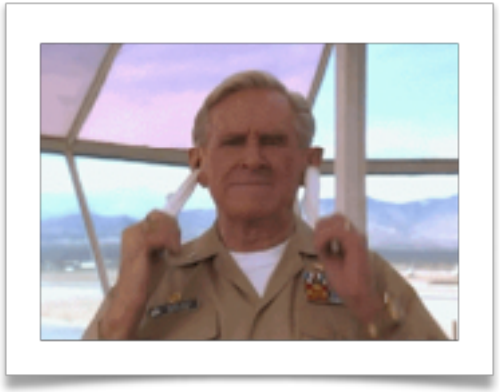
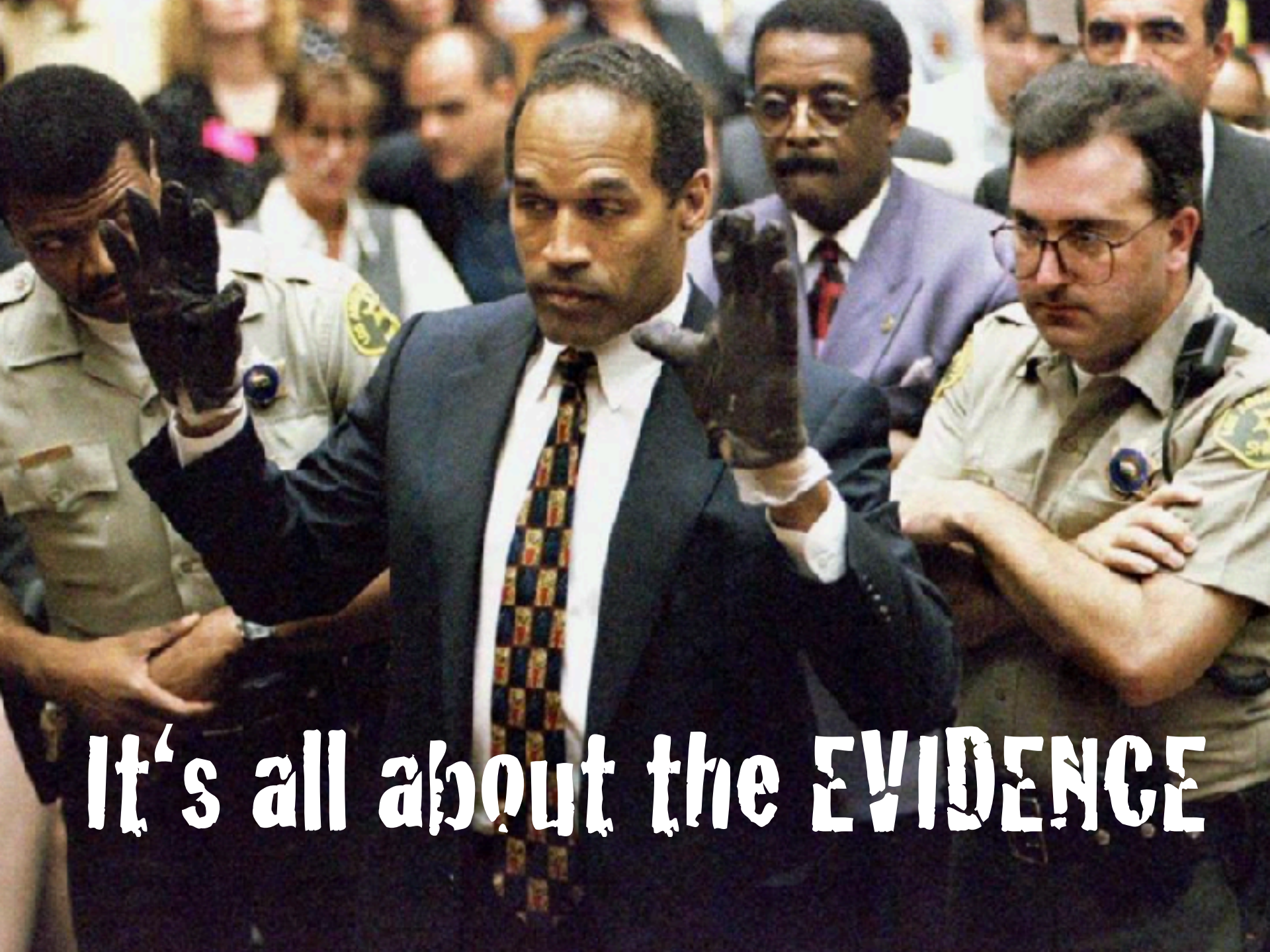


Intensivmedizin Standards 2017

Timothy Aebi MD MCAI
ICU Lindenhofspital
3001 Bern

Vortrag Download unter: www.crit.cloud -> Education

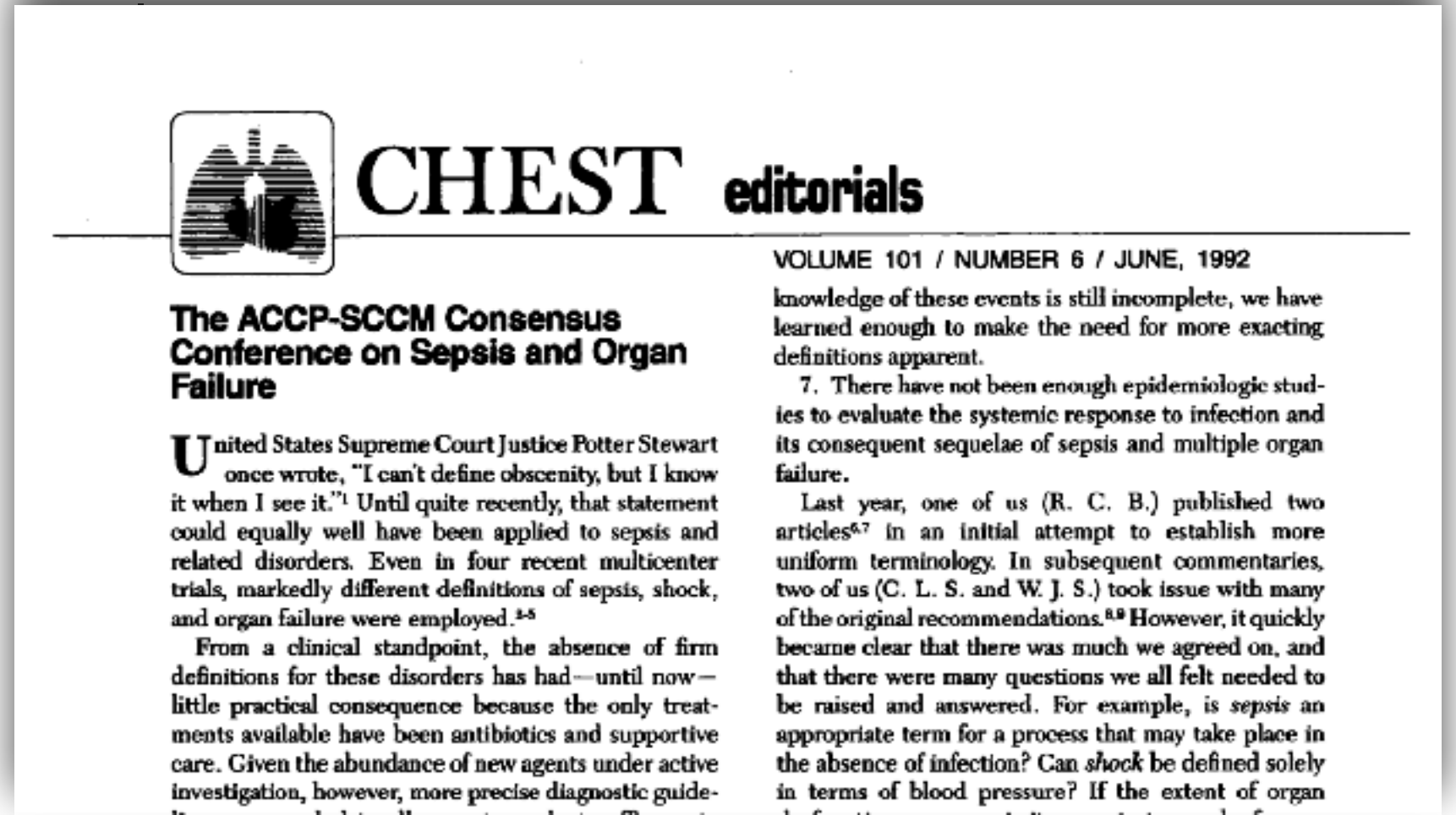
Best Medical Practice


It's all about the EVIDENCE

Sepsis Definition 3.0

Sepsis-Definition 3.0

- Ursprüngliche Definition mehr als 20 Jahre



CHEST editorials

VOLUME 101 / NUMBER 6 / JUNE, 1992

The ACCP-SCCM Consensus Conference on Sepsis and Organ Failure

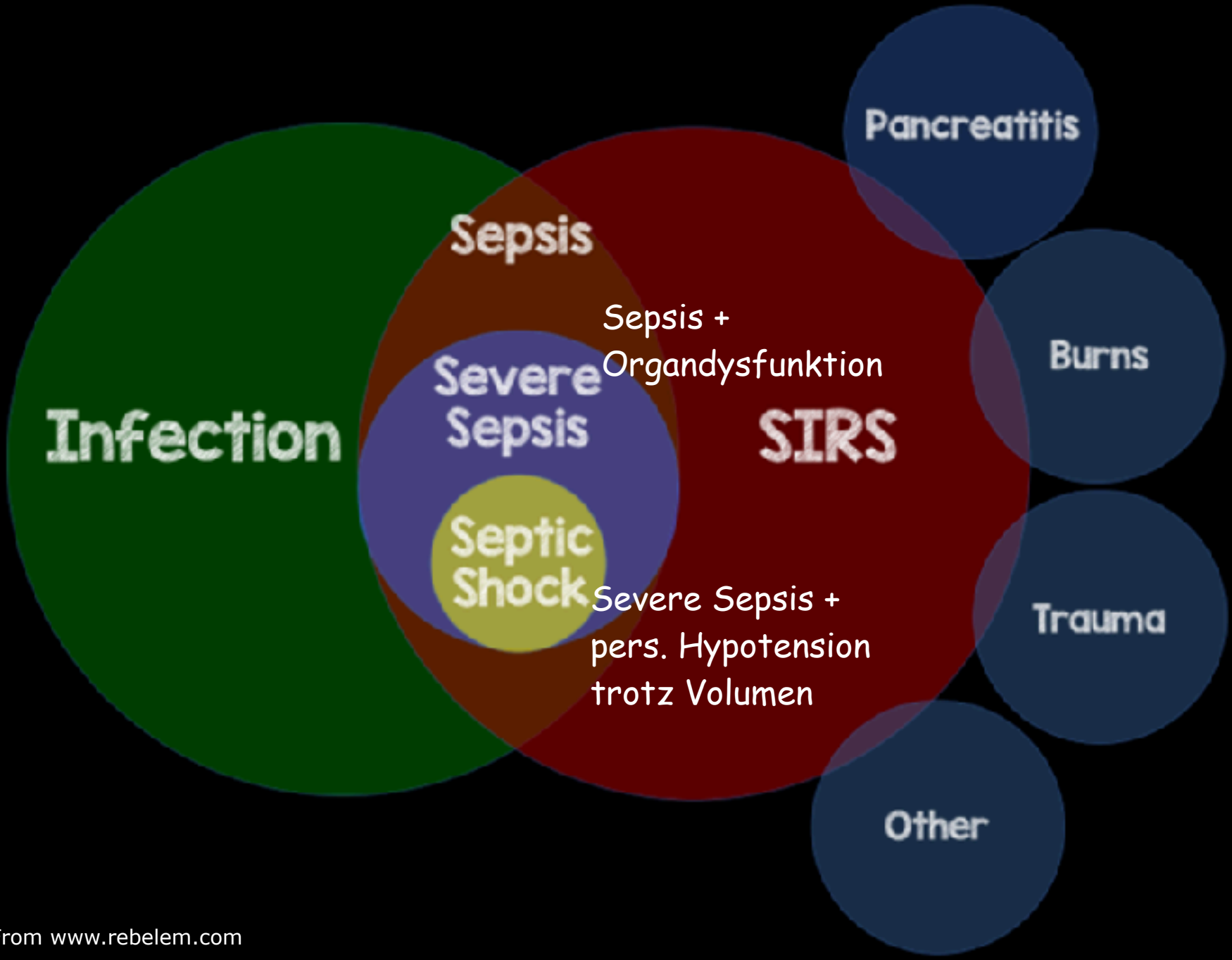
United States Supreme Court Justice Potter Stewart once wrote, "I can't define obscenity, but I know it when I see it."[1] Until quite recently, that statement could equally well have been applied to sepsis and related disorders. Even in four recent multicenter trials, markedly different definitions of sepsis, shock, and organ failure were employed.[2-5]

From a clinical standpoint, the absence of firm definitions for these disorders has had—until now—little practical consequence because the only treatments available have been antibiotics and supportive care. Given the abundance of new agents under active investigation, however, more precise diagnostic guide-

knowledge of these events is still incomplete, we have learned enough to make the need for more exacting definitions apparent.

