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April 4, 2017

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Agenda

- Didactic: *Sepsis I*
- Case: Lincoln Hospital, Davenport, WA

URL: http://rwpoll.com
Code: uwecho

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Sepsis I (*Σήψις*)

John Lynch, MD, MPH
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April 4, 2017

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This presentation is intended for educational use only, and does not in any way constitute medical consultation or advice related to any specific patient.

Definitions Remain Broad

- 18 yo with meningococcemia, coagulopathy and hypoxemia
- 45 yo tourist returning from SE Asia with malaria, renal dysfunction and hyperbilirubinemia
- 90 yo with worsening mental status, decrease UO and CAUTI

➢ All can fall into the exact same categories of sepsis and septic shock

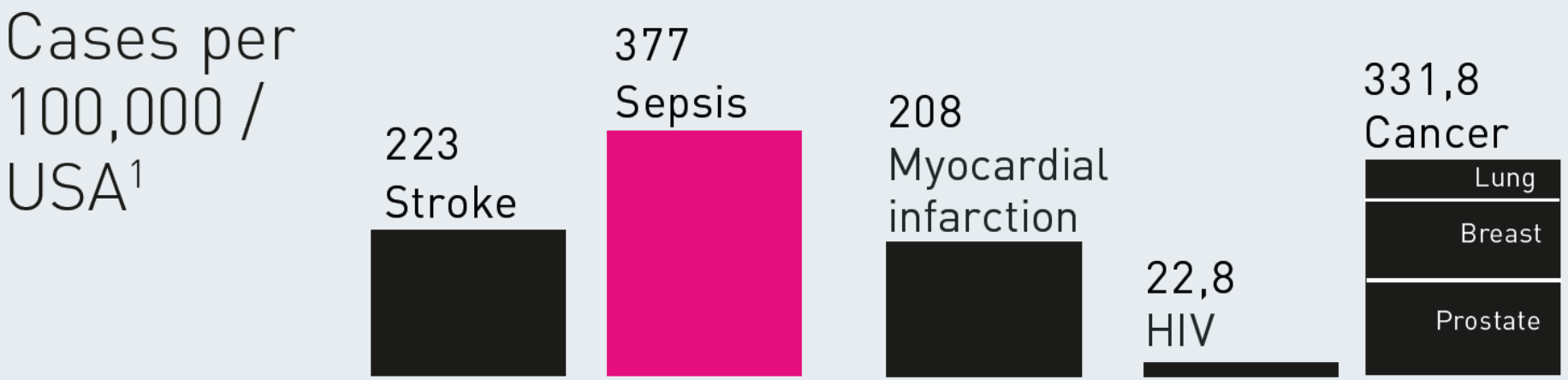
Abraham, JAMA, 2016

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



World-sepsis-day.org

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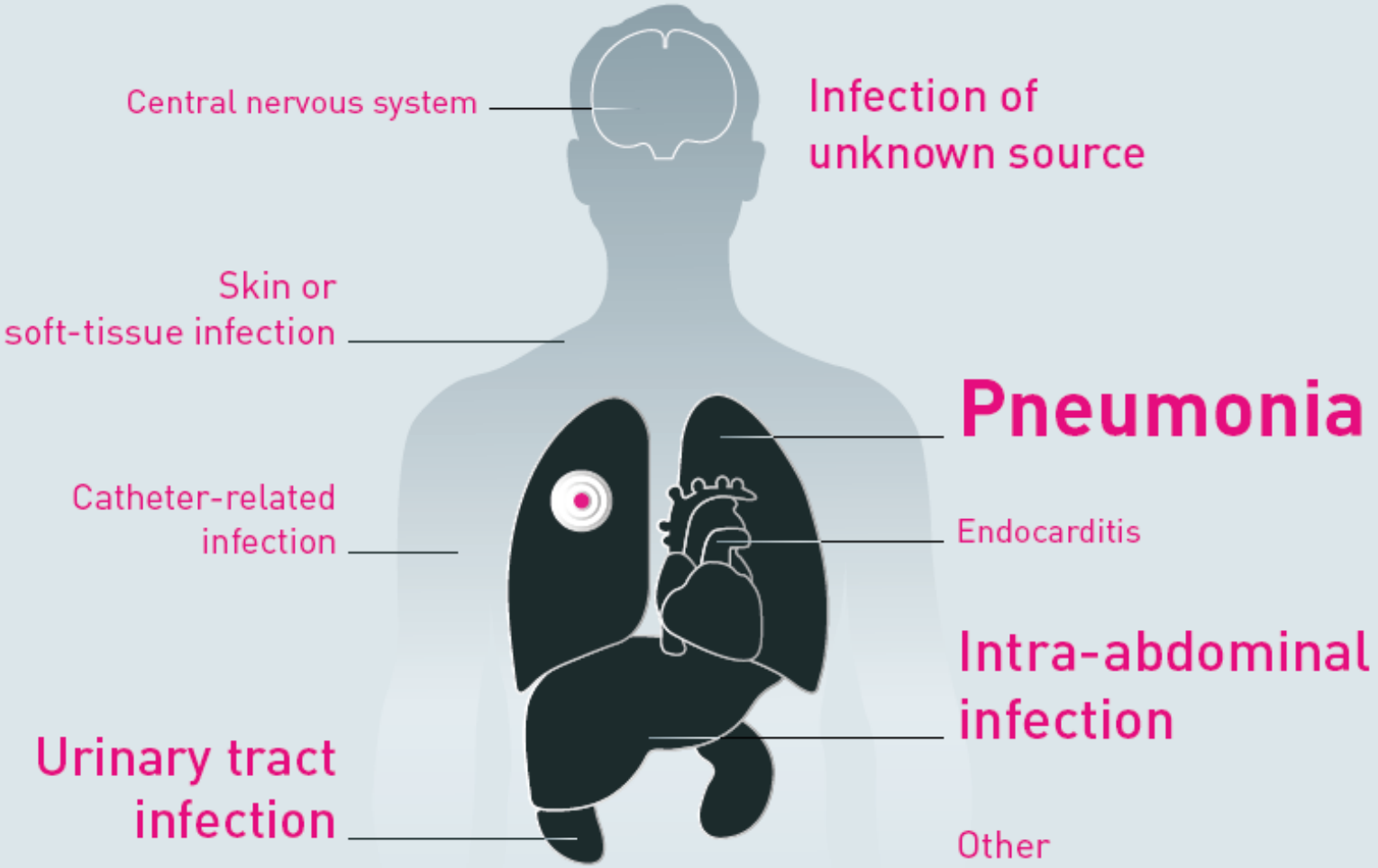
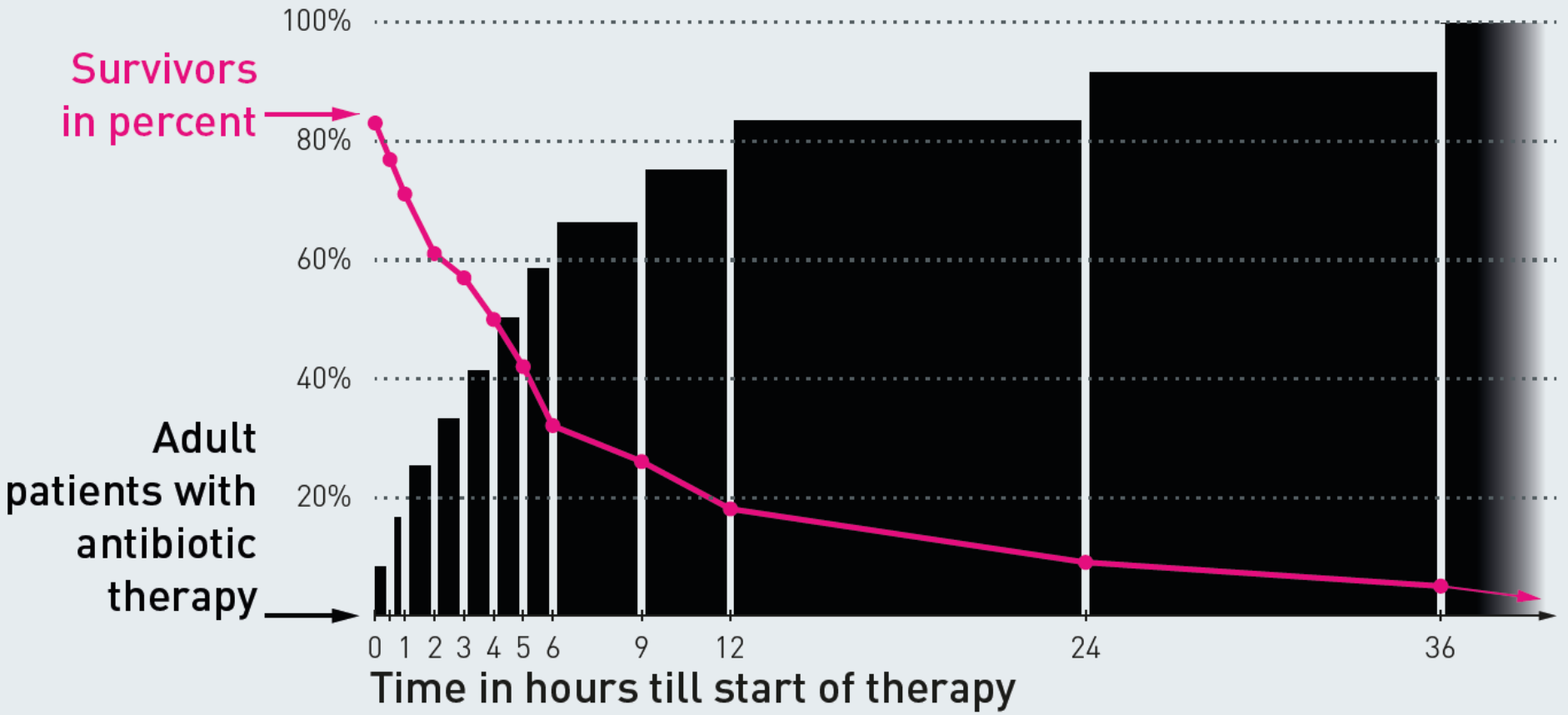
The most common sources of sepsis are:



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

Evolution of Definitions – SEPSIS III

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 – Sepsis-III

- Sepsis: Life-threatening organ dysfunction cause by dysregulated host response to infection
- Suspected or documented infection and an acute increase of ≥2 SOFA points

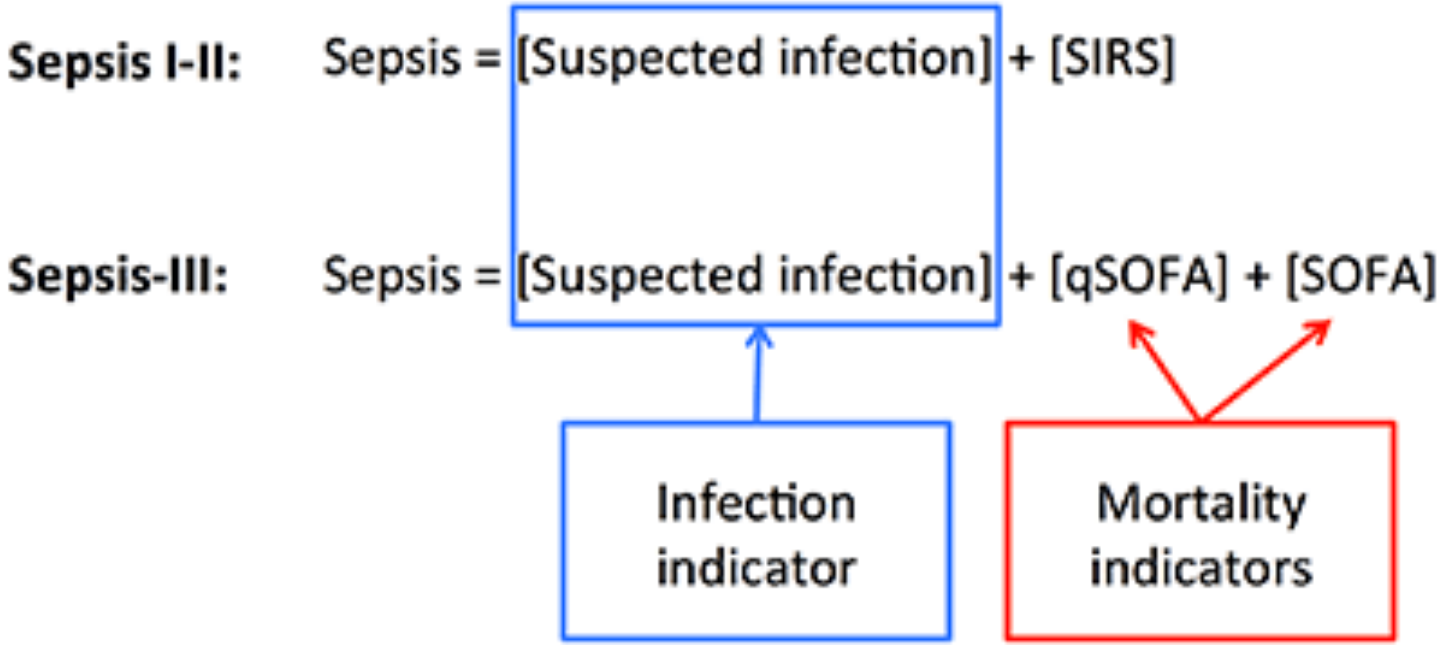
Singer, JAMA, 2016

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

New Definitions

- No more SIRS
- Many inpatients met criteria, sometime for benign conditions, so not specific



Sequential Organ Failure Assessment Score

System	Score 0	1	2	3	4
Respiration					
Pao_2/Fio_2, mm Hg (kPa)	≥400 (53.3)	<400 (53.3)	<300 (40)	<200 (26.7) with respiratory support	<100 (13.3) with respiratory support
Coagulation					
Platelets, $\times 10^3/\mu L$	≥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)[b]	Dopamine 5.1-15 or epinephrine ≤0.1 or norepinephrine ≤0.1[b]	Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1[b]
Central nervous system					
Glasgow Coma Scale score[c]	15	13-14	10-12	6-9	<6
Renal					
Creatinine, mg/dL (μmol/L)	<1.2 (110)	1.2-1.9 (110-170)	2.0-3.4 (171-299)	3.5-4.9 (300-440)	>5.0 (440)
Urine output, mL/d				<500	<200

