What's up, What's down? Identifying signs of sepsis

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Disclosure belangen spreker	
(potentiële) Belangenverstrengeling	**Geen / Zie hieronder**
Voor bijeenkomst mogelijk relevante relaties met bedrijven[1]	**Bedrijfsnamen**
• Sponsoring of onderzoeksgeld[2] □ Honorarium of andere (financiële) vergoeding[3] □ Aandeelhouder[4] □ Andere relatie, namelijk …[5]	-Adviesraad: Boehringer Ingelheim, Vifor Pharma -Spreker: Pfizer

Wat gaan we bespreken?

- Vroegtijdig identificeren van patiënten at risk
- Vroegtijdig herkennen van sepsis
- Toepassingen van de sepsis richtlijnen (bij kankerpatiënten)
- Behandelen van sepsis of septische shock
- Nieuwe definities van sepsis
  - Waarom definitie verandering?
  - Wat is er veranderd?

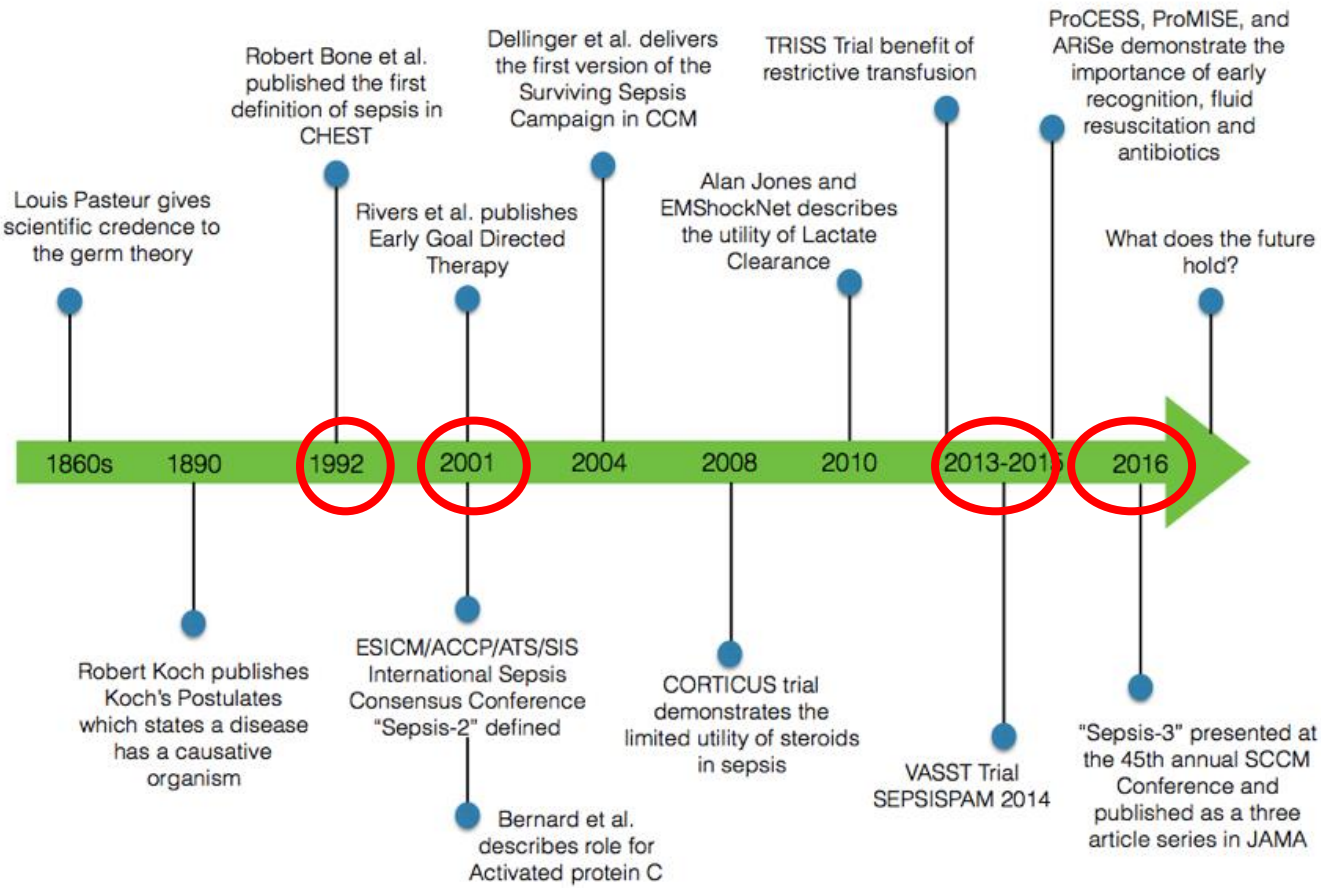
meeting 14 Nederlandse POST-O.N.S.

Sepsis statistieken

- In NL op IC: doodsoorzaak nr. 1
- < 1e 4 uur behandeld: overlevingspercentage >50%. Daarna daalt de overlevingskans snel.
- 3e oorzaak van overlijden in de wereld, meest gangbare oorzaak van niet-maligne dood in de oncologie[1,2]
- Komt bij 14% van de kankerpatiënten voor[1,3,4]
- Mortaliteit bij kankerpatiënten 30-40%, hoger dan bij andere populaties
- 22% ongeplande opnames (SKCCC John Hopkins in Baltimore)

1. Baden, .R., Swaminathan, S , Angarone, M., Blouin, G., Camins, B.C., Casper, C., … Wilson, J.W. (2017). *Prevention and treatment of cancer-related infections, version 2.2017, Retrieved from www.nccn.org, on February 28, 2017. 2. Mariotte, E., Canet, E., Debrumetz, A., Lemiale, V., Seguin, A., Darmon, M., Schlemmer, B., & Azoulay, E. (2012). Survival in neutropenic patients with severe sepsis or septic shock. Critical Care Medicine, 40(1). 43-49. 3. Mokart, D., Saillard, C., Sannini, A., Chow-Chine, L., Brun, J.P., Faucher, M., Blache, J.L., Blaise, D., Leone, M. (2014). Neutropenic cancer patients with severe sepsis: need for antibiotics in the first hour. Intensive Care Med, 40 (8), 1173-1174. 4. Young, R.S., Gobel, B.H., Schumacher, M., Lee, J., Weaver, C., Weitzman, S. (2014). Use of the modified early warning score and serum lactate to prevent cardiopulmonary arrest in hematology-oncology patients: a quality improvement study. American Journal Medical Quality, 29(6), 530-53.*

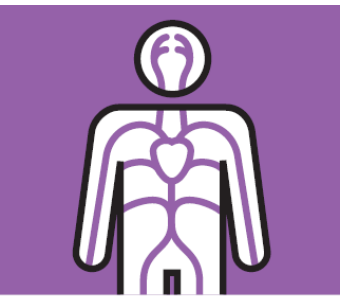
Het verleden



Vroegtijdig herkennen van patiënten at risk.

