Sepsiste Bundle Uygulamaları

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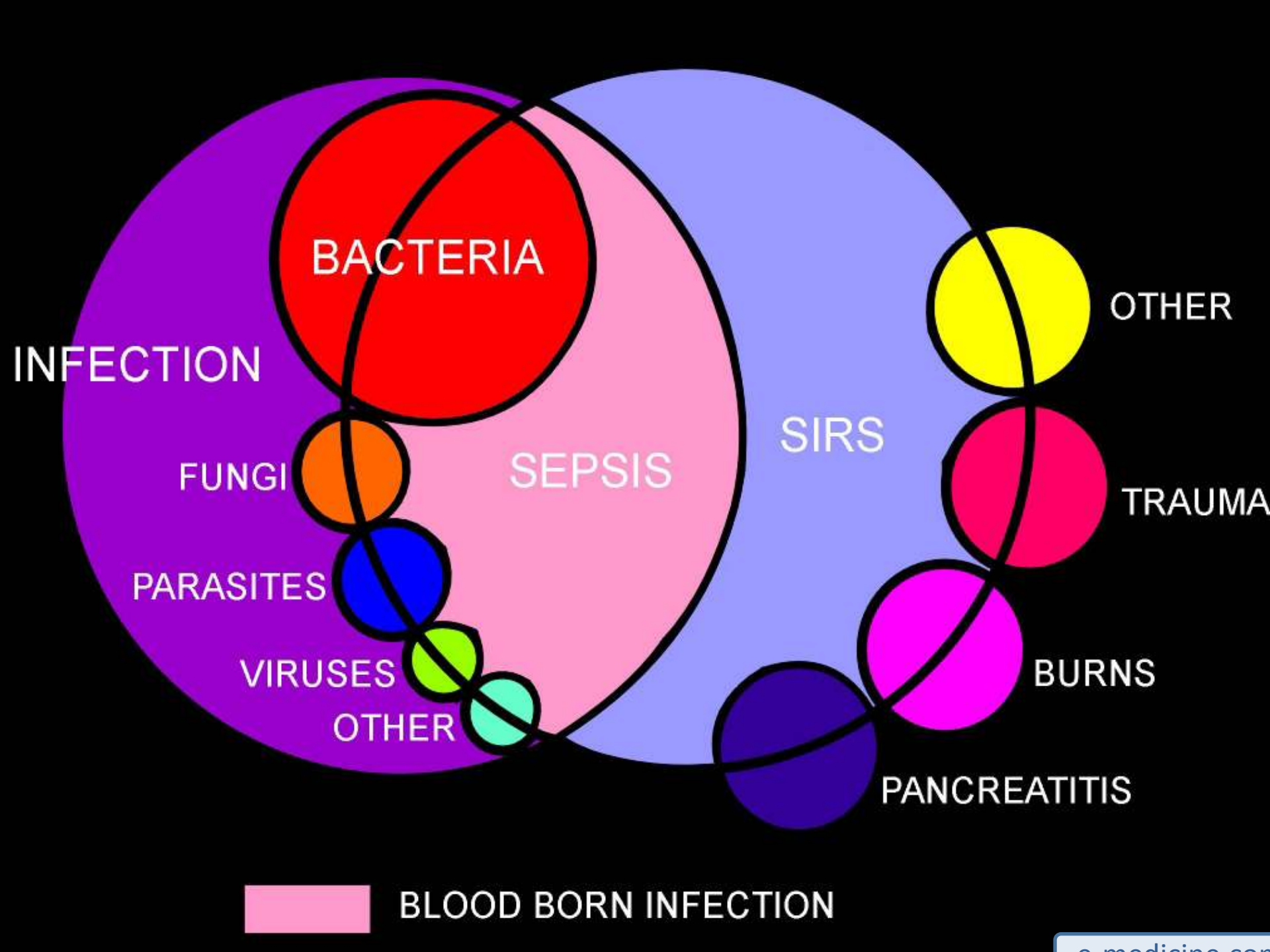
Yıldırım Beyazıt Üniversitesi
Tıp Fakültesi
Enfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Kliniği

