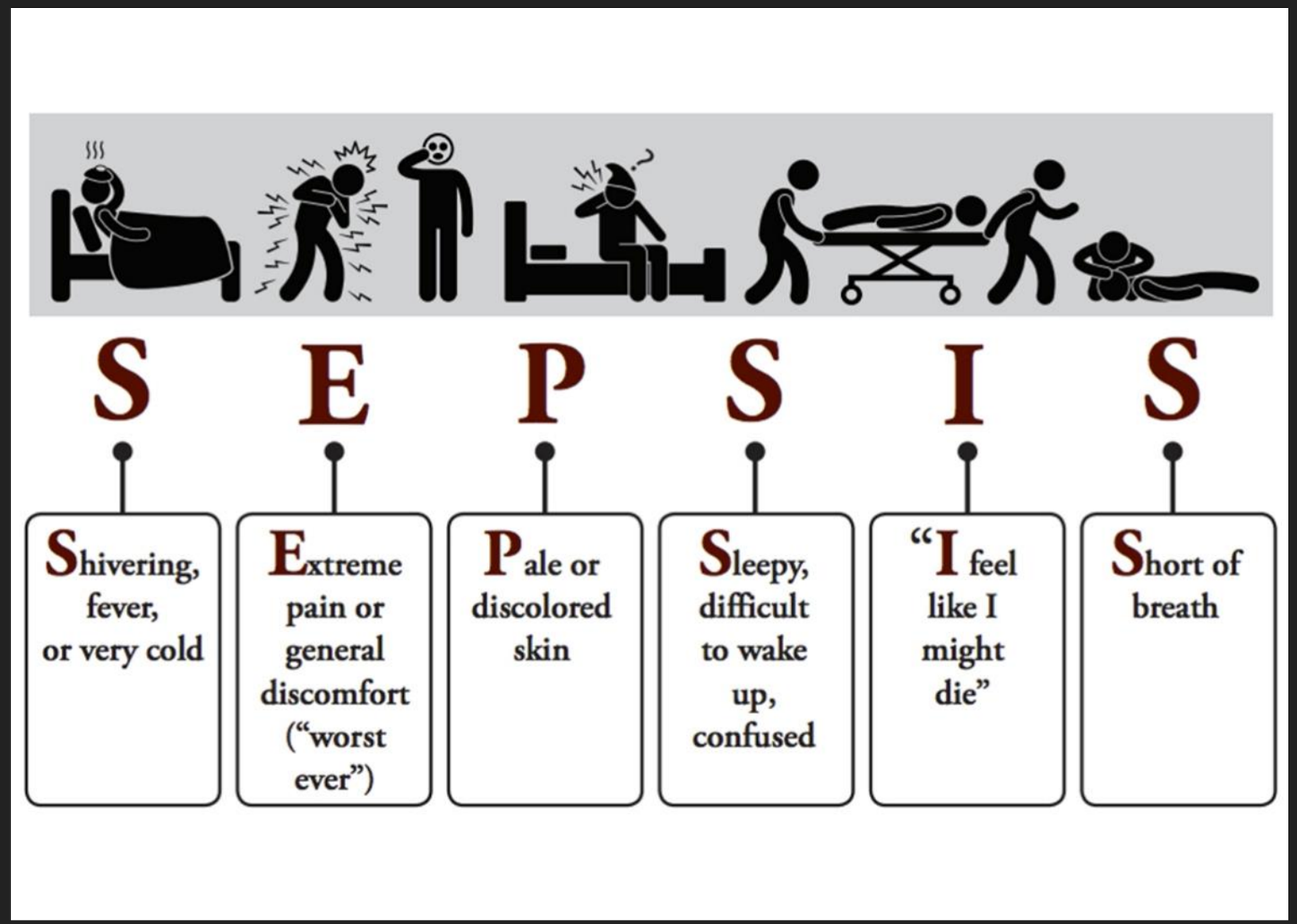