SIRS

- Systemic Inflammatory Response Syndrome (SIRS) is two or more of the following: Temp >38.3°C or <36°C, HR >90, RR >20, WBC >12 or <4 K/cu mm or >10% bands


Systolische bloeddruk <90 en >200 mmHg


Hartritme <40 en >130 slagen per minuut

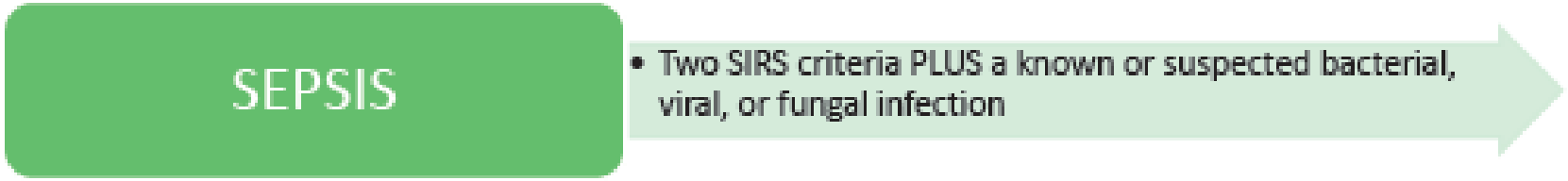

Zuurstofsaturatie <90 %


Ademhalingsfrequentie <8 en >30 per minuut


Bewustzijnsverandering

Oude definitie: sepsis

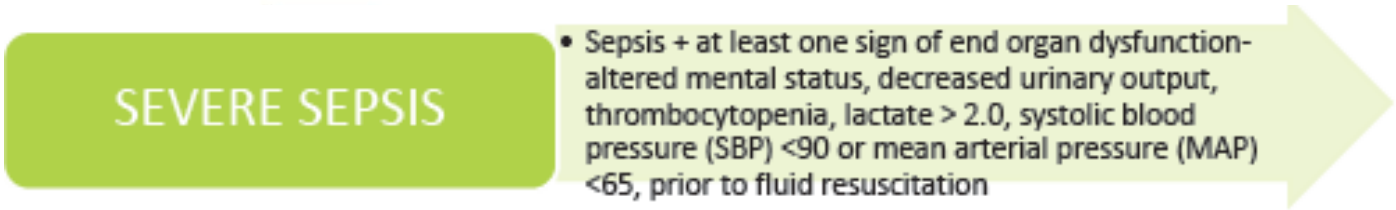
Sepsis: ≥ 2 SIRS-verschijnselen met verdenking op of aanwijzing voor infectie.



Oude definitie: ernstige sepsis

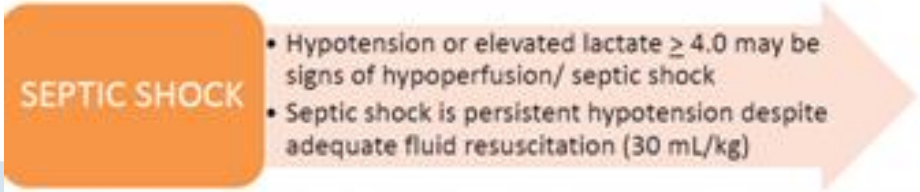
Hiervan is sprake, wanneer naast sepsis ook nog aanwijzingen zijn voor een acute stoornis in de functie van één of meerdere organen zoals:

- Hypoxie
- Hypotensie (systolische bloeddruk < 90 mm Hg, MAP < 70 mm Hg of een daling van de systolische bloeddruk met meer dan 40 mm Hg ten opzichte van de vorige waarde of een systolische bloeddruk < 10de percentiel voor de leeftijd)
- Tekenen van hypoperfusie (lactaatacidose, oligurie, veranderd bewustzijn)



Oude definitie: Septische shock

- Sepsis geassocieerd met hypoperfusie, orgaanfalen of hypotensie die niet herstelt na volumetoediening, zodat er voor de behandeling vasopressoren nodig zijn.



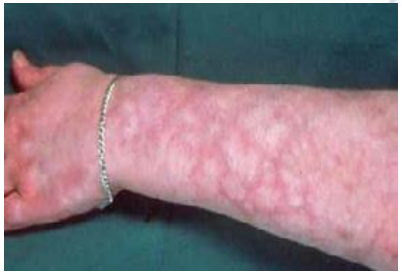
Orgaandysfunctie

Signs & symptoms

- Veranderde mentale status
- Verminderde urineproductie
- Capp refill > 3 sec.
- Vlekken
- Toename gewicht >20 ml/kg (ongeveer 2 kg in 2 voorgaande dagen)

Labwaarden

- Bilirubin > 2 mg/dl
- Creatinine > 2.0 mg/dl
- Glucose > 140 mg/dl w/o diabetes
- Hypoxemia requiring BiPAP
- INR ≥ 1.5
- Lactate > 2.0 mmol
- Platelets < 100,000/mm3



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Labwa rden

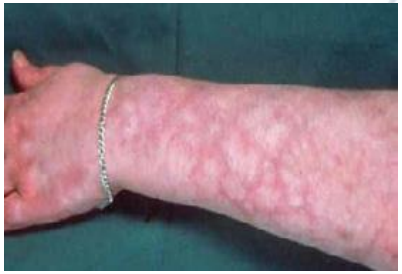
- Bili ll

Lactaat is een marker voor de mate van weefseloxygenatie. Bij zuurstoftekort zal er veel lactaat gevormd worden.

betes

AP

0/mm3



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Where does febrile neutropenia fit?

Even though this uses 38.3°C, oncology resources[1,6] recommend 38.0°C X 2 within one hour

SIRS

- Temp >38.3 C or <36 C, HR >90, RR >20, WBC >12 or <4 K/cu mm or >10% bands

SEPSIS

- SIRS + Infection

SEVERE SEPSIS

- Sepsis + End Organ Damage or SBP <90 or MAP <65, prior to fluid resuscitation

SEPTIC SHOCK

- Severe Sepsis Hypotension refractory to fluids

Patients with neutropenia are escalated to at least sepsis

Definitie: Leukopene koorts

- Sepsis bij hematologische/oncologische patiënten met :
  - leukopenie < 1 x 10^9/l en/of granulocyten < 0,5 x 10^9/l.
  - T>38.3
- De meest voorkomende verwekkers (bij adequate SDD) zijn:
  - grampositieve micro-organismen (60-70%); stafylokokken, streptokokken, enterokokken en *Corynebacteria*.
  - Soms gisten (*Candida*), schimmels (*Aspergillus*), opportunisten
  - gramnegatieve bacteriën, zoals *Pseudomonas spp., E. coli, Klebsiella*-spp.
- Mucositis en i.v.-of Port-A-Cath-katheter zijn sterk predisponerende factoren.
- Hematologische patiënten hebben meestal SDD, oncologische patiënten hebben meestal geen infectieprofylaxe.

Screeningsinstrumenten

Screening Ernstige Sepsis

3 keer "JA" is ernstige sepsis:

1 **Is er verdenking op een (nieuwe) infectie?**

2 **Zijn ≥ 2 symptomen aanwezig?**
a. Ademfrequentie > 20/min (of pCO_2 < 4,3 kPa)
b. Hartfrequentie > 90/min
c. Veranderd bewustzijn/delirium
d. Temperatuur > 38,0 of < 36,0 °C
e. Koude rillingen
f. Leukocyten > 12 of < 4 x 10^9/l
g. Glucose > 6,8 mmol/l in afwezigheid van diabetes

3 **Is orgaandisfunctie aanwezig (en niet chronisch bestaand)?**
a. Zuurstofbehoefte 5 Ltr O_2 of meer om SaO_2 > 90% te houden
b. Bloeddruk (syst) < 90 mmHg of > 40 mmHg gedaald
c. Lactaat > 2 mmol/l
d. PT > 20 sec of APTT > 60 sec
e. Trombocyten < 100 x 10^9/l
f. Bilirubine > 35 µmol/l
g. Kreatinine > 150 µmol/l of diurese < 0,5 ml/kg/u

- Overleg met zaalarts; informeer zo nodig het MET
- Start zo snel mogelijk met de resuscitatiebundel en registreer de uitvoering hiervan op het sepsisformulier.