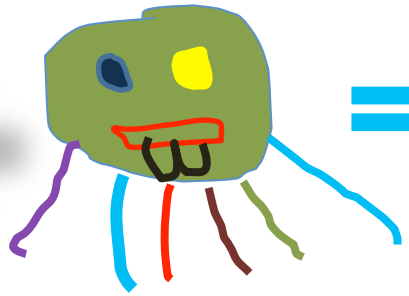
Tanımlamalar

Bakteremi

SIRS

Sepsis

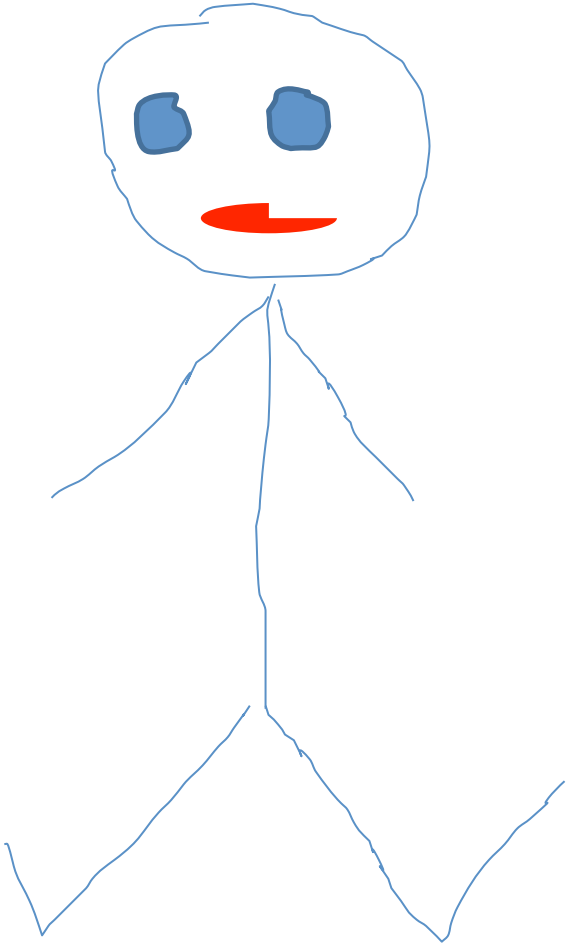

BACTERIA
INFECTION
FUNGI
SEPSIS
SIRS
OTHER
TRAUMA
PARASITES
VIRUSES
OTHER
BURNS
PANCREATITIS
BLOOD BORN INFECTION

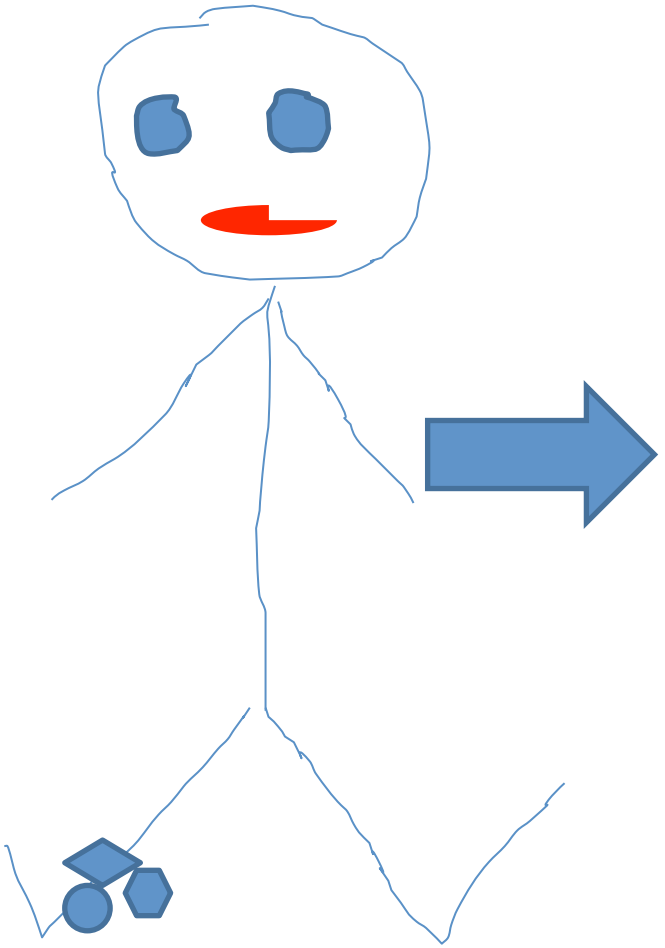
SIRS +  = Sepsis

Sepsis + Organ yetmezliği = Ağır Sepsis/ Sepsis Sendromu

Hipoperfüzyon
Laktik asidoz
Oliguri
Mental durum değişikliği

NORMAL HOST

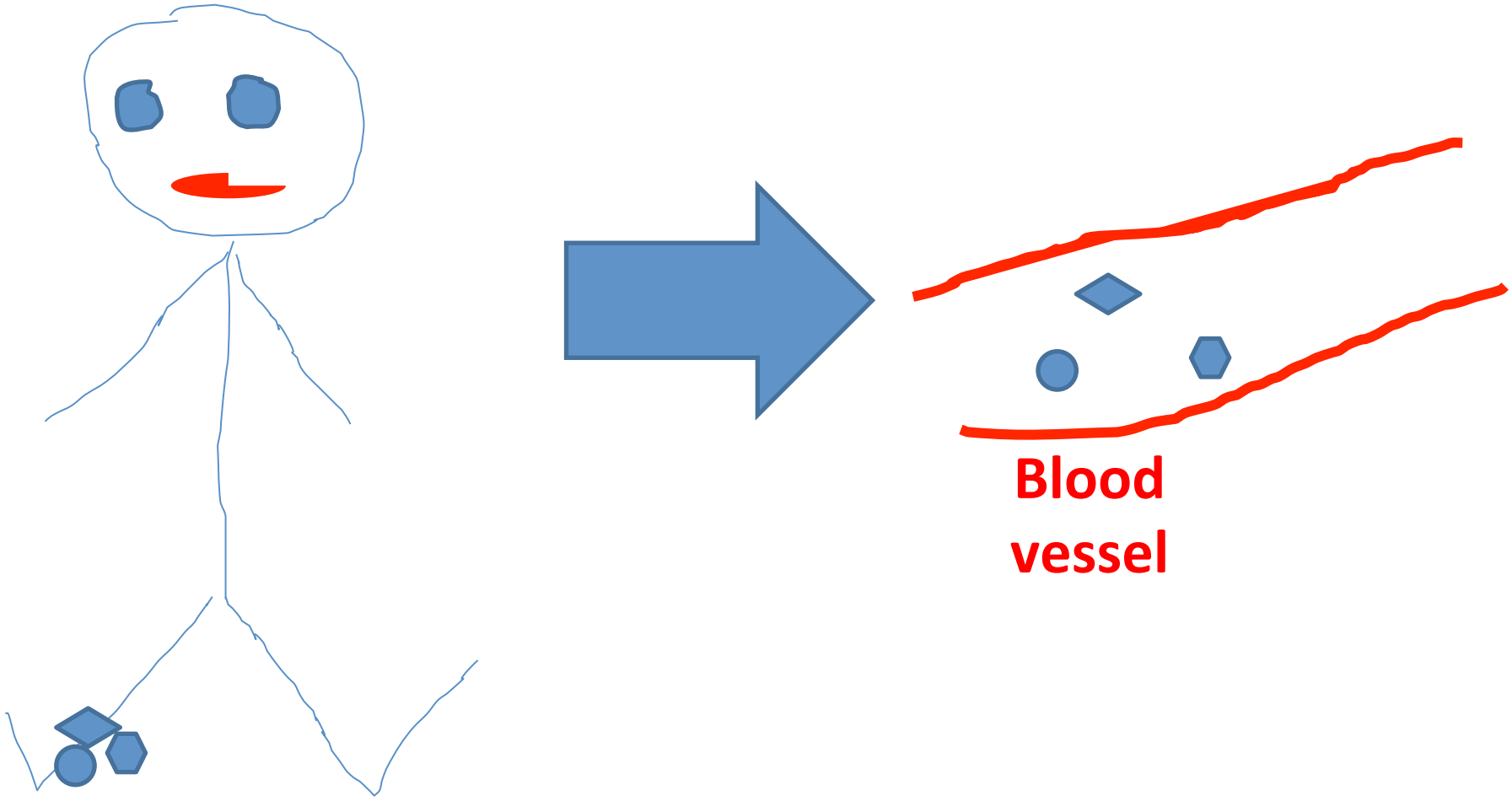




interaction between the pathogen and the host's immune system

Host kills bacteria

Bacteria kills the host


Blood
vessel

ENDOTOXINS

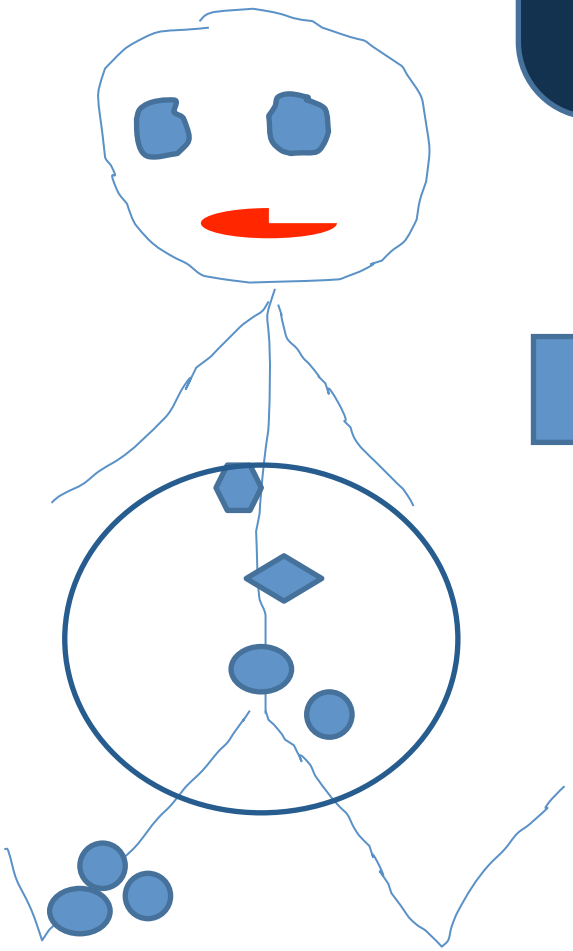
Cytokine release

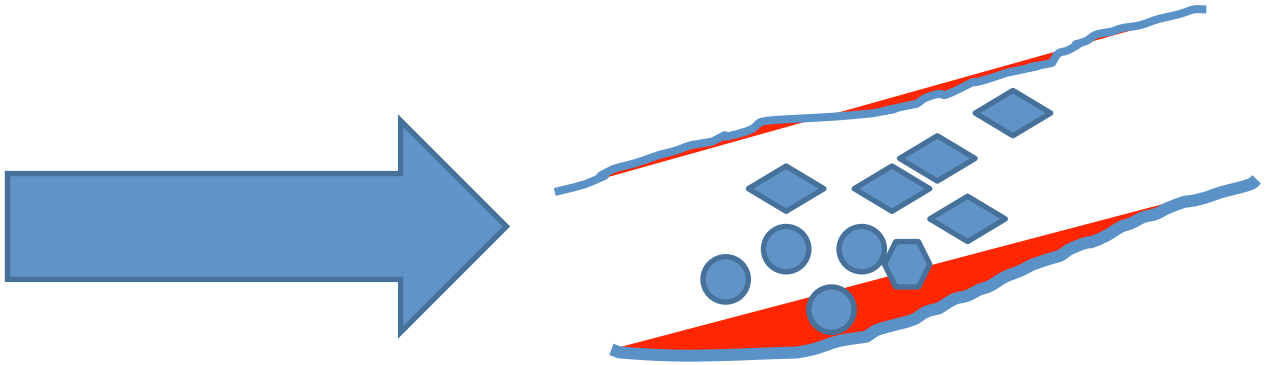
LPS!!----growth phases of the Gr neg bacteria

Cell lysis by host defence mechanism-antibiotics

Peptidoglycan layer and

Teichoic acids (Gram pos)





