



May 28th, 2019

Announcements

- TASP Noon Session
- Cases!



May 28th, 2019

Agenda

- Didactic: *Sepsis Revisited, Part 1*
- Case Discussions

Does your hospital have a sepsis program?

A. Yes

B. No

C. Not sure



If yes, does the program use SEP-1 criteria?

A. Yes

B. No

C. Not sure



Sepsis Definitions

- 18 yo with meningococccemia, coagulopathy and hypoxemia
- 45 yo tourist returning from SE Asia with malaria, renal dysfunction and hyperbilirubinemia
- 90 yo with worsening mental status, decreased UOP and CAUTI



Definitions remain broad

- 18 yo with meningococccemia, coagulopathy and hypoxemia
 - 45 yo tourist returning from SE Asia with malaria, renal dysfunction and hyperbilirubinemia
 - 90 yo with worsening mental status, decreased UOP and CAUTI
- All can fall into the exact same categories of sepsis and septic shock



A Conceptual Approach

UTI

mild

mod

severe

PNA

mild

mod

severe

BSI

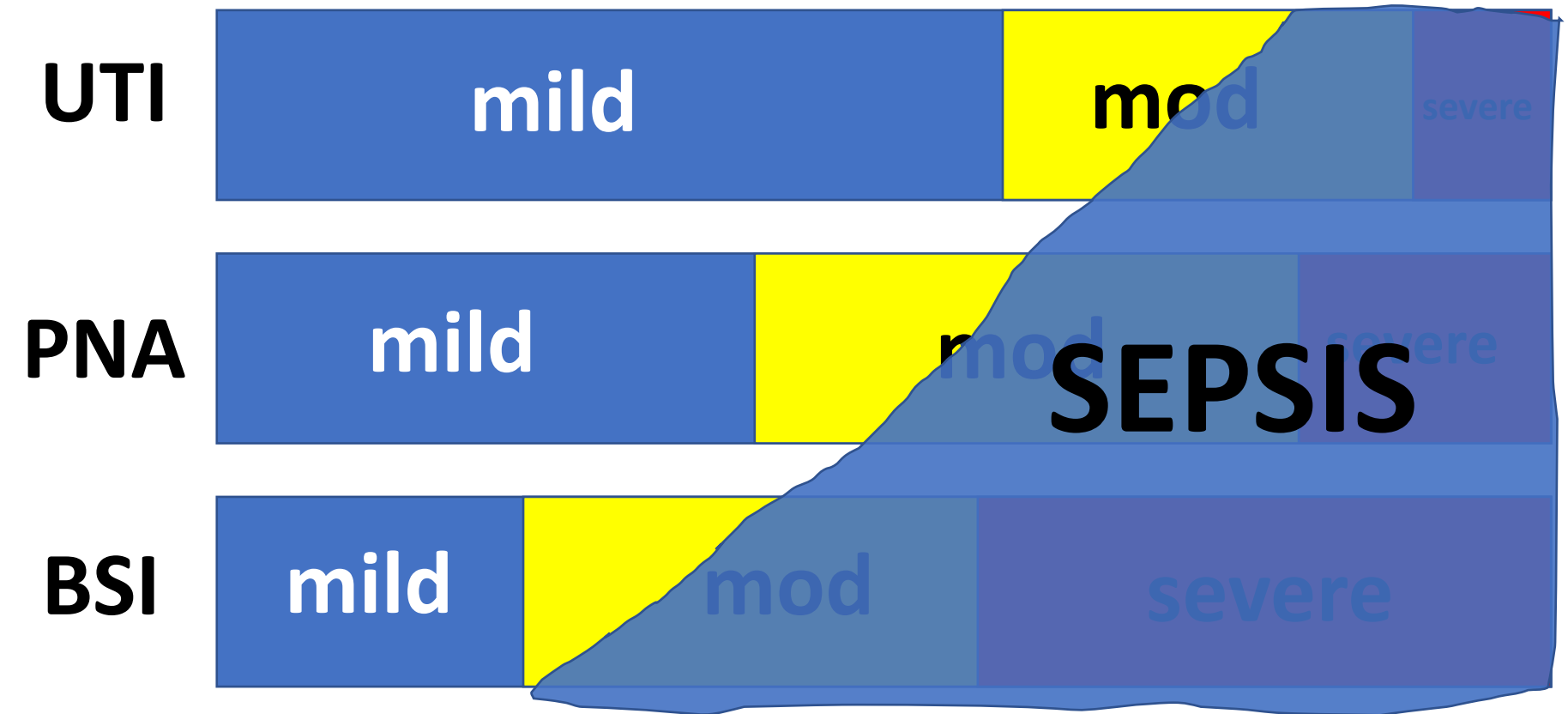
mild

mod

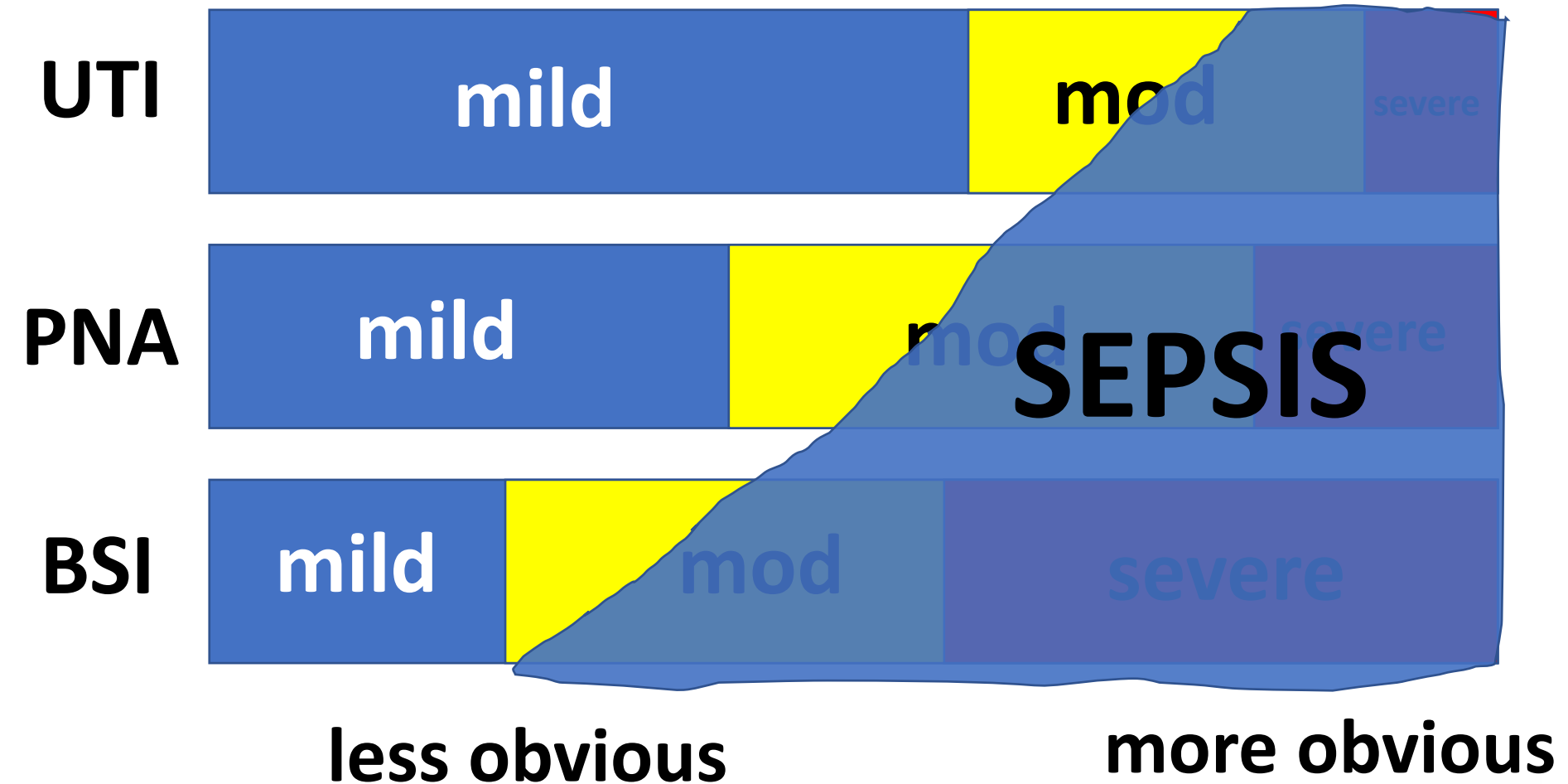
severe



A Conceptual Approach



A Conceptual Approach



Sepsis treatment in practice

- Low adherence to guidelines (ex. 10% of patients do not receive prompt antibiotic therapy)
- All recommended interventions occur ~30% of patients



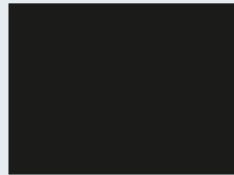
Sepsis

- >1,000,000 patients per year in the USA, ~27,000,000 globally
- \$20.3 billion / 5.2% of total hospital costs
- Mortality rate = 28% - 50% (8,000,000/world)
- ~50% of hospitals deaths attributable to sepsis
- Many survivors have long-lasting complications



