Neue Sepsis Definition: Sepsis-3

Prof. Dr. Frank M. Brunkhorst
Jena University Hospital
Sepsis-1:
The “old” sepsis definitions
Early Goal Directed Therapy (EGDT)

Sepsis - 1

Definitions for Sepsis and Organ Failure and Guidelines for the Use of Innovative Therapies in Sepsis

THE ACCP/SCCM CONSENSUS CONFERENCE COMMITTEE:
Roger C. Bone, M.D., F.C.C.P., Chairman
Robert A. Balk, M.D., F.C.C.P.
Frank B. Cerra, M.D.
R. Phillip Dellinger, M.D., F.C.C.P.
Alan M. Fein, M.D., F.C.C.P.
William A. Knaus, M.D.
Roland M. H. Schein, M.D.
William J. Sibbald, M.D., F.C.C.P.

(Chest 1992; 101:1644-55)

2001 SCCM/ESICM/ACCP/ATS/SIS International Sepsis Definitions Conference

Mitchell M. Levy, MD, FCCP; Mitchell P. Fink, MD, FCCP; John C. Marshall, MD; Edward Abraham, MD; Derek Angus, MD, MPH, FCCP; Deborah Cook, MD, FCCP; Jonathan Cohen, MD; Steven M. Opal, MD; Jean-Louis Vincent, MD, FCCP, PhD; Graham Ramsay, MD; For the International Sepsis Definitions Conference

[Crit Care Med 2003; 31:1250–1256]
SIRS und Sepsis im ICD-10-GM 01.01.2005

<table>
<thead>
<tr>
<th>Code</th>
<th>Beschreibung</th>
</tr>
</thead>
<tbody>
<tr>
<td>R65.-!</td>
<td>Systemisches inflammatorisches Response-Syndrom</td>
</tr>
<tr>
<td>R65.2!</td>
<td>Systemisches inflammatorisches Response-Syndrom nicht infektiöser Genese ohne Organkomplikationen</td>
</tr>
<tr>
<td>R65.3!</td>
<td>Systemisches inflammatorisches Response-Syndrom nicht infektiöser Genese mit Organkomplikationen</td>
</tr>
<tr>
<td>R65.9!</td>
<td>Systemisches inflammatorisches Response-Syndrom, nicht näher bezeichnet</td>
</tr>
</tbody>
</table>

!: bitte kurze Erläuterung angeben
Betr.: Änderungen der Definitionen des SIRS im ICD-10

Nun hat sich i.R. einer Analyse der Anwendung der Kodes gezeigt, dass es bei der Schlüsselnummern R65.0! zu unerwünschten Effekten bei der Kodierung gekommen ist, die einer Lösung zugeführt werden sollen.

DIMDI, 12. Dezember 2006
Nationwide trends of severe sepsis
USA, 2000-2007

Nationwide trends of severe sepsis
USA, 2000-2007

Sepsismodellierungen aus administrativen Daten, Deutschland 2007-2013

Fleischmann C et al. Dtsch Ärztebl Int 2016;113:159-166
Regulatory Mandates for Sepsis Care — Reasons for Caution

Chanu Rhee, M.D., Shruti Gohil, M.D., M.P.H., and Michael Klompas, M.D., M.P.H.

Hospitalizations for which certain infection codes were listed as a primary diagnosis, 2003–2011.

N ENGL J MED 2014; 370:1673-1676
"We believe that policy mandates are premature until we can develop better diagnosis and surveillance metrics."

Michael Klompas, MD, MPH, FRCPC,
Harvard Medical School, Department of Population Medicine, Boston

N ENGL J MED 2014; 370:1673-1676
Early Goal Directed Therapy (EGDT)

Age- and Sex-Adjusted Mortality Relative to 2003 Among Patients Discharged With a Principal Diagnosis of Pneumonia, Sepsis With Pneumonia, Respiratory Failure With Pneumonia, and the Combination of the 3 Diagnoses

Pneumonia USA, 2003-2009

Age- and Sex-Adjusted Mortality Relative to 2003 Among Patients Discharged With a Principal Diagnosis of Pneumonia, Sepsis With Pneumonia, Respiratory Failure With Pneumonia, and the Combination of the 3 Diagnoses

While this may be the result of advances in clinical care or improvements in quality, it may also represent an artifact of changes in diagnostic coding.