Blood vessel

EXOTOXINS

TSST!!- *S. aureus* and Gr A *Streptococcus*

Large T cell and cytokine response

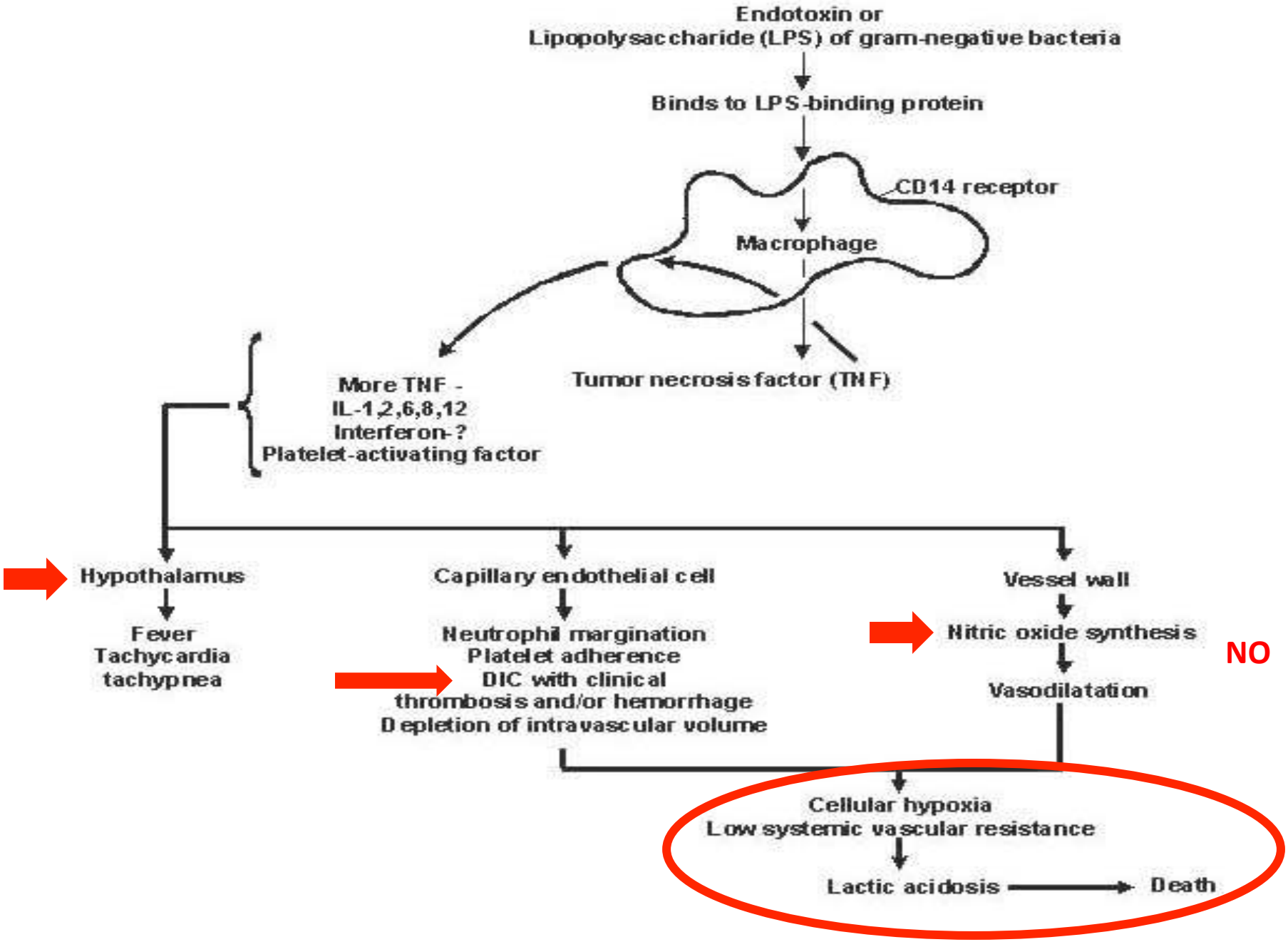
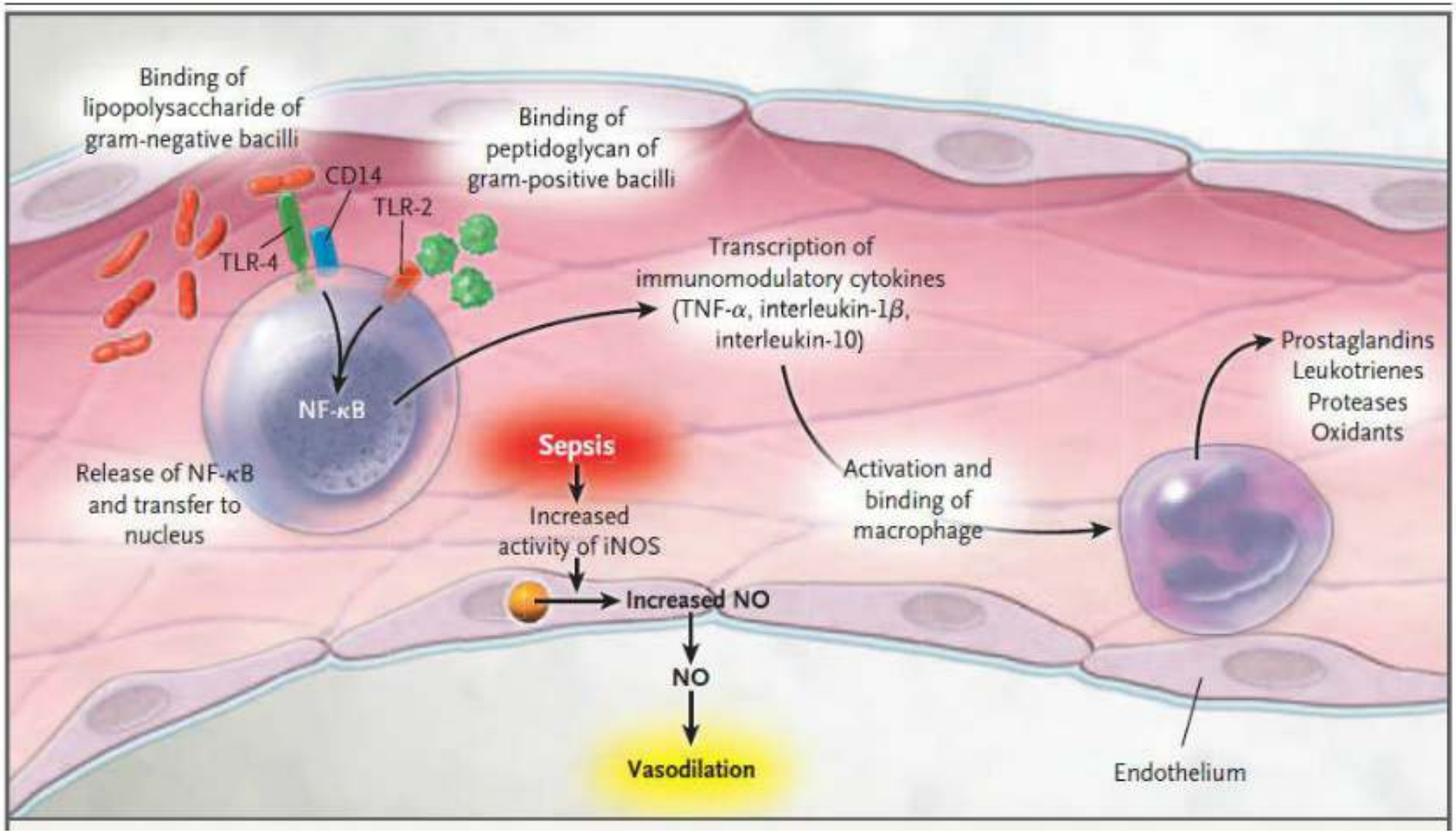
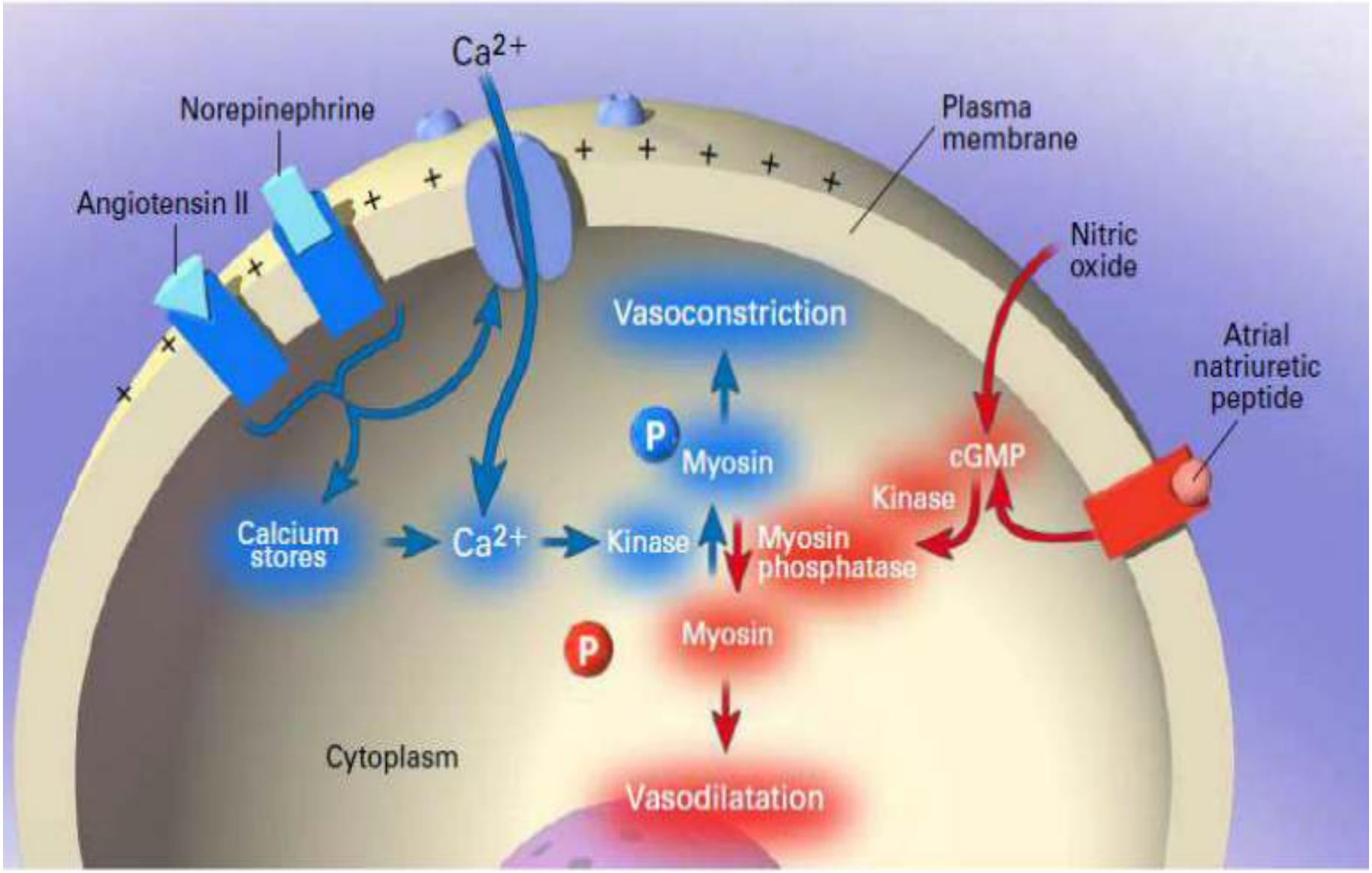


Diagram depicting the pathogenesis of sepsis and multiorgan failure. DIC = disseminated intravascular coagulation; IL = interleukin.
Khalil A. Medscape 2014



Hypotension, the cardinal manifestation of sepsis, occurs via induction of nitric oxide (NO).