Resuscitatiebundel Ernstige Sepsis

- Meet lactaat (als dat nog niet gedaan is)
- Neem direct 2 bloedkweken af en kweek andere verdachte foci
- Geef antibiotica (<1 uur) volgens beleid Radboudumc
- Geef bij hypotensie / lactaat > 4 mmol/l: fluid challenge (b.v. 500-1000 ml NaCl 0,9% in 30 min.)
- Streef na: - bloeddruk (syst) > 90 mmHg,
  - diurese > 0,5 ml/kg/u
  - SaO_2 > 90%

december 2014_v12.4

Werkwijze: Screening Ernstige Sepsis

Modified Early Warning Score (MEWS) en referentiewaarden

Alarmsignalen bij vitaal bedreigde patiënt

Score		3	2	1	0	1	2	3
A	O_2-toediening				buitenlucht	< 5l O_2/min	≥ 5l O_2/min	
	SaO_2%	≤ 91	92-93	94-95	≥ 96			
B	Ademfrequentie	≤ 8		9-11	12-20		21-24	≥ 25
C	Hartfrequentie	≤ 40		41-50	51-90	91-110	111-130	≥ 131
	Bloeddruk (syst)	≤ 90	91-100	101-110	111-219			≥ 220
D	Bewustzijn				A		delirium	V/P/U
E	Temperatuur	≤ 35,0		35,1-36,0	36,1-38,0	38,1-39,0	≥ 39,1	

- **MEWS 0,1 of 2** : controleer vitale waarden **1 x per 8 uur.**
- **MEWS 3,4,5 of ongerust** : controleer vitale waarden **1 x per 4 uur** . Overleg met collega verpleegkundige/zaalarts
- **MEWS 6 of meer** : controleer vitale waarden **1 x per uur,** overweeg continue monitoring. Overleg met zaalarts < 10 min. Informeer zo nodig het MET

A = *alert* V= *reactie op aanspreken* P = *reactie op pijn* U = *geen reactie* Denk aan sepsis z.o.z.

MET (Medical Emergency Team) - toestel *77777*, b.g.g. *90000* Radboudumc

Risicoscore Febriele Neutropenie

MASCC score

Tabel 1. Risicostratificatiemodel van 'The Multinational Association for Supportive Care in Cancer'.[15]	
Kenmerk	**Punten**
leeftijd <60 jaar	2
poliklinische behandeling	3
klinische status bij presentatie:	
• geen of milde klachten	5
• matig ernstige klachten	3
geen hypotensie (systolische bloeddruk >90 mmHg)	5
geen dehydratie (waarvoor intraveneuze suppletie)	3
co-morbiditeit	
• geen COPD	4
• solide maligniteit of hematologische maligniteit zonder voorgaande invasieve schimmel- of gistinfectie	4
Indien een kenmerk aanwezig is, worden punten toegekend. Bij een totaalscore >20 geldt de patiënt als laag risico (<10%) op het ontwikkelen van ernstige medische complicaties gedurende de neutropene fase.	
COPD=chronic obstructive pulmonary disease.	

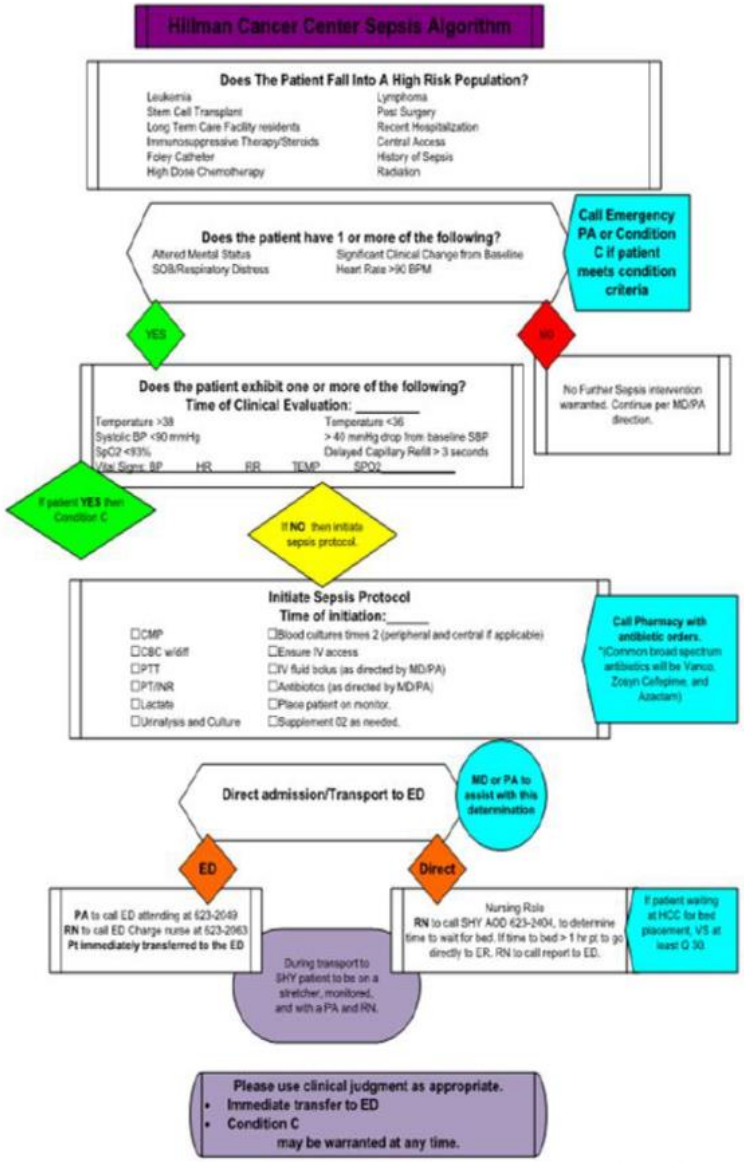
Overzichtstabel aangaande risico op febriele neutropenie bij chemotherapie behandeling