Peter K. Lindenauer, Division of General Medicine and Geriatrics, Baystate Medical Center, Springfield, Massachusetts
Dear SIRS, I´m sorry to say that I don´t like you
Vincent JL. Crit Care Med 1997;25:372

The NEW ENGLAND JOURNAL of MEDICINE

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.

- 1,171,797 patients, 109,663 with infection and organ failure
- Patients with SIRS-Positive Severe Sepsis (N = 96,385)
- Patients with SIRS-Negative Severe Sepsis (N = 13,278)

March 17, 2015, at NEJM.org.
Dear SIRS, I´m sorry to say that I don´t like you

Vincent JL. Crit Care Med 1997;25:372

Mortality increased linearly with each additional SIRS criterion without any transitional increase in risk at a threshold of two SIRS criteria.

March 17, 2015, at NEJM.org.
Septic shock: 4-fold variation in mortality, 10-fold variation in incidence

The old SIRS criteria are outdated ...

- ‘Sepsis’ is a syndrome with no perfect diagnostic test  
  .. though the science has clearly moved on since 2001

- SIRS criteria offer markers of possible infection ... including a cold  
  .. does a cold (infection + ≥2 SIRS) represent ‘sepsis’??

- No specified criteria to describe ‘organ dysfunction’ or ‘shock’  
  .. so the epidemiology is a complete mess

- Sepsis is a killer .. but is it a mass murderer? Hype +++++
Sepsis-3: The new sepsis definitions
SEPSIS - 3

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, MS; 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

Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Assessment of Clinical Criteria for Sepsis For the Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)

Christopher W. Seymour, MD, MSc; Vincent X. Liu, MD, MSc; Theodore J. Iwashyna, MD, PhD; Frank Brunshorst, MD; Thomas D. Rea, MD, MPH; André Scherag, PhD; Gordon Rubenfeld, MD, MSc; Jeremy M. Kahn, MD, MSc; Manu Shankar-Hari, MD, MSc; Mervyn Singer, MD, FRCP;

Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

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; Gary S. Phillips, MAS; Mitchell L. Levy, MD; Christopher W. Seymour, MD, MSc; Vincent X. Liu, MD, MSc; Clifford S. Deutschman, MD; Derek C. Angus, MD, MPH; Gordon D. Rubenfeld, MD, MSc; Mervyn Singer, MD, FRCP; for the Sepsis Definitions Task Force
“ Tradition is not holding the ashes but passing on the flame. ”

Thomas Morus  
07. 02. 1478 - London,  
† 06. 07. 1535 - London,  
englischer Staatsmann, humanistischer Autor, Heiliger der Römisch-Katholischen Kirche (Gedenktag 22. Juni) und Patron der Regierenden
Early Goal Directed Therapy (EGDT)

http://qsofa.org/

qSOFA was studied among more than 800,000 electronic health record encounters at 177 hospitals worldwide, including community and academic, rural, suburban, and urban, public, private, and federal hospitals.
Limitations of previous definitions included an excessive focus on inflammation, the misleading model that sepsis follows a continuum through severe sepsis to shock, and inadequate specificity and sensitivity of the systemic inflammatory response syndrome (SIRS) criteria. Multiple definitions and terminologies are currently in use for sepsis, septic shock, and organ dysfunction, leading to discrepancies in reported incidence and observed mortality. The task force concluded the term severe sepsis was redundant.
Importance

- The 3rd International Consensus Definitions Task Force defined sepsis as “life-threatening organ dysfunction due to a dysregulated host response to infection.”

- The performance of clinical criteria for this sepsis definition is unknown.