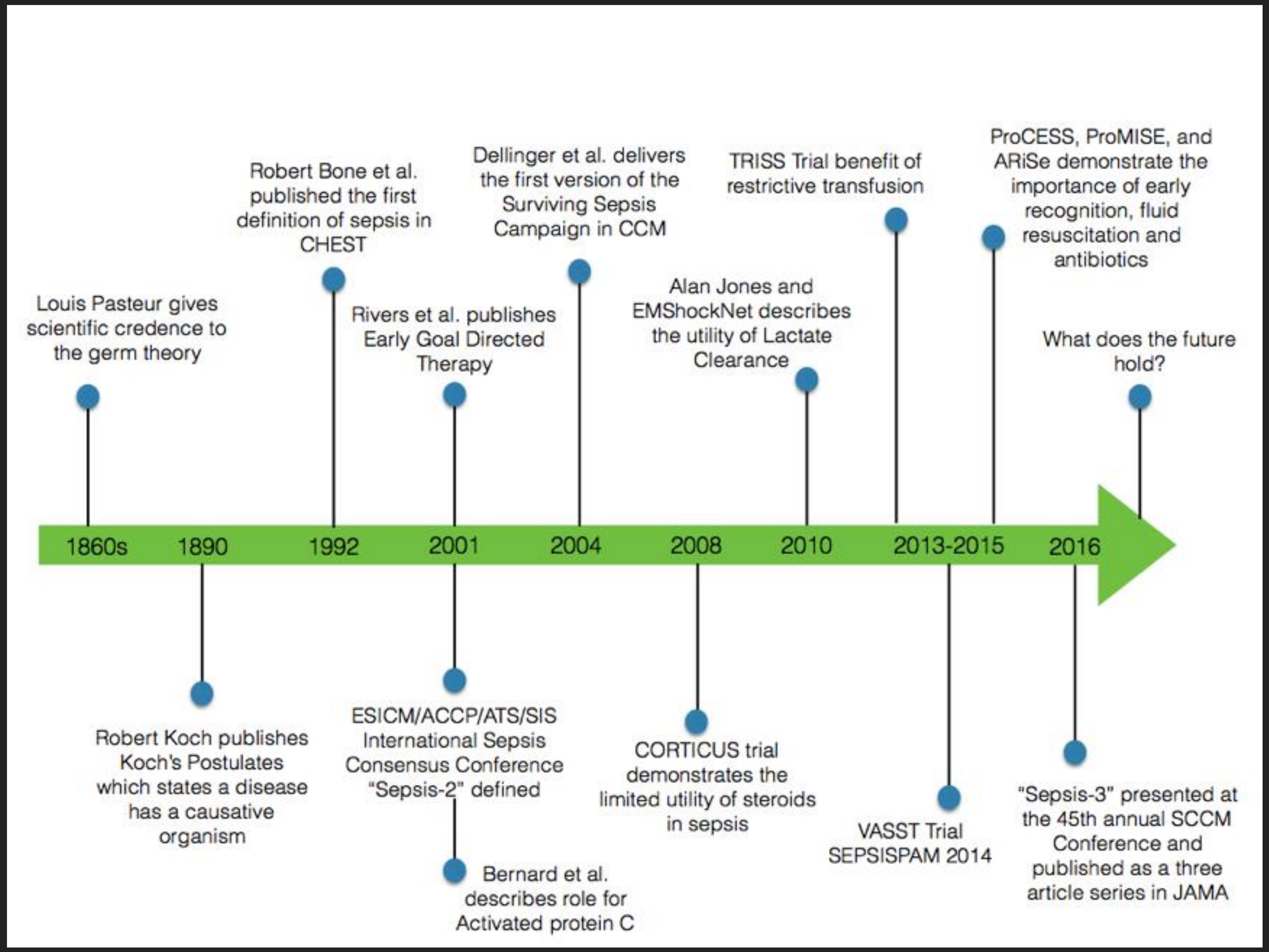


