

Supplementary Material 3

Electronic case report form (eCRF)

Study: Validation and optimization of the utility of routine data for improving the quality of sepsis management in hospitals
(*Validierung und Optimierung der Nutzbarkeit von Routinedaten zur Qualitätsverbesserung des Sepsis-Managements im Krankenhaus*)

Study acronym: OPTIMISE

Case-ID:

Explanations:

- *italic text*: Gives explanation, is not presented in the eCRF
- **blue text**: multiple answers possible
- ***italic red text***: condition for presentation of item or query rule

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A. Identification of patients with sepsis

1000 random cases per study centre need to be documented by trained study physicians

0. Admission and discharge dates

a. Where several stays merged to one case for billing reasons?	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes
<i>If a = yes,</i> how many stays/cases have been merged?	_____ <i>Query rule: N >= 2</i>
b. Admission and discharge dates	Admission date: _ _ _ _ Discharge date: _ _ _ _ Admission date: _ _ _ _ Discharge date: _ _ _ _ Admission date: _ _ _ _ Discharge date: _ _ _ _ Admission date: _ _ _ _ Discharge date: _ _ _ _ <i>Query rule: discharge date after admission date</i>
c. ICU treatment	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes If yes, length of stay: _ _ days

1. Presence of infection during hospitalisation?

a. Presence of infection	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes
b. <i>if 1a = yes</i> , highest degree of confirmation?	<input type="checkbox"/> 1 microbiologically proven <input type="checkbox"/> 2 other confirmation of infection (i.e. radiological finding with according clinical syndrome, conspicuous urine status) <input type="checkbox"/> 3 clinically suspected (increased infection levels, fever)
c. <i>if 1a = yes</i> , origin of infection symptoms?	<input type="checkbox"/> 1 present on admission, nosocomial <input type="checkbox"/> 2 present on admission, not nosocomial <input type="checkbox"/> 3 present on admission, unknown origin <input type="checkbox"/> 4 onset during stay at our hospital, nosocomial <input type="checkbox"/> 5 onset during stay at our hospital, not nosocomial <input type="checkbox"/> 6 onset during stay at our hospital, unknown origin <input type="checkbox"/> 9 unknown
d. <i>if 1a = yes & 1c = 4, 5, or 6</i>	Date of first appearance of infection symptoms:
e. <i>if 1a = yes</i> , source of infection known?	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes
<i>if 1e = yes</i>	
catheter-related infection CNS cardiovascular pneumonia other upper/lower respiratory infections thoracic (empyema / mediastinitis) intraabdominal gastrointestinal urogenital bones / soft tissue primary bacteremia other	<input type="checkbox"/> 0 nein <input type="checkbox"/> 1 ja <input type="checkbox"/> 0 nein <input type="checkbox"/> 1 ja <input type="checkbox"/> 0 nein <input type="checkbox"/> 1 ja <input type="checkbox"/> 0 nein <input type="checkbox"/> 1 ja <input type="checkbox"/> 0 nein <input type="checkbox"/> 1 ja <input type="checkbox"/> 0 nein <input type="checkbox"/> 1 ja <input type="checkbox"/> 0 nein <input type="checkbox"/> 1 ja <input type="checkbox"/> 0 nein <input type="checkbox"/> 1 ja <input type="checkbox"/> 0 nein <input type="checkbox"/> 1 ja <input type="checkbox"/> 0 nein <input type="checkbox"/> 1 ja <input type="checkbox"/> 0 nein <input type="checkbox"/> 1 ja <input type="checkbox"/> 0 nein <input type="checkbox"/> 1 ja
<i>at least one yes if 1e = yes</i>	

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2. if 1a = yes: infection-related SIRS criteria

