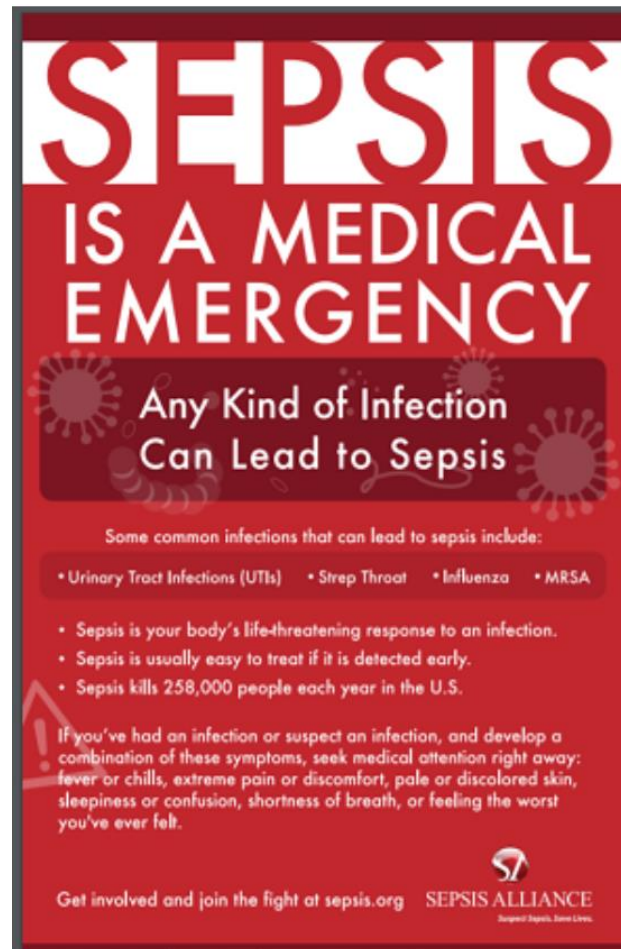




# Sepsis and Septic Shock

Dr Aggrey Lubikire  
Anesthesiologist/intensivist

# SEPSIS KILLS; time is of the essence



A vertical poster with a red background. At the top, the word "SEPSIS" is written in large, bold, white capital letters. Below it, "IS A MEDICAL EMERGENCY" is written in smaller white capital letters. In the center, there is a dark red rectangular box with white text that reads "Any Kind of Infection Can Lead to Sepsis". To the left and right of this box are stylized virus particles. Below the box, the text "Some common infections that can lead to sepsis include:" is followed by a list of four items: "• Urinary Tract Infections (UTIs)", "• Strep Throat", "• Influenza", and "• MRSA". Below this list, there are three bullet points: "• Sepsis is your body's life-threatening response to an infection.", "• Sepsis is usually easy to treat if it is detected early.", and "• Sepsis kills 258,000 people each year in the U.S.". To the left of the next paragraph is a red warning triangle icon. The paragraph reads: "If you've had an infection or suspect an infection, and develop a combination of these symptoms, seek medical attention right away: fever or chills, extreme pain or discomfort, pale or discolored skin, sleepiness or confusion, shortness of breath, or feeling the worst you've ever felt." At the bottom, there is a logo for the Sepsis Alliance, which consists of a stylized 'S' and 'A' inside a circle. To the left of the logo is the text "Get involved and join the fight at [sepsis.org](http://sepsis.org)". To the right of the logo is the text "SEPSIS ALLIANCE" and below it, in smaller text, "Disseminate. Report. Save Lives."

## SEPSIS

### IS A MEDICAL EMERGENCY

Any Kind of Infection  
Can Lead to Sepsis


Some common infections that can lead to sepsis include:

- Urinary Tract Infections (UTIs)
- Strep Throat
- Influenza
- MRSA

- Sepsis is your body's life-threatening response to an infection.
- Sepsis is usually easy to treat if it is detected early.
- Sepsis kills 258,000 people each year in the U.S.

If you've had an infection or suspect an infection, and develop a combination of these symptoms, seek medical attention right away: fever or chills, extreme pain or discomfort, pale or discolored skin, sleepiness or confusion, shortness of breath, or feeling the worst you've ever felt.