Cases per
100,000 /
USA¹

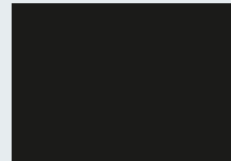
223
Stroke



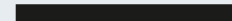
377
Sepsis



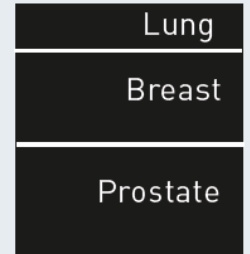
208
Myocardial
infarction



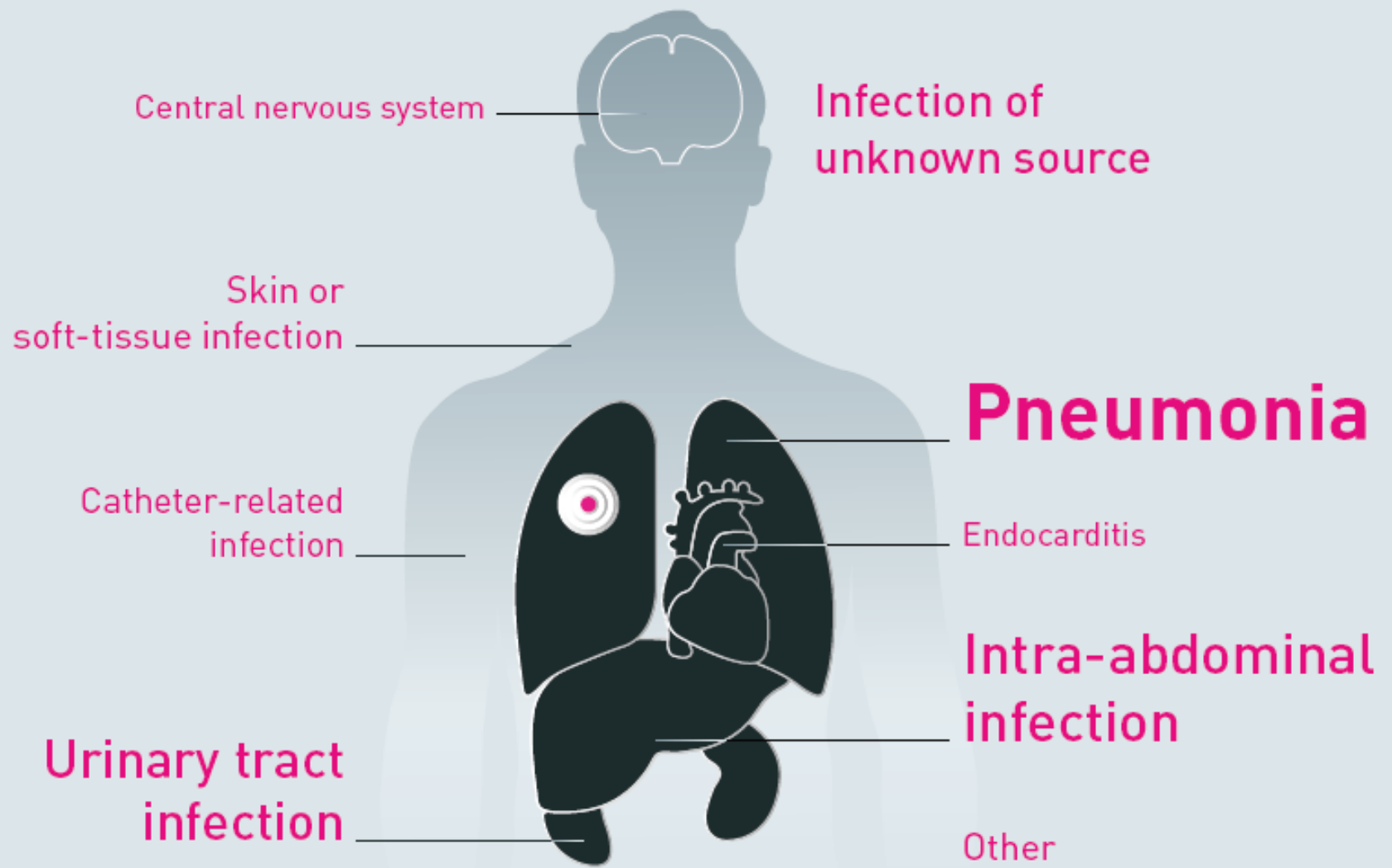
22,8
HIV



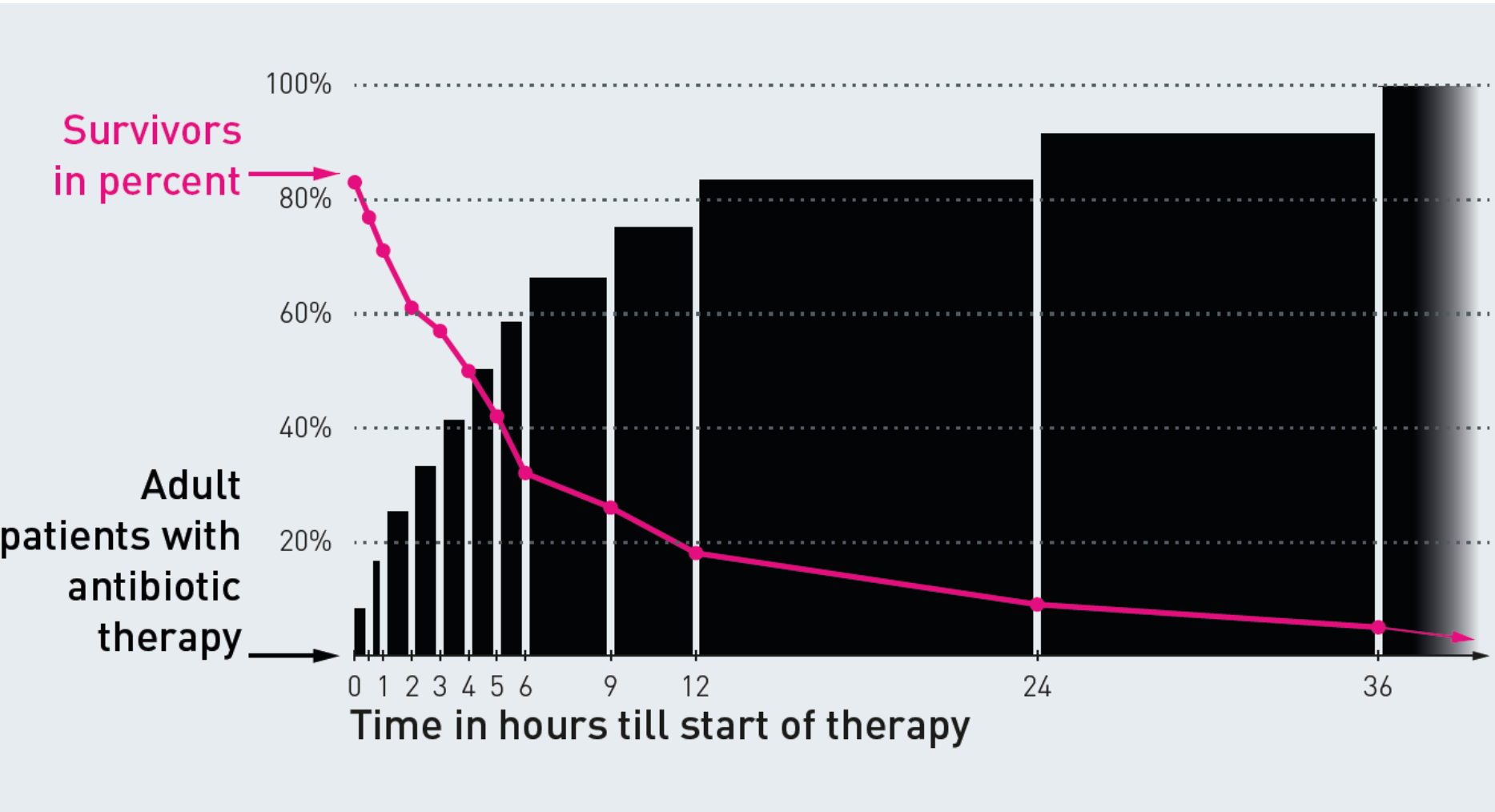
331,8
Cancer



The most common sources of sepsis are:



Early Administration of Antimicrobials is Critical



Pathophysiology of Sepsis

- More complicated than “inflammation”
- Likely involves immunosuppression
- Involves non-immune physiology
- Organ dysfunction and “hibernation”



Risk Factors for Sepsis

- Extremes of age
- Immunocompromised state
(chronic steroids, cancer, SCT, SOT)
- Trauma or burn
- Devices (catheters)
- Genetics



SIRS to Sepsis

- <36 degrees C or >38 degrees
 - HR > 90 /minute
 - RR >20 /minute
 - PaCO₂ 32 mmHg and
 - WBC $<4,000$ or $12,000$ and/or $>10\%$ bands