NO plays a major role in the hemodynamic alterations of septic shock, which is a hyperdynamic form of shock.


Ca2+
Norepinephrine
Angiotensin II
Plasma membrane
Nitric oxide
Vasoconstriction
Atrial natriuretic peptide
P
Myosin
cGMP
Kinase
Calcium stores
Ca2+
Kinase
Myosin phosphatase
P
Myosin
Cytoplasm
Vasodilatation

NEJM 2001

TABLE 1. Diagnostic Criteria for Sepsis

Infection, documented or suspected, and some of the following:
General variables
Fever (> 38.3°C)
Hypothermia (core temperature < 36°C)
Heart rate > 90/min^{-1} or more than two SD above the normal value for age
Tachypnea
Altered mental status
Significant edema or positive fluid balance (> 20 mL/kg over 24 hr)
Hyperglycemia (plasma glucose > 140 mg/dL or 7.7 mmol/L) in the absence of diabetes
Inflammatory variables
Leukocytosis (WBC count > 12,000 μL^{-1})
Leukopenia (WBC count < 4000 μL^{-1})
Normal WBC count with greater than 10% immature forms
Plasma C-reactive protein more than two SD above the normal value
Plasma procalcitonin more than two SD above the normal value
Hemodynamic variables
Arterial hypotension (SBP < 90 mm Hg, MAP < 70 mm Hg, or an SBP decrease > 40 mm Hg in adults or less than two SD below normal for age)
Organ dysfunction variables
Arterial hypoxemia (Pao_2/Fio_2 < 300)
Acute oliguria (urine output < 0.5 mL/kg/hr for at least 2 hrs despite adequate fluid resuscitation)
Creatinine increase > 0.5 mg/dL or 44.2 μmol/L
Coagulation abnormalities (INR > 1.5 or aPTT > 60 s)
Ileus (absent bowel sounds)
Thrombocytopenia (platelet count < 100,000 μL^{-1})
Hyperbilirubinemia (plasma total bilirubin > 4 mg/dL or 70 μmol/L)
Tissue perfusion variables
Hyperlactatemia (> 1 mmol/L)
Decreased capillary refill or mottling

WBC = white blood cell; SBP = systolic blood pressure; MAP = mean arterial pressure; INR = international normalized ratio; aPTT = activated partial thromboplastin time.

Diagnostic criteria for sepsis in the pediatric population are signs and symptoms of inflammation plus infection with hyper- or hypothermia (rectal temperature > 38.5° or < 35°C), tachycardia (may be absent in hypothermic patients), and at least one of the following indications of altered organ function: altered mental status, hypoxemia, increased serum lactate level, or bounding pulses.

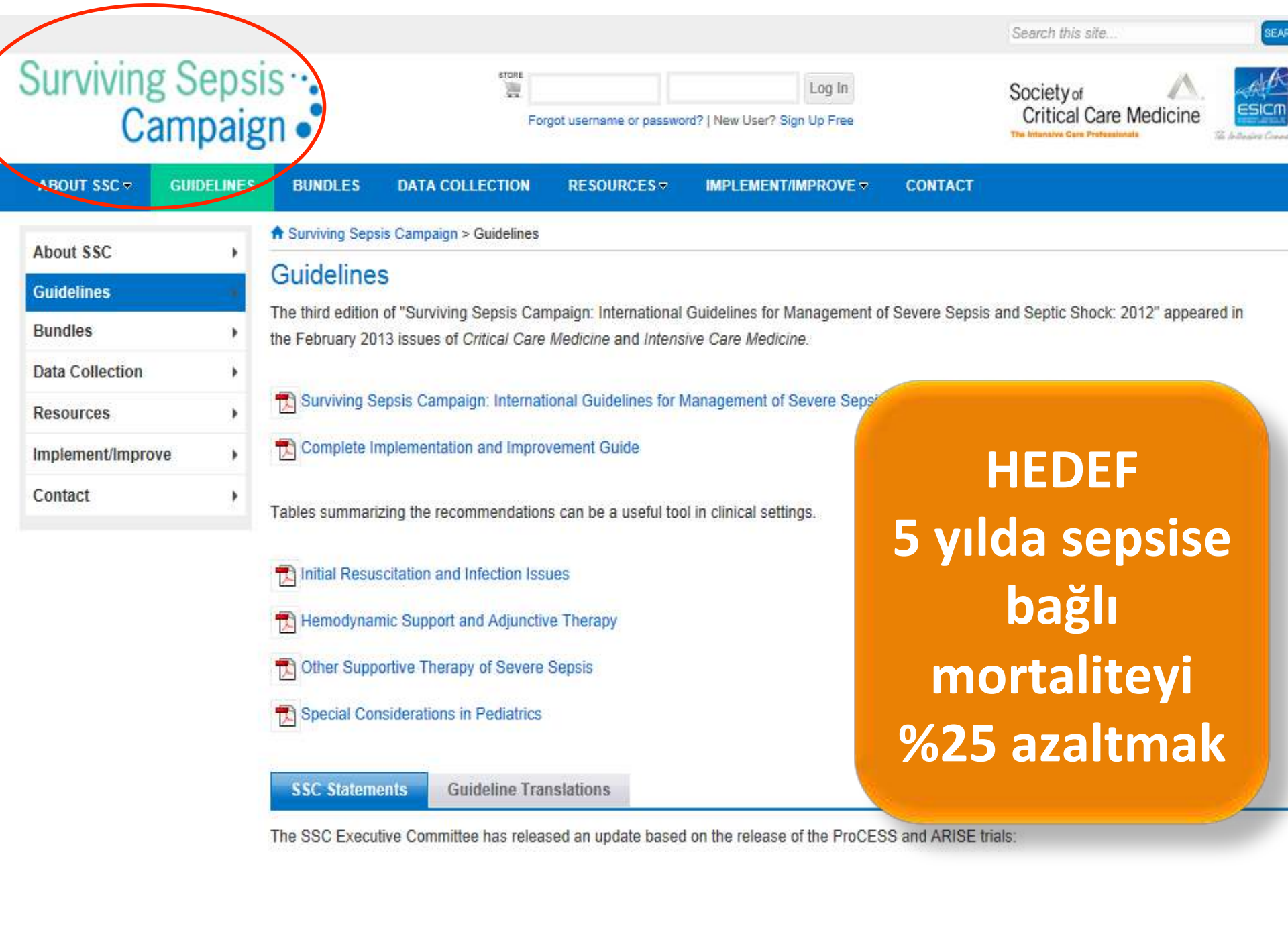
Adapted from Levy MM, Fink MP, Marshall JC, et al: 2001 SCCM/ESICM/ACCP/ATS/SIS International Sepsis Definitions Conference. *Crit Care Med* 2003; 31: 1250–1256

Critical care journal 2013

Surviving Sepsis Campaign

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

Critical Care Medicine
2013 Feb;41(2):580-637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Surviving Sepsis Campaign > Guidelines
Guidelines
The third edition of "Surviving Sepsis Campaign: International Guidelines for Management of Severe Sepsis and Septic Shock: 2012" appeared in the February 2013 issues of Critical Care Medicine and Intensive Care Medicine.
Surviving Sepsis Campaign: International Guidelines for Management of Severe Sepsi
Complete Implementation and Improvement Guide
Tables summarizing the recommendations can be a useful tool in clinical settings.
Initial Resuscitation and Infection Issues
Hemodynamic Support and Adjunctive Therapy
Other Supportive Therapy of Severe Sepsis
Special Considerations in Pediatrics
SSC Statements
Guideline Translations
The SSC Executive Committee has released an update based on the release of the ProCESS and ARISE trials:
HEDEF
5 yılda sepsise bağlı mortaliteyi %25 azaltmak

About SSC
History
Leadership
SSC Collaborative
Guidelines
Bundles
Data Collection
Resources
Implement/Improve
Contact

History

Campaign's history Since its inception in 2002 the Campaign has achieved several key milestones.