Get involved and join the fight at [sepsis.org](http://sepsis.org)

 **SEPSIS ALLIANCE**  
Disseminate. Report. Save Lives.

# Defn of Sepsis and Septic Shock

- Sepsis: A life-threatening organ dysfunction caused by a dysregulated host response to infection.
- Septic shock: Sepsis in which underlying circulatory and cellular/metabolic abnormalities are profound enough to substantially increase mortality.
- Terms like severe sepsis/ septicemia removed

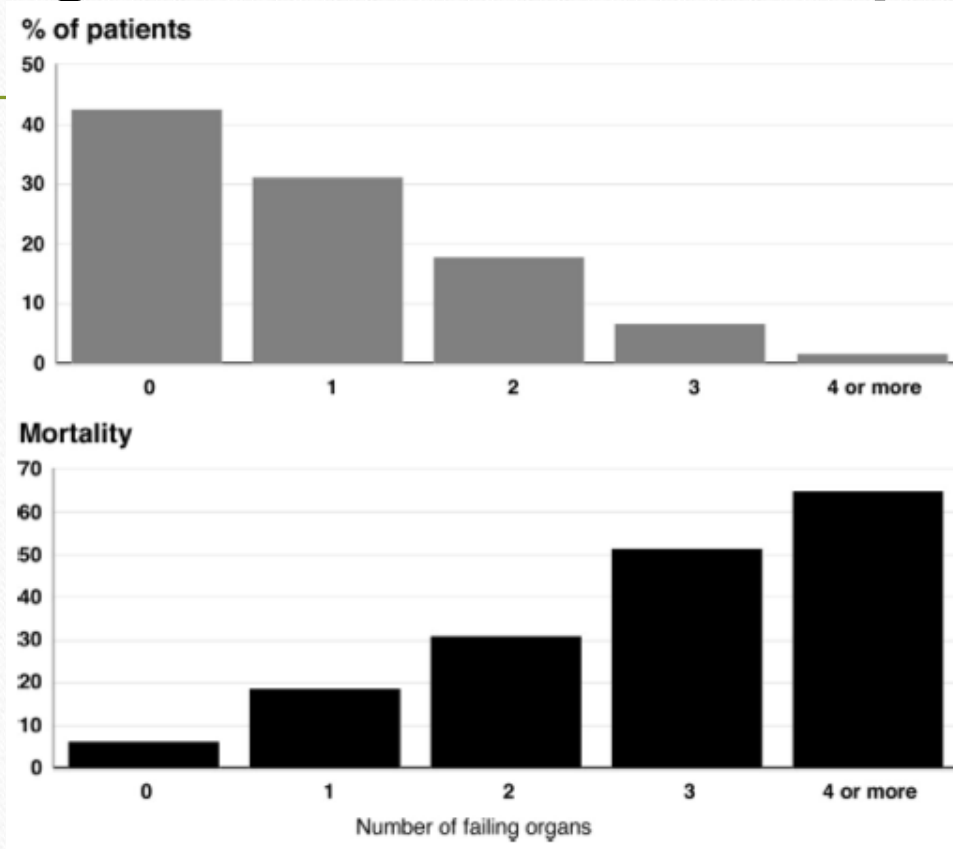
# Background:

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- Global healthcare issue: continues to be the leading cause of death from infection.
- Early recognition & Dx of sepsis is required; prevent the transition into septic shock, which is associated with >40% Mortality Rate.
- ICU mortality was 25.8%, & hospital mortality was 35.3% VZ 16.2%, & 24.2% respectively



# Organ failure in sepsis

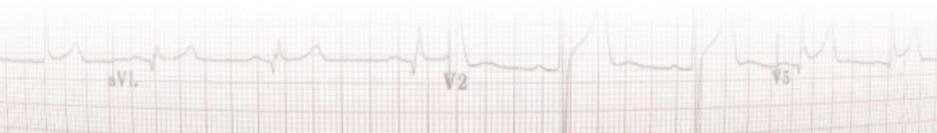


P/F  
Platelets  
Bili  
BP  
GCS  
Cr/UOP

# Aetiology of Sepsis

## Understanding Sepsis

- Regardless of what caused it, the inflammatory response is the same and is designed to help the body fight infection and repair itself.
- SIRS is local inflammatory response that gets out of control.
- An avalanche of chemical mediators is set off that leads to tissue/organ damage
- Endotoxins from bacteria signal release of cytokines and other mediators that circulate throughout the body and cause a number of responses:

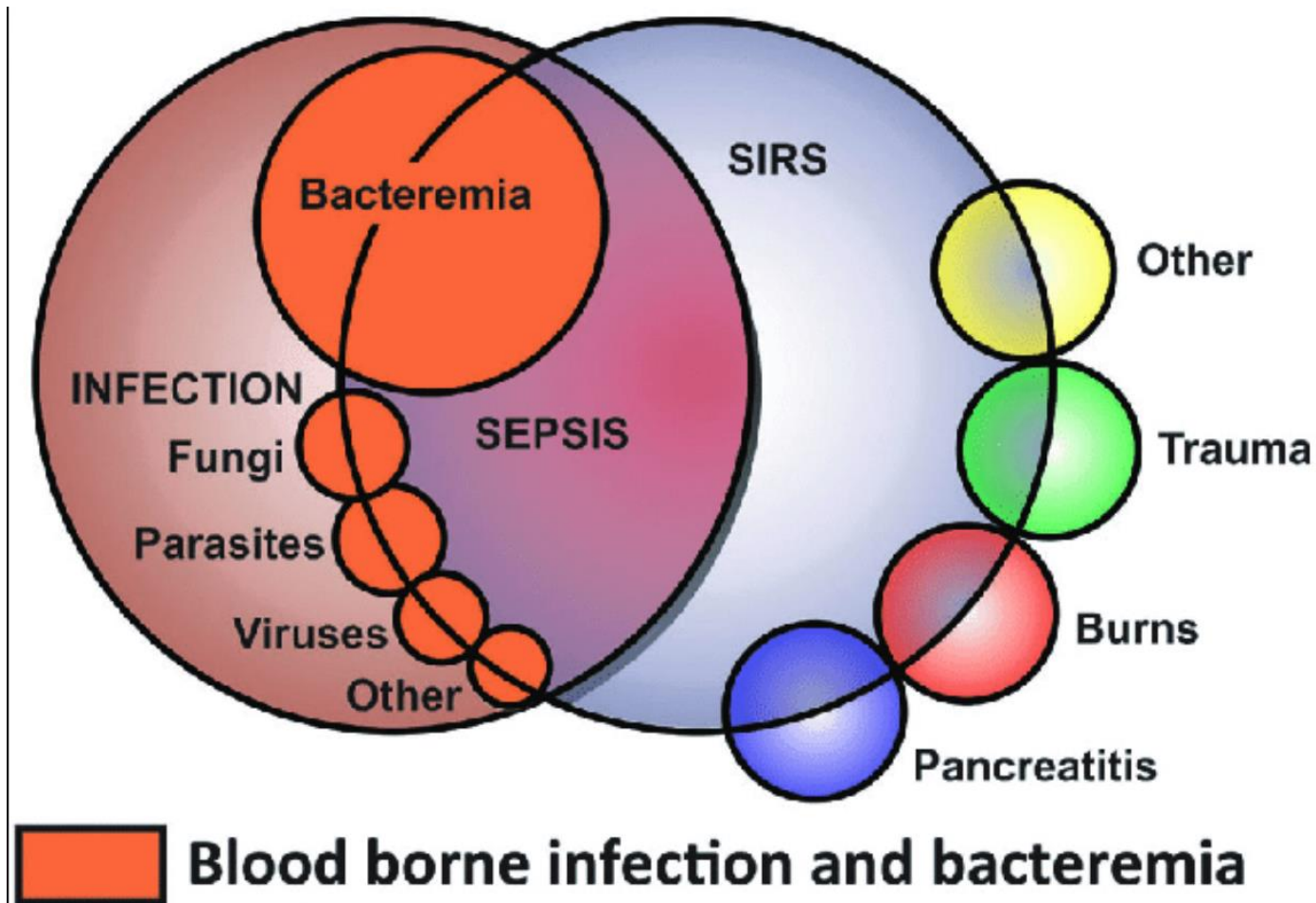


# What is not sepsis

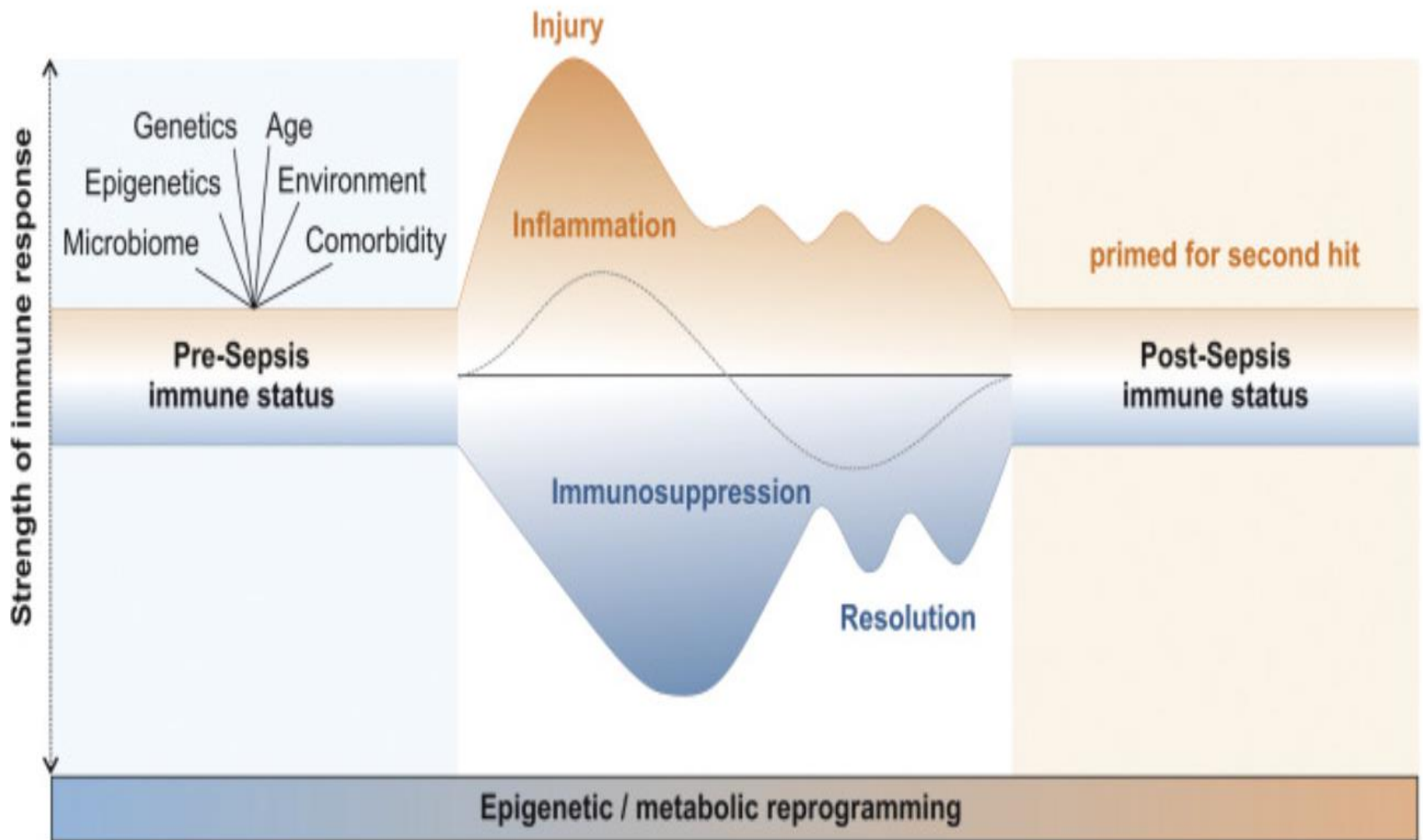


- Heart rate increase
- Rapid resp Rate
- Flushing or heat or Cold
- Shock or collapse
- Manic /depressive behaviour

