



Diagnosis And Management of Sepsis

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Disclosures

- ▶ Avera Health Utilization Committee Member

Objectives

1. Discuss why the identification and management of sepsis is so important
2. Define SIRS, Sepsis, Severe Sepsis, and Septic Shock
3. Discuss management of Sepsis, Severe Sepsis, and Septic Shock
 - ▶ Identify key points in sepsis care
 - Focus on nursing workflow once admitted to the hospital

CMS “Sepsis Bundle” (SEP-1 Measure)

- ▶ Data show increased utilization of 3 hour and 6 hour sepsis bundles decrease mortality⁵
- ▶ Measure created to increase compliance in achieving superior outcomes in patients diagnosed with severe sepsis and septic shock
- ▶ Hospital performance analyzed and compared
- ▶ Measure starts at “Time Zero”
 - ▶ Time zero = When sepsis identified.

CMS "Bundle" (SEP-1 Measure)

3 Hour Bundle

- ▶ Blood cultures x 2 prior to antibiotic administration
- ▶ Broad spectrum antibiotics delivered
- ▶ Initial Lactic Acid

Additional Bundle Components

- ▶ Repeat Lactic Acid within 6 hours of "time zero" if initial Lactate >2
- ▶ 30ml/kg fluid bolus for the following
 - ▶ Hypotension
 - ▶ Lactic Acid ≥ 4.0
- ▶ Following **completion** of fluid bolus, if persistent hypotension exists the following must occur:
 - ▶ Physical Reassessment performed
 - ▶ Vasopressors initiated within 1 hour cessation fluid bolus

Why is early identification and management of sepsis so important?

- ▶ Sepsis and septic shock represent medical emergencies.¹
- ▶ Every hour delay of antimicrobial administration is associated with increase in mortality in patients with sepsis.^{2,3}
- ▶ Sepsis mortality in one study was 16%...those with septic shock had a mortality of 46%.⁴

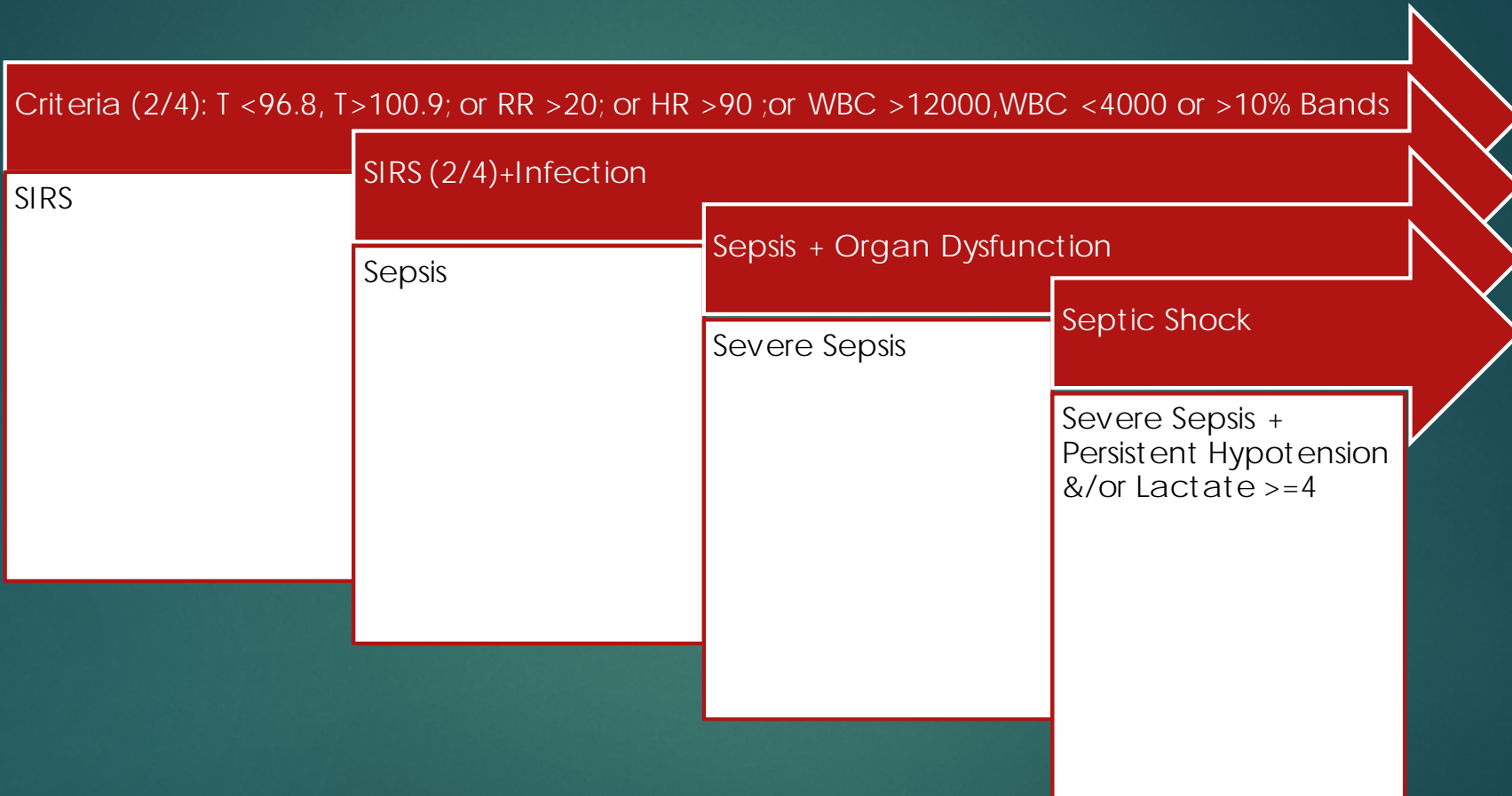
Why is early identification and management of sepsis so important?