JAMA. 2016;315(8):762-774
Design, Settings, and Population

- 1.3 million electronic health record encounters from Jan 2010-Dec 2012
- 12 hospitals in Pennsylvania/U.S.
- We identified those with suspected infection in whom to compare criteria.
- Confirmatory analyses were performed in 4 data sets of 706,399 out-of-hospital and hospital encounters at 165 US and non-US hospitals ranging from Jan 2008- Dec 2013.
Main Outcomes and Measures

- Predictive validity of the candidate sepsis criteria
- And discrimination for outcomes
  - primary: in-hospital mortality;
  - secondary: in-hospital mortality or ICU length of stay $\geq 3$ days

JAMA. 2016;315(8):762-774
Results 1: Primary cohort at 12 UPMC hospitals

- 148,907 patients with suspected infection (n = 74,453 derivation; n = 74,454 validation), 4% died.

Random split sample (50/50):
- Derivation cohort for developing new criteria
- Validation cohort for assessment of new and existing criteria.
Results 1: Distribution of SIRS, SOFA, LODS and qSOFA and mortality in the UPMC derivation cohort (N=74,453).
**Results 4**

- Relative to qSOFA scores lower than 2, encounters with qSOFA scores of 2 or higher had a 3- to 14-fold increase in hospital mortality across baseline risk deciles.
- Findings were similar in external data sets and for the secondary outcome.

### Why is qSOFA useful?

<table>
<thead>
<tr>
<th>qSOFA</th>
<th>mortality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>~1</td>
</tr>
<tr>
<td>1</td>
<td>~3</td>
</tr>
<tr>
<td>2</td>
<td>~8-10</td>
</tr>
<tr>
<td>3</td>
<td>&gt;20</td>
</tr>
</tbody>
</table>

While only 1 IN 4 infected patients have 2+ qSOFA POINTS, they account for 3 OUT OF 4 deaths.
Conclusions and Relevance

- Among ICU encounters with suspected infection, the predictive validity for in-hospital mortality of SOFA was not significantly different than the more complex LODS but was statistically greater than SIRS and qSOFA, supporting its use in clinical criteria for sepsis.

- Among encounters with suspected infection outside of the ICU, the predictive validity for in-hospital mortality of qSOFA was statistically greater than SOFA and SIRS, supporting its use as a prompt to consider possible sepsis.
Patient mit V.a. Infektion

qSOFA ?

Ja

Nein

Weiterhin V.a. Sepsis

Ja

Nein

Klinik überwachen; Reevaluation für mögliche Sepsis falls klinisch indiziert

Organfunktionsersatz erfassen

Ja

Nein

SOFA ?

Ja

Nein

Siehe A

Siehe B

Sepsis

Septischer Schock

Trotz adäquater Volumengabe:
1. Vasopressorengabe erforderlich um bei persistierender Hypotonie einen mittleren arteriellen Druck ≥ 65 mmHg aufrecht zu erhalten
   Und
2. Serumlaktat ≥ 2 mmol/l (18 mg/dl)

A. qSOFA Variablen
   - Atemfrequenz
   - Bewusstsein
   - Systolischer Blutdruck

B. SOFA Variablen
   - PaO₂/FiO₂ Ratio
   - Glasgow Coma Scale
   - Mittlerer arterieller Blutdruck
   - Gabe von Vasopressoren
   - mit Präparat und Infusionsrate
   - Serum-Kreatinin u. Urinvolumen
   - Bilirubin
   - Thrombozyten

JAMA. 2016;315(8):762-774
The new sepsis consensus definitions (Sepsis-3): the good, the not-so-bad, and the actually-quite-pretty

Mervyn Singer

Intensive Care Med
qSOFA, SIRS, and Early Warning Scores for Detecting Clinical Deterioration in Infected Patients Outside the ICU

METHODS

Study Population

All adult patients admitted to the University of Chicago, an urban tertiary care medical center with approximately 500 beds, from November 2008 until January 2016 were eligible for inclusion in this observational study. Patients without vital sign or laboratory data documented in the ED or ward were excluded. In addition, patients receiving mechanical ventilation or vasopressor medications prior to first suspicion of infection were excluded because a decision support tool would not offer additional value for these patients, as they would be admitted directly to the ICU. The protocol was approved by the University of Chicago Institutional Review Board (IRB #15-1705).