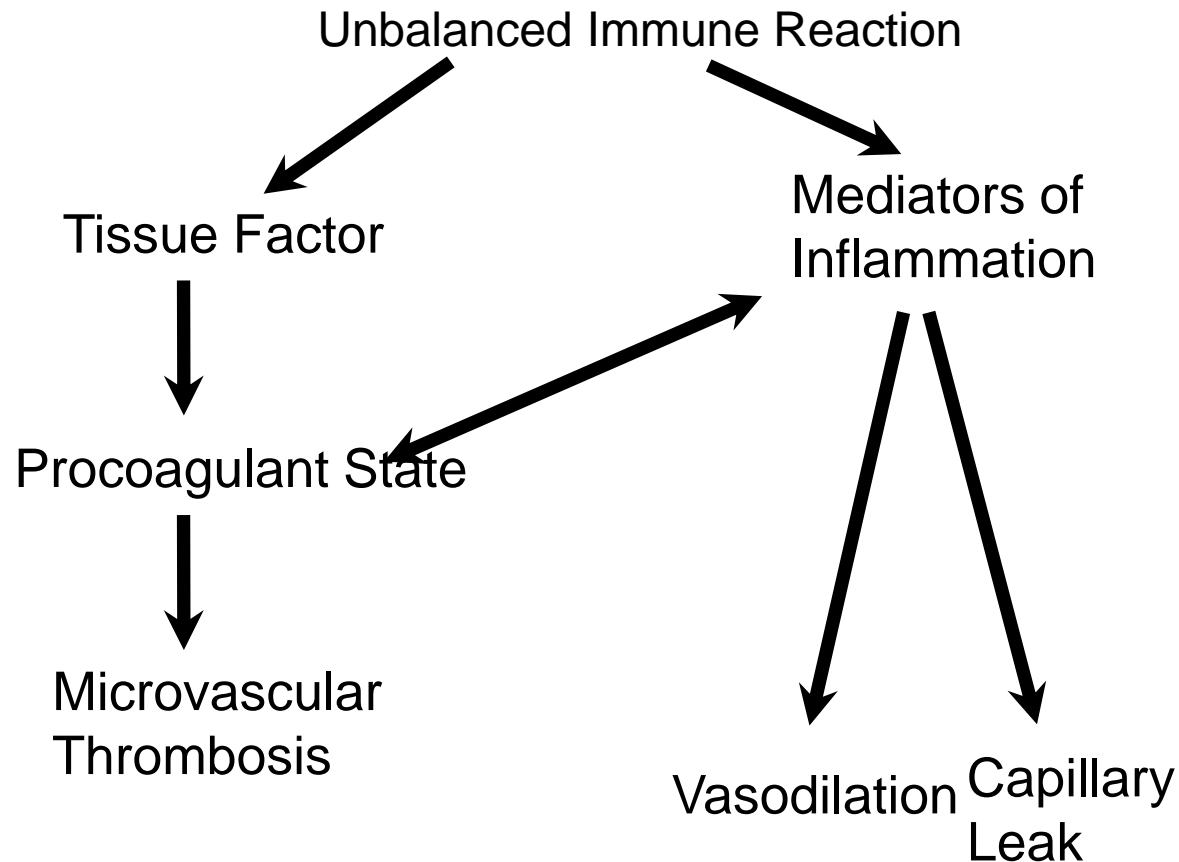
# Aetiology of sepsis and Septic Shock







# Sepsis Pathogenesis/cytokine storm



# Assessment tools for sepsis

▪

- Sequential (sepsis-related) Organ Failure Assessment (SOFA) score is useful in identifying patients with a suspected infection who are likely to need ICU or die
- Scoring of many parameters including the use of laboratory results
- q(quick) SOFA score can be used at the bedside to identify patients using clinical information only

# Assessment of Sepsis and Septic Shock

**Sequential (Sepsis-Related) Organ Function Assessment (SOFA) Score.<sup>a</sup>**

System / Score	0	1	2	3	4
Respiration: PaO <sub>2</sub> /FiO <sub>2</sub> , mmHg (kPa)	≥400 (53.3)	<400 (53.3)	<300 (40)	<200 (26.7) with respiratory support	<100 (13.3) with respiratory support
Coagulation: Platelets x 10 <sup>3</sup> /μL	≥150	<150	<100	<50	<20
Liver: Bilirubin, mg/dL (μmol/L)	<1.2 (20)	<1.2-1.9 (20-32)	2.0-5.9 (33-101)	6.0-11.9 (102-204)	>12.0 (204)
Cardiovascular	MAP ≥70 mm Hg	MAP <70 mm Hg	Dopamine <5 or dobutamine (any dose) <sup>b</sup>	Dopamine 5.1-15 or epinephrine ≤0.1, or norepinephrine ≤0.1 <sup>b</sup>	Dopamine >15 or epinephrine, >0.1, or norepinephrine >0.1 <sup>b</sup>
Central nervous system: Glasgow coma scale score <sup>c</sup>	15	13-14	10-12	6-9	<6
Renal: Creatinine mg/dL (μmol/L); Urine output, mL/day	<1.2 (110)	1.2-1.9 (110-170)	2.0-3.4 (171-299)	3.5-4.9 (300-440); <500	>5.0 (440); <200

**Figure 2.** Abbreviations: PaO<sub>2</sub>/FiO<sub>2</sub>, partial pressure of oxygen/fraction of inspired oxygen. a) Adapted from Vincent et al<sup>3</sup>; b) Catecholamine dose in μg/kg/min, >1 hour; c) Glasgow Coma Scale scores range from 3-15 (3 minimum, 15 normal).



# Mortality with sepsis by SOFA SCORE

## Correlation of Total Score and Hospital Mortality

Maximum SOFA Score	Mortality
7 to 9	15 - 20%
10 to 12	40 - 50%
13 to 14	50 - 60%
15	> 80%

# Assessment of Sepsis and Septic Shock

## Quick SOFA( q SOFA) *Seymour et al*

Parameters	Criteria
Respiratory rate	$\geq 22/\text{min}$
Altered mentation	GCS $< 13$
Systolic blood pressure	$\leq 100\text{mmHg}$

Early Screening for Performance Improvement

# How to deal with Sepsis and ER(Management)

When it comes to sepsis, remember  
***IT'S ABOUT TIME™***. Watch for:



**TEMPERATURE**  
higher or lower  
than normal



**INFECTION**  
may have signs  
and symptoms of  
an infection



**MENTAL DECLINE**  
confused, sleepy,  
difficult to rouse



**EXTREMELY ILL**  
"I feel like I might  
die," severe pain  
or discomfort

Watch for a combination of these symptoms. If you suspect sepsis, see a doctor urgently, CALL 911 or go to a hospital and say, "I AM CONCERNED ABOUT SEPSIS."