Data Timeframe

- July 2017-June 2018
- Patient Population
 - Adults \geq 18
 - Dx: Severe Sepsis, Septic Shock
 - N=1038

Avera Health Data

	<u>Met Bundle</u>	<u>Didn't Meet the bundle</u>
<u>Mortality</u>	32% (24/74)	68% (50/74)
<u>LOS</u>	5.5 days (1.2 ICU days)	8.6 days (2.1 days in ICU)



Systemic Inflammatory Response Syndrome (SIRS)

- ▶ Criteria
 - ▶ Temperature:
 - ▶ < 96.8 Degrees F
 - ▶ >100.9 F
 - ▶ Respiratory Rate: > 20
 - ▶ Heart Rate: >90
 - ▶ WBC:
 - ▶ <4000
 - ▶ >12000
 - ▶ >10% Bands

* Need to fulfill 2/4 criteria to be diagnosed with SIRS

Sepsis

- ▶ Sepsis = SIRS + concern for infection
 - ▶ Potential sources
 - ▶ Urine (UTI/Pyelonephritis)
 - ▶ Lungs (Pneumonia)
 - ▶ Skin/Soft Tissue (Cellulitis)
 - ▶ Heart (Endocarditis)
 - ▶ Abdomen (Intra-abdominal abscess)
 - ▶ Brain (Encephalitis/Meningitis)

Severe Sepsis=Sepsis + Organ Dysfunction (any of below criteria)

Physical Exam Findings

- ▶ Hypotension:
 - ▶ SBP <90
 - ▶ MAP <65, or
 - ▶ Decrease in SBP by >40 points from normal.
- ▶ New need for CPAP, BiPAP or ventilator support.
- ▶ Urine output <0.5 mL/kg/hr for 2 consecutive hours.
- ▶ Mental status changes.