Select cutoffs to predict mortality or ICU transfer

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All patients (n=30,677)</th>
<th>Ward patients (n=12,154)</th>
<th>ED patients (n=18,523)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD), years</td>
<td>58 (18.0)</td>
<td>57 (16.7)</td>
<td>58 (18.9)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Female sex, n (%)</td>
<td>16,116 (53)</td>
<td>5,856 (48)</td>
<td>10,260 (55)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Race, n (%)</td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Black</td>
<td>17,813 (58)</td>
<td>4,384 (36)</td>
<td>13,429 (73)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>10,885 (35)</td>
<td>6,631 (55)</td>
<td>4,054 (22)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1,253 (4)</td>
<td>595 (5)</td>
<td>658 (4)</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>926 (3)</td>
<td>544 (4)</td>
<td>382 (2)</td>
<td></td>
</tr>
<tr>
<td>LOS prior to time of suspicion, median (IQR), hours</td>
<td>2.9 (1.1-7.9)</td>
<td>7.4 (2.4-30.5)</td>
<td>1.9 (0.8-4.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LOS after time of suspicion, median (IQR), days</td>
<td>7.3 (5.8-11.5)</td>
<td>8.3 (6.0-14.3)</td>
<td>5.8 (5.8-10.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Met Angus sepsis criteria, n (%)</td>
<td>8,744 (29)</td>
<td>3,350 (28)</td>
<td>5,394 (29)</td>
<td>0.003</td>
</tr>
<tr>
<td>Ever ICU transfer, n (%)</td>
<td>7,258 (24)</td>
<td>2,390 (20)</td>
<td>4,868 (26)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Ever received vasopressor, n (%)</td>
<td>2,724 (9)</td>
<td>1,113 (9)</td>
<td>1,611 (8)</td>
<td>0.166</td>
</tr>
<tr>
<td>In-hospital mortality, n (%)</td>
<td>1,649 (5)</td>
<td>729 (6)</td>
<td>920 (5)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Composite outcome, n (%)</td>
<td>7,385 (24)</td>
<td>2,385 (20)</td>
<td>5,000 (27)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Abbreviations: ED, emergency department; LOS, length of stay; ICU, intensive care unit

Predictive performance of qSOFA for mortality and ICU admission in patients with infection at the ED.

qSOFA vs CRB-65 for risk prediction in patients with community-acquired pneumonia

<table>
<thead>
<tr>
<th>Score</th>
<th>30-day mortality</th>
<th>AUC (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRB-65</td>
<td>0.77 (0.77–0.78)</td>
<td>≤0.001</td>
<td></td>
</tr>
<tr>
<td>CRB</td>
<td>0.68 (0.67–0.69)</td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td>qSOFA-65</td>
<td>0.78 (0.77–0.79)</td>
<td>≤0.001</td>
<td></td>
</tr>
<tr>
<td>qSOFA (Reference)</td>
<td>0.70 (0.69–0.71)</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

30-day mortality: 3% (280/9047)

**CRB-65 and qSOFA to predict site of care and mortality in pneumonia patients in the ED**

- 1641 patients, China
- 861 (53%) were hospitalised (38% in a general ward, 15% in the ICU),
- 780 (47%) were treated as outpatients or were observed in the ED.
- 28-day mortality: 33% (547/1641)
- Patients with qSOFA scores of 2 and 3 had a significantly higher prevalence of mortality and ICU admission than patients with identical CRB-65 scores.