Febriele neutropenie (%)	Graad 3–4 neutropenie (%)	Schema (mg/m², tenzij anders aangegeven)	Chemotherapie	Referentie nr.
Borstkanker				
2	–	600/(40/600)$^{d1+8}$ Q3W	CMF	2
0–2	25–84	500/90–100/500 Q3W	FEC 90/100	4,5
9–14	86–94	(500/60)$^{d1+8}$/75^{d1-14} Q4W	FEC 120	3,6
10–20	–	60/600 Q3W	AC	7
16–17	77	100 Q3W	Doc	7,8,9
25	> 88	(60/600–100) Q3W	AC–T	7,10
33–48	61–97	50/75 Q3W	A doc	11,12
21–32	89–91	60/125–200 Q3W	AT	7,13,14
25	66	75/50/500 Q3W	TAC	7,15
Lymfomen				
4	19	(25/10/6/375)$^{d1+15}$ Q4W	ABVD HD	16
20.8	–	375/(750/50/1.4)^{d3}/ 100 mg^{d3-7} Q3W	R-CHOP-21 NHL	38
31	> 53	100/2 x 2,000^{d2}/40 mg^{d1-4} Q3W–Q4W	DHAP NHL	7,18
Niet-kleincellig longkanker				
5 - 11	69-75	75/75 Q3W	Doc/Cis	19,26
1–7	17–64	1.250^{d1+8}/75–100 Q3W	Gem/Cis	20,21
1–10	43 –81	25^{QW}/100 Q4W	Vin/Cis	21,22,23
< 5	14–63	175–225/AUC6 Q3W	Pac/Cb	21,24,26
16	75	135/75^{d2} Q3W	Pac/Cis	7,26
26	> 73	75/AUC6 Q3W	Doc/Cb	7,27
54	86	(200/35)$^{d1-3}$ Q4W	Etop/Cis	28
Kleincellig longkanker				
9	47	200/AUC6 Q3W	Pac/Cb	29
10–20	–	100^{d1-3}/300 Q3W	Etop/Cb	7
19	76	0,75^{d1-5}/60 Q3W	Top/Cis	7,30
57	–	50/1,000/120^{d1-3} Q3W	ACE (=CDE)	7,31
28	88	1,5^{d1-5} Q3W	Top	7,32
Ovariumkanker				
3–8	37–72	175–185/AUC5–6 Q3W	Pac/Cb	33,34
10–18	82–97	1.5^{d1-5} Q3W	Top	7,35,36,37
33	78	135 Q3W	Pac	7,39

- (R-)CHOP-14 dient altijd ondersteund te worden met G-CSF (Neulasta®)

VS: sepsis algoritme

Stichting Oncowijs



Hillman Cancer Center-Pittsburgh Cancer Institute

Surviving Sepsis Campaign

Johns Hopkins in Baltimore

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Implementeren richtlijnen sepsis bij kankerpatiënten: een uitdaging!

- Exclusie bij meeste studies
  - Kanker
  - CHF
- Variabiliteit in meten
- Meerdere verstoringen lactaat
  - Maligniteit
  - Dehydratie of hypoperfusie

- 7% -15% mortaliteit reductie
- Patiënten ontvangen niet overal dezelfde zorg
  - ‘Time zero’ is moeilijk vast te stellen
  - Niet overal goede sepsis management
  - Tijdig starten ANTIBIOTICUM is lastig

Surviving Sepsis Recommendations

1e 6 uur

3 uur

- Screen for sepsis- first encounter/ triage, defined intervals
- Blood cultures + lactate if positive screen
- Assess organ function
- First antimicrobial dose within 60 min of triage
- Oxygen if O2 sat < 90%
- Fluid bolus *at least 30 mL/kg if hypotensive*

6 uur

- Assessment of source
- MAP ≥ 65 mm Hg
- Vasopressors initiated within 6 hr if persistent hypotension
- CVP line- goal 8-12 mm Hg
- Central venous oxygen saturation (ScvO2) ≥ 70%
- Urine output ≥ 0.5 mL/kg/hr

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Sepsis aanbevelingen 1e 24 uur

- Indications:
  - Severe sepsis or septic shock OR
  - Persistent hypotension OR
  - hyperlactemia (≥ 4.0 mmol/L)
- Low volume ventilation/plateau pressures < 30 mm
- Glucose goal < 180 mg/dl
- Gastric Ulcer prophylaxis
- Venous thromboembolism (VTE) prophylaxis
- Low dose steroids for patients with hypotension*

Dellinger, R.P., Levy, M.M., Rhodes, A., Annane, D., Gerlach, H., Opal, S.M….. The Surviving Sepsis Campaign Guidelines Committee including the Pediatric Subgroup. (2013). Surviving Sepsis Campaign: International Guidelines for management of severe sepsis and septic shock, 2012. *Intensive Care Medicine, 39, 165-228.*

Hoe richtlijn te implementeren

Strategy	Pro	Con
Focused Education[18]	Easy answer Easy to perform	Knowledge retention inconsistent Staff turnover
Protocols, policies, algorithms[19-24]	Summarization complex literature Familiar structure	Accessibility when and where needed Complexity
Structured pre-printed or electronic orders[17,19-28]	Guide prescribers to choose correct EBP interventions	Requires recognition of need to activate May lead to over-treatment
Unit based Champions/ super-users[29]	Solutions within the unit culture Peer to peer influence	Labor-intensive Champions may not always be present/available
Rapid Response activation with protocols[21]	High activation rates (crying wolf) Standardization/frequent usage	Resource intensive
Combined interventions[23,30-35]	Proven most effective Targets different learning styles/ locus of motivation	Resource intensive for integration

Largest Threat to Effective Implementation

Recognizing the septic patient early

BUT…

Oncology may require revised screening processes OR anticipate many false positive alerts