7. There have not been enough epidemiologic studies to evaluate the systemic response to infection and its consequent sequelae of sepsis and multiple organ failure.

Last year, one of us (R. C. B.) published two articles[6,7] in an initial attempt to establish more uniform terminology. In subsequent commentaries, two of us (C. L. S. and W. J. S.) took issue with many of the original recommendations.[8,9] However, it quickly became clear that there was much we agreed on, and that there were many questions we all felt needed to be raised and answered. For example, is *sepsis* an appropriate term for a process that may take place in the absence of infection? Can *shock* be defined solely in terms of blood pressure? If the extent of organ



From www.rebelem.com

Sepsis-Definition 3.0

Sepsis-Definition 3.0

Clinical Review & Education

Special Communication | CARING FOR THE CRITICALLY ILL PATIENT

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

Mervyn Singer, MD, FRCP; Clifford S. Deutschman, MD, MSc; Christopher Warren Seymour, MD, MSc; Manu Shankar-Hari, MSc, MD, FFICM; Djillali Annane, MD, PhD; Michael Bauer, MD; Rinaldo Bellomo, MD; Gordon R. Bernard, MD; Jean-Daniel Chiche, MD, PhD; Craig M. Coopersmith, MD; Richard S. Hotchkiss, MD; Mitchell M. Levy, MD; John C. Marshall, MD; Greg S. Martin, MD, MSc; Steven M. Opal, MD; Gordon D. Rubenfeld, MD, MS; Tom van der Poll, MD, PhD; Jean-Louis Vincent, MD, PhD; Derek C. Angus, MD, MPH

IMPORTANCE Definitions of sepsis and septic shock were last revised in 2001. Considerable advances have since been made into the pathobiology (changes in organ function, morphology, cell biology, biochemistry, immunology, and circulation), management, and epidemiology of sepsis, suggesting the need for reexamination.

OBJECTIVE To evaluate and, as needed, update definitions for sepsis and septic shock.

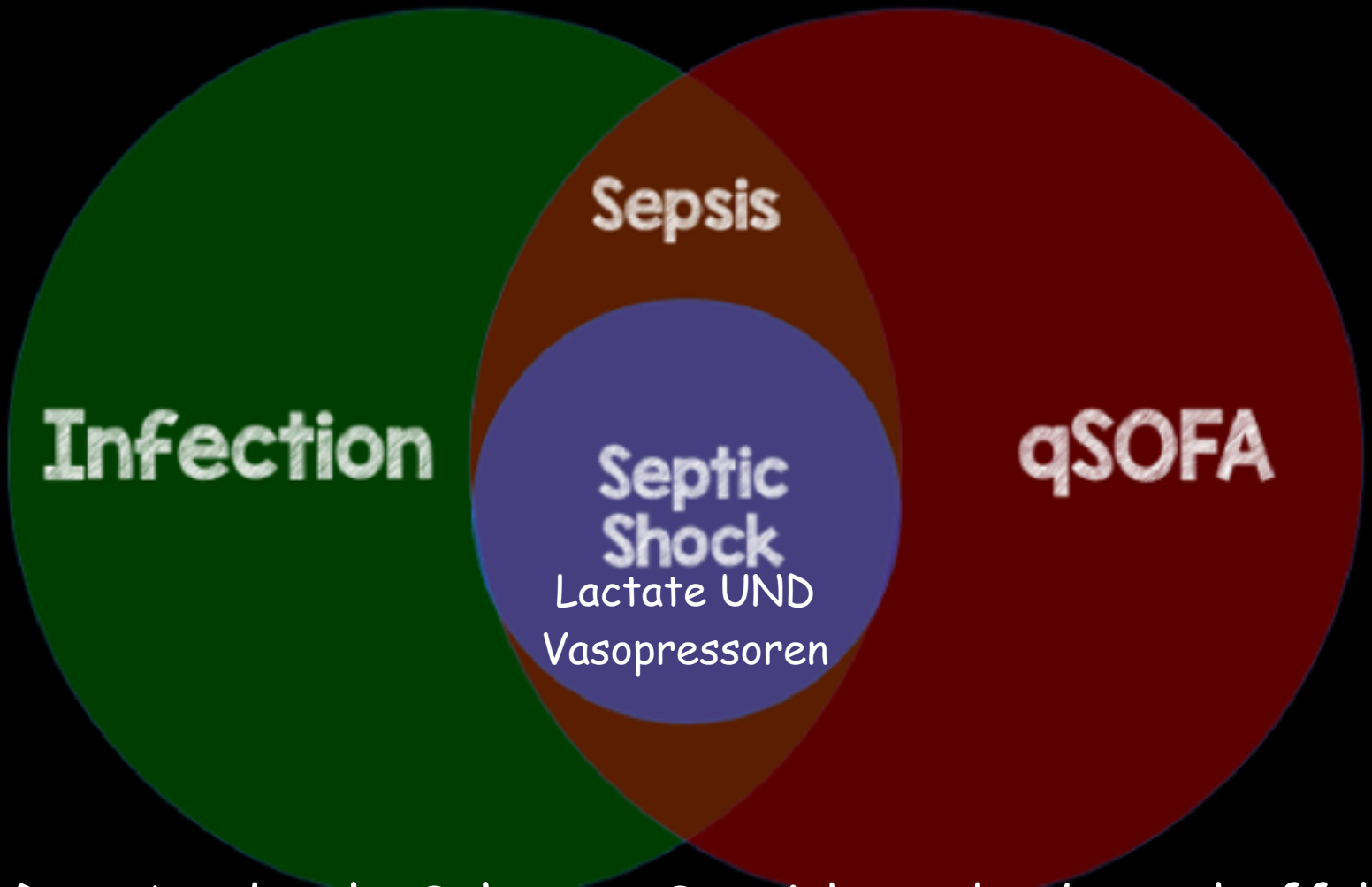
PROCESS A task force (n = 19) with expertise in sepsis pathobiology, clinical trials, and epidemiology was convened by the Society of Critical Care Medicine and the European Society of Intensive Care Medicine. Definitions and clinical criteria were generated through meetings, Delphi processes, analysis of electronic health record databases, and voting, followed by circulation to international professional societies, requesting peer review and endorsement (by 31 societies listed in the Acknowledgment).

Editorial page 757

Author Video Interview, Author Audio Interview, and JAMA Report Video at jama.com

Related articles pages 762 and 775

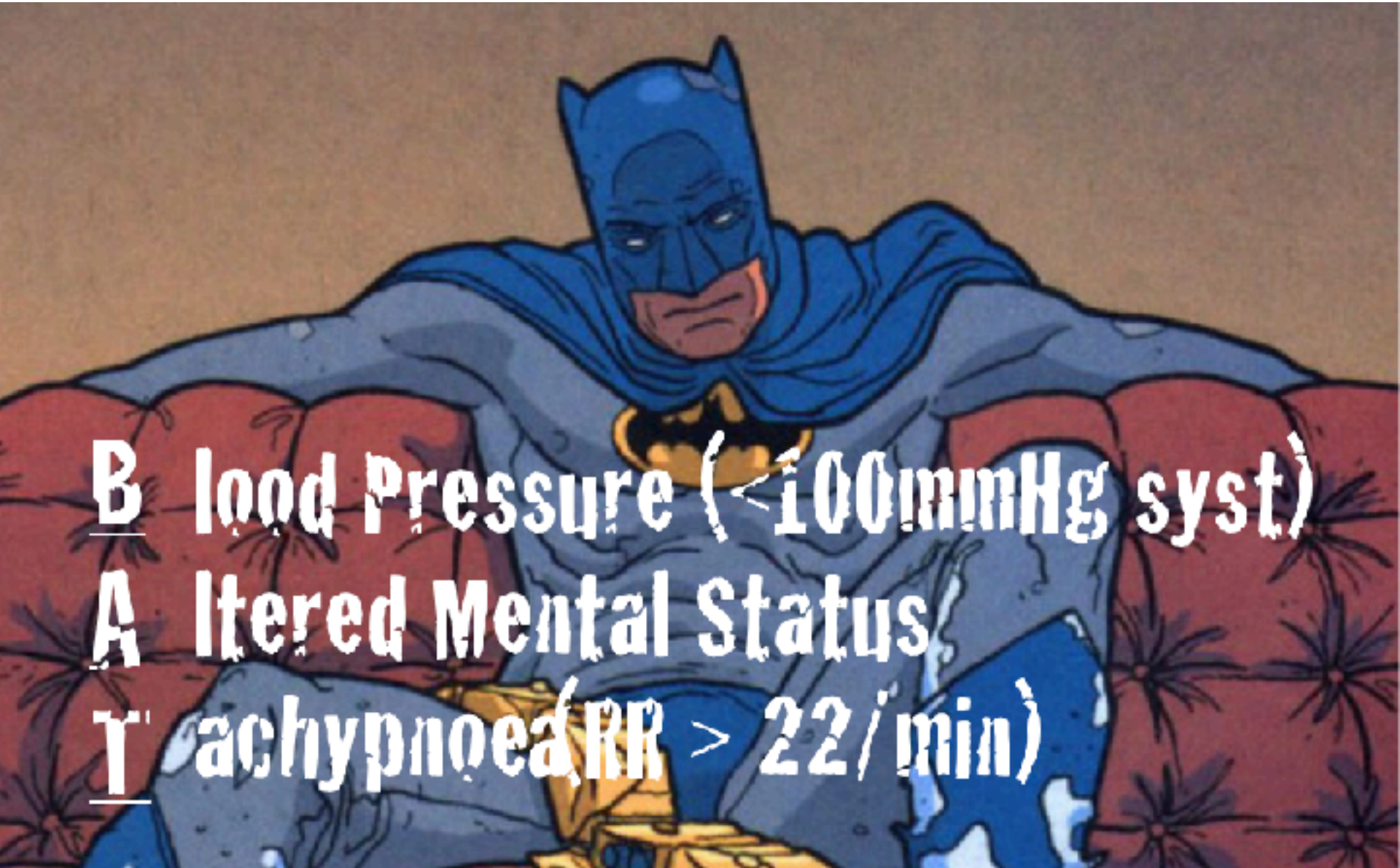
CME Quiz at jamanetworkcme.com and CME Questions page 816