# Investigations in sepsis/septic shock

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- For sepsis – essential investigations –
- CBC with platelet count
- Smear for malarial parasite & rapid malarial antigen test
- Blood culture
- Urine R/M & C/S- process for culture in 1 hr of collection
- Cxray
- USG abdomen
- CRP & if available Procalcitonin
- CSF analysis – should be evaluated in half an hour of collection
- Tissue/ pus culture
- Serological test like NS 1 / widal test



# Biofire film Array-Sepsis investigation



1024 × 968

The BioFire® FilmArray® Torch...  
[biofiredx.com](http://biofiredx.com)



BIOFIRE® FILMARRAY® SY...  
[biomerieux-diagnostics.com](http://biomerieux-diagnostics.com)

# Mgt of Sepsis

Surviving Sepsis  
Campaign

  **BUNDLESOFT**  
Screen Capture

## **HOURL-1 BUNDLE: INITIAL RESUSCITATION FOR SEPSIS AND SEPTIC SHOCK:**

- 1) Measure lactate level.\*
- 2) Obtain blood cultures before administering antibiotics.
- 3) Administer broad-spectrum antibiotics.
- 4) Begin rapid administration of 30mL/kg crystalloid for hypotension or lactate  $\geq 4$  mmol/L.
- 5) Apply vasopressors if hypotensive during or after fluid resuscitation to maintain a mean arterial pressure  $\geq 65$  mm Hg.

\*Remeasure lactate if initial lactate elevated ( $> 2$  mmol/L).

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[survivingsepsis.org](http://survivingsepsis.org)

# Mgt of Sepsis

## 2016 Surviving Sepsis Campaign Guidelines Important ED Medication Recommendations

### Antimicrobials

- Give ASAP,  $\leq 1$  hr after recognition of sepsis/septic shock [strong R, moderate Q]
- Consider initial doses at high end of dosing range
- Consider double coverage in septic shock (not routinely for bacteremia or sepsis [weak R, low Q] or neutropenic sepsis [strong R, moderate Q])

R = Recommendation  
Q = Quality of evidence

### Vasoactives

- Norepinephrine 1<sup>st</sup> line [strong R, moderate Q]
- Add vasopressin [weak R, moderate Q] or epinephrine [weak R, low Q]
- No low-dose dopamine for renal protection [strong R, high Q]
- Dobutamine for persistent hypoperfusion despite fluids & vasopressors [weak R, low Q]

### Corticosteroids

- IV hydrocortisone (200 mg/day) only if hemodynamic stability not achieved with fluids & vasopressors [weak R, low Q]

Rhodes A, et al. *Crit Care Med.* 2017 Jan 17. Epub ahead of print.

 @PharmERToxGuy

# Steroids: ADRENAL TRIAL

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- Less ICU Stay
- Decrease time on Ventilatory Support
- More Rapid SHOCK REVERSAL
- Fewer Blood Transfusions



# Vitamin C, Thiamine & Steroid Cock tail(Paul Merrick Protocol)/VICTAS TRAIL

TREATMENTS



## Doctor Turns Up Possible Treatment For Deadly Sepsis

March 23, 2017 · 12:01 AM ET

Heard on [Morning Edition](#)

- Cocktail of Vitamin C, thiamine and steroids was shown to reduce death from sepsis
- 8.5% mortality in treatment group vs 40% in “control” group
- N = 47 patients
- Retrospective before/after study  $\neq$  RCT



## extracorporeal blood purification - Cytosorb Therapy

<https://cytosorb-therapy.com/the-therapy/> ▼

**CytoSorb** is an extracorporeal blood purification therapy designed to reduce excessive levels of inflammatory mediators such as cytokines, or “cytokine storm”, from blood (see “The Adsorber”). In doing so, the goal is to reduce the potentially deadly systemic inflammatory response ...



orb, Extracorporeal Th...



Blood Filter Will Saves Lives ...



Research article | [Open Access](#) |  
[Published: 04 November 2019](#)

# Ulinastatin treatment for acute respiratory distress syndrome in China: a meta-analysis of randomized controlled trials

[Xiangyun Zhang](#), [Zhaozhong Zhu](#), ... [Xi Zhu](#) 

[+ Show authors](#)

[BMC Pulmonary Medicine](#) **19**,

Article number: 196 (2019) | [Cite this article](#)

**23k** Accesses | **17** Citations | **3** Altmetric |  
[Metrics](#)

# ASPEN:NUTRITION IN CRITICAL ILLNESS

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- High vs low calorie
- High protein vs low protein
- Enteral vs Parental