DR. LUCA LAGHI

SEPSIS-3

CRITICITA', RIVISITAZIONE E LORO IMPATTO E CONSEGUENZE

WHERE DID IT START?



SEPSIS DEFINITION

Sepsis is defined as life-threatening organ dy

AZIENDA OSPEDALIERO-UNIVERSITARIA POLICLINICO-VITTORIO EMANUELE

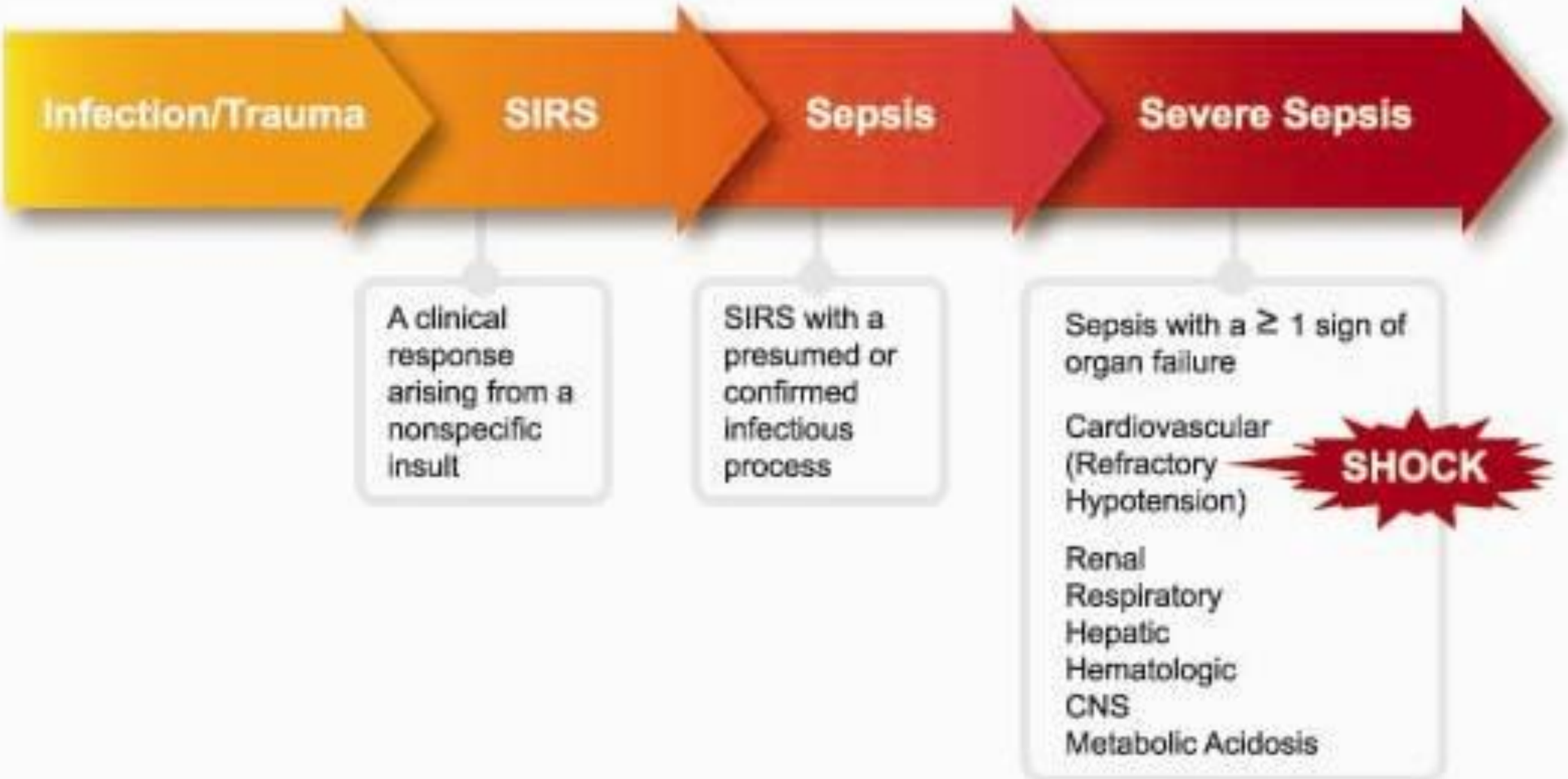
ARNAS GARIBALDI CATANIA
AZIENDA OSPEDALIERA DI RILIEVO NAZIONALE E DI ALTA SPECIALIZZAZIONE