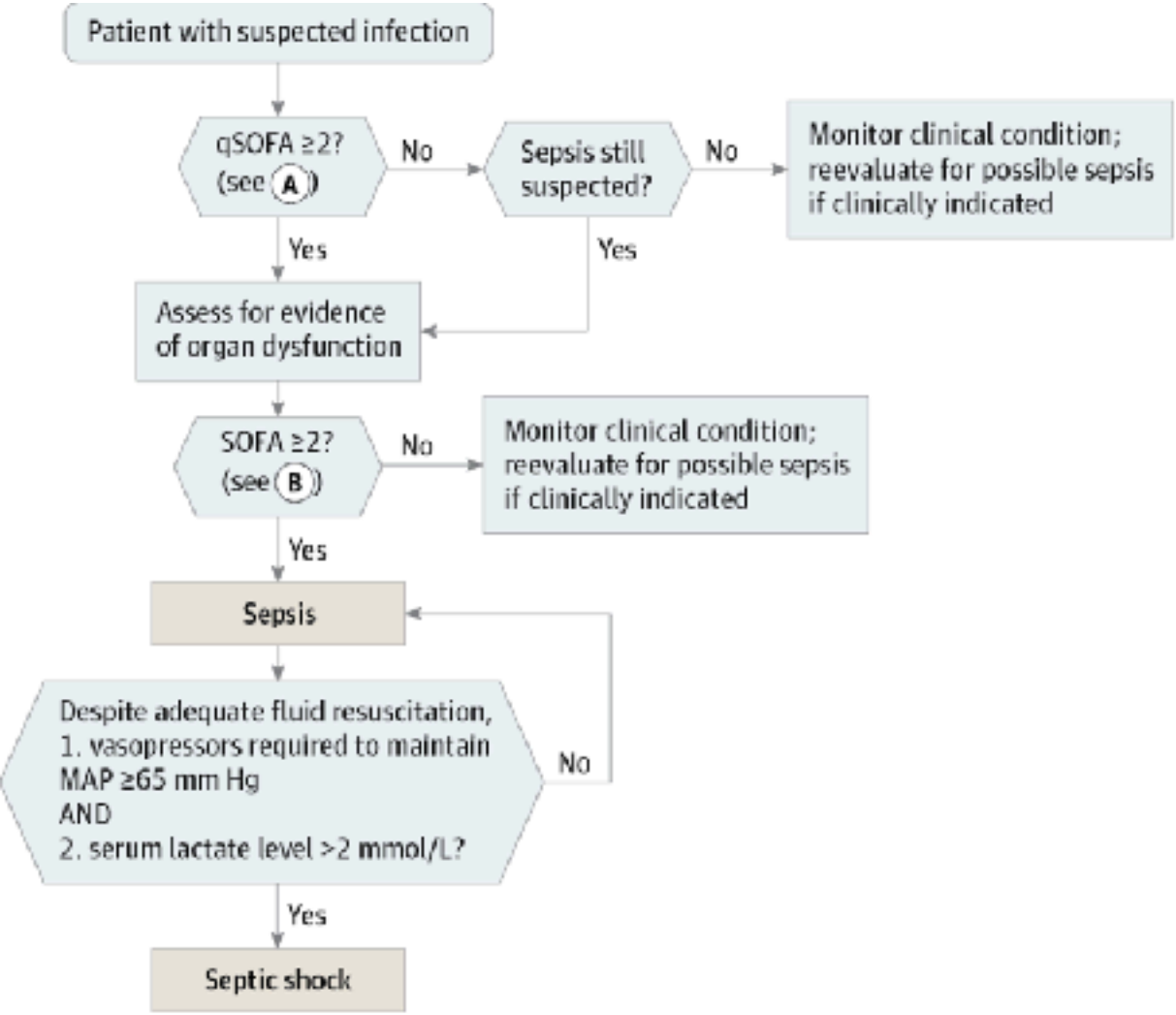
Der Ausdruck ‚Schwere Sepsis' wurde abgeschafft!

From www.rebelem.com

Quick SOFA – aka the B.A.T.



Sepsis-Definition 3.0



A qSOFA Variables

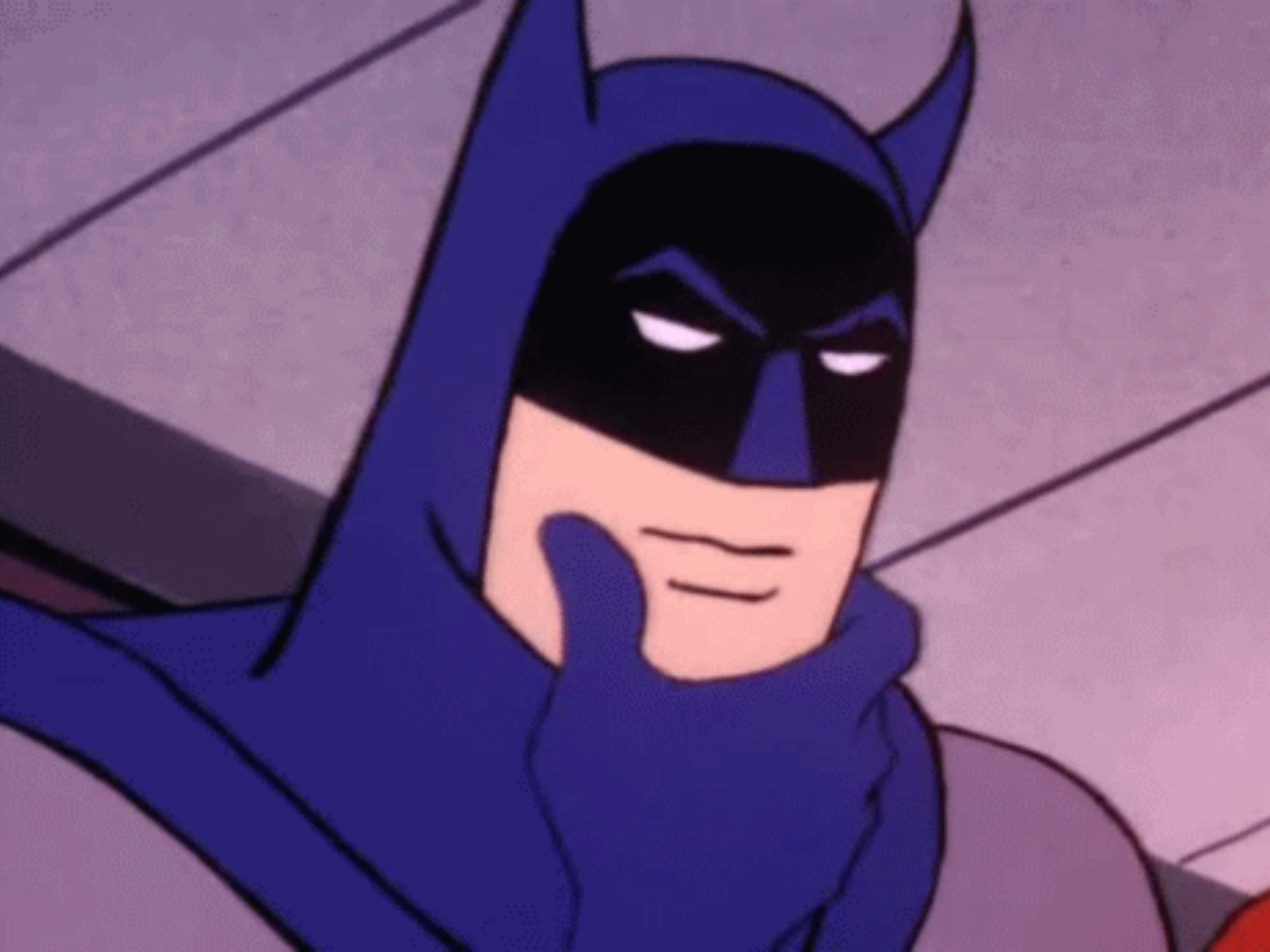
- Respiratory rate
- Mental status
- Systolic blood pressure

B SOFA Variables

- PaO_2/FiO_2 ratio
- Glasgow Coma Scale score
- Mean arterial pressure
- Administration of vasopressors with type and dose rate of infusion
- Serum creatinine or urine output
- Bilirubin
- Platelet count

SOFA Score

Organ System, Measurement	SOFA Score				
	0	1	2	3	4
Respiration PaO_2/FiO_2, mmHg	Normal	<400	<300	<200 (with respiratory support)	<100 (with respiratory support)
Coagulation Platelets $x10^3/mm^3$	Normal	<150	<100	<50	<20
Liver Bilirubin, mg/dL (µmol/l)	Normal	1.2-1.9 (20-32)	2.0-5.9 (33-101)	6.0-11.9 (102-204)	>12.0 (<204)
Cardiovascular Hypotension	Normal	MAP<70 mmHg	Dopamine ≤5 or dobutamine (any dose)**	Dopamine >5 or epinephrine ≤0.1 or norepinephrine ≤0.1	Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1
Central Nervous System Glasgow Coma Score	Normal	13-14	10-12	6-9	<6
Renal Creatinine, mg/dL (µmol/l) or Urine output	Normal	1.2-1.9 (110-170)	2.0-3.4 (171-299)	3.5-4.9 (300-440) or <500 mL/day	>5.0 (>440) or <200 mL/day



Sepsis-Definition 3.0

Intensive Care Med (2015) 41:505–507
DOI 10.1007/s00134-014-3570-7

WHAT'S NEW IN INTENSIVE CARE

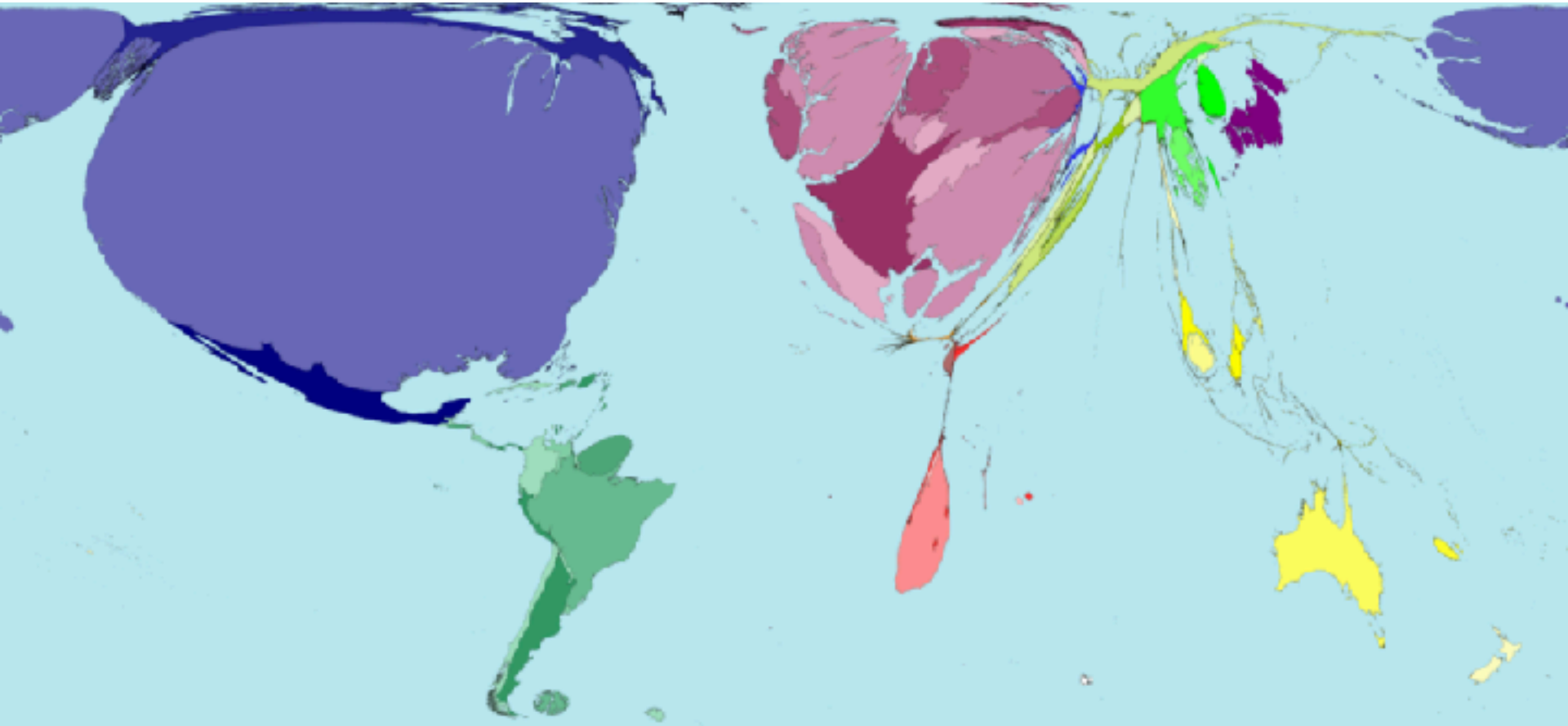
Jean-Louis Vincent
Jesse B. Hall
Arthur S. Slutsky

Ten big mistakes in intensive care medicine

1. We focus too much on syndromes—prominently the acute respiratory distress syndrome (ARDS), sepsis, and acute kidney injury (AKI)—and we spend much time redefining them. Even though we consider sepsis to be too vaguely defined [1], we did have one