<table>
<thead>
<tr>
<th>qSOFA</th>
<th>Mortality (%)</th>
<th>Hospitalization (%)</th>
<th>ICU admission (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>16.3</td>
<td>37.2</td>
<td>9.3</td>
</tr>
<tr>
<td>1</td>
<td>24.4</td>
<td>47.4</td>
<td>9.1</td>
</tr>
<tr>
<td>2</td>
<td>48.2</td>
<td>61.6</td>
<td>22.4</td>
</tr>
<tr>
<td>3</td>
<td>68.4</td>
<td>73.7</td>
<td>45.3</td>
</tr>
</tbody>
</table>

**CONCLUSIONS:**
- qSOFA is better than CRB-65 for identification of a high risk of mortality and requirement of ICU admission.

Predictive value of qSOFA, SIRS in patients with suspected infection in a resource limited setting in Gabun

<table>
<thead>
<tr>
<th>Diagnoses</th>
<th>Total n=329</th>
<th>p-value</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaria (%)</td>
<td>122 (37)</td>
<td>0.01</td>
<td>0.11 (0.01-0.88)</td>
</tr>
<tr>
<td>Bacterial infection (%)</td>
<td>98 (30)</td>
<td>0.39</td>
<td>1.61 (0.56-4.65)</td>
</tr>
<tr>
<td>Tuberculosis (%)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>26 (8)</td>
<td>0.11</td>
<td>3.16 (0.83-12.02)</td>
</tr>
<tr>
<td>Other (%)</td>
<td>83 (25)</td>
<td>0.54</td>
<td>1.51 (0.50-4.56)</td>
</tr>
<tr>
<td><strong>qSOFA score</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory rate ≥22/min (%)</td>
<td>283 (86)</td>
<td>&lt;0.001</td>
<td>34.5 (9.7-102.4)</td>
</tr>
<tr>
<td>Glasgow coma score ≤14 (%)</td>
<td>19 (6)</td>
<td>0.07</td>
<td>2.65 (0.93-7.54)</td>
</tr>
<tr>
<td>Systolic blood pressure ≤100mmHg</td>
<td>85 (26)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>qSOFA score ≥2 (%)</td>
<td>68 (21)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>

AUROC 0.83
Huson MAM et al. Travel Med Infect Dis 2016 (ePub)
# Tabelle 2: Sepsis-3-Validierungsstudien 2016 bis 2017