OSPEDALE CANNIZZARO CATANIA
AZIENDA OSPEDALIERA PER L'EMERGENZA

ASP CATANIA
AZIENDA SANITARIA PROVINCIALE

Surviving SEPSI campaign

SEPSIS: Defining a Disease Continuum



Bone et al. *Chest* 1992; 101:1644; Wheeler and Bernard. *N Engl J Med* 1999; 340:207

SIRS

- SIRS – systemic inflammatory response syndrome
- Must have at least 2 of the following:
  - **Temperature >38.5ºC or <36ºC**
  - **Heart rate >90 beats/min**
  - **Respiratory rate >20 breaths/min or PaCO2 <32 mmHg**
  - **WBC >12,000 cells/mm3, <4000 cells/mm3, or >10 % immature (band) forms**
- SIRS is the body's response to infection, inflammation, stress.

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- SIRS is the body's response to infection, inflammation, stress.

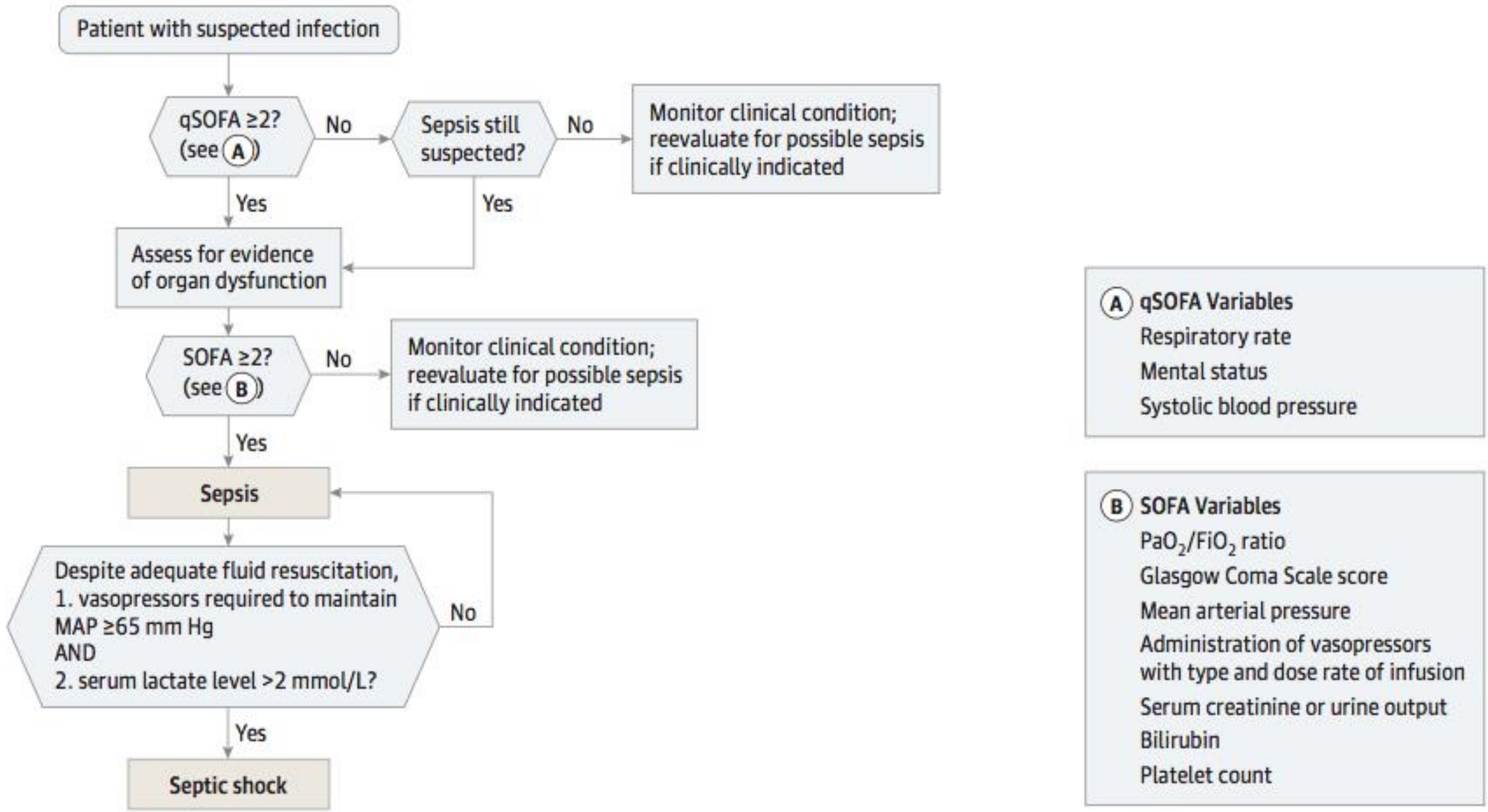
TE PIACESSE…

- Sepsis – SIRS + suspected or confirmed infection (documented via cultures or visualized via physical exam/imaging)
- Severe Sepsis – Sepsis + at least one sign of organ hypo-perfusion or dysfunction

Areas of mottled skin	Disseminated intravascular coagulation
Capillary refill > 3 secs	AKI
UOP < 0.5cc/kg /hr	ARDS or acute lung injury (ALI)
Lactate > 2mmol /L	Cardiac dysfunction on echo
Altered mental status	Plt < 100
Abnormal EEG	Troponin Leak

- Sepsis – SIRS + suspected or confirmed infection (documented via cultures or visualized via physical exam/imaging)
- Septic SHOCK – Sepsis + circulatory and cellular metabolism abnormalities that are profaned enough to *SUBSTANTIALLY increase mortality*

Figure. Operationalization of Clinical Criteria Identifying Patients With Sepsis and Septic Shock



The baseline Sequential [Sepsis-related] Organ Failure Assessment (SOFA) score should be assumed to be zero unless the patient is known to have preexisting (acute or chronic) organ dysfunction before the onset of infection. qSOFA indicates quick SOFA; MAP, mean arterial pressure.

ORGAN DYSFUNCTION

Organ dysfunction can be identified as an acute change in total SOFA score ≥2 points consequent to the infection

Sequential (Sepsis-Related) Organ Function Assessment (SOFA) Score.[a]