Problem: **Allgemein**

- Low to Middle Income Countries (LMIC) wurden NICHT miteinbezogen



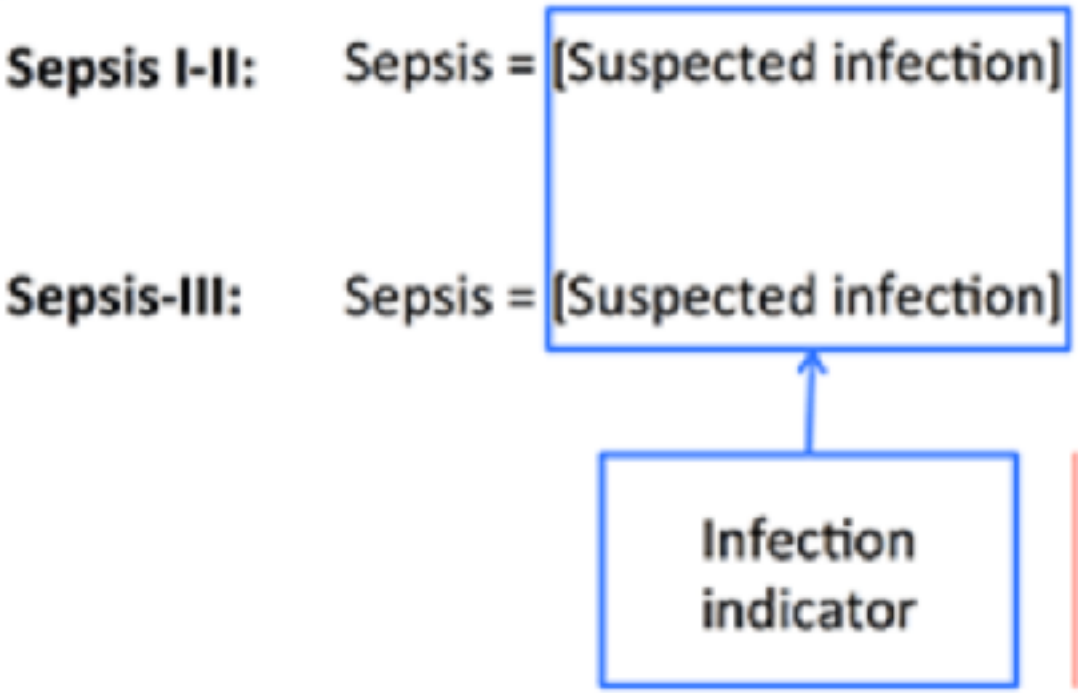
Problem: **Allgemein**

- Interessanterweise auch keine einzige Frau im Committee

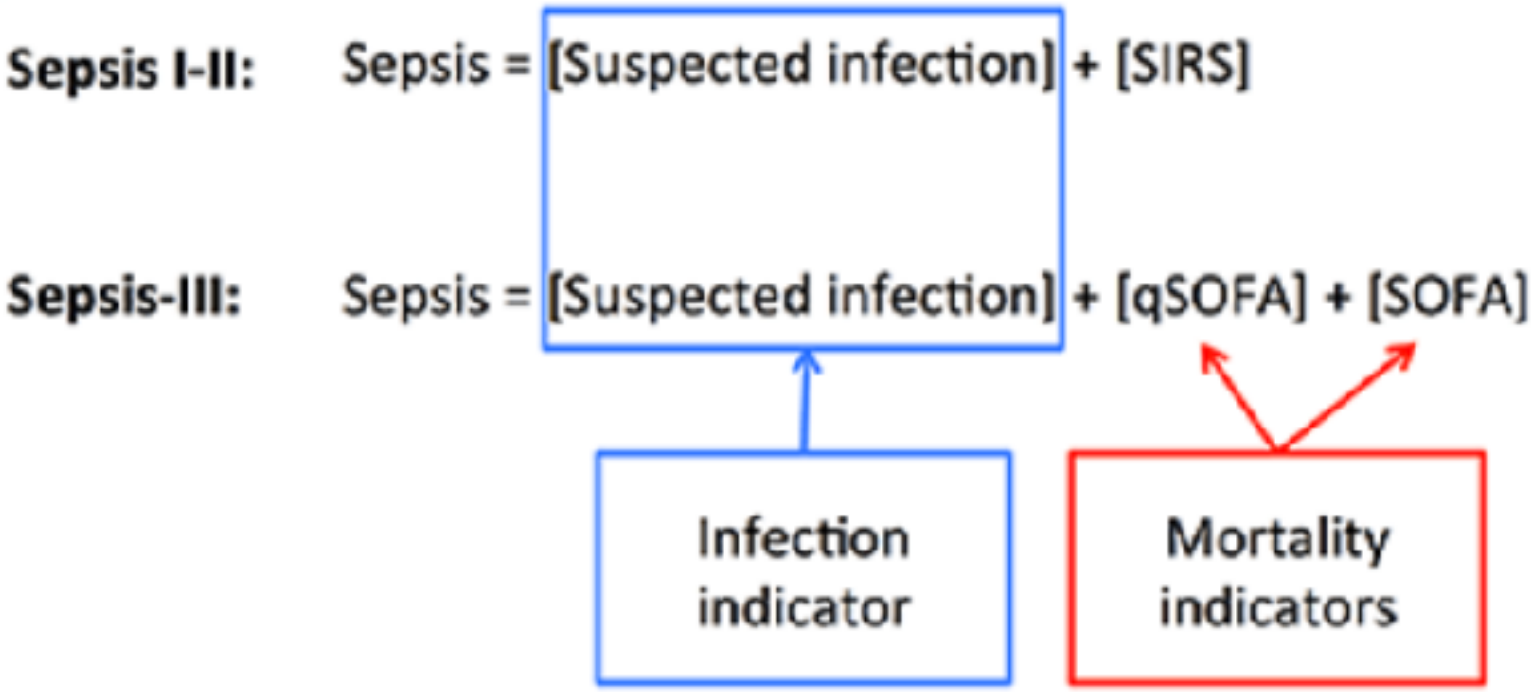
The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)

Mervyn Singer, MD, FRCP; Cliffo… …nu Shankar-Hari, MSc, MD, FFICM; Djillali Annane, MD, PhD; Michae… …l Chiche, MD, PhD; Craig M. Coopersmith, MD; Richa… …S. Martin, MD, MSc; Steven M. Opal, MD; Gordon D. … …D, PhD; Derek C. Angus, MD, MPH

Problem: **Scores**

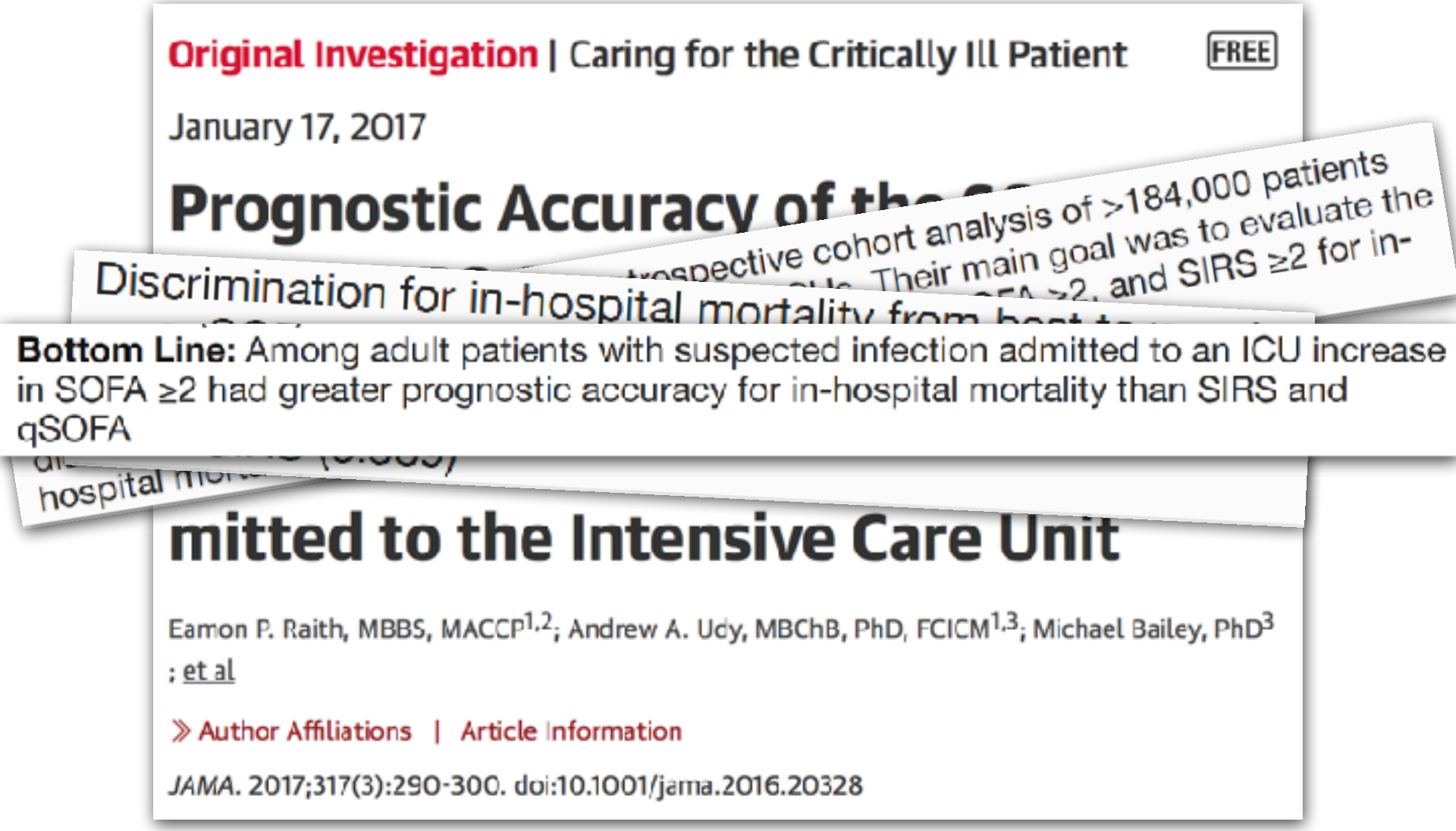


Problem: **Scores**



qSOFA und SOFA sind Mortality Predictors und keine Sepsis-Tests

Problem: **Scores - Who's the best?**



Original Investigation | Caring for the Critically Ill Patient FREE

January 17, 2017

Prognostic Accuracy of the

mitted to the Intensive Care Unit

Eamon P. Raith, MBBS, MACCP[1,2]; Andrew A. Udy, MBChB, PhD, FCICM[1,3]; Michael Bailey, PhD[3]; et al