Original Stated Goal of Campaign
To reduce mortality from sepsis by 25% in 5 years (that translates to 2009 from the date of publication of the first set of guidelines) via a 7-point agenda including:

- Building awareness of sepsis
- Improving diagnosis
- Increasing the use of appropriate treatment
- Educating healthcare professionals
- Improving post-ICU care
- Developing guidelines of care
- Implementing a performance improvement

Phase I | Phase II | Phase III | Phas

Phase I: Development of Awareness of Scope of

Late 2001/Early 2002

- Separate from Campaign activities, a seps
  updates to criteria established in 1991. Le
  Conference. *Crit Care Med*. 2003 31(4):125
- Campaign was formed by the Society of Cri
  Forum and launched at the ESICM Annual
  on to the "Barcelona Declaration."
- Steering committee formed with 3 represen

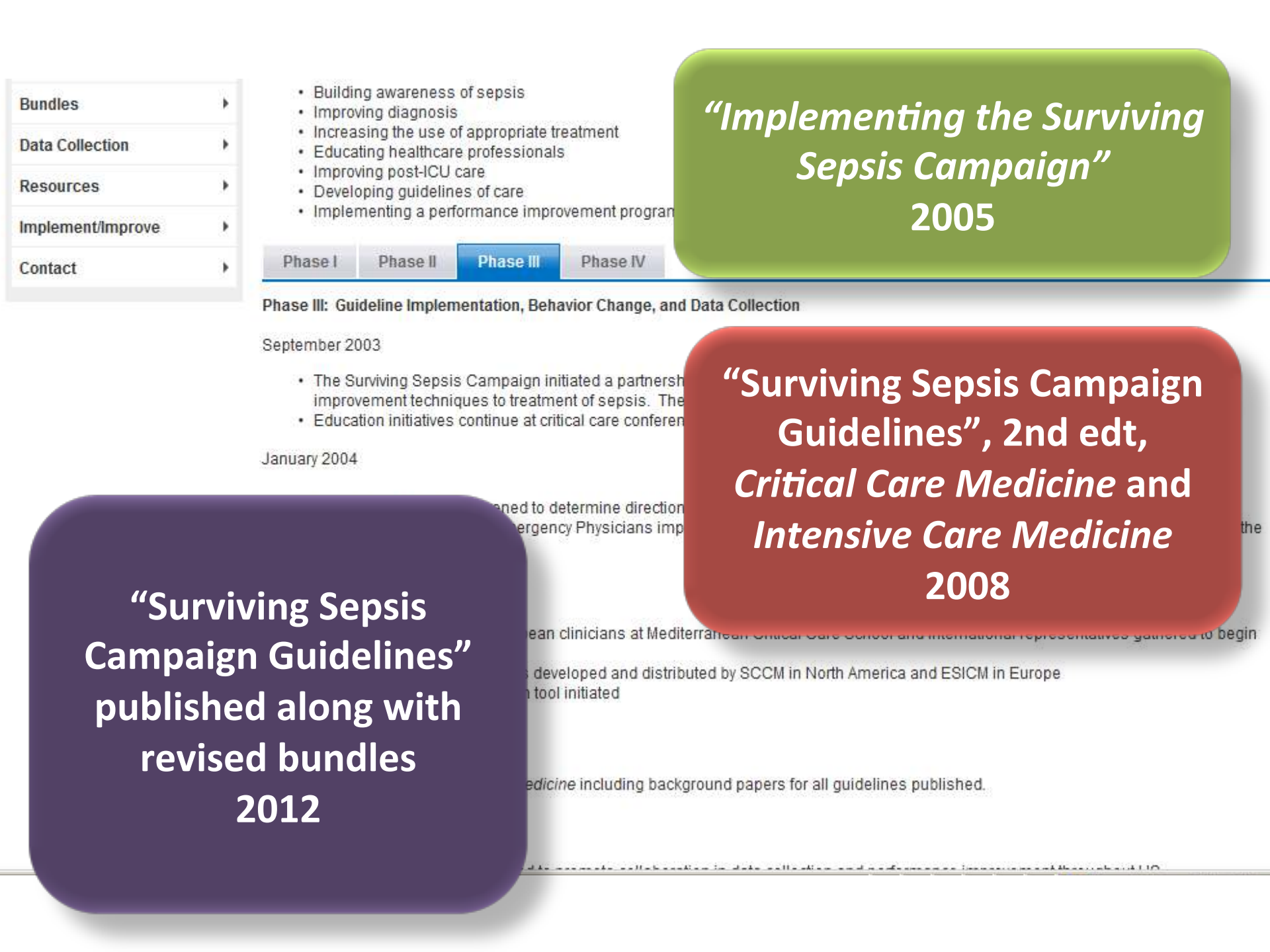
January 2003

- Executive committee meeting held in Amst

February 2003

7 Nokta

1. Farkındalığı arttırma
2. Tanıyı arttırma
3. Uygun tedavi
4. Sağlık personelinin eğitimi
5. Post-YBU bakımı geliştirme
6. Kılavuzların geliştirilmesi
7. Performans geliştirici program


Bundles
Data Collection
Resources
Implement/Improve
Contact
• Building awareness of sepsis
• Improving diagnosis
• Increasing the use of appropriate treatment
• Educating healthcare professionals
• Improving post-ICU care
• Developing guidelines of care
• Implementing a performance improvement progran
Phase I
Phase II
Phase III
Phase IV
Phase III: Guideline Implementation, Behavior Change, and Data Collection
September 2003
• The Surviving Sepsis Campaign initiated a partnersh
improvement techniques to treatment of sepsis. The
• Education initiatives continue at critical care conferen
January 2004
developed and distributed by SCCM in North America and ESICM in Europe
tool initiated
edicine including background papers for all guidelines published.
"Implementing the Surviving Sepsis Campaign"
2005
"Surviving Sepsis Campaign Guidelines", 2nd edt, Critical Care Medicine and Intensive Care Medicine
2008
"Surviving Sepsis Campaign Guidelines" published along with revised bundles
2012

Management of Severe Sepsis

- Initial Resuscitation
- Diagnosis
- Antibiotic Therapy
- Source Control
- Fluid Therapy
- Vasopressors
- Corticosteroids
- Blood Product Administration
- Glucose Control
- Bicarbonate Therapy

Surviving Sepsis Campaign

Sepsis Guidelines 2012

Surviving Sepsis Campaign Bundles

SURVIVING SEPSIS CAMPAIGN CARE BUNDLES

TO BE COMPLETED WITHIN 3 HOURS:
1) Measure lactate level
2) Obtain blood cultures prior to administration of antibiotics
3) Administer broad spectrum antibiotics
4) Administer 30 mL/kg crystalloid for hypotension or lactate ≥ 4 mmol/L

TO BE COMPLETED WITHIN 6 HOURS:
5) Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥ 65 mm Hg
6) In the event of persistent arterial hypotension despite volume resuscitation (septic shock) or initial lactate ≥ 4 mmol/L (36 mg/dL):
   - Measure central venous pressure (CVP)*
   - Measure central venous oxygen saturation ($ScvO_2$)*
7) Remeasure lactate if initial lactate was elevated*

*Targets for quantitative resuscitation included in the guidelines are CVP of ≥8 mm Hg, $ScvO_2$ of ≥ 70%, and normalization of lactate.

Laktat!
Kültür!
Antibiyotik!
Sıvı!

Surviving Sepsis Campaign

- F- Fluids, (Give and measure).
- O- Give Oxygen (If not contraindicated)
- C- Culture
- A- Antibiotics
- L- Lactate

1) Sepsise bağlı doku hipoperfüzyonlu hastalarda destek miktarı

(başlangıç sıvı desteğine rağmen devam eden hipotansiyon veya kan laktat konsatrasyonunun > 4 mmol/L olması durumunda)

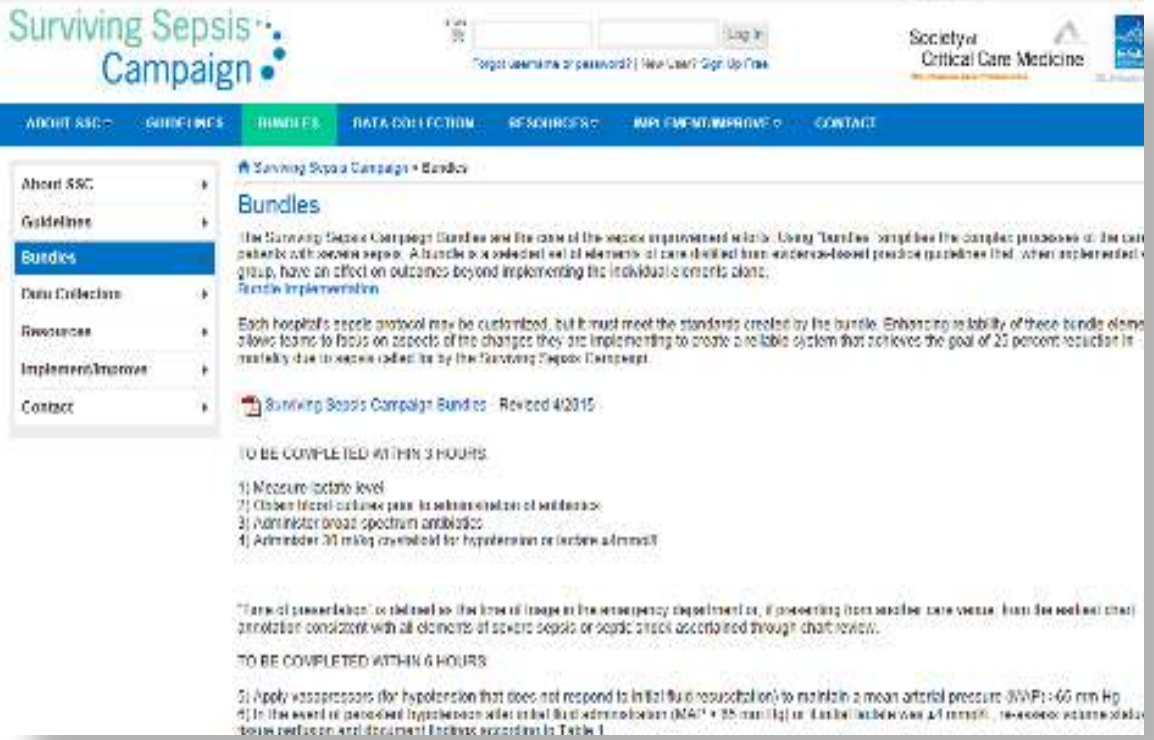
İlk 6 saatlik resüsitasyonda hedefler:

a) **CVP 8–12 mmHg**
b) **MAP ≥ 65 mm Hg**
c) **$ScvO_2$ 70% veya 65%** (1C).