# Renal Dosing of antimicrobials in sepsis AKI and Role of Thiamine

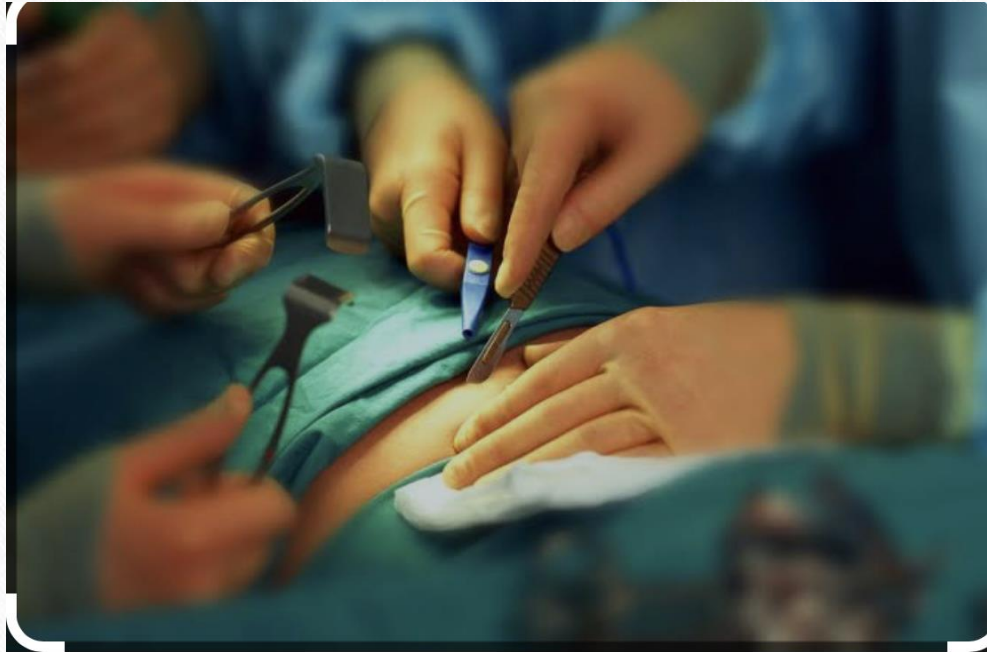
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# Surgical Sepsis: source control

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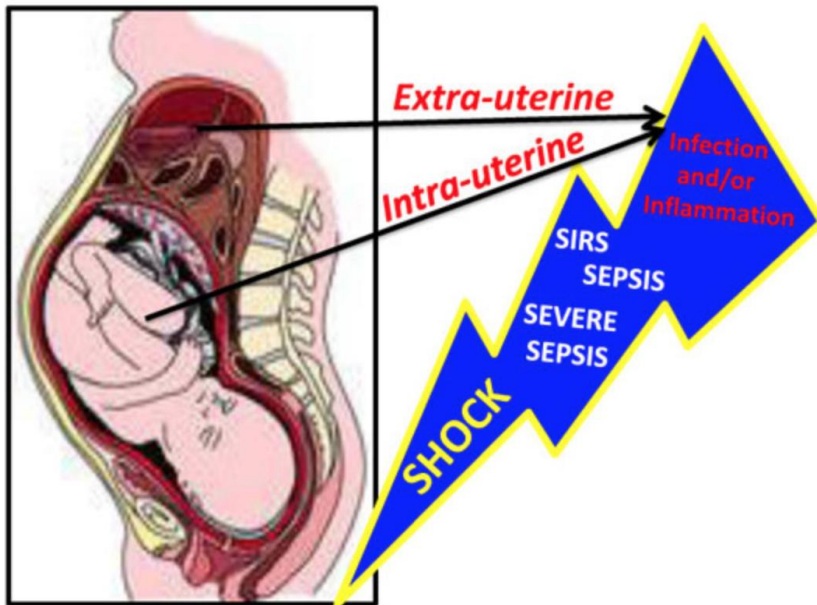


# Angiotensin II: a new therapeutic option for vasodilatory shock

[Rachel L Bussard](#)<sup>1</sup> and [Laurence W Busse](#)<sup>2,3</sup>

Angiotensin II (Ang II), part of the renin–angiotensin–aldosterone system (RAS), is a potent vasoconstrictor and has been recently approved for use by the US Food and Drug Administration in high-output shock. Though not a new drug, the recently published Angiotensin II for the Treatment of High Output Shock (ATHOS-3) trial, as well as a number of retrospective analyses have sparked renewed interest in the use of Ang II, which may have a role in treating refractory shock. We describe refractory shock, the unique

# Special people at risk for sepsis(pregnancy)



## Predisposing factors for sepsis in obstetrics

- Post cesarean delivery endometritis
- Prolonged rupture of membranes
- Retained products of conception
- Cerclage in presence of ruptured membranes
- Intraamniotic infusion
- Water birth
- Retained product of conception
- Urinary tract infection
- Toxic shock syndrome
- Necrotising Fascitis