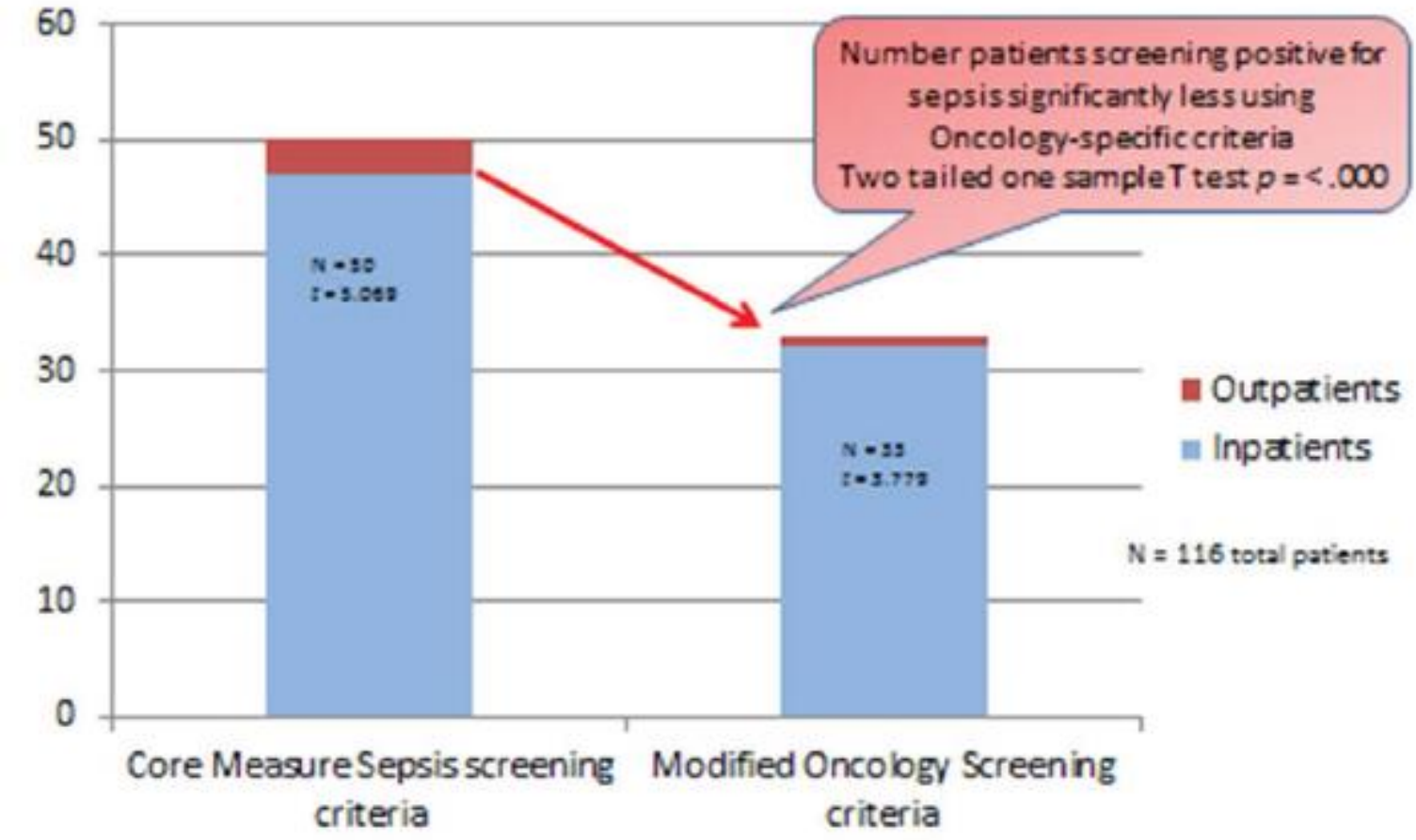
Johns Hopkins Baltimore

Revised sepsis criteria

Parameter	Surviving sepsis	JHH
Temperature (T)	T< 36.0C or > 38.3C	T < 35.5C (without symptoms) or >38.0C [1,36,37]
Heart rate (HR)	HR > 90/min	HR > 100/min[37,38]
Respirations (RR)	RR > 20/min	RR > 20/min
Blood pressure (BP)	Systolic BP < 90 mm or> 40 mm drop from baseline, OR MAP < 65 mm	Systolic BP < 90 mm or> 40 mm drop from baseline, OR MAP < 65 mm
WBC	< 4000/mm3 or > 12,000/mm3, or > 10% bands	< 4000/mm3 or > 12,000/mm3, or > 10% bands, neutropenia[1,38]
Other	None	Glucose > 140 mg/dl in absence of diabetes[5,36] Altered mental status[5,36,38,39] Mottling[5,36-38]

Verschil in screen Positive patiënt

No missed cases true sepsis



Shelton, B.K., Kane, J., Jones, R., & Weber, M. (2016). Abstract 27: Challenges in Implementing the Sepsis Core Measure in Oncology. *Oncology Nursing Forum, 43(2)E82, 74.*

Stichting Oncowijs

Critical sepsis **intervention** tracking

To be done within 3 hours of Time Zero

Vitals: Increase frequency of VS to Q2hrs x 3, unless ordered more frequently

Lactate level collected within 3 hours of start time

Time collected:

Check if done ☐

Cultures obtained before giving antibiotics

Check if done ☐

Fluid bolus (30 mL/kg) given as ordered if hypotensive or lactate ≥ 4 mmol/L

Within 1 Hour After Infusion:

BP#1 _____ Time

BP#2 _____ Time

Check if done ☐

Antibiotics infused

Abx name:

Time hung:

To be done within 6 hours of Time Zero

Vitals: Increase frequency for level of care

Repeat lactate within 5 hours of Time Zero, if first lactate is > 2

Check if done ☐

If hypotensive after fluid bolus, remind provider to complete ***Septic Shock Reassessment*** **Note**

Check if done ☐

Vasopressors if persistent hypotension

Check if done ☐

Start Antibiotica <1 uur

Citation	Methods	Results
Gaieski, Pines, Band, Mikkelsen, Massone, Furia, Shofer, Goyal, 2010[46]	Single center, retrospective cohort, 161 pts with severe sepsis and tic shock from 2005-2006	Me me to antimicrobials was 119 min association between antimicrobial ation > 1 hr to increased mortality increased for every hour delay in bial ation
Fletcher, Hodgkiss, Zhang, Browning, Hadden, Hoffman, Winick, M 2013[47]	Sin ped	1.1%, 0.7% mortality, 4.7% PICU adverse adverse outcomes > 60 robial
Ali, Baqir, Hamid, Khurshid		was 45 min than 60 min, and included the ed severe sepsis
Ko, Ahn, Lee, Kim Lee, 2015[49]		to antimicrobials was140 min Time to imicrobial did NOT influence incidence of severe sepsis, septic shock or mortality
Mokart, Saillard, Sannini, Chow-Chine, Brun, Faucher, Blache, Blaise, Leone, 2014[3]	Si , retro ve cohort, 118 pt ted to ICU with severe sepsis or tic shock from 2008-2010	Multivariate analysis showed most important predictor for mortality was time to antibiotic greater than 1 hr

Elk uur wachten na het eerste uur, verhoogd mortaliteit met 7,6%.

Time zero

Time zero is wanneer patiënt aan onderstaande criteria voldoet

- 2 of meer SIRS criteria met EN verdenking op infectie EN orgaan dysfunctie aangetoond in lab/ lactaat > 2 mmol/ L OR
- Hypotensie en/of lactaat ≥ 4 mmol/L

Fever order set

John Hopkins

(for Fevers that are unrelated to blood product transfusion)

Goal: Administration of a broad-spectrum antibiotic within 60 minutes.

"New" fever - a patient that has been previously treated for a fever and remains afebrile for 48 hours but later develops fever. This is to be treated as a "new" fever.

If patient has a NEW temperature ≥ 38°C then proceed with the following:		
NURSING INTERVENTIONS	**Time Done**	**Initial (RN)**
√ Inform a medical officer or consultant to assess the patient immediately		
√ IV access (if not already initiated)		
√ FBC, SP1 and 2 sets of blood cultures (2 peripheral or 1 peripheral and 1 via central line if in place). *If obtaining 2 sets of blood cultures will delay administration of antibiotic by ≥ 60 minutes, initiate antibiotic after 1st set of blood cultures and then proceed to obtain second set*		
√ Urine FEME and culture		
√ Monitor vital signs every hour for 4 hours or until stable then per routine		
√ If patient is hypotensive (systolic blood pressure less than 90) or tachycardic (heart rate greater than 125), then monitor vital signs every 15 minutes for 1 hour until stable and then as above		
√ Place Intra nasal O_2 at 2L/min if O_2 saturation is less than 93% or in respiratory distress		
PHYSICIAN ORDERS		
☐ Portable Chest X-ray		
IV fluids *(if required)* *(Continuous infusions order on MAR)*		
☐ Normal Saline bolus 500ml		
☐ Normal Saline bolus 1000ml		
☐ Other:		
Antibiotics *(to be administered within 60 minutes)*		
(All orders are one-time orders - routine antibiotics should be ordered on MAR)		
Allergies: ☐ NKA Other:		
Reaction Type:		
*For hemodynamically unstable or suspected neutropenic patients, consider antibiotics in bold		
☐ ***Piperacillin/Tazobactam 4.5g IV**		
☐ ***Cefepime 1 or 2** *(circle)* **gram IV**		
☐ ***Meropenem 1 gram IV**		
☐ ***Imipenem 750 mg IV**		
☐ Ceftazidime 1 gram IV		
☐ If **Penicillin allergy**, Aztreonam 1 gram IV & Amikacin 15 mg/kg IV		
☐ Other:		
Other Laboratory Tests		
☐ PT/PTT		
☐ D-dimer		
☐ Sputum Gram Stain and culture		
☐ Other		

Overige interventies

Unclear if CVP measurements or CVP guided therapy enhances outcomes.