2) Laktat düzeyi yüksek hastalarda hedef resüsitasyon laktatı normalize etmek (2C)

Surviving Sepsis Campaign

Updated Bundles in Response to New Evidence



Revised
4/2015

TO BE COMPLETED WITHIN 3 HOURS OF TIME OF PRESENTATION*:

1. Measure lactate level
2. Obtain blood cultures prior to administration of antibiotics
3. Administer broad spectrum antibiotics
4. Administer 30ml/kg crystalloid for hypotension or lactate ≥4mmol/L

* *"Time of presentation" is defined as the time of triage in the emergency department or, if presenting from another care venue, from the earliest chart annotation consistent with all elements of severe sepsis or septic shock ascertained through chart review.*

3 saat içinde

1. Laktat seviyesini ölç
2. Antibiyotik öncesi KK al
3. Geniş spektrumlu antibiyotik başla
4. Hipotansiyon veya laktat>=4mmol/L ise 30ml/kg kristaloid başla

SIVI tedavisi

TO BE COMPLETED WITHIN 6 HOURS OF TIME OF PRESENTATION:

5. Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥65mmHg
6. In the event of persistent hypotension after initial fluid administration (MAP < 65 mm Hg) or if initial lactate was ≥4 mmol/L, re-assess volume status and tissue perfusion and document findings according to Table 1.
7. Re-measure lactate if initial lactate elevated.

6 saat içinde

5. **MAP>=65mmHg olacak şekilde vasopressor** başla (başlangıç sıvı tedavisine yanıt vermeyen sıvı resusitasyonunda)

6. **Başlangıc laktat düzeyi >=4mmol/L veya başlangıç sıvı tedavisine rağmen persistan hipotansiyon** varsa volüm durumunu ve doku perfüzyonunu tekrar gözden geçir, Tablo 1 e göre bulguları kaydet

7. Başlangıç laktat düzeyi yüksekse tekrar laktat düzeyini ölç

TABLE 1

DOCUMENT REASSESSMENT OF VOLUME STATUS AND TISSUE PERFUSION WITH:

EITHER

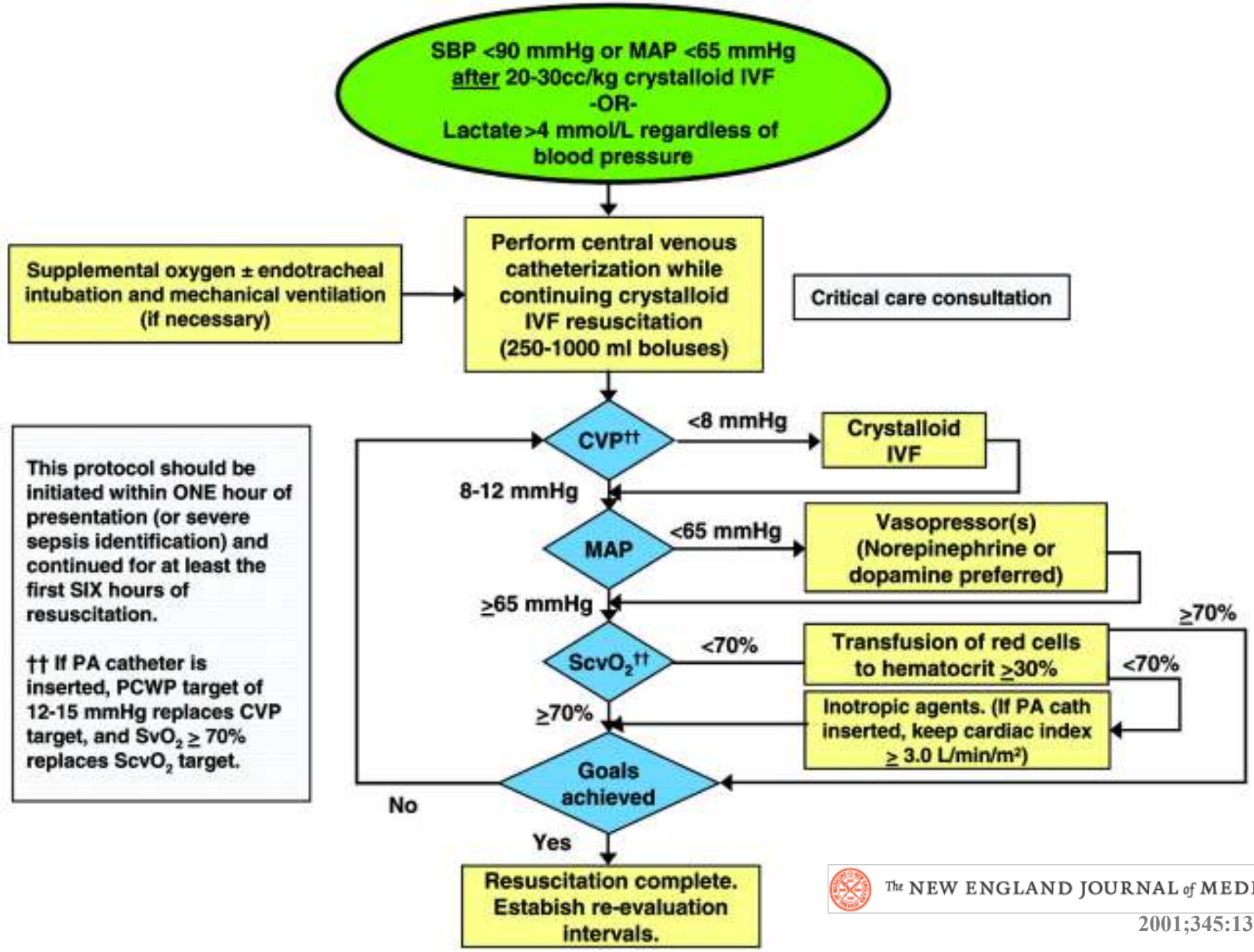
- Repeat focused exam (after initial fluid resuscitation) by licensed independent practitioner including vital signs, cardiopulmonary, capillary refill, pulse, and skin findings.

OR TWO OF THE FOLLOWING:

- Measure CVP
- Measure $ScvO_2$
- Bedside cardiovascular ultrasound
- Dynamic assessment of fluid responsiveness with passive leg raise or fluid challenge

Of note, the 6-hour bundle has been updated; the 3-hour SSC bundle is not affected.

While no suggestion of harm was indicated with use of a central line in any trial, and published evidence shows significant mortality reduction using the original SSC bundles (5), the committee has taken a prudent look at all current data and, despite weaknesses as in all studies, determined the above bundles to be the appropriate approach at this time.



The NEW ENGLAND JOURNAL of MEDICINE
2001;345:1368-77.

SAINT JOSEPH MERCY HEALTH SYSTEM
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ST. JOSEPH MERCY ANN ARBOR
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SEPTIC SHOCK CLINICAL PATHWAY

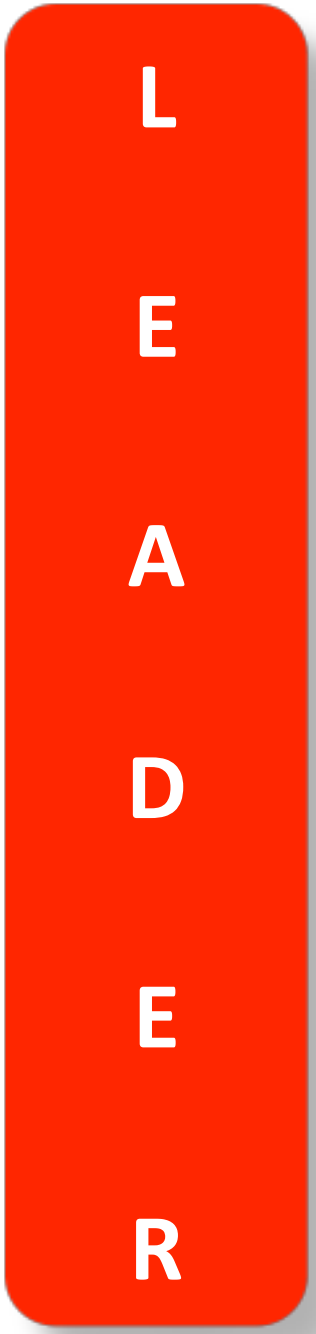
Room # _____ ICU admission Date: _____ Time: _____

Please complete the following:

- **ED Triage: Date:** _____ **Time:** _____
- **Septic Shock* diagnosis (Time Zero): Date:** _____ **Time:** _____
- Patient transferred from (unit or hospital): _____
- Patient was identified as having severe sepsis or septic shock: ❑ ED ❑ Floor ❑ ICU Admission ❑ During ICU Stay
- Decision to move to comfort care in first 24 hours after diagnosis Yes No
- ICU discharge: Date: _____ Time: _____
- Discharge status: Alive Expired **Attending physician at time of diagnosis: ED** _____ **ICU** _____

***Septic Shock (Time Zero) defined as:** SBP less than 90mmHg or 40mmHg decrease from baseline after 30ml/kg fluid bolus, or requires vasopressors or initial lactic acid is greater than or equal to 4mEq/L

