Days
1-4 points:	ICU Mort 1-2%, Hosp Mort 7%, ICU Stay 3 Days
5-8 points:	ICU Mort 3-5%, Hosp Mort 16%, ICU Stay 6 Days
9-12 points:	ICU Mort 25%, Hosp Mort 50%, ICU Stay 10 Days
13-16 points:	ICU Mort 50%, Hosp Mort 70%, ICU Stay 17 Days
17-20 points:	ICU Mort 75%, Hosp Mort 82%, ICU Stay 21 Days
21-24 points:	ICU Mort 100%, Hospital Mortality 100%

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QuickSOFA (qSOFA)

Suspected infection and 2 of the following:

- RR $\geq$ 22
- Altered mentation
- SBP $\leq$ 100 mm Hg

Used to quickly identify patient had high risk for poor outcome/deterioration.

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Septic Shock

- Is a subset of sepsis in which underlying circulatory and cellular/metabolic abnormalities are profound enough to substantially increase morality.

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Septic Shock*

In the absence of hypovolemia:

- Vasopressor required to maintain a MAP ≥ 65mmHg

and

- Serum lactate > 2 mmol/L

*Associated with hospital mortality > 40%

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Controversies and Issues:

- 2016 definitions have not been "blessed" by the Canadian Critical Care Society
- Early recognition continues to be a challenge; the new definition for "Sepsis" includes organ dysfunction
- SIRS is important to recognize and understand as it is a physiological component of most critical illnesses
- Many early warning systems (computerized and paper based) have been implemented to promote early detection; these are based on SIRS criteria as a prompt to search for a source
- Definition confusion risk: "Mr Brown has Sepsis"
  - Report as Mr. Brown has sepsis with or without organ dysfunction to avoid confusion
- SOFA is not used in Ontario (use MODS); SOFA is outdated
- SOFA versus MODS is not useful for clinical assessment
- How reliable is respiratory rate?

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References

- Marshall JC, Cook DJ, Christou NV, et. al. Multiple organ dysfunction score: a reliable descriptor of a complex clinical outcome. *Crit Care Med*. 1995 Oct;23(10):1638-52. Review.
- Singer M, et al. The third international consensus definitions for sepsis and septic shock (Sepsis-3). JAMA. 2016, 315(8): 801-810.
- Shankar-Hari, M, et al. Developing a new definition and assessing new clinical criteria for septic shock. For the third international consensus definitions for sepsis and septic shock (Sepsis-3).

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