» Author Affiliations | Article Information

JAMA. 2017;317(3):290-300. doi:10.1001/jama.2016.20328

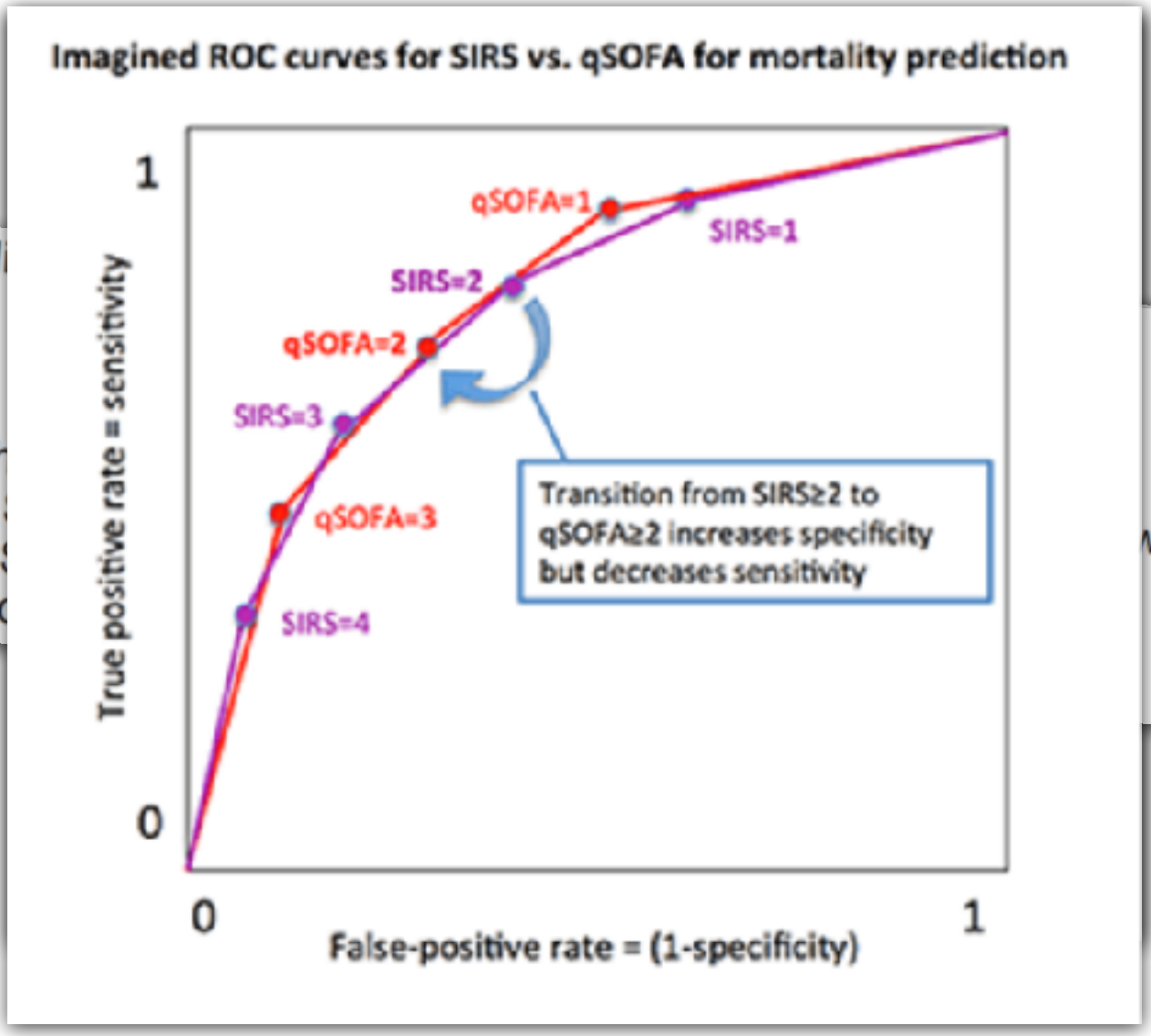
Discrimination for in-hospital mortality from

trospective cohort analysis of >184,000 patients
Their main goal was to evaluate the
and SIRS ≥2 for in-

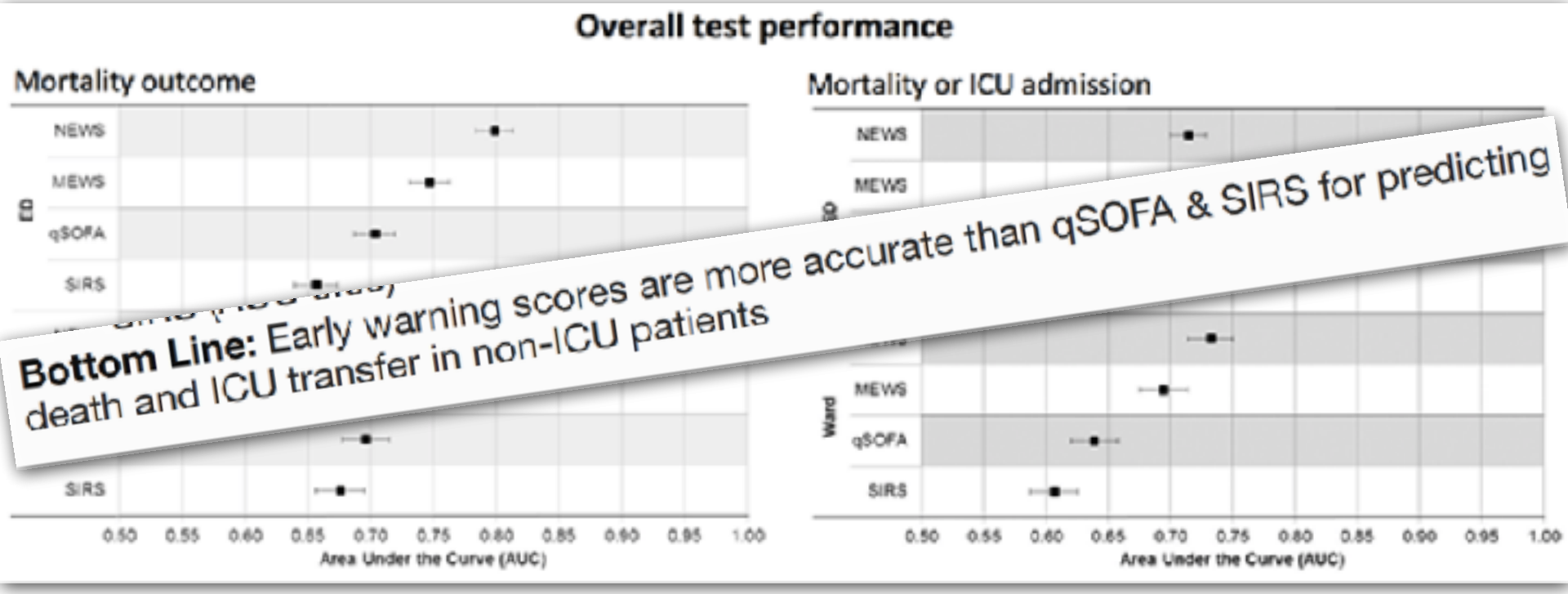
hospital

Bottom Line: Among adult patients with suspected infection admitted to an ICU increase in SOFA ≥2 had greater prognostic accuracy for in-hospital mortality than SIRS and qSOFA

Problem: **Scores - Who's the best?**



Problem: **Scores - Who's the best?**



qSOFA = simplifed NEWS score?

Chart 1: National Early Warning Score (NEWS)*

PHYSIOLOGICAL PARAMETERS	3	2	1	0	1	2	3
Respiration Rate	≤8		9 - 11	12 - 20		21 - 24	≥25
Oxygen Saturations	≤91	92 - 93	94 - 95	≥96			
Any Supplemental Oxygen		Yes		No			
Temperature	≤35.0		35.1 - 36.0	36.1 - 38.0	38.1 - 39.0	≥39.1	
Systolic BP	≤90	91 - 100	101 - 110	111 - 219			≥220
Heart Rate	≤40		41 - 50	51 - 90	91 - 110	111 - 130	≥131
Level of Consciousness				A			V, P, or U

*The NEWS initiative flowed from the Royal College of Physicians' NEWSDIG, and was jointly developed and funded in collaboration with the Royal College of Physicians, Royal College of Nursing, National Outreach Forum and NHS Training for Innovation.

Royal College of Physicians

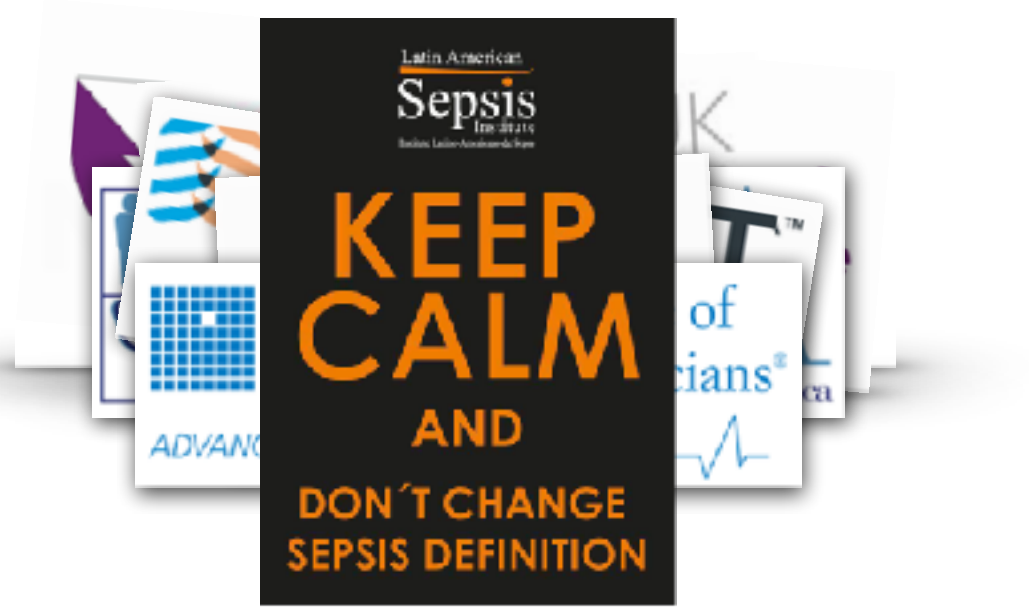
NHS Training for Innovation

qSOFA score:

- Altered mental status
- Respiratory rate ≥ 22
- Systolic blood pressure ≤ 100

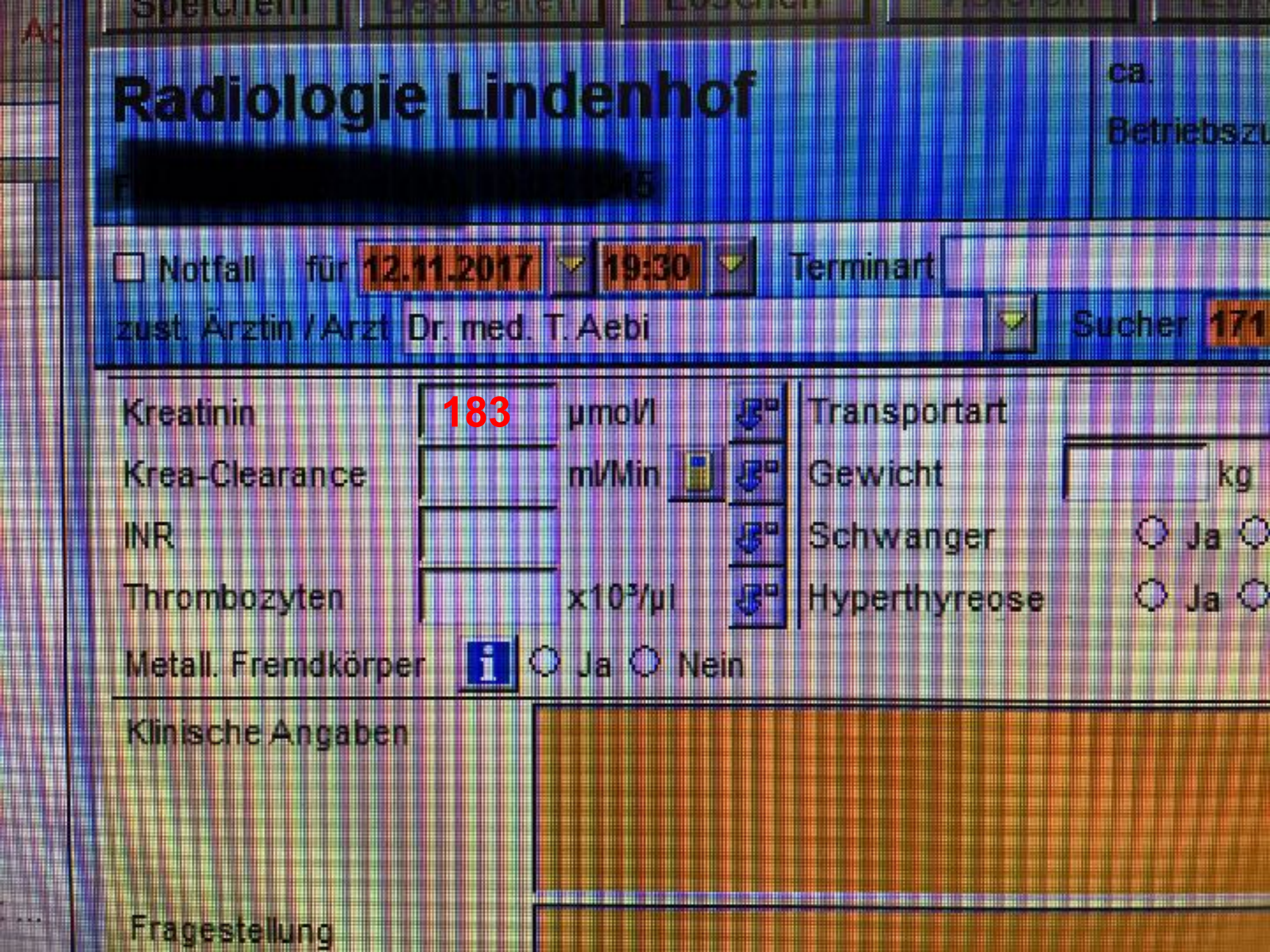
Problem: Kein Consensus

- Der SOFA Score ist kompliziert und wird nicht überall verwendet (z.B. Australien: Apache II)
- Sepsis-III ist weiterhin **kein** Consensus Guideline in GB, Irland, den USA, Australien oder Lateinamerika