- 2 or more + concern for infection =
sepsis



Sepsis to Severe Sepsis and Shock

- Sepsis +
 - End-organ dysfunction
 - <90 mmHg
 - And/or lactate >4 mmol/L

➤ = **Severe sepsis**
- Persistent hypotension, end-organ damage = **Septic shock**



New Definitions – Septic Shock

- Septic shock: Sepsis with circulatory and cellular/metabolic abnormalities profound enough to substantially increase mortality
- Sepsis and vasopressor therapy needed to elevate MAP ≥ 65 mmHg and lactate >2 mmol/L after adequate fluid resuscitation



Issues with New Definitions

- Based on retrospective data
- “Consensus” of 2 organizations
- Diagnosis delay?
- No more SIRS, so mortality increases as the denominator population decreases in size, even if the hospital is diagnosing and treating sepsis better



Immediate Actions – Severe Sepsis

- Time Zero = meets SEPSIS criteria*
 - ED, acute care, ICU
 - Early recognition is critical, hence the push
- Resuscitation bundles
 - 3 and 6 hours bundles
 - Key elements are antibiotics and resuscitation (EGDT)



3-Hour Bundle

- Measure lactate level
- Blood cultures prior to antimicrobial administration (if possible)
- Administer broad spectrum antimicrobials
- Give 30ml/kg crystalloid for hypotension or lactate ≥ 4 mmol/L



6-Hour Bundle

- Give vasopressors (MAP <65 mmHg)*
- If persistent hypotension or initial lactate ≥ 4 mmol/L
 - Check CVP (goal ≥ 8 mmHg)
 - Measure ScvO₂ (goal $\geq 70\%$)
- Check lactate again

*other markers of preload: bedside ultrasound, pulse-pressure dissociation, UOP, mentation



Surviving Sepsis Campaign: International Guidelines for Management of Severe Sepsis and Septic Shock: 2012

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Discussion, questions, comments?