Date _____ to _____ **0-1 Hours**	**Decision Grid**	Date _____ to _____ **1-6 Hours**	Date _____ to _____ **6-24 Hours**	Date _____ to _____ **24-72 Hours**
❑ Initial Labs: serum lactic acid, additional labs as ordered by physician	Yes No Is patient hypotensive after initial fluid bolus?	**Septic Shock Bundle Resuscitation Goals**	**Septic Shock Bundle**	❑ Confirm Infectious Source
_____ Time Serum lactic acid drawn	Yes No Did patient require vasopressor(s)?	Yes No CVP placed If no, why? _____	Yes No Is patient on vasopressor at greater than 6 hours	❑ Re-assess need for broad spectrum antibiotics based on culture reports.
Yes No Blood Cultures X 2 Time 1: _____ Time 2: _____	If YES to either, continue to next column (Septic Shock Bundle)	_____ Time Time CVP placed (record first CVP reading prior to x-ray confirmation)	Yes No Consider Vasopressin for refractory septic shock	Yes No Was there an organism identified?
❑ Other Cultures:	Yes No Is lactic acid greater or equal to 4 mEq/L?	Record the **FIRST TIME** the following is achieved:	In patients with acute lung injury or ARDS;	Yes No If YES, was the organism sensitive to the initial antibiotic?
❑ Establish IV access	Yes No Is there evidence of additional organ dysfunction besides elevated lactic acid?	_____ Time CVP 8-12 mmHg on vent 12-15 mmHg	Yes No Patient on mechanical ventilator	❑ Discontinue Vancomycin if appropriate
❑ Volume resuscitate: initial 30ml/kg over 1 hour or as fast as possible then additional boluses as needed per order	If YES to lactic acid & additional organ dysfunction, please continue to next column (Septic Shock Bundle)	_____ Time MAP greater than or equal to 65 mmHg	_____ PaO2 / FiO2 ratio	❑ Re-evaluate need for invasive lines and tubes
_____ Time Time initial fluid bolus completed to resolve hypotension	If NO to additional organ dysfunction, **please continue below:**	_____ Time $SCVO_2$ greater than 70%: mixed venous greater than or equal to 65%	Yes No Is tidal volume 6ml/kg of ideal body weight in first 24 hours?	❑ Nutrition Therapy
❑ Broad Spectrum Antibiotic-start after obtain blood culture (see Infonet under Pharmacy Guide to Antimicrobial Therapy)	❑ Maintain MAP greater than or equal to 65 mmHg ❑ Maintain U/O of 0.5 ml/kg/hour ❑ Consider arterial line insertion ❑ Monitor Stroke Volume & Stroke Volume Variation to guide fluid resuscitation ❑ Ensure decrease in lactic acid x3 or normalization x2 within 12 hours • Begin next column (Septic Shock Bundle) if additional organ dysfunction occurs &/ or patient remains/becomes hypotensive after initial 30 ml/kg fluid bolus	_____ Time Optimized stroke volume (optional)	Yes No Are the static or plateau inspiratory pressures less than 30cmH2O in first 24 hours?	❑ Progress Mobility
Yes No Was a new antibiotic initiated for this episode of septic shock?		Yes No Assess for risk factors for abdominal compartment syndrome (fluid resuscitation greater than 5 L in 24 hours or less)		
_____ Time Time antibiotic hung		_____ Repeat lactic acid every 4-6 hours		
❑ Source Control				
Nurse				
Nurse				
Physician				
Signature, Date & Time				



LEARN

ESTABLISH

ASK

DEVELOP

EDUCATE

REMEDİATE

Examples Of Effective Teams

Example 1: Effective Work Team

Aim: Diagnose patients with severe sepsis or septic shock in the emergency department (ED) within 2 hours of triage

Core Working Team: The overall core team must be interdisciplinary and must include, at a minimum:

- ED physician
- Triage nurse
- Staff nurse
- Laboratory technician
- Laboratory supervisor
- Admissions clerk

Additional team members may include:

- Critical care medicine (CCM) physician
- House officer
- ICU charge nurse
- Infectious disease physician

Examples of Effective Aim Statements:

- Time from ED triage to presumptive diagnosis of severe sepsis is less than 2 hours
- Time from ED triage to all patients' meeting severe sepsis criteria having a serum lactate is less than 3 hours
- Time from ED triage to appropriate antibiotics given is less than 1 hour
- If hypotensive or if lactate > 4.0 mmol, immediate fluid resuscitation is started (at least 30 mL/kg normal saline or lactated ringers solution within 1 hour)
- If MAP < 65 mmHg and not responsive to adequate (at least 30 mL/kg) fluid resuscitation, vasopressors are started immediately
- If blood pressure or serum lactate not responsive to fluid, a central venous pressure monitor is instituted within the first 6 hours

Surviving Sepsis Campaign

IMPRESS

INTERNATIONAL MULTICENTRE PREVALENCE STUDY ON SEPSIS

Surviving Sepsis Campaign

An International Multicentre Prevalence Study on Sepsis.

IMPRESS

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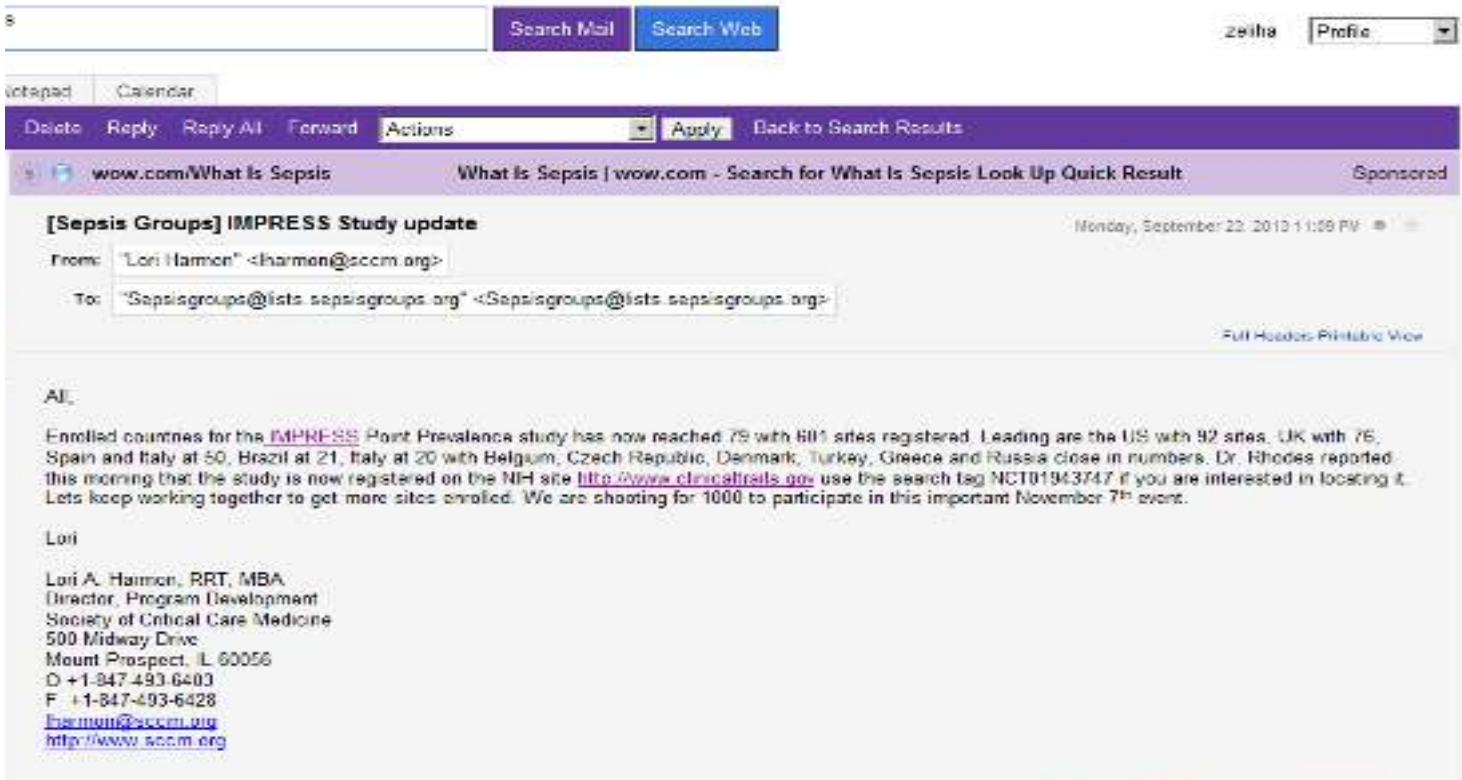
International Multicentre PREvalence Study on Sepsis
Turkey, USA, UK
Brezilya, Çek Cumhuriyeti, Danimarka
Yunanistan, Rusya
……



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[Sepsis Groups] IMPRESS Study update

From: "Lori Harmon" <lharmon@sccm.org>

To: "Sepsisgroups@lists.sepsisgroups.org" <Sepsisgroups@lists.sepsisgroups.org>

All,

Enrolled countries for the IMPRESS Point Prevalence study has now reached 79 with 681 sites registered. Leading are the US with 92 sites, UK with 76, Spain and Italy at 50, Brazil at 21, Italy at 20 with Belgium, Czech Republic, Denmark, Turkey, Greece and Russia close in numbers. Dr. Rhodes reported this morning that the study is now registered on the NIH site http://www.clinicaltrials.gov use the search tag NCT01943747 if you are interested in locating it. Lets keep working together to get more sites enrolled. We are shooting for 1000 to participate in this important November 7th event.