a. Have there been at least 2 SIRS criteria due to infection present simultaneously / at the same time?	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
b. if a=yes , select the according SIRS criteria present at the same time (≥ 2)	<input type="checkbox"/> tachycardia ($\geq 90/\text{min}$) <input type="checkbox"/> tachypnoea ($\geq 20/\text{min}$) and/ or hypocapnia (arterial $\text{paCO}_2 \leq 4,3 \text{ kPa}$ [33 mmHg]) and / or mechanical ventilation <input type="checkbox"/> leukocytosis $\geq 12000/\mu\text{l}$ or leukopenia $\leq 4000/\mu\text{l}$ and/or Normal WBC count with $> 10\%$ immature forms <input type="checkbox"/> hypothermia ($\leq 36^\circ\text{C}$) or fever ($\geq 38^\circ\text{C}$)
c. if 2a = yes : date of simultaneous occurrence of ≥ 2 SIRS criteria	_____._____._____. <input type="checkbox"/> 9 unknown
d. if 2a = yes : where did at least 2 infection-related SIRS criteria occur for the first time?	<input type="checkbox"/> 1 ICU <input type="checkbox"/> 2 emergency department <input type="checkbox"/> 3 normal ward <input type="checkbox"/> 4 intermediate care unit <input type="checkbox"/> 5 prior to admission to our hospital <input type="checkbox"/> 9 unknown

3. if 1a = yes: infection-related organ dysfunction

a. After the onset of infection, did criteria referring to a new onset of infection-related organ dysfunction occur?	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
if 3a = yes : b1. Acute encephalopathy (impaired vigilance, disorientation, restlessness, delirium)	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
b2. thrombocytopenia (decrease in platelet count of more than 30% within 24 h or platelet count $\leq 100.000/\text{mm}^3$. Acute hemorrhage or immunological causes must be ruled out)	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
b3. arterial hypoxemia ($\text{PaO}_2 \leq 10 \text{ kPa}$ ($\leq 75 \text{ mmHg}$) while breathing room air or $\text{PaO}_2/\text{FiO}_2$ -ratio $\leq 33 \text{ kPa}$ ($\leq 250 \text{ mmHg}$) on oxygen administration. Manifested heart- or lung disease must be ruled out as cause.)	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
b4. renal dysfunction (diuresis of $\leq 0.5 \text{ ml/kg/h}$ for at least 2 h despite adequate volume resuscitation and/or increase in serum creatinine level $> 2\text{x}$ the upper limit of normal)	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
b5. metabolic acidosis (base excess $\leq -5 \text{ mmol/l}$ or lactate concentration $> 1.5\text{x}$ the upper limit of normal)	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
b6. arterial hypotension (confirmation of infection and $> 1 \text{ h}$ systolic arterial BP $\leq 90 \text{ mmHg}$ or MAP $\leq 70 \text{ mmHg}$ or vasopressor administration to maintain target systolic BP of $\geq 90 \text{ mmHg}$ or MAP $\geq 70 \text{ mmHg}$; despite adequate volume resuscitation and not explainable by other causes)	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
c. if 3a = yes : date at which the first organ dysfunction occurred	_____._____._____. <input type="checkbox"/> 9 unknown
d. if 3a = yes : Where did the first infection-related organ dysfunction occur?	<input type="checkbox"/> 1 ICU <input type="checkbox"/> 2 emergency department <input type="checkbox"/> 3 normal ward <input type="checkbox"/> 4 intermediate care unit <input type="checkbox"/> 5 prior to admission <input type="checkbox"/> 6 other hospital <input type="checkbox"/> 9 unknown

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4. if 1a = yes: infection-related qSOFA criteria

a. Have there been at least 2 infection-related qSOFA criteria present simultaneously / at the same time? (first relevant timepoint)	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
b. if 4a = yes: select the according qSOFA criteria present simultaneously (at least 2)	<input type="checkbox"/> tachypnoea (breathing rate ≥ 22 /min) <input type="checkbox"/> altered mental status (GCS <15) <input type="checkbox"/> arterial hypotension (systolic BP ≤ 100 mmHg)
c. if 4a = yes: date of simultaneous occurrence of at least 2 infection-related qSOFA criteria	_____._____._____. <input type="checkbox"/> 9 unknown
d. if 4a = yes: where did at least 2 infection-induced qSOFA criteria occur for the first time simultaneously?	<input type="checkbox"/> 1 ICU <input type="checkbox"/> 2 emergency department <input type="checkbox"/> 3 normal ward <input type="checkbox"/> 4 intermediate care unit <input type="checkbox"/> 5 prior to admission <input type="checkbox"/> 6 other hospital <input type="checkbox"/> 9 unknown