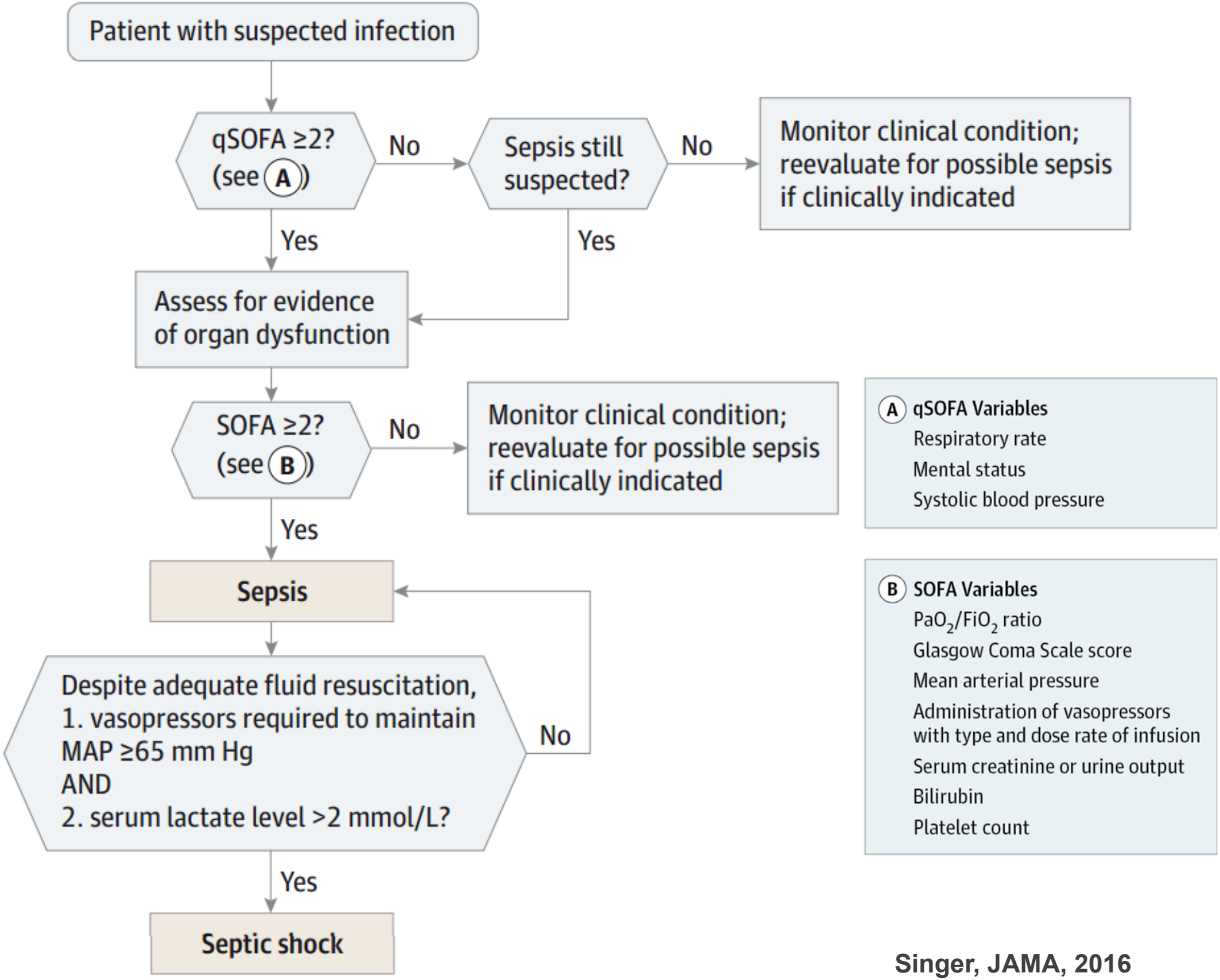
aka SOFA score acute = >2 indicates organ dysfunction

Singer, JAMA, 2016

quickSOFA Score

- RR >21, alt mentation, SBP <100
- Study used SOFA, SIRS and LODS to evaluate 148,907 patients with suspected sepsis
- Among ICU pts, SOFA superior to SIRS as predictor
- Outside the ICU, qSOFA better predictor of in-hospital mortality
- Based on retrospective data, more research is needed

Seymour, JAMA, 2016



Singer, JAMA, 2016

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)

References

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Thank you!

Next week: *Sepsis II*

Next session: Tuesday April 11th, 2017