<table>
<thead>
<tr>
<th>Autor</th>
<th>Land</th>
<th>Setting</th>
<th>Zeit</th>
<th>Design</th>
<th>Outcome</th>
<th>Patienten</th>
<th>Ergebnisse</th>
<th>Validierung</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seymour, JAMA 2016</td>
<td>USA, Deutschland</td>
<td>Krankenhaus, n=165 (Validierungskohorte)</td>
<td>2010-2012</td>
<td>Prospektive Kohortenstudie</td>
<td>Prädiktion Krankenhaussterblichkeit und ITS-Aufenthalt &gt;3 Tage (SIRS vs SSOA vs SOFA vs DSS)</td>
<td>N=706.199</td>
<td>AUC: Interinstitutional: SIRS 0.64; SOFA 0.66; SOFA 0.71; SOFA 0.75; AUC: Normalstationen und Intensivstationen: SIRS 0.78; SOFA 0.81; SOFA 0.70</td>
<td>✔</td>
</tr>
<tr>
<td>Reznik, Ann Intern Med 2017</td>
<td>Brasilien</td>
<td>ITS, n=1</td>
<td>2010-2016</td>
<td>Retrospektive Kohortenstudie</td>
<td>Prädiktion ITS Sterblichkeit (Sepsis-3 vs Sepsis-3)</td>
<td>N=957</td>
<td>S-3 besser in der Sterblichkeit prädikt</td>
<td>✔</td>
</tr>
<tr>
<td>Delaney, Lancet Infect Dis 2017</td>
<td>USA</td>
<td>ED (USA-weiß; V.a. ambulant erworbene Infektion)</td>
<td>2016-2017</td>
<td>Prospektive Kohortenstudie (REGARDS)</td>
<td>Prädiktion Krankenhaus- und 1-Jahres-Sterblichkeit (SIRS vs SOFA vs qSOFA)</td>
<td>N=2593</td>
<td>SIRS: 9%; SOFA: 22%; SOFA: 13%</td>
<td>✔</td>
</tr>
<tr>
<td>Renzoni, AJICCM 2017</td>
<td>Spanien</td>
<td>ED, n=2; CAP</td>
<td>1998-2015</td>
<td>Prospektive Kohortenstudie</td>
<td>Prädiktion Krankenhaustotenstlichkeit (SIRS vs SOFA vs qSOFA)</td>
<td>N=6024</td>
<td>qSOFA und CRB am besten</td>
<td>✔</td>
</tr>
<tr>
<td>Freund, JAMA 2016</td>
<td>Frankreich, Spanien, Belgien, Schweiz</td>
<td>ED, n=30; V.a. ambulant erworbene Infektion</td>
<td>Mai-Juni 2016</td>
<td>Prospektive Kohortenstudie</td>
<td>Prädiktion Krankenhaustotenstlichkeit (qSOFA vs SOFA)</td>
<td>N=719</td>
<td>qSOFA 0.08; SIRS 0.95</td>
<td>✔</td>
</tr>
<tr>
<td>Reith, JAMA 2016</td>
<td>Australien, Neuseeland</td>
<td>ITS, n=182; V.a. Infektion innerhalb 24 Std nach ITS-Aufnahme</td>
<td>2000-2015</td>
<td>Retrospektive Kohortenstudie, krankenkassen- basiert</td>
<td>Prädiktion Krankenhaustotenstlichkeit (qSOFA, SIRS, SOFA)</td>
<td>N=194.675</td>
<td>AUC: qSOFA 0.60; SIRS 0.58; SOFA 0.75</td>
<td>✔</td>
</tr>
<tr>
<td>Chopra, AJICCM 2017</td>
<td>USA</td>
<td>ED, n=1; V.a. Infektion</td>
<td>2008-2016</td>
<td>Retrospektive Kohortenstudie, krankenkassen- basiert</td>
<td>Prädiktion Krankenhaustotenstlichkeit (qSOFA, SIRS, SOFA)</td>
<td>N=30.877</td>
<td>AUC: NEWS 0.77; MEWS 0.73; qSOFA 0.69; SIRS 0.95</td>
<td>✔</td>
</tr>
<tr>
<td>Finkelnburg, Crit Care Med 2017</td>
<td>USA</td>
<td>ED/ward, n=1; V.a. Infektion</td>
<td>2014-7</td>
<td>Retrospektive Kohortenstudie</td>
<td>Prädiktion Krankenhaustotenstlichkeit (qSOFA, SIRS)</td>
<td>N=152</td>
<td>AUC: qSOFA 0.74; SIRS 0.69</td>
<td>✔</td>
</tr>
<tr>
<td>Kidiri, Intensive Care Med 2016</td>
<td>Deutschland</td>
<td>ED/wards, n=14; CAP</td>
<td>2002-2015</td>
<td>Retrospektive Kohortenstudie (CAPNETZ. Register)</td>
<td>Prädiktion Krankenhaustotenstlichkeit (qSOFA vs CRB mit und ohne Athersklerose [9, J])</td>
<td>N=3227</td>
<td>AUC: qSOFA 0.70; CRB 0.67; CRB 0.88; qSOFA 0.69</td>