5 if 1a = yes: infection-related increase in SOFA score ≥ 2 points

a. infection-related SOFA increase ≥ 2 pt.	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 2 evaluation impossible because no previous values available <input type="checkbox"/> 3 evaluation impossible because no values were measured
b. if 5a = yes: date at which first infection-related increase in SOFA score occurred	_____._____._____. <input type="checkbox"/> 9 unknown
c. if 5a = yes: where did the infection-related SOFA increase of at least 2 pt. occur for the first time?	<input type="checkbox"/> 1 ICU <input type="checkbox"/> 2 emergency department <input type="checkbox"/> 3 normal ward <input type="checkbox"/> 4 intermediate care unit <input type="checkbox"/> 5 prior to admission <input type="checkbox"/> 6 other hospital <input type="checkbox"/> 9 unknown
d. If 5a = yes: list the SOFA values referring to the respective organ systems for the timepoint PRIOR TO the first infection-rated SOFA score increase of at least 2 pt.	

Organ system	0	1	2	3	4	
Respiration PaO ₂ /FiO ₂ , mmHg	<input type="checkbox"/>	<input type="checkbox"/> <400	<input type="checkbox"/> <300	<input type="checkbox"/> <200 and respiratory support	<input type="checkbox"/> <100 and respiratory support	<input type="checkbox"/> unknown
Central nervous system Glasgow Coma Score (GCS)	<input type="checkbox"/>	<input type="checkbox"/> 13–14	<input type="checkbox"/> 10–12	<input type="checkbox"/> 6–9	<input type="checkbox"/> <6	<input type="checkbox"/> unknown
Cardiovascular system (adrenergic agents administered for at least 1 h, doses in $\mu\text{g}/\text{kg min}$)	<input type="checkbox"/>	<input type="checkbox"/> MAP <70 mmHg	<input type="checkbox"/> Dopamine ≤ 5 or dobutamine (any dose)	<input type="checkbox"/> Dopamine >5 or epinephrine ≤ 0.1 or norepinephrine ≤ 0.1	<input type="checkbox"/> Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1	<input type="checkbox"/> unknown
Liver Bilirubin mg/dl ($\mu\text{mol}/\text{l}$)	<input type="checkbox"/>	<input type="checkbox"/> 1.2–1.9 (20–32)	<input type="checkbox"/> 2.0–5.9 (33–101)	<input type="checkbox"/> 6.0–11.9 (102–204)	<input type="checkbox"/> >12.0 (>204)	<input type="checkbox"/> unknown
Coagulation Platelets / μl	<input type="checkbox"/>	<input type="checkbox"/> <150.000	<input type="checkbox"/> <100.000	<input type="checkbox"/> <50.000	<input type="checkbox"/> <20.000	<input type="checkbox"/> unknown
Renal system Creatinine, mg/dl ($\mu\text{mol}/\text{l}$) or urine output	<input type="checkbox"/>	<input type="checkbox"/> 1.2–1.9 (110–170)	<input type="checkbox"/> 2.0–3.4 (171–299)	<input type="checkbox"/> 3.5–4.9 (300–440) or urine output < 500 ml/d	<input type="checkbox"/> > 5.0 (> 440) (or urine output < 200 ml/d)	<input type="checkbox"/> unknown

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e. If 5a = yes: list the SOFA values referring to the respective organ systems for the time point AFTER the first infection-related SOFA-score increase of at least 2 pt.

Organ system	0	1	2	3	4	
Respiration PaO ₂ /FiO ₂ , mmHg	<input type="checkbox"/>	<input type="checkbox"/> <400	<input type="checkbox"/> <300	<input type="checkbox"/> <200 and respiratory support	<input type="checkbox"/> <100 and respiratory support	<input type="checkbox"/> unknown
Central nervous system Glasgow Coma Score (GCS)	<input type="checkbox"/>	<input type="checkbox"/> 13–14	<input type="checkbox"/> 10–12	<input type="checkbox"/> 6–9	<input type="checkbox"/> <6	<input type="checkbox"/> unknown
Cardiovascular system (adrenergic agents administered for at least 1 h, doses in µg/kg min)	<input type="checkbox"/>	<input type="checkbox"/> MAP <70 mmHg	<input type="checkbox"/> Dopamine ≤5 or dobutamine (any dose)	<input type="checkbox"/> Dopamine >5 or epinephrine ≤0.1 or norepinephrine ≤0.1	<input type="checkbox"/> Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1	<input type="checkbox"/> unknown
Liver Bilirubin mg/dl (µmol/l)	<input type="checkbox"/>	<input type="checkbox"/> 1.2–1.9 (20–32)	<input type="checkbox"/> 2.0–5.9 (33–101)	<input type="checkbox"/> 6.0–11.9 (102–204)	<input type="checkbox"/> >12.0 (>204)	<input type="checkbox"/> unknown
Coagulation Platelets /µl	<input type="checkbox"/>	<input type="checkbox"/> <150.000	<input type="checkbox"/> <100.000	<input type="checkbox"/> <50.000	<input type="checkbox"/> <20.000	<input type="checkbox"/> unknown
Renal system Creatinine, mg/dl (µmol/l) or urine output	<input type="checkbox"/>	<input type="checkbox"/> 1.2–1.9 (110–170)	<input type="checkbox"/> 2.0–3.4 (171–299)	<input type="checkbox"/> 3.5–4.9 (300–440) or urine output < 500 ml/d	<input type="checkbox"/> > 5.0 (> 440) (or urine output < 200 ml/d)	<input type="checkbox"/> unknown