Lori

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R683

Publication Only

Clinical ID: Community-acquired infections including CAP, sepsis, STD,...

A survey of physicians' knowledge on evaluation of sepsis bundles: a multi-centre study

F. Civelek Eser[1], Z. Kocak Tufan[1], E. Vudali[2], A. Batirel[3], B. Kayaaslan[4], A. Tanrici Bastug[4], D. Eray[5], **V. Turhan**[5], F. Duygu[6], D. Tok[7], S. Altun[8]

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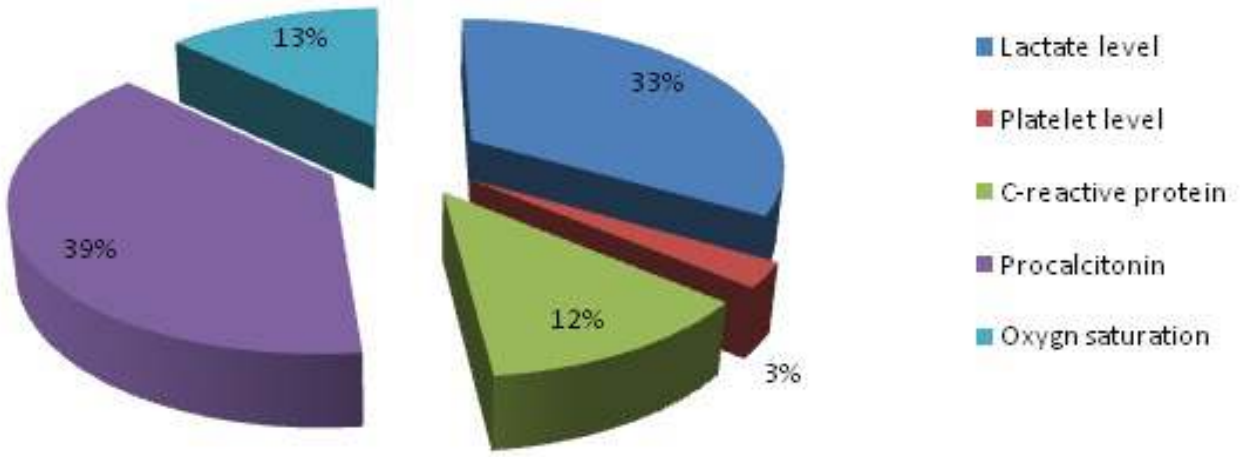


Figure 1. Q-Which parameter is more important than others in sepsis management?

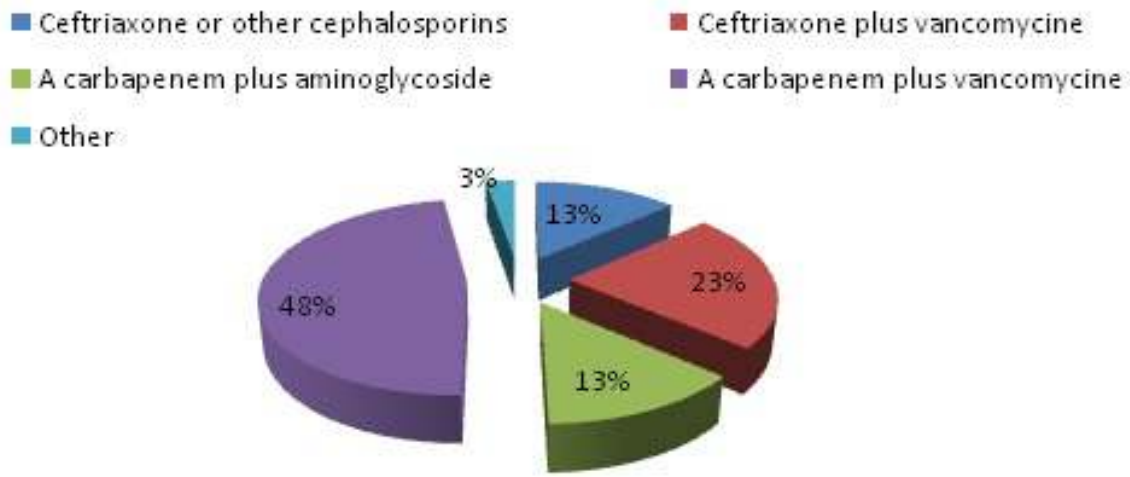
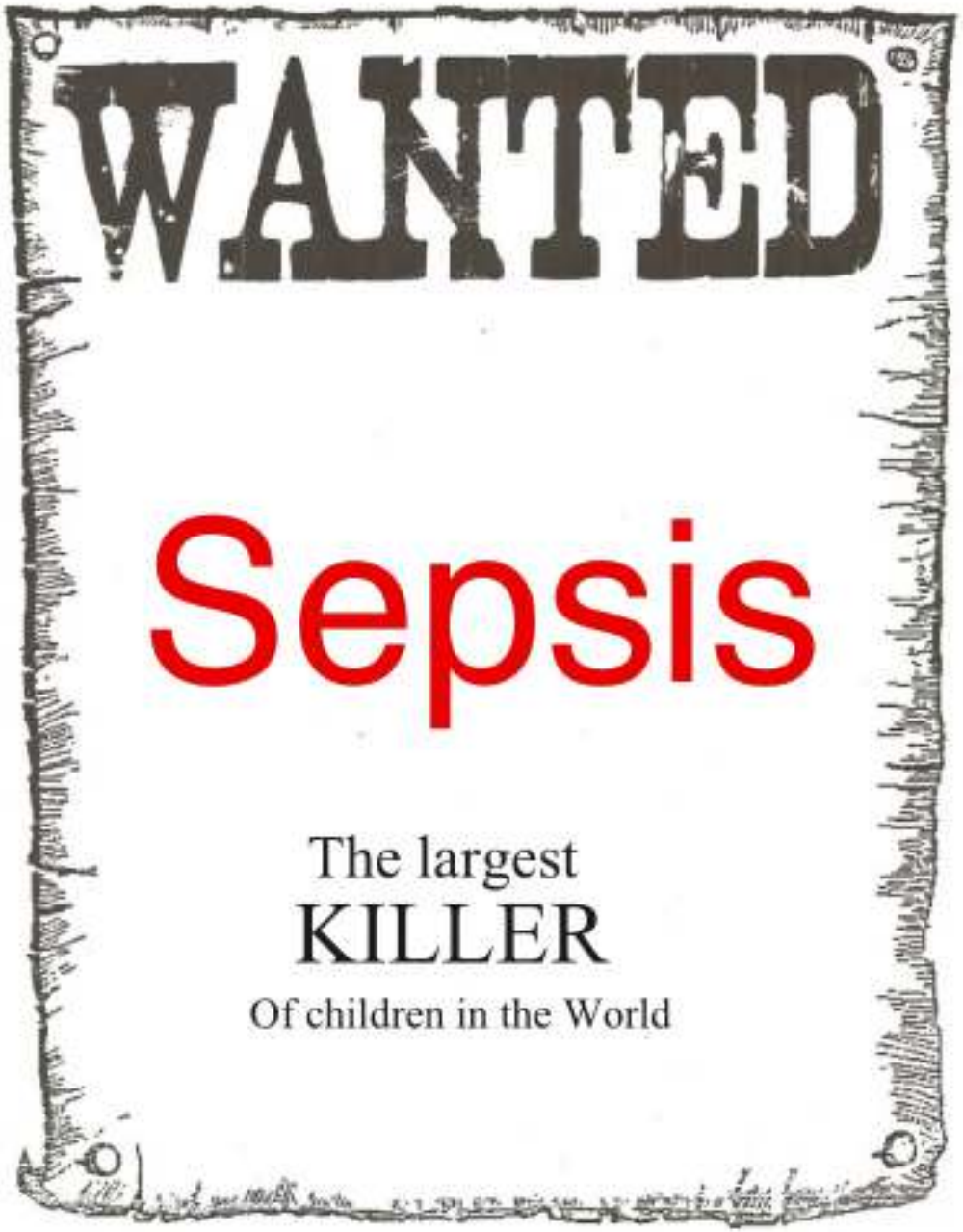


Fig 2. Q-Which antibiotics should be used in sepsis ?

Table 1. The rate of correct answers to sepsis bundle survey of different departments

	Infectious Diseases (59) n (%)	Emergency (46) n (%)	Internal Medicine (62) n (%)	Anesthesiology (56) n (%)
Need for measuring lactate level	50 (81.4)	42 (92.3)	29 (46.8)	54 (96.4)
Take blood culture within 3 hours prior to antibiotics	58 (98)	41 (89.1)	53 (85.5)	47 (83.9)
Administer crystalloid in hypotension (30 ml/kg)	12 (20.3)	26 (56.5)	21 (33.9)	31 (55.4)
Lactate threshold in sepsis (>4mmol/L)	13 (22.0)	20 (43.5)	5 (8.2)	21 (37.5)
Target mean arterial pressure (≥65mmHg)	33 (56.9)	39 (84.8)	29 (46.8)	29 (51.8)
Target central venous pressure (8-12mmHg)	31 (52.5)	31 (67.4)	38 (61.3)	41 (73.2)
Re-measure lactate if initial lactate was elevated	42 (71.2)	34 (73.9)	45 (72.6)	46 (82.1)


WANTED
Sepsis
The largest
KILLER
Of children in the World