Overige interventies

No established best practice for steroid use in sepsis despite recommendations from Surviving Resuscitation.

Concerns for Implementation in Resource-limited settings

Concern	Response
Screening criteria sensitive, many false positives	New recommended qSOFA criteria are simpler with better predictability for poor outcomes[39,41]
Time sensitivity of recommendations	Studies show benefit even with less than optimal implementation[48-50]
Availability of lactate measurement	Hypotension paired with other clinical signs of hypoperfusion (urine out, mottling) may be equally predictive[14,35]
Perfusion evaluation requiring technology	Latest recommendations no longer suggest central venous catheter or central venous oxygen saturation. Physical evaluation of perfusion acceptable[39,51]

Discussie

- Sepsis core measure has a clinical impact upon workload.
- Hospital-wide efforts to detect and intervene in sepsis should be tailored to the population
  – Cancer-specific sepsis triggers missed with universal screening
  – Oncology-specific criteria require more robust evaluation.
  – Pilot data suggest that modified screening criteria reduces workload without sacrificing sensitivity of screening.
- Accurate and streamlined early screening for sepsis permits more time for recommended three-hour interventions.

Samenvattend – het verleden

- SIRS lijkt niet meer te voldoen
- Er is geen gouden standaard voor sepsis of septische shock
- Er is behoefte aan meer uniformiteit
- De huidige definitie geeft te weinig uniformiteit
- Ernstige sepsis lijkt een overbodige term
- Is sepsis en septische shock niet voldoende?

Waarom moeilijk bij oncologie patienen?

Tijd voor verandering

- Task force SCCM/ESICM

Special Communication | Caring for the Critically Ill Patient

FREE

February 23, 2016

The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)

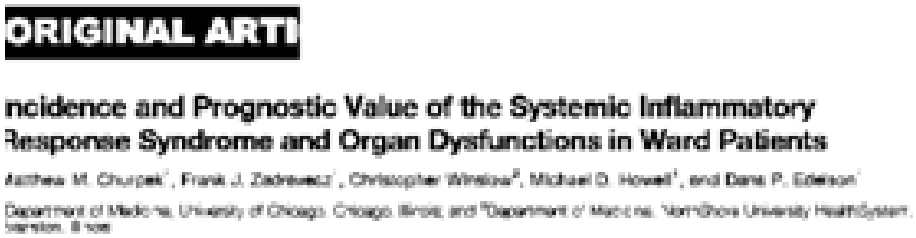
Mervyn Singer, MD, FRCP[1]; Clifford S. Deutschman, MD, MS[2]; Christopher Warren Seymour, MD, MSc[3]; et al

» Author Affiliations | Article Information

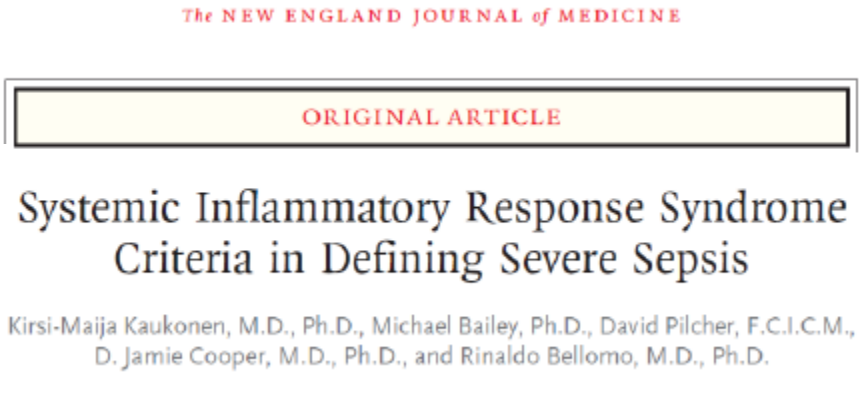
JAMA. 2016;315(8):801-810. doi:10.1001/jama.2016.0287

SIRS

- 1:8 ptn met een ernstige sepsis is SIRS negatief
- Geen duidelijke cut-off bij 2 SIRS criteria
- >2 SIRS criteria = goede sensitiviteit, maar lage specificiteit


ORIGINAL ARTI

ncidence and Prognostic Value of the Systemic Inflammatory
Response Syndrome and Organ Dysfunctions in Ward Patients


The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Systemic Inflammatory Response Syndrome Criteria in Defining Severe Sepsis

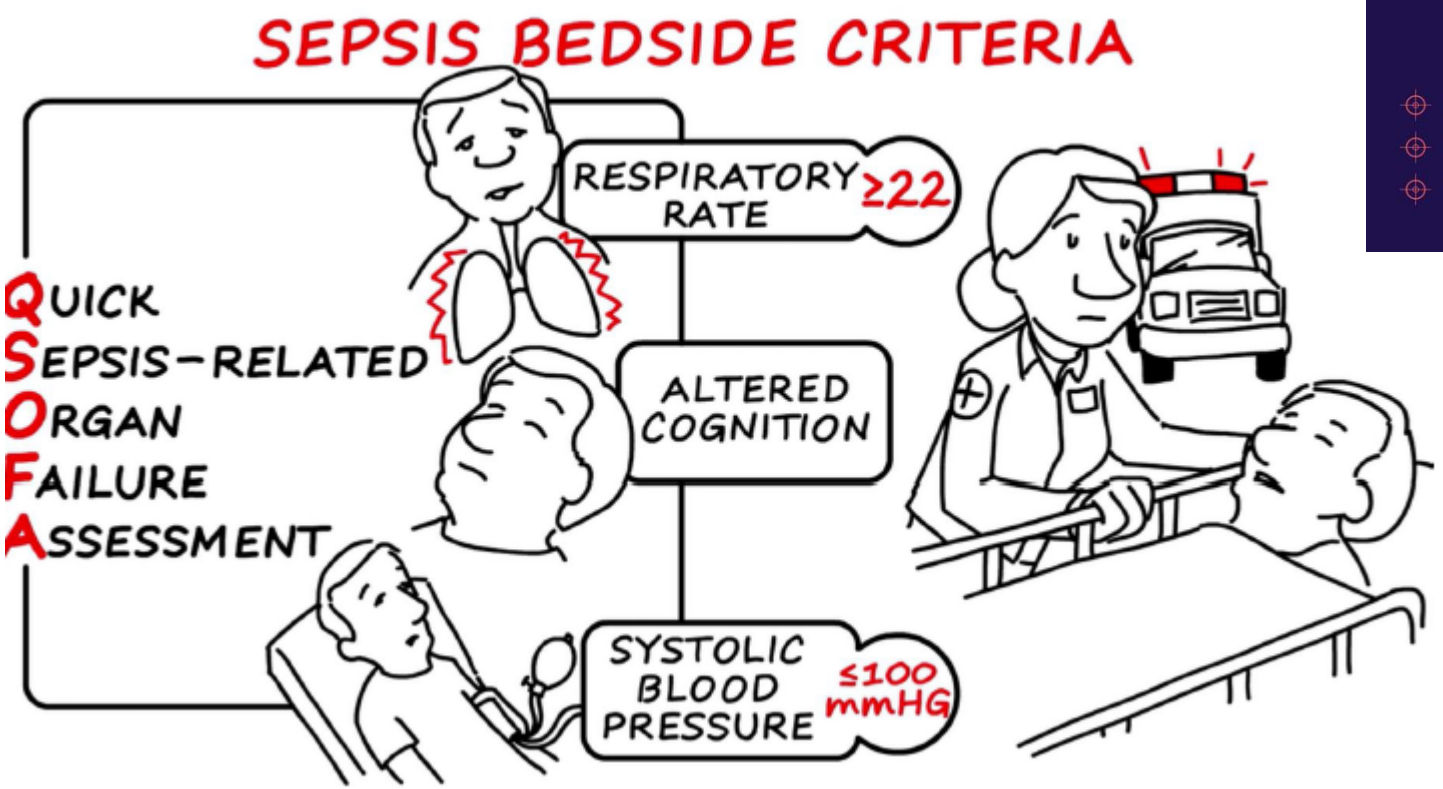
Kirsi-Maija Kaukonen, M.D., Ph.D., Michael Bailey, Ph.D., David Pilcher, F.C.I.C.M., D. Jamie Cooper, M.D., Ph.D., and Rinaldo Bellomo, M.D., Ph.D.