6. if 1a = yes: infection-related criteria for septic shock (sepsis-3)

a. After onset of infection: Did septic shock criteria according to sepsis-3 were present simultaneously? (increase in serum lactate to > 2mmol/l; persistent hypotension demanding vasopressor administration to maintain MAP ≥65 mmHg)

☐ 1 yes, both criteria were present simultaneously
☐ 2 persistent hypotension, but no increase in serum lactate
☐ 3 persistent hypotension, but no information regarding serum lactate available
☐ 4 increase in serum lactate, but no persistent hypotension
☐ 5 increase in serum lactate, but no information regarding blood pressure
☐ 6 none of the criteria present (or one not present and the other unknown)
☐ 7 both criteria unknown

b. if 6a = 1: Date when both shock criteria were present together for the first time? ____-____-____ ☐ 9 unknown

d. if 6a = yes: where were both shock criteria were present together for the first time?

☐ 1 ICU ☐ 2 emergency department
☐ 3 normal ward ☐ 4 intermediate care unit
☐ 5 prior to admission ☐ 6 other hospital
☐ 9 unknown

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e. If 6a = 1 and 5a = not yes:

Give SOFA values for each organ system, respectively,
for the time point of first simultaneous presence of shock
criteria:

Organ system	0	1	2	3	4	
Respiration PaO ₂ /FiO ₂ , mmHg	<input type="checkbox"/>	<input type="checkbox"/> <400	<input type="checkbox"/> <300	<input type="checkbox"/> <200 and respiratory support	<input type="checkbox"/> <100 and respiratory support	<input type="checkbox"/> unknown
Central nervous system Glasgow Coma Score (GCS)	<input type="checkbox"/>	<input type="checkbox"/> 13–14	<input type="checkbox"/> 10–12	<input type="checkbox"/> 6–9	<input type="checkbox"/> <6	<input type="checkbox"/> unknown
Cardiovascular system (adrenergic agents administered for at least 1 h, doses in µg/kg min)	<input type="checkbox"/>	<input type="checkbox"/> MAP <70 mmHg	<input type="checkbox"/> Dopamine ≤5 or dobutamine (any dose)	<input type="checkbox"/> Dopamine >5 or epinephrine ≤0.1 or norepinephrine ≤0.1	<input type="checkbox"/> Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1	<input type="checkbox"/> unknown
Liver Bilirubin mg/dl (µmol/l)	<input type="checkbox"/>	<input type="checkbox"/> 1.2–1.9 (20–32)	<input type="checkbox"/> 2.0–5.9 (33–101)	<input type="checkbox"/> 6.0–11.9 (102–204)	<input type="checkbox"/> >12.0 (>204)	<input type="checkbox"/> unknown
Coagulation Platelets /µl	<input type="checkbox"/>	<input type="checkbox"/> <150.000	<input type="checkbox"/> <100.000	<input type="checkbox"/> <50.000	<input type="checkbox"/> <20.000	<input type="checkbox"/> unknown
Renal system Creatinine, mg/dl (µmol/l) or urine output	<input type="checkbox"/>	<input type="checkbox"/> 1.2–1.9 (110–170)	<input type="checkbox"/> 2.0–3.4 (171–299)	<input type="checkbox"/> 3.5–4.9 (300–440) or urine output < 500 ml/d)	<input type="checkbox"/> > 5.0 (> 440) (or urine output < 200 ml/d)	<input type="checkbox"/> unknown

7. Validation of presence of sepsis / severe sepsis/septic shock

Based on the information documented above, the eCRF gives feedback regarding which category of sepsis is present. Then the study physician needs to validate this categorization to finalize the identification of sepsis.