- qSOFA und SIRS haben ähnliche Overall- Performance
- qSOFA <50% sensitiv um Patienten zu detektieren, welche entweder sterben werden oder auf eine IPS müssen
- Vorliegende Evidenz unterstützt die Sepsis 3.0 Definitionen definitiv nicht!
- **The British Aproach: Early Warning Scores wären wahrscheinlich besser!**

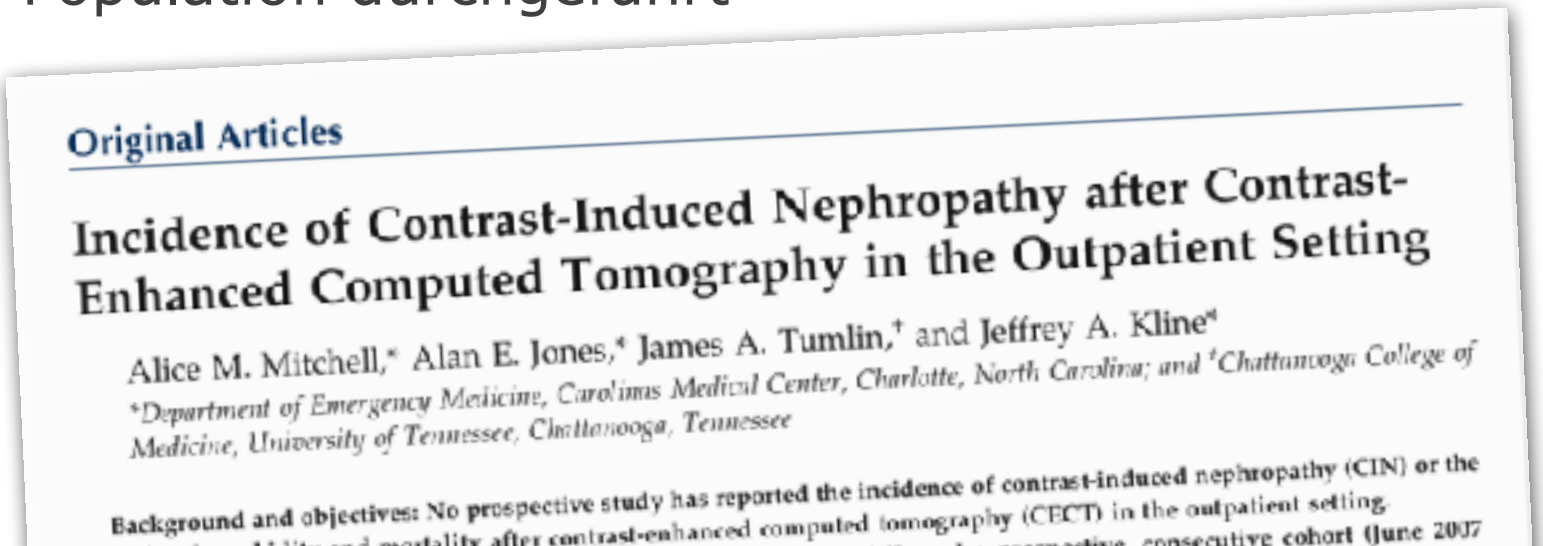

IV Contrast Media
Ahead!


Radiologie Lindenhof
[redacted]
ca.
Betriebszu
Notfall
für
12.11.2017
19:30
Terminart
zust. Ärztin / Arzt
Dr. med. T. Aebi
Sucher
171
Kreatinin
183
µmol/l
Transportart
Krea-Clearance
ml/Min
Gewicht
kg
INR
Schwanger
Ja
Thrombozyten
x10³/µl
Hyperthyreose
Ja
Metall. Fremdkörper
Ja
Nein
Klinische Angaben
Fragestellung

Contrast Induced Nephropathy CIN

Contrast Induced Nephropathy CIN

- Das meiste Wissen stammt aus Studien mit arteriellen Angiographien
- Es werden keine hoch-osmolaren KM mehr verwendet
- Praktisch alle Studien wurden ohne Kontroll-Population durchgeführt



Original Articles

Incidence of Contrast-Induced Nephropathy after Contrast-Enhanced Computed Tomography in the Outpatient Setting

Alice M. Mitchell,* Alan E. Jones,* James A. Tumlin,† and Jeffrey A. Kline*

*Department of Emergency Medicine, Carolinas Medical Center, Charlotte, North Carolina; and †Chattanooga College of Medicine, University of Tennessee, Chattanooga, Tennessee

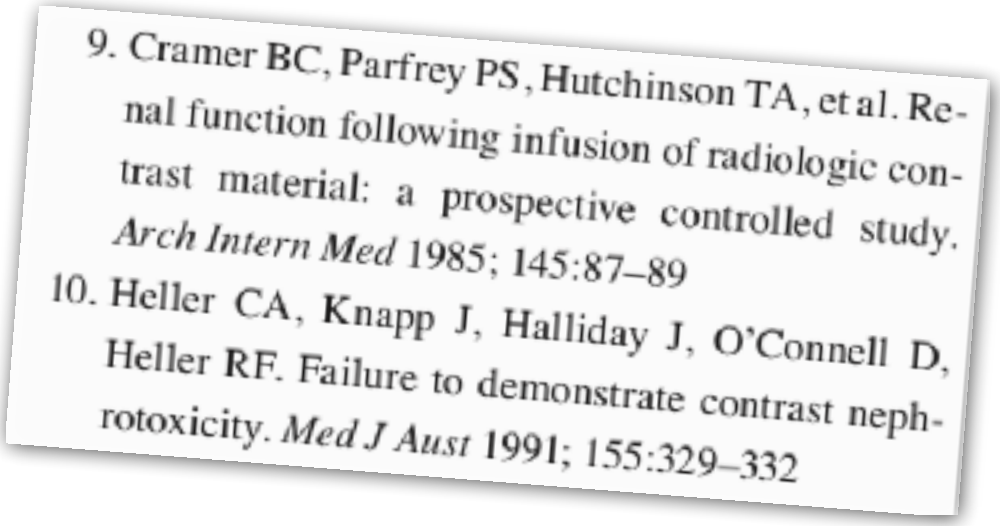
Background and objectives: No prospective study has reported the incidence of contrast-induced nephropathy (CIN) or the

enhanced computed tomography (CECT) in the outpatient setting.

consecutive cohort (June 2007

Contrast Induced Nephropathy CIN

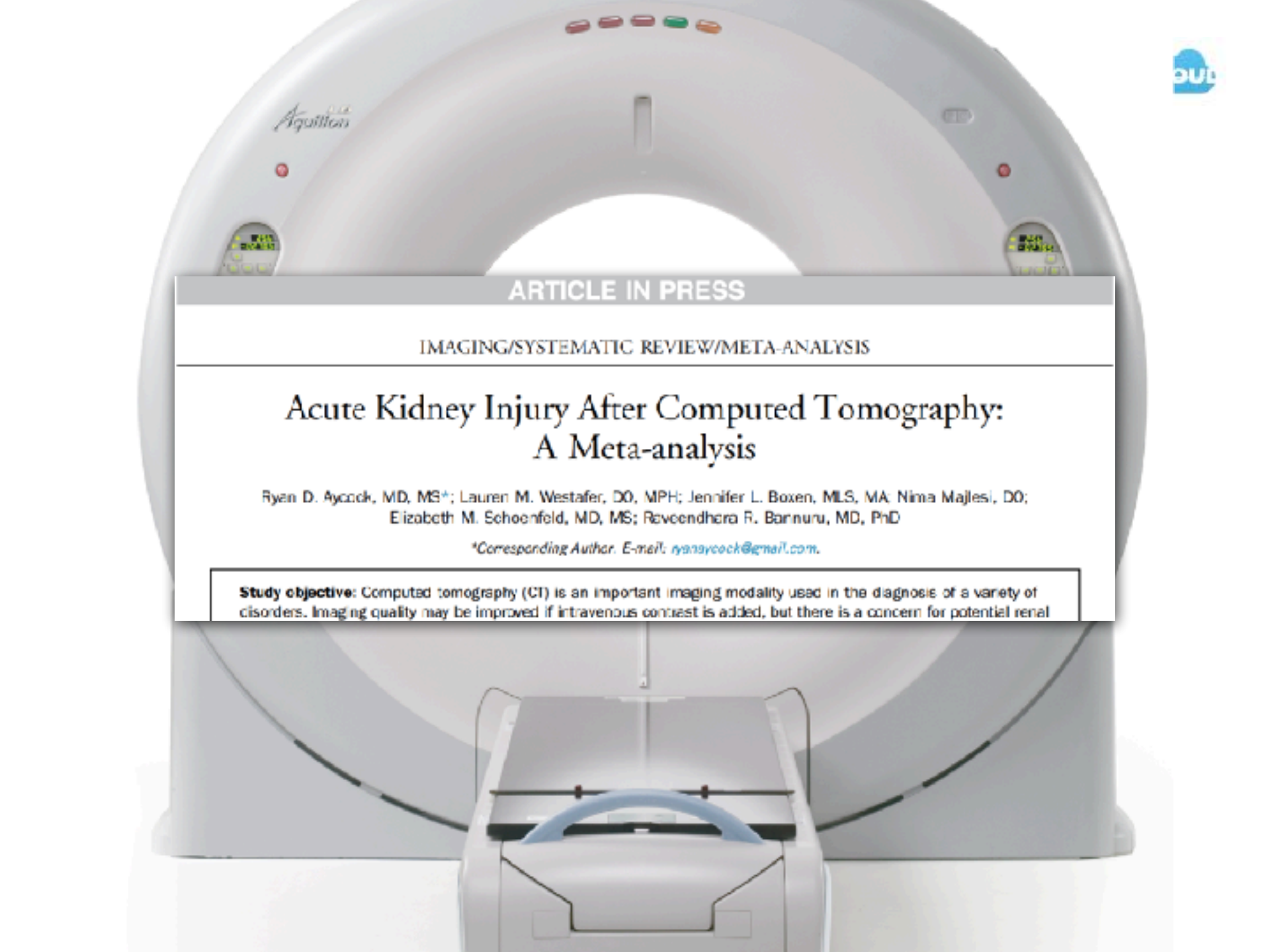
- Nur 2 ältere Studien haben eine Kontrollgruppe verwendet – und keine fand einen statistisch relevanten Unterschied!



9. Cramer BC, Parfrey PS, Hutchinson TA, et al. Renal function following infusion of radiologic contrast material: a prospective controlled study. *Arch Intern Med* 1985; 145:87–89
10. Heller CA, Knapp J, Halliday J, O'Connell D, Heller RF. Failure to demonstrate contrast nephrotoxicity. *Med J Aust* 1991; 155:329–332

Contrast Induced Nephropathy CIN

Es wurde einfach vorausgesetzt, dass diese Agenzien eine CIN direkt versursachen und daher gefährlich sind!



ARTICLE IN PRESS

IMAGING/SYSTEMATIC REVIEW/META-ANALYSIS

Acute Kidney Injury After Computed Tomography: A Meta-analysis

Ryan D. Aycock, MD, MS*; Lauren M. Westafer, DO, MPH; Jennifer L. Boxen, MLS, MA; Nima Majlesi, DO; Elizabeth M. Schoenfeld, MD, MS; Raveendhara R. Bannuru, MD, PhD

*Corresponding Author. E-mail: ryanaycock@gmail.com.