# Special people at Risk for Sepsis(Elderly)

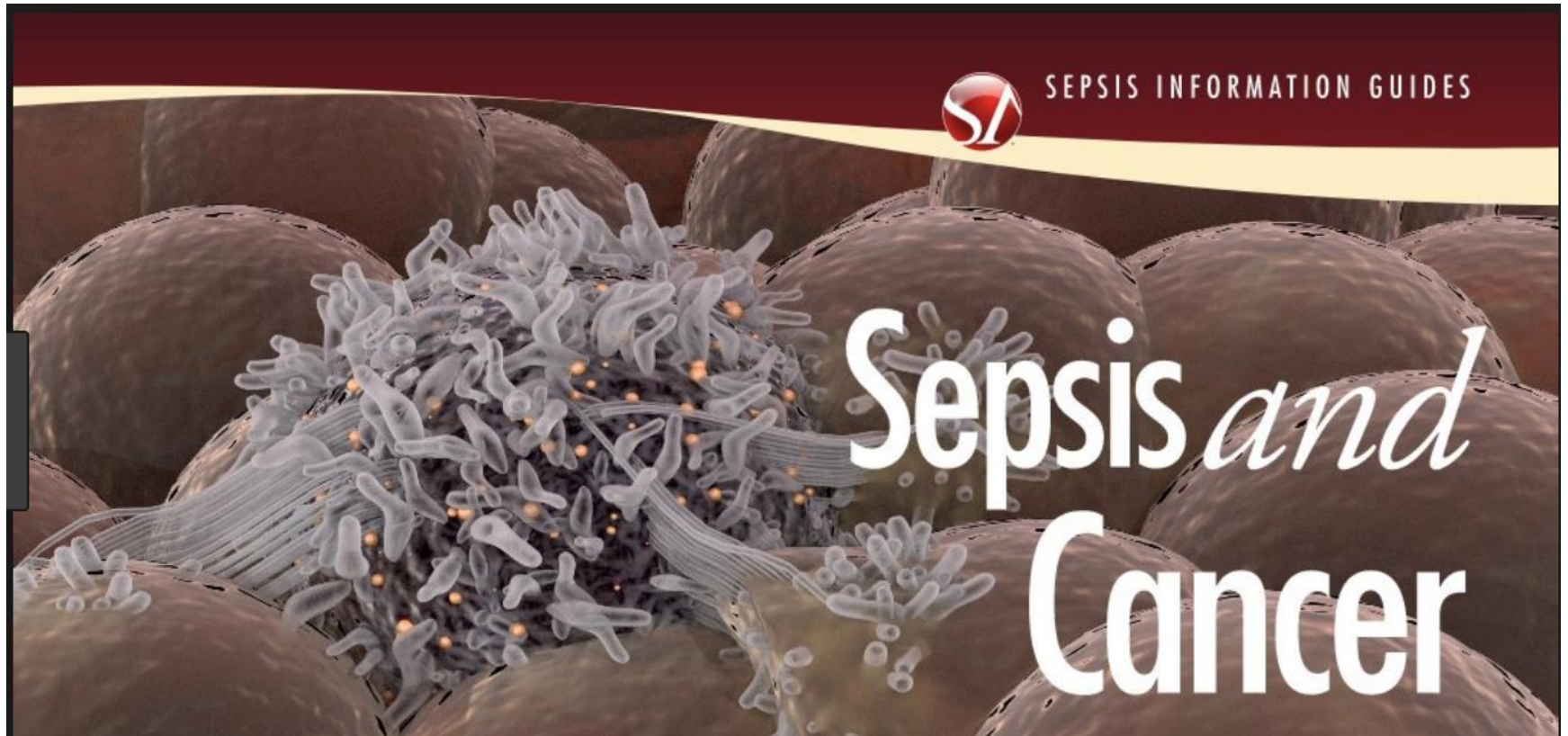


# Special people at risk for Sepsis and Septic Shock





# Special people at risk for Sepsis and Spetic Shock



# Treatment challenges:antimicrobial dosing in sepsis-induced Aki

- Renal dosing in septic shock-using Creatinine clearance : Anish Kumar et al.,(2015);IJCCM.





# Take Home Message



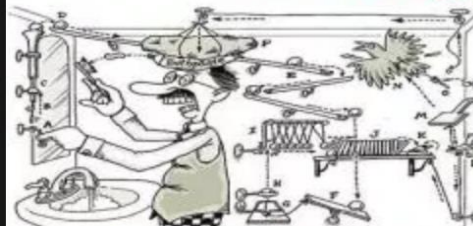
**GET AHEAD  
OF SEPSIS**

**KNOW THE RISKS. SPOT THE SIGNS. ACT FAST.**



## KISS Principle

**KISS** stands for *Keep It Simple, Stupid*  
**Brushing your teeth**



**Bla bla bla bla bla. Bla bla  
bla bla bla. Bla bla bla**



**Squeeze paste onto brush.  
Now brush your teeth.**

**Which way is going to catch on?**



THANK YOU FOR CARING

ANY

?



A great Day, Think Sepsis and Treat Fast!!!



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