<td>✔</td>
</tr>
<tr>
<td>Hayat, Ann J Emerg Med 2017</td>
<td>USA</td>
<td>ED, n=1; V.a. ambulant erworbene Infektion</td>
<td>2014-2015</td>
<td>Retrospektive Datenerhebung (random sample)</td>
<td>Prädiktion Krankenhaustotenstlichkeit (qSOFA vs SIRS)</td>
<td>N=200</td>
<td>AUC: qSOFA 0.68; SIRS 0.51</td>
<td>✔</td>
</tr>
<tr>
<td>Chen, Crit Care Med 2016</td>
<td>China</td>
<td>ED, n=1; CAP</td>
<td>2012-2014</td>
<td>Retrospektive Kohortenstudie</td>
<td>Prädiktion 28-Tage-Sterblichkeit (qSOFA vs CRB mit und ohne Athersklerose [9, J])</td>
<td>N=1641</td>
<td>AUC: qSOFA 0.85; CRB 0.96; CRB 0.65; qSOFA 0.85</td>
<td>✔</td>
</tr>
<tr>
<td>April, J Emerg Med 2016</td>
<td>USA</td>
<td>ED/ITS, n=1; V.a. ambulant erworbene Infektion</td>
<td>2012-2014</td>
<td>Retrospektive Kohortenstudie (Register)</td>
<td>Prädiktion Krankenhaustotenstlichkeit (qSOFA vs SOFA)</td>
<td>N=214</td>
<td>AUC: qSOFA 0.66; SIRS 0.60</td>
<td>✔</td>
</tr>
<tr>
<td>Huson, Travel Med Infect Dis 2016</td>
<td>Gabon/ Afrika</td>
<td>ED, n=1; V.a. ambulant erworbene Infektion</td>
<td>2012-2013</td>
<td>Retrospektive Kohortenstudie</td>
<td>Prädiktion Krankenhaustotenstlichkeit (qSOFA)</td>
<td>N=343</td>
<td>AUC: qSOFA 0.13</td>
<td>✔</td>
</tr>
<tr>
<td>Williams, Australien</td>
<td>USA</td>
<td>ED, n=1; V.a. ambulant erworbene Infektion</td>
<td>2007-2008; 2008-2011</td>
<td>Retrospektive Kohortenstudie (Register)</td>
<td>Prädiktion Krankenhaustotenstlichkeit (SIRS, qSOFA, SOFA)</td>
<td>N=8.871</td>
<td>AUC: qSOFA 0.73; SIRS 0.72</td>
<td>✔</td>
</tr>
<tr>
<td>Asoke, Scand J Trauma, Resuscit Emerg Med 2017</td>
<td>Norwegen</td>
<td>ED, n=1; V.a. ambulant erworbene Infektion</td>
<td>2012</td>
<td>Retrospektive Kohortenstudie</td>
<td>Prädiktion 7- und 30-Tage-Sterblichkeit (qSOFA, SOFA)</td>
<td>N=1.535</td>
<td>AUC: qSOFA 0.54; SIRS 0.80</td>
<td>✔</td>
</tr>
</tbody>
</table>
Summary qSofa

- is NOT a diagnostic for sepsis but a rapid prompt to consider it
- in 2 mins, with sphygmomanometer, watch and a pair of eyes, can indicate likelihood of infected patient having organ dysfunction (confirmed by blood tests —> rise in SOFA ≥2) .. and thus ‘sepsis’
- ... but if worried despite qSOFA 0-1, do blood tests anyway and manage appropriately!
- c/f SIRS - requires bloods for WBC, PaCO\textsubscript{2} ... >1 hour delay
- needs validation in different healthcare settings but early results suggest non-inferiority (at least) to SIRS as a prognostic ..
- + + much faster to access ... + no need for blood tests (LMIC utility)
Conclusions

- SEPSIS-3 offers (we hope) objectivity, reproducibility and generalizability for research, for coding, for epidemiology..
- definitions don’t change patient management - clinicians do!
- qSOFA may be a useful bedside prompt to highlight at-risk patients
  - needs prospective validation
  - embedded within NEWS (standard-of-care EWS in UK)
- NOT the final word - it’s an iterative process..
  - Sepsis-4 will improve on Sepsis-3
- .. but I do hope it is progress!!!
Thank you for your attention!

Jena Center for Clinical Studies

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