System / Score	0	1	2	3	4
Respiration: PaO_2/FiO_2, 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 $10^3/\mu L$	≥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); 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_2/FiO_2, partial pressure of oxygen/fraction of inspired oxygen. a) Adapted from Vincent et al[3]; b) Catecholamine doss in μg/kg/min, >1 hour; c) Glasgow Coma Scale scores range from 3-15 (3 minimum,15 normal).

qSOFA

What caught a lot of attention was the development of a new term: qSOFA (or Quick SOFA). Patients with suspected infection who are likely to have a prolonged ICU stay or to die in the hospital can be promptly identified at the bedside with qSOFA

QUICK SOFA CRITERIA:

TION IN MENTAL STATUS (G
POTENSION - SBP ≤100 MM
ESPIRATORY RATE ≥22/MIN


WHERE'S MY BASEGEAR?

KEEP
CALM
I'm
A
GERIATRICIAN


Isansys is working with the Queen Elizabeth Hospital, Birmingham, on the early detection of sepsis

Sepsis: Key Facts

Early recognition and treatment

=

Reduced hospital stay and increased survival

Early blood cultures and antibiotics increase survival

70% **30%**

Sepsis cases arise in the community and in hospital

ITU beds for patients with sepsis costs the NHS 2.5 billion pounds per year

36000 - 64000 deaths due to sepsis in the UK

4 out of 10 people with severe sepsis die

4. IDENTIFICATION OF SEPSIS

Person with possible infection

- Think '***COULD THIS BE SEPSIS?***' if patient presents with signs and/or symptoms that indicate infection, even if they do not have a high temperature (See above for 'Risk factors for sepsis')
- Patients with a SEWS score 4 and above should be screened for sepsis
- Be aware that people with sepsis may have non-specific, non-localising presentations (for example, feeling very unwell)
- Pay particular attention to concerns expressed by the person and family/carer
- Take particular care in the assessment of people who might have sepsis who are unable, or their family/carer is unable, to give a good history (for example, young children, people with English as a second language, people with communication problems)