Laboratory Findings

- ▶ • Lactate >2.0
- ▶ • Creatinine >2.0
- ▶ • Total bilirubin >2.0
- ▶ • Platelet <100,000
- ▶ • INR >1.5
- ▶ • aPTT >60 seconds

Septic Shock=Severe Sepsis and 1 of the following:

Vital Sign Criteria

- ▶ Persistent Hypotension
 - ▶ Defined as 2 consecutive low B/P readings 1 hour after conclusion of 30 mL/kg bolus
- ▶ Hypotension Definition
 - ▶ SBP <90
 - ▶ Mean Arterial Pressure (MAP) <65
 - ▶ Decrease in SBP by >40 points from normal

Lab Criteria

- ▶ Initial Lactic Acid
 - ▶ ≥ 4.0

Criteria (2/4): T <96.8, T >100.9; or RR >20; or HR >90 ;or WBC >12000, WBC <4000 or >10% Bands

SIRS

SIRS (2/4)+ Infection

Sepsis

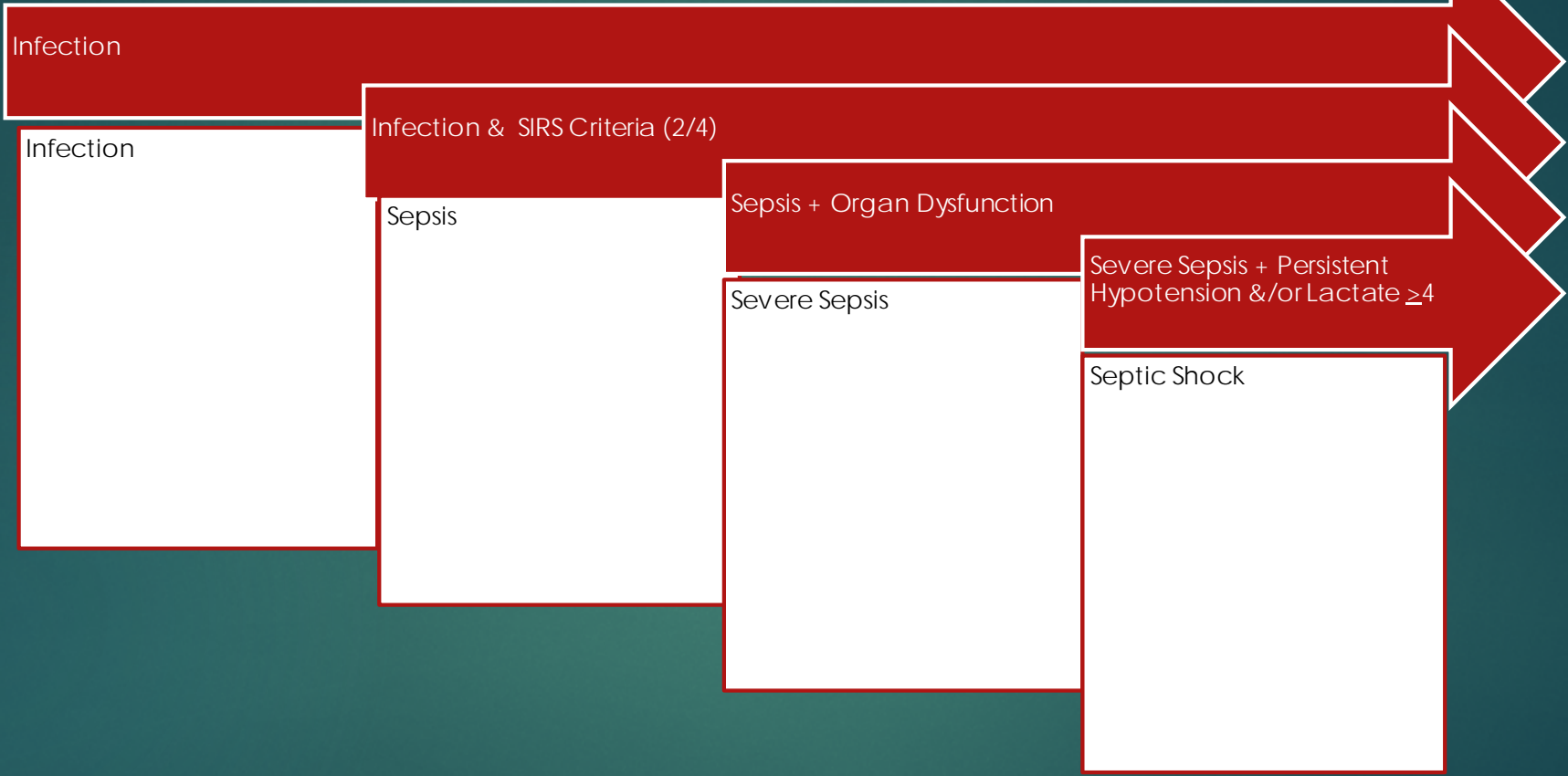
Sepsis + Organ Dysfunction

Severe Sepsis

Severe Sepsis + Persistent Hypotension &/or Lactate ≥ 4

Septic Shock





Management of the “Septic” Patient

- ▶ Concern for infection & 2/4 SIRS criteria
 1. Obtain two peripheral blood cultures immediately PRIOR to antibiotic use
 2. Obtain Labs
 - ▶ Lactic Acid
 - ▶ Comprehensive Metabolic Panel
 - ▶ CBC
 - ▶ INR
 3. Ensure Appropriate IV Access Established
 - ▶ 2 large bore (Preferably 20 gauge or greater) Ivs
 - ▶ Antecubital fossa most distal access point
 4. Administer Broad Spectrum Antibiotics
 - ▶ Immediately following blood cultures
 - ▶ IV access limited?
 - ▶ Administer antibiotics that are able to be infused via bolus.¹

Management of the patient with "Severe Sepsis"

Group 1: Treatment no different than "septic patient" *

- ▶ • Creatinine >2.0
- ▶ • Total bilirubin >2.0
- ▶ • Platelet <100,000
- ▶ • INR >1.5
- ▶ • aPTT >60 seconds
- ▶ Mental status changes
- ▶ New initiation of BiPAP or CPAP

One Exception!

- Lactic Acid >2
 - ▶ Repeat Lactic Acid