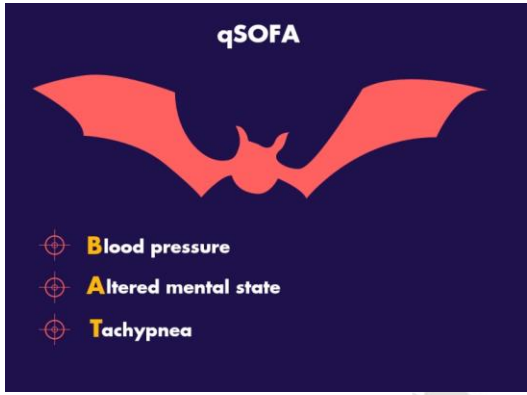
Key points

- Na 15 jaar is in 2016 een update van de sepsis definities verschenen
- SIRS wordt al jaren bekritiseerd door de matige specificiteit maar ook sensitiviteit en is uit de definities gehaald.
- SIRS dwingt wel tot nadenken: waarom vertoont mijn patiënt deze abnormale parameters?
- Nieuw in de definities is de quick SOFA (qSOFA) score

1.Singer M, Deutschman CS, Seymour CW, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). JAMA. 2016;315(8):801-810.
2.Seymour CW, Liu VX, Iwashyna TJ, et al. Assessment of Clinical Criteria for Sepsis For the Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). JAMA. 2016;315(8):762-774.
3.Shankar-Hari, M, Phillips GS, Levy ML, et al. Criteria for Septic Shock For the Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). JAMA. 2016;315(8):775-787.

Q SOFA


SEPSIS BEDSIDE CRITERIA
QUICK
SEPSIS-RELATED
ORGAN
FAILURE
ASSESSMENT
RESPIRATORY RATE ≥22
ALTERED COGNITION
SYSTOLIC BLOOD PRESSURE ≤100 mmHG


qSOFA
Blood pressure
Altered mental state
Tachypnea

Nieuwe definitie: Sepsis

- Sepsis is een levensbedreigend orgaanfalen veroorzaakt door een gedysreguleerde host respons op een infectie
- Criteria: infectie + stijging *Sepsis related organ failure assessment* SOFA ≥ 2
  - Op afdeling/ extern: infectie + stijging qSOFA ≥ 2

Sepsis = oude ernstige sepsis

Gereguleerde host respons = normale response op infectie.

February 23, 2016

Assessment of Clinical Criteria for Sepsis

: For the Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)

Christopher W. Seymour, MD, MSc[1,2]; Vincent X. Liu, MD, MSc[3]; Theodore J. Iwashyna, MD, PhD[4,5,6]; et al

Nieuwe definitie: septische shock

- *Septische* shock:
  - een onderdeel van sepsis waarin uitgesproken circulatoire, cellulaire en metabole afwijkingen geassocieerd zijn met een hoger mortaliteitsrisico dan sepsis alleen.
- Klinische criteria septische shock:
  - Circulatoire dysfunctie: aanhoudende hypotensie, waarbij vasopressoren nodig zijn om een MAP ≥ 65 mmHg te verkrijgen én
  - Metabole en cellulaire afwijkingen: serum lactaat ≥ 2 mmol/L ondanks adequate volumeresuscitatie.

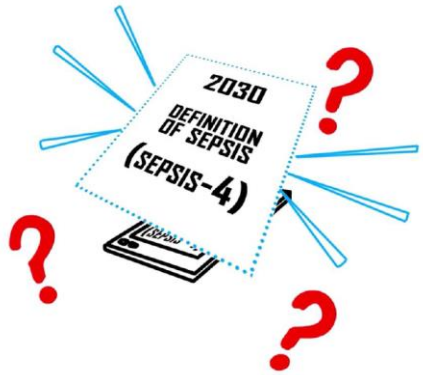
  Met deze criteria ligt de *in-hospital* mortaliteit boven de **40%**.
- Septische shock verschilt van sepsis in mortaliteit.

Developing a New Definition and Assessing New Clinical Criteria for Septic Shock
: For the Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)

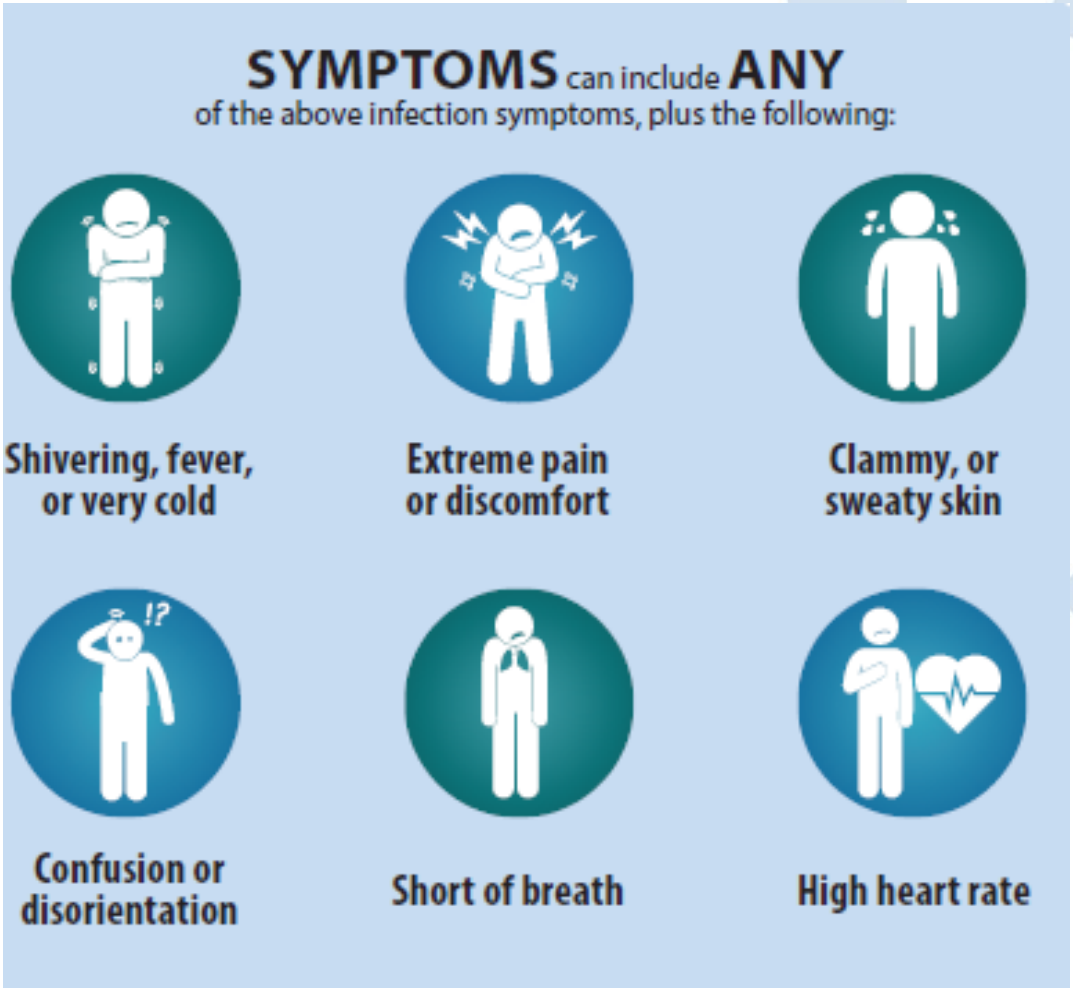
Manu Shankar-Hari, MD, MSc[1,2]; Gary S. Phillips, MAS[3]; Mitchell L. Levy, MD[4]; et al
> Author Affiliations | Article Information
JAMA. 2016;315(8):775-787. doi:10.1001/jama.2016.0289