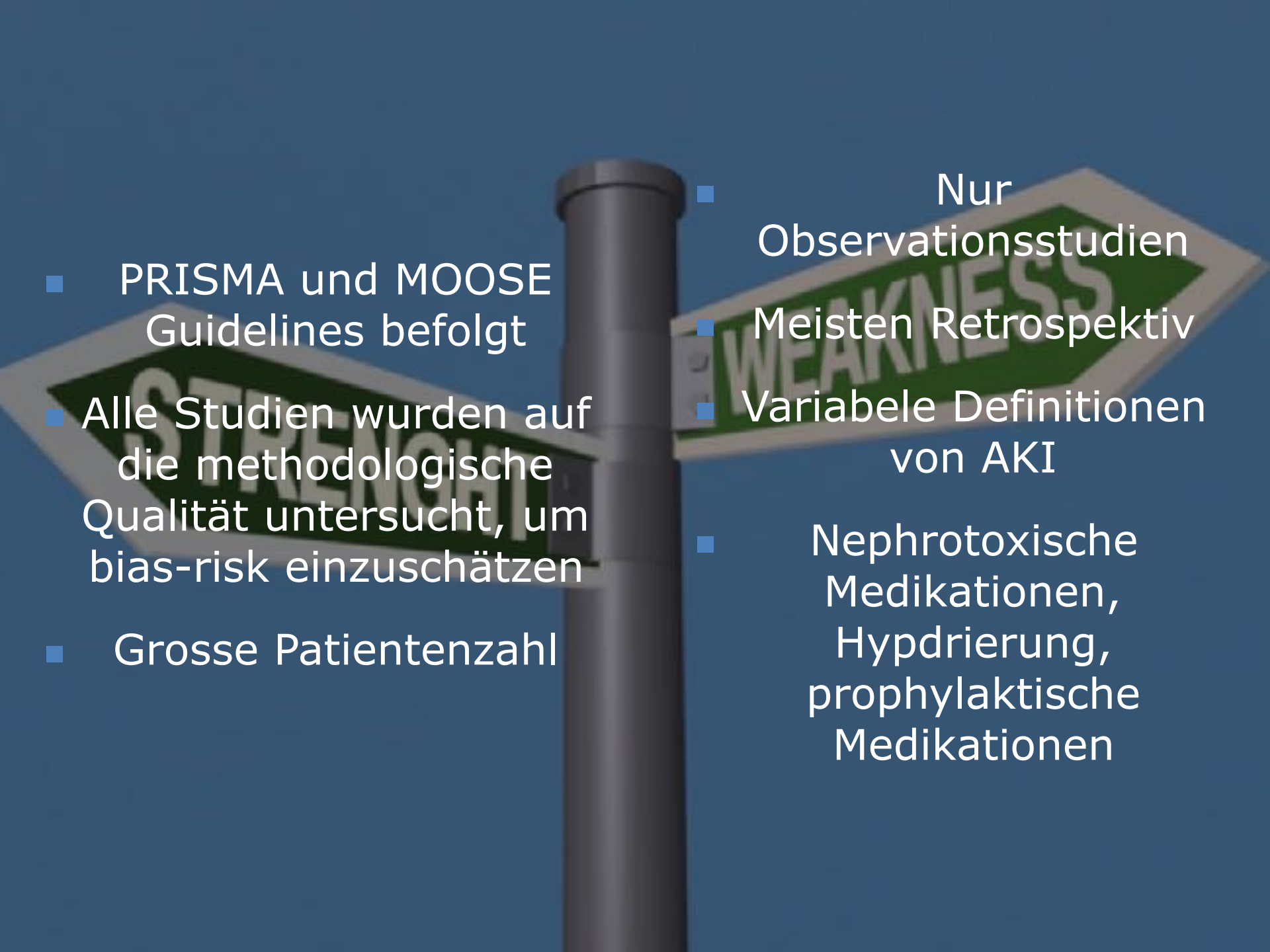
Study objective: Computed tomography (CT) is an important imaging modality used in the diagnosis of a variety of disorders. Imaging quality may be improved if intravenous contrast is added, but there is a concern for potential renal

CIN – Nicht-existente Komplikation?

- Systematic Review und Meta-Analyse
- Primary Outcome: Nierenversagen (**AKI**)
- Secondary Outcome: Nierenersatzverfahren (**RRT's**) und Mortalität
- Nicht-interventionelle Studien, welche Kontrast-CT's mit Nicht-Kontrast-CT's verglichen

CIN – Nicht-existente Komplikation?

- 28 Studien mit insg. 107’335 Patienten
  - Kontrast-CT’s **nicht** mit vermehrtem Nierenversagen assoziiert (26 Studien)
  - **Nicht** mit vermehrten RRT’s assoziiert (13 Studien)
  - **Nicht** mit erhöhter Mortalität assoziiert (9 Studien)

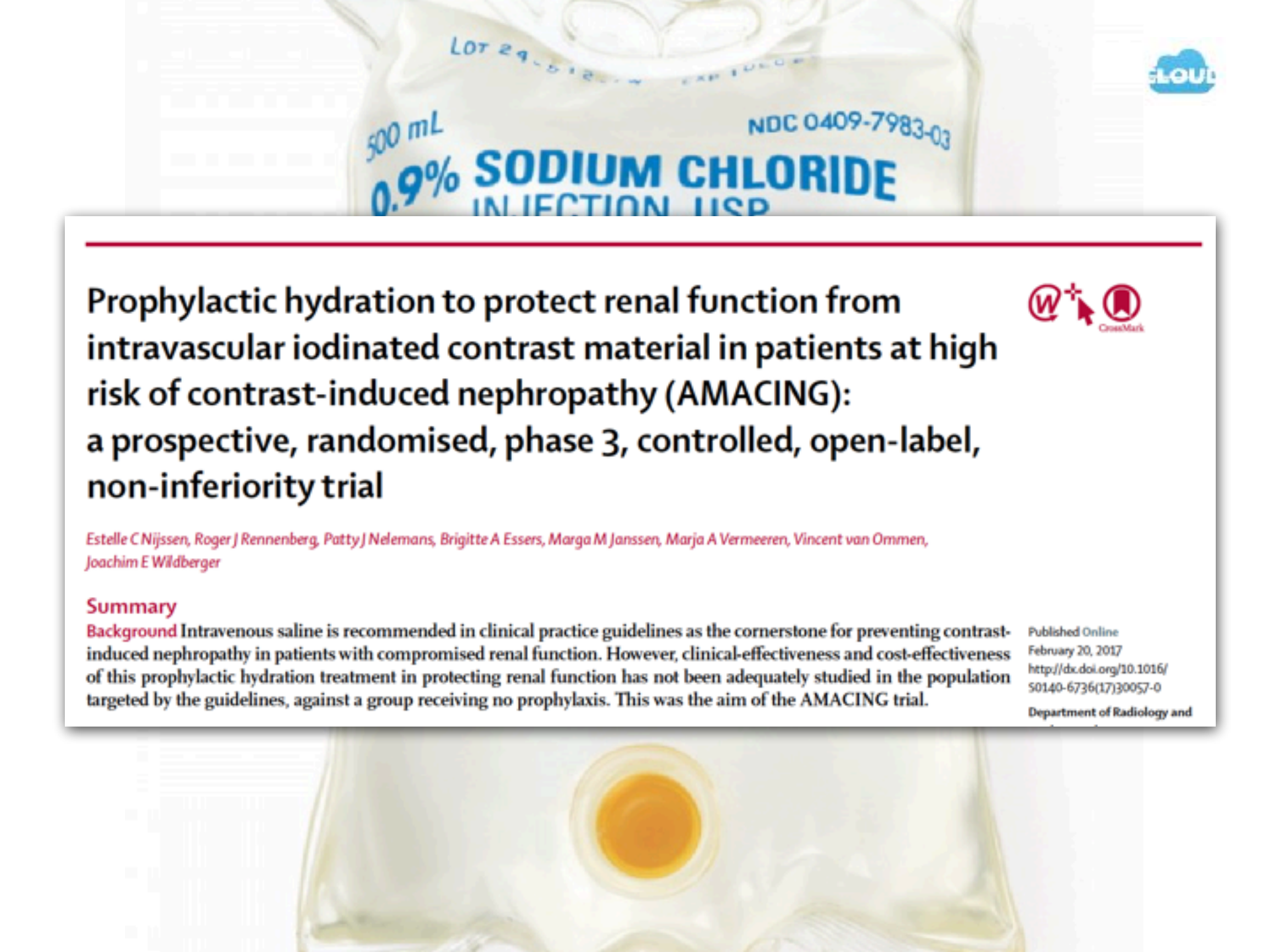


- PRISMA und MOOSE Guidelines befolgt
- Alle Studien wurden auf die methodologische Qualität untersucht, um bias-risk einzuschätzen
- Grosse Patientenzahl

- Nur Observationsstudien
- Meisten Retrospektiv
- Variabele Definitionen von AKI
- Nephrotoxische Medikationen, Hypdrierung, prophylaktische Medikationen

- Es gibt keine RCT, welche eine def. Antwort geben
- RCT wäre ethisch kaum vertretbar
- Basiert auf der aktuell best verfügbaren Evidenz sind low- und iso-osmolare IV Kontrastmittel **nicht** mit einem erhöhten Risiko für AKI, RRT's oder Mortalität assiziiert
- **Wer ein CT mit Kontrastmittel braucht, bekommt eins… unabhängig von der Nierenfunktion!**


LOT
EXP
NDC 0264 1800-32
38004-5264
100 mL Partial Fill
in 150 mL
PAB® Container
0.9% Sodium Chloride
Injection USP
B|BRAUN
Prävention!



Prophylactic hydration to protect renal function from intravascular iodinated contrast material in patients at high risk of contrast-induced nephropathy (AMACING): a prospective, randomised, phase 3, controlled, open-label, non-inferiority trial

Estelle C Nijssen, Roger J Rennenberg, Patty J Nelemans, Brigitte A Essers, Marga M Janssen, Marja A Vermeeren, Vincent van Ommen, Joachim E Wildberger

Summary

Background Intravenous saline is recommended in clinical practice guidelines as the cornerstone for preventing contrast-induced nephropathy in patients with compromised renal function. However, clinical-effectiveness and cost-effectiveness of this prophylactic hydration treatment in protecting renal function has not been adequately studied in the population targeted by the guidelines, against a group receiving no prophylaxis. This was the aim of the AMACING trial.

Published Online
February 20, 2017
http://dx.doi.org/10.1016/
S0140-6736(17)30057-0

Department of Radiology and

- Keine Prophylaxe ist genau gleich gut!

- ... und erst noch Billiger!


Noch mehr Evidenz gefällig?
NEW ENGLAND JOURNAL OF MEDICINE


Dr.Oetker
BICARBONAT
DE SODIU
ALIMENTAR
LAMBERTS
THE PROFESSIONAL RANGE
NAC
(N-Acetyl Cysteine)
600mg
FOOD SUPPLEMENT
90 Capsules
8308-90

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Outcomes after Angiography with Sodium Bicarbonate and Acetylcysteine

CONCLUSIONS

Among patients at high risk for renal complications who were undergoing angiography, there was no benefit of intravenous sodium bicarbonate over intravenous sodium chloride or of oral acetylcysteine over placebo for the prevention of death, need for dialysis, or persistent decline in kidney function at 90 days or for the prevention of contrast-associated acute kidney injury. (Funded by the U.S. Depart-

ABSTRACT

BACKGROUND

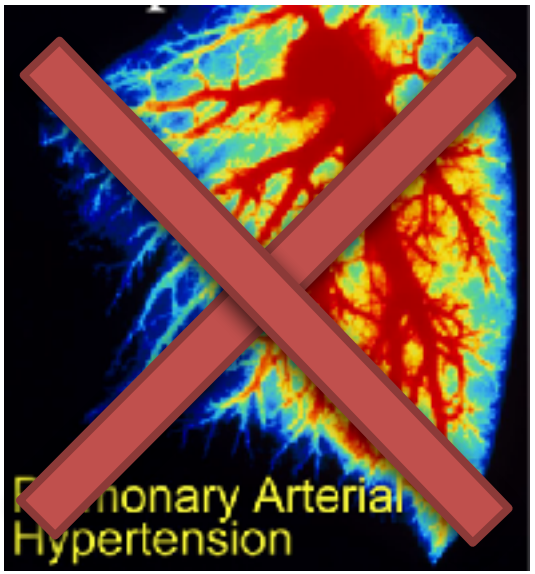
Intravenous sodium bicarbonate and oral acetylcysteine are widely used to prevent acute kidney injury and associated adverse outcomes after angiography without definitive evidence of their efficacy.