 - ▶ Process hardwired to reflex if > 2, thus no additional order/intervention necessary

Group 2: Sepsis treatment & 30 cc/kg bolus IVF

- ▶ Hypotension:
 - ▶ SBP <90 mm Hg
 - ▶ MAP <65 mm Hg
 - ▶ Decrease SBP >40 mm Hg from baseline
- ▶ Lactate \geq 4

Management of Patient with “Septic Shock”

Septic Shock Definition

- ▶ Persistent hypotension
 - ▶ Defined as 2 consecutive low B/P readings 1 hour after conclusion of 30 mL/kg bolus
- ▶ Hypotension definition
 - ▶ SBP <90
 - ▶ Mean Arterial Pressure (MAP) <65
 - ▶ Decrease in SBP by >40 points from normal
- ▶ Initial lactic acid \geq 4.0
 - ▶ And persistent hypotension

Severe Sepsis Treatment and the Following:

- ▶ Initiate vasopressors
 - ▶ Levophed (norepinephrine)
 - ▶ Vasopressin (Pitressin)
- ▶ Goal MAP
 - ▶ 65 (Most Often)

Critical Transitions in Sepsis Care

Clinic to ED

- Communication is the most important aspect
 - Suspected source of infection
 - Blood cultures obtained
 - Antibiotics administered thus far (and those left to administer)
 - Initial lactic acid
 - Candidate for 30 cc fluid bolus
 - Amount administered & amount remaining

ED to Inpatient

- Communication is the most important aspect
 - Suspected source of infection
 - Blood cultures obtained
 - Antibiotics administered thus far (and those left to administer)
 - Initial lactic acid
 - Candidate for 30 cc fluid bolus
 - Amount administered & amount remaining

Hospital to Hospital

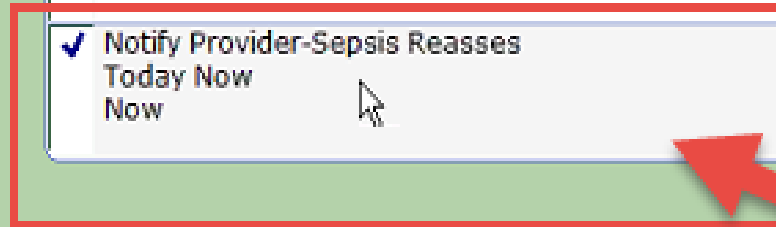
- Communication is the most important aspect
 - Suspected source of infection
 - Blood cultures obtained
 - Antibiotics administered thus far (and those left to administer)
 - Initial lactic acid
 - Candidate for 30 cc fluid bolus
 - Amount administered & amount remaining