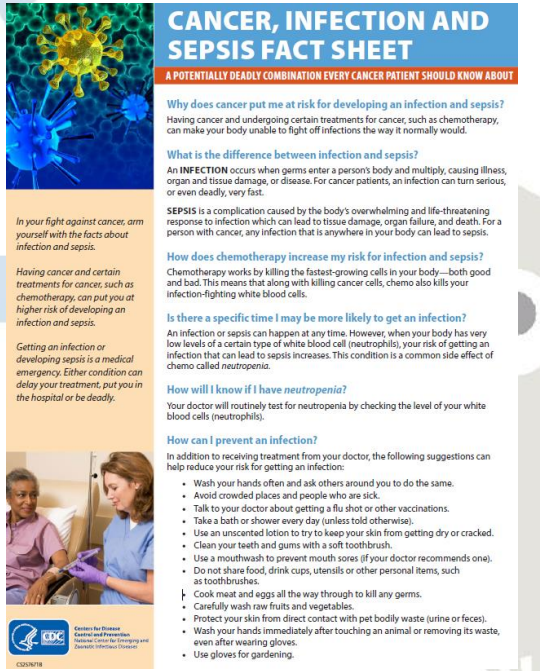
Kijkje in de toekomst

- Waar q SOFA je op dit moment mee kan helpen, is risicostratificatie. Wat is het risico op overlijden of langdurige IC-opname?
- Wat zal het worden? Definities aan de hand van biomarkers? (een patiënt heeft sepsis bij CRP > 100, een PCT van > 10 en een verhoogde IL-1, IL-6 en TNF-α?)



Informatie voor de patiënt





CANCER, INFECTION AND SEPSIS FACT SHEET

A POTENTIALLY DEADLY COMBINATION EVERY CANCER PATIENT SHOULD KNOW ABOUT

In your fight against cancer, arm yourself with the facts about infection and sepsis.

Having cancer and certain treatments for cancer, such as chemotherapy, can put you at higher risk of developing an infection and sepsis.

Getting an infection or developing sepsis is a medical emergency. Either condition can delay your treatment, put you in the hospital or be deadly.

Why does cancer put me at risk for developing an infection and sepsis?

Having cancer and undergoing certain treatments for cancer, such as chemotherapy, can make your body unable to fight off infections the way it normally would.

What is the difference between infection and sepsis?

An **INFECTION** occurs when germs enter a person's body and multiply, causing illness, organ and tissue damage, or disease. For cancer patients, an infection can turn serious, or even deadly, very fast.

SEPSIS is a complication caused by the body's overwhelming and life-threatening response to infection which can lead to tissue damage, organ failure, and death. For a person with cancer, any infection that is anywhere in your body can lead to sepsis.

How does chemotherapy increase my risk for infection and sepsis?

Chemotherapy works by killing the fastest-growing cells in your body—both good and bad. This means that along with killing cancer cells, chemo also kills your infection-fighting white blood cells.

Is there a specific time I may be more likely to get an infection?

An infection or sepsis can happen at any time. However, when your body has very low levels of a certain type of white blood cell (neutrophils), your risk of getting an infection that can lead to sepsis increases. This condition is a common side effect of chemo called *neutropenia*.

How will I know if I have *neutropenia*?

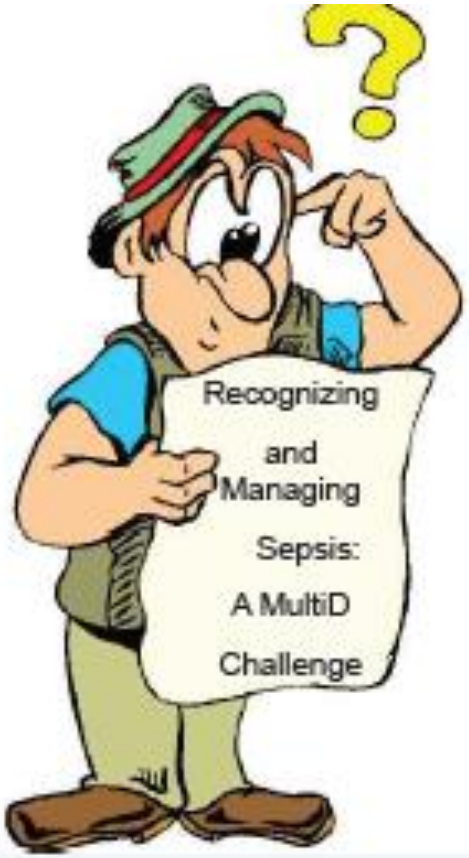
Your doctor will routinely test for neutropenia by checking the level of your white blood cells (neutrophils).

How can I prevent an infection?

In addition to receiving treatment from your doctor, the following suggestions can help reduce your risk for getting an infection:

- Wash your hands often and ask others around you to do the same.
- Avoid crowded places and people who are sick.
- Talk to your doctor about getting a flu shot or other vaccinations.
- Take a bath or shower every day (unless told otherwise).
- Use an unscented lotion to try to keep your skin from getting dry or cracked.
- Clean your teeth and gums with a soft toothbrush.
- Use a mouthwash to prevent mouth sores (if your doctor recommends one).
- Do not share food, drink cups, utensils or other personal items, such as toothbrushes.
- Cook meat and eggs all the way through to kill any germs.
- Carefully wash raw fruits and vegetables.
- Protect your skin from direct contact with pet bodily waste (urine or feces).
- Wash your hands immediately after touching an animal or removing its waste, even after wearing gloves.
- Use gloves for gardening.

Take home message



- Bij ‘time ‘zero’ begint het sepsis management en is lastig vast te stellen
- < 1 uur start antibiotica!
- Lactaat een voorspeller?
- QSOFA → ook voor oncologiepatiënten?