- NaBic und NAC bringen keinen zusätzlichen Benefit
- Entweder: NaBic und NAC sind nutzlos
- Oder: CIN ist tatsächlich kein wirkliches Problem


Thrombolyse bei der
Intermediate Risk Lungenembolie?

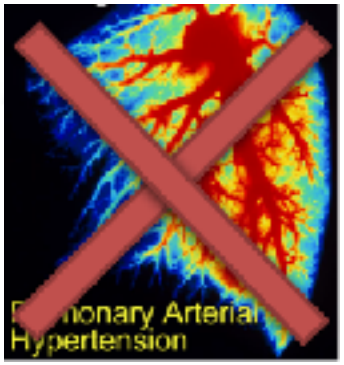
Ziele der Thrombolyse

- Reduktion der Morbidität infolge chron. pulmonalen Hypertonie



- PEA verhindern

Long Term Outcome



PEITHO Trial

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
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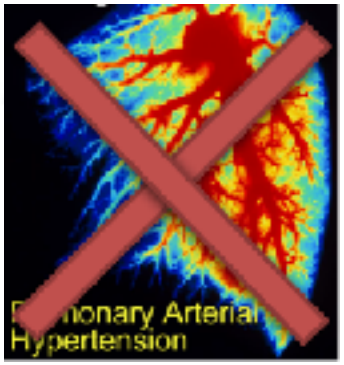
ISSN 0735-1097/$36.00
http://dx.doi.org/10.1016/j.jacc.2016.12.039

Impact of Thrombolytic Therapy on the Long-Term Outcome of Intermediate-Risk Pulmonary Embolism

Stavros V. Konstantinides, MD, PhD,[a,b] Eric Vicaut, MD, PhD,[c] Thierry Danays, MD,[d] Cecilia Becattini, MD,[e]

Long Term Outcome



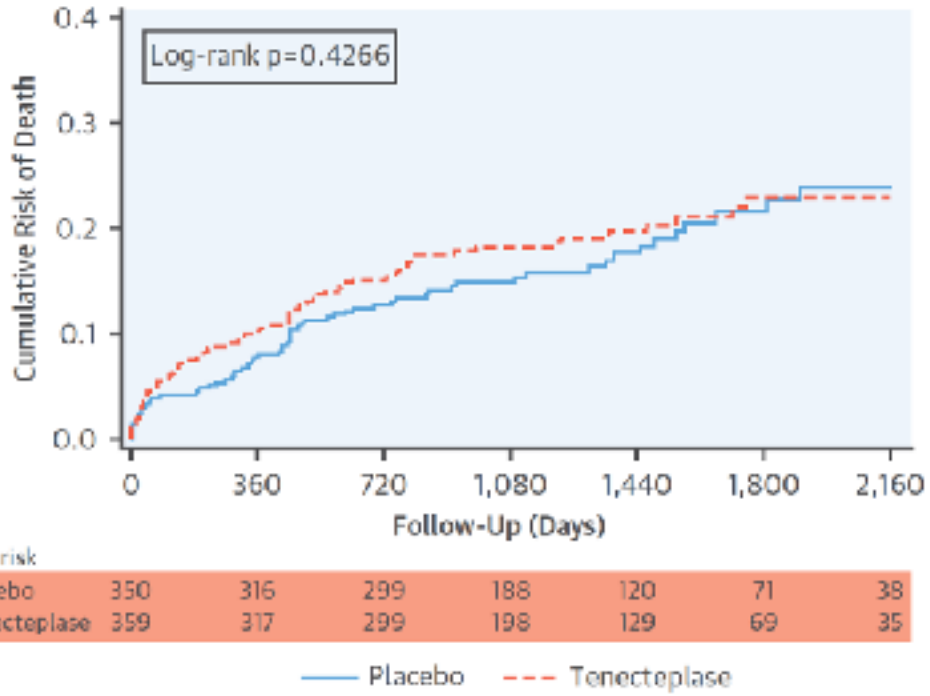
- 709 Patienten

- Tenecteplase und Heparin
- Nur Heparin

- Long Term Follow Up über im Schnitt fast 38 Monate

Long Term Outcome

CENTRAL ILLUSTRATION Thrombolysis for Pulmonary Embolism: Kaplan-Meier Survival Curves of Patients Randomized to Tenecteplase Compared With Placebo



Konstantinides, S.V. et al. J Am Coll Cardiol. 2017;69(12):1536–44.

Kaplan-Meier curves showing the cumulative risk of death in patients with intermediate-risk pulmonary embolism who were randomized to tenecteplase versus placebo in the PEITHO (Pulmonary Embolism Thrombolysis) trial. A total of 1,002 patients, corresponding to 78% of the overall intention-to-treat population, were randomized by 28 study sites that signed the third protocol amendment extending the follow-up period to at least 24 months. Long-term follow-up extended over a median period of 57.8 months, with an interquartile range of 24.8 to 66.8 months. Survival status was assessed in 353 of 359 (98.3%) patients in the thrombolysis arm and in 348 of 350 (99.4%) patients in the placebo arm. Overall long-term mortality was did not differ significantly between the 2 treatment arms: 10.3% and 15.0%, respectively (log-rank: p = 0.43).

Long Term Outcome

TABLE 4 Findings in Patients With Echocardiographic Long-Term Follow-Up

	Tenecteplase (N = 144)	Placebo (N = 146)	p Value
Right ventricular end-diastolic diameter >30 mm	34 (23.6)	22 (15.1)	0.058
Missing data	12 (8.3)	11 (7.5)	
Right/left ventricular end-diastolic diameter >0.9	34 (23.6)	22 (15.1)	0.834
Missing data	12 (8.3)	11 (7.5)	
Hypokinesia of the right ventricular free wall (any view)	6 (4.2)	5 (3.4)	0.740
Missing data	4 (2.8)	4 (2.7)	
Tricuspid annulus plane systolic excursion reduced	14 (9.7)	7 (4.8)	0.107
Mean, mm Hg	23.6 ± 4.8	23.9 ± 3.6	
Median, mm Hg	24.0 (20.0-27.0)	24.0 (21.0-26.0)	0.551
Missing data,	19 (13.2)	18 (12.3)	
Tricuspid systolic velocity >2.6 m/s	22 (15.3)	27 (18.5)	0.412
Missing data	11 (7.6)	14 (9.6)	
Systolic pulmonary artery pressure, mm Hg			
Mean	31.6 ± 12.3	30.7 ± 10.2	0.527
Median	30.0 (24.0-35.0)	30.0 (25.0-35.0)	
Missing data	33 (22.9)	39 (26.7)	

Values are n (%), mean ± SD, or median (interquartile range).

Long Term Outcome

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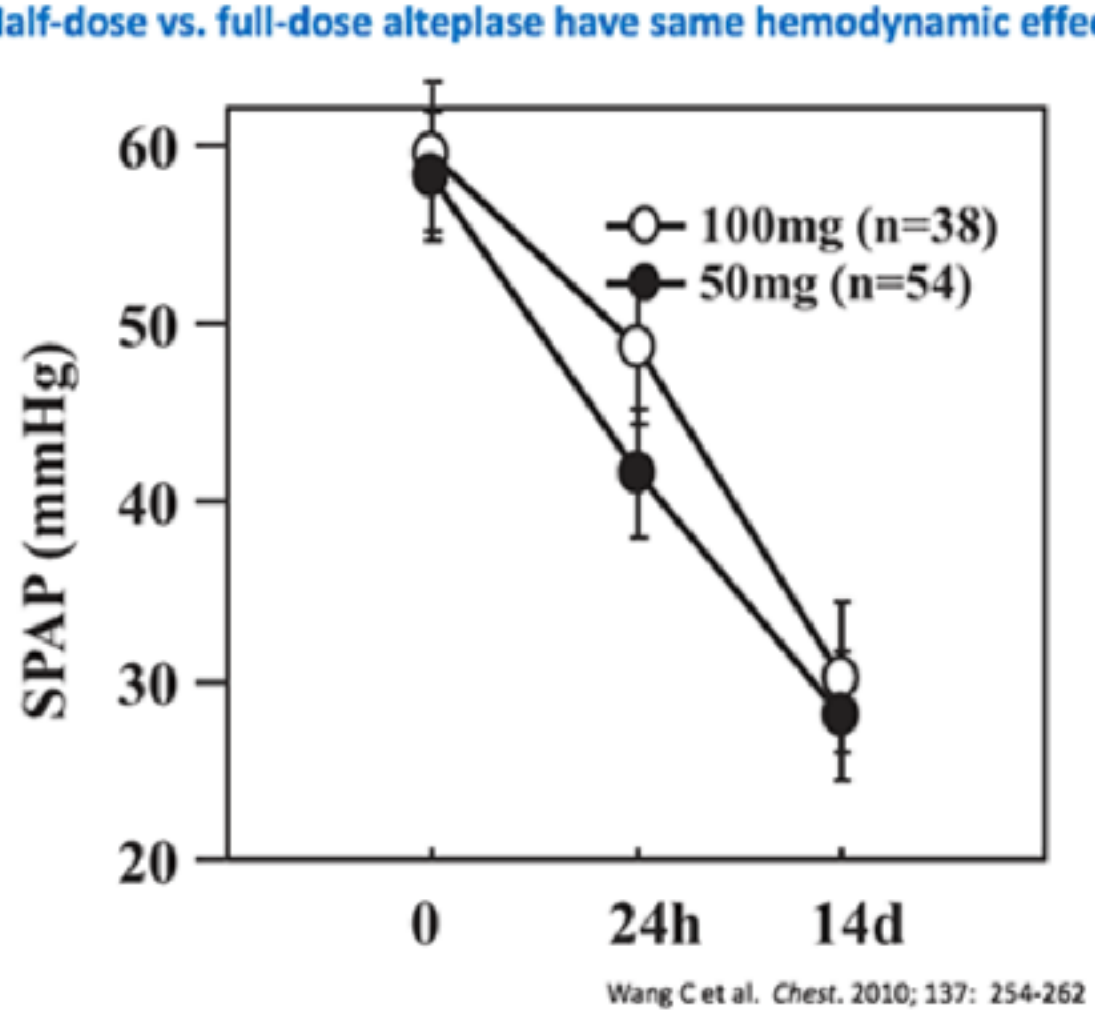
Robuste Evidenz: Thrombolyse hat keinen Einfluss auf Long Term Outcome

PEA verhindern!

- Pulmonal-arteriellen Druck einfach so stark senken, das der Patient nicht tot umfällt

PEA verhindern!



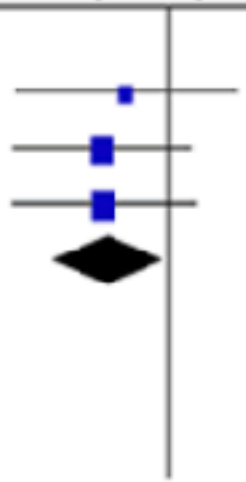
PEA verhindern!

Reduced-dose alteplase causes less major bleeding than full-dose (100 mg)

Study or Subgroup	low dose Events	Total	standard dose Events	Total	Weight	Odds Ratio M-H, Fixed, 95% CI
1.3.1 Major bleeding						
Goldhaber 1994	2	61	2	29	20.3%	0.46 [0.06, 3.42]
Sors 1994	3	36	4	17	38.5%	0.30 [0.06, 1.51]
Wang 2010	2	65	5	53	41.3%	0.30 [0.06, 1.64]
Subtotal (95% CI)		**162**		**99**	**100.0%**	**0.33 [0.12, 0.91]**
Total events	7		11			

Heterogeneity: $Chi^2 = 0.13$, $df = 2$ ($P = 0.94$); $I^2 = 0\%$

Test for overall effect: $Z = 2.14$ ($P = 0.03$)



Zhang Z et al. *Thrombosis Res* 2014; 133: 357

- PEITHO Trial: Thrombolyse hat keinen Einfluss auf chronische, pulmonale Morbidität
- Patienten mit einer intermediate Risk LE profitieren nicht von einer Thrombolyse
- Ziel der Thrombolyse ist das Verhindern eines Herzstillstandes
- Dies ist vermutlich auch mit niedrigeren Dosierungen möglich, dies zugunsten der Patientensicherheit!


GUINNESS

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