Critical Transitions in Sepsis Care:

- Severe sepsis + hypotension and/or lactate >4
- Administration of 30 ml/kg bolus
- If Adult sepsis diagnostic or therapeutic order set utilized (Inpatient)
 - Volume reassessment order (reflex order) generated
 - Critical to obtain 2 blood pressures immediately following completion of fluid bolus
 - Perform focused fe-assessment/physical exam post 30 ml/kg fluid bolus
 - Notify Provider of results

4 Selected Orders

Reflexed From: Sodium Chloride 0.9% Duration (Ns)	
Nursing	
<input checked="" type="checkbox"/>	VS - Vital Signs Today Now Q30MX12
<input checked="" type="checkbox"/>	VS - Vital Signs ICU Today Now Q30MX12
<input checked="" type="checkbox"/>	Sepsis Volume Reassessment Today Now Q1MX1,Q2HX1
<input checked="" type="checkbox"/>	Notify Provider-Sepsis Reasses Today Now Now



Critical Transitions in Sepsis Care:

- Severe sepsis + hypotension and/or lactate >4
 - Notify provider of recent vital signs & physical exam findings

Real Time
Mon, Oct 14, 2019 1024
Greg A Hartman

Intervention	Text/Ord	Status	Src	Frequency	History	Next Scheduled	Prtcl	Assoc Data
Sepsis Volume Reassessment	💬	A	OE	Q1MX1,Q2HX1		0955 1155		
VS - Vital Signs	💬	A	OE	Q30MX12		0955 1025		▶
VS - Vital Signs ICU	💬	A	OE	Q30MX12		0955 1025		▶
Notify Provider-Sepsis Reassessment	💬					0955		

View Sepsis Volume Reassessme... x

Text

Complete 1 hr post 30 ml/kg bolus.

Contact provider/EICU with this physical assessment and most recent vital signs/labs to evaluate need for vasopressors or next steps.

Clarify if provider/EICU will complete the Acute Sepsis Vol Reassess" NQM order or accept/enter their verbal/telephone order.

Critical Transitions in Sepsis Care:

- Inquire if you can enter the sepsis NQM order based on your physical assessment
- If has refractory hypotension
 - Inquire if vasopressors need to be initiated

MIS - Enter/Edit MIS Assessment | STD5.67 - Test) - Greg A Hartman

MIS - ORM/EDM Assessment Preview

Notify Provider - Sepsis

Physician Notification	
Time Doctor Paged	
Doctor Notified	Name of Dr. notified
Method of Notification	<input type="radio"/> Dr.'s Nurse <input type="radio"/> In Person <input type="radio"/> Phone
Communication Time with Dr.	
Reason Dr. Called	<input type="checkbox"/> AMA <input type="checkbox"/> Admit <input type="checkbox"/> Chest Pain <input type="checkbox"/> Code <input type="checkbox"/> Condition Change <input type="checkbox"/> Consult <input type="checkbox"/> Discharge <input type="checkbox"/> Lab Results <input type="checkbox"/> Medication <input type="checkbox"/> Nausea <input type="checkbox"/> Pain <input type="checkbox"/> Pt.'s Status <input type="checkbox"/> Rad. Results <input type="checkbox"/> Rapid Response <input type="checkbox"/> Weight Change
MD Call Information	<input type="checkbox"/> Text
Sepsis NQM	<input type="radio"/> Nurse <input type="radio"/> Provider
Order Entered By	Discuss physical assessment and most recent vital signs to evaluate need for vasopressors and next steps.