↓

Take full set of observations
(Blood pressure, Heart rate, Temperature, Respiratory rate, and Oxygen saturations, AVPU)

↓

Complete '<u>Sepsis screening and action tool</u>' (see appendix 1)

↓

Red flag sepsis present:

<u>START SEPSIS SIX</u>

- **Take blood cultures (including additional cultures if needed e.g. urine, sputum, CSF, etc.)**
- **Give IV antibiotics as per Trust guidelines (See appendix 2)**
- **Give IV fluids**
- **Give oxygen**
- **Take serial lactate and Hb**
- **Monitor urine output**

↓

Red flag NOT present:

- **Continue screening tool and assess any cause for concern**
- **Ensure:**
  - **Senior review undertaken**
  - **Send bloods**
  - **Check for acute kidney injury (AKI)**

Appendix 1: See link: Trust sepsis screening and action tool

University Hospitals Birmingham NHS Foundation Trust

Sepsis Screening & Action Tool

To be applied to all non-pregnant adults and young people over 16 years with fever (or recent fever) symptoms, or who are clearly unwell with any abnormal observations

THE UK SEPSIS TRUST

Patient details (affix label):

.....

.....

.....

.....

Staff member completing form:

Date: (DD/MM/YY): .....

Name (print): .....

Designation: .....

Signature: .....

Important: Is an end of life pathway in place? **Yes/No** ☐ , Is escalation clinically inappropriate? **Yes/No** ☐ , Initials ☐ , Discontinue pathway Yes/No ☐

1. Does patient look sick?

Tick

OR has SEWS trigger of 4 and above? ☐

No →
- Low risk of sepsis. Use standard protocols, consider discharge (approved by senior decision maker) with safety netting
- Re-assess for Sepsis hourly and escalate further if indicated

↓ Yes

2. Could this be due to an infection?

	Tick
Yes, but source unclear at present	☐
Pneumonia	☐
Urinary Tract Infection (UTI)	☐
Abdominal pain or distension / diarrhoea	☐
Cellulitis / Septic arthritis / Infected wound	☐
Device-related infection	☐
Meningitis	☐
Other (specify: .....)	☐

No

↓ Yes

3. Is any ONE red flag present?

	Tick
Responds only to voice or pain/ unresponsive	☐
Acute confusional state	☐
Systolic B.P $\leq$ 90 mmHg (or drop >40mmHg from normal)	☐
Heart rate > 130 per minute	☐
Respiratory rate $\geq$ 25 per minute	☐
Needs oxygen to keep SpO_2 $\geq$92%	☐
Non-blanching rash, mottled/ ashen/ cyanotic	☐
Not passed urine in last 18 h/ UO <0.5 ml/kg/hr	☐
Lactate $\geq$ 2mmol/L (Result:.....mmol/L)	☐
Recent chemotherapy / transplant	☐

↓ Yes

No

↑ No

4. Any cause for concern?

Some patients without Red Flags may still have factors which warrant assessment of need for formal intervention for sepsis, such as:

	Tick
Relatives unusually concerned	☐
Acute deterioration in functional ability	☐
Significant risk e.g. immunosuppressed (including recent chemotherapy/potential neutropenia), on steroids (even oral)	☐
Health professional remains worried	☐
Surgery or invasive procedure in last six weeks	☐

↓ Yes

	Time complete	Initials
Send bloods include FBC, U&Es, CRP, LFTs, clotting, blood cultures		
Ensure urgent senior review (SpR or above) within 1 hour with review of bloods –if concerned start Sepsis 6 immediately, do not wait for blood results		

AKI

↓ NO AKI

	Time complete	Initials
If for antimicrobials, administer Within 3hours		
Not for antimicrobials?		
	Discharged?	Initials
Senior clinician decision to discharge with safety netting?		

Red Flag Sepsis. Start Sepsis 6 pathway NOW (see overleaf)

This is time critical, immediate action is required.

University Hospitals Birmingham NHS Foundation Trust

Sepsis Six Pathway

To be applied to all adults and young people over 12 years of age with suspected or confirmed Red Flag Sepsis

THE UK SEPSIS TRUST

Make a treatment escalation plan and decide on CPR status Inform Consultant that patient has Red Flag Sepsis	Time zero	Consultant informed? (tick)	Name (Clearly write)

Action (Complete ALL within 60mins)	Time complete	Initials	Reason not done/variance
1. Administer oxygen Aim to keep target saturation of 94-98% (88-92% if at risk of CO_2 retention e.g. COPD)			
2. Take blood cultures Take a peripheral blood cultures. Also consider other samples (e.g. Blood culture from CVC lines, urine, sputum, CSF) *Think source control!* Call surgeon/ radiologist if needed *CXR and urinalysis for all adults*			
3. Give IV antibiotics According to Trust antibiotic guidelines Consider allergies prior to administration			
4. Give IV fluids If hypotensive / lactate >2mmol/L, Give 500ml Hartmann's over less than 15mins. May be repeated if clinically indicated- do not exceed 30ml/kg *Call Critical Care/Outreach now if >2.5L administered*			
5. Check serial lactates and Hb (after 1hr) Corroborate high VBG lactate with arterial sample *If lactate ≥4mmol/l, call Critical Care outreach and redback after each 10ml/kg challenge . If not reducing call Critical Care outreach*			Not applicable if initial lactate <2 ☐
6. Measure urine output May require urinary catheter Ensure fluid balance chart commenced & completed hourly			

IF AFTER DELIVERING SEPSIS SIX ABOVE, PATIENT STILL HAS:

- Systolic BP <90 mmHg, mean blood pressure <65mmHg
- reduced level of consciousness despite resuscitation
- respiratory rate over 25 breaths per minute
- lactate not reducing
- or if patient is clearly critically ill at any time

Then call Critical Care/Outreach immediately via urgent care acute pain (UCAP) team via switchboard

- See Trust Antimicrobial Guideline for choice of agent to prescribe
  - See under 'help' tab in PICS
  - Search 'Antibiotics' under policies
  - Direct web address
    - http://uhbpolicies/antimicrobial-prescribing.htm
- Always consider patients allergy status before prescribing
- Ensure PICS checked prior to prescribing for previous microbiology results and BEE AWARE alerts in case patient known to have previous infection e.g. MRSA, VRE, CPE, C. difficile.

Appendix 2: Sepsis antimicrobial treatment

Antimicrobial Guidelines for treating Sepsis

- Check dose and frequency of dosing with guidelines once U&E's are available as doses will differ in renal impairment
- **If patient does not have red flag sepsis or signs of organ dysfunction (I.e. amber sepsis) then treat as per Trusts antimicrobial guidelines for the suspected source of infection**
- Antibiotics must be reviewed daily with a view to de-escalating treatment as appropriate. For red flag sepsis patients and above discuss with microbiologist (Tel: via switchboard)

Red flag sepsis

Source of sepsis known / suspected

- See Trust antimicrobial guidelines for treatment related to suspected cause
- For Haematology or Oncology patients with suspected infection see 'suspected infection in neutropenic or immunocompromised patients' section in the Trust antimicrobial guidelines
- For patients with suspected meningitis see 'Meningitis – community acquired' section in the Trust antimicrobial guidelines

Sepsis of unknown cause:

- **Meropenem** 1g TDS IV. Reduce dose in renal impairment
  PLUS Vancomycin 1g STAT (See guidelines for dosing)

- *Severe penicillin allergy (anaphylaxis)*
  Amikacin 15mg/kg OD IV (max daily dose = 1.5g) (See guidelines for dosing/monitoring)
  PLUS Vancomycin 1g STAT (See guidelines for dosing)