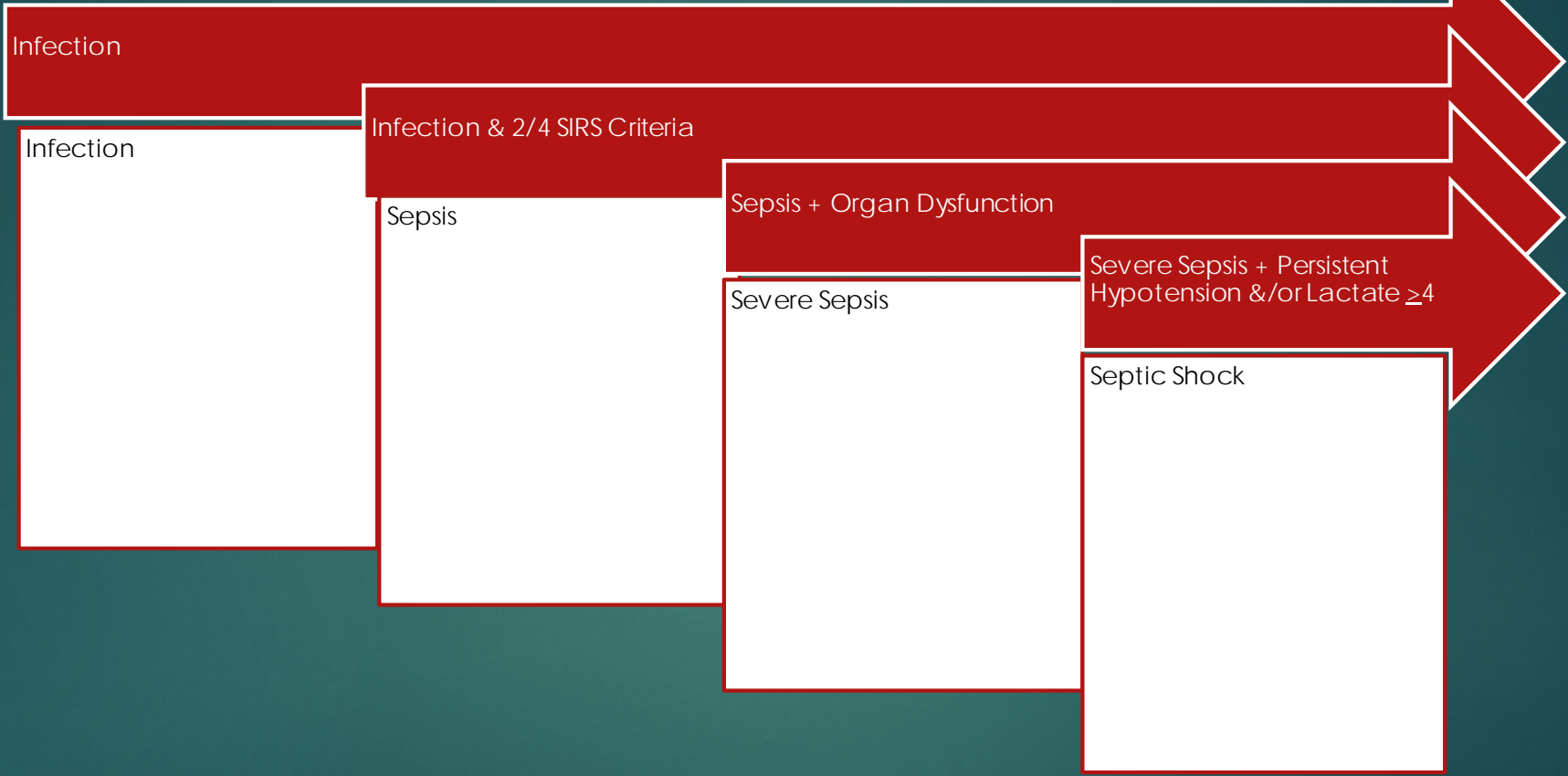
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Status Board
Interventions
Outcomes
eMAR
IV Spreadsheet
Transfusions
Manage Cond Lists
Special Panel

Assign Care Providers
Notes
Process Plans
Schedule

EMR
Orders
Allergies
Physician Doc
Oncology
Reconcile Meds
Patient Instructions
Pt Ed
Discharge
Exit PCS



Take Home Points

- ▶ Sepsis kills-if patients develop septic shock, mortality can reach 46%⁴
- ▶ Nursing is critical in ensuring septic patients are identified early, and managed appropriately
- ▶ Communication between nursing departments is critical for success

References

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2. Kumar A, Roberts D, Wood KE, et al. Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock. Critical Care Medicine 2006; 34:1589–1596.
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