This case was categorized...
according to sepsis-1 definition

- no sepsis
- sepsis without organ dysfunction (infection and at least 2 out of 4 SIRS criteria)
- sepsis with organ dysfunction without septic shock (infection, at least 2 out of 4 SIRS criteria, at least 1 organ dysfunction)
- septic shock (infection, at least 2 out of 4 SIRS criteria, arterial hypotension (> 1 h systolic arterial BP ≤90 mmHg or MAP ≤65 mmHg or vasopressor use necessary to maintain a systolic arterial BP >90mmHg or MAP>65mmHg despite adequate volume resuscitation)
- sepsis with organ dysfunction, but no SIRS criteria (infection and at least 1 infection-related organ dysfunction, but fewer than 2 SIRS criteria)

according to sepsis-3 definitions

- no sepsis
- sepsis with organ dysfunction (SOFA score increase of at least 2 points)
- septic shock (persistent hypotension demanding vasopressor administration despite adequate volume resuscitation to maintain MAP ≥65mmHg and increase in lactate concentration > 2 mmol/l)

a. Does this categorization correspond to your clinical judgement? (if you answer this question with no, check and correct your answers to the questions above)

☐ 0 no
☐ 1 yes

8. Further information (if one of the sepsis categories mentioned above applies)

a. Is sepsis an explicitly specified diagnosis in the medical record (without discharge letter)?

☐ 0 no ☐ 1 yes

b. Is sepsis an explicitly specified diagnosis in the discharge letter?

☐ 0 no ☐ 1 yes

If yes:

☐ 1 sepsis without ODF
☐ 2 sepsis with ODF without shock
☐ 3 sepsis with shock
☐ 9 not specified

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9. Limitation of life-sustaining therapies: *(if one of the sepsis categories mentioned above applies)*

a. Were there any preexisting or new decisions to limit therapy?	<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes	<input type="checkbox"/> 9 unknown
b. <i>if 9a = yes</i> , state the origin for the first decisions for limitation of therapy	<input type="checkbox"/> 1 pre-existing at hospital admission <input type="checkbox"/> 2 made during the course of stay on a normal ward <input type="checkbox"/> 3 made during the course of stay on an ICU <input type="checkbox"/> 9 unknown		
c. <i>if 9a = yes</i> , what was the most severe limitation of therapy?	<input type="checkbox"/> 1 do not resuscitate (DNR) <input type="checkbox"/> 2 withhold <input type="checkbox"/> 3 withdraw		
d. <i>if 9a = yes</i> , has the patient died under therapy limitation?	<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes	<input type="checkbox"/> 9 unknown

10. Death *(if one of the sepsis categories mentioned above applies)*

a. Did the patient die during hospital stay?	<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes	
b. <i>if 10a = no</i>			Discharge to <input type="checkbox"/> 1 rehab <input type="checkbox"/> 2 home <input type="checkbox"/> 3 nursing home <input type="checkbox"/> 4 other hospital <input type="checkbox"/> 5 hospice <input type="checkbox"/> 6 home care with ventilation <input type="checkbox"/> 7 unknown
b. <i>if 10a = yes</i>			Location of death <input type="checkbox"/> 1 ICU <input type="checkbox"/> 2 emergency department <input type="checkbox"/> 3 normal ward <input type="checkbox"/> 4 intermediate care unit <input type="checkbox"/> 9 unknown
c. <i>if 10a = yes</i> Was the infection/sepsis the immediate cause of death? (or, if the patient died during the existing limitation of therapy, the immediate cause that led to the patient's aggravation) Note: the immediate cause of death is the final disease, injury or state of disease that leads to death. The mechanism of death or the terminal incident (e.g. cardiac arrest or respiratory arrest) is NOT meant.	<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes	
d. <i>if 10c = no</i> : What was the immediate cause leading to death?	ICD- Code: _____		
e. <i>if 10a = yes</i> : what was the patient's underlying disease? Note: the underlying disease is the preceding cause or state of disease that, together with aggravation or complications, led to the immediate cause of death.	ICD- Code: _____		

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B. Part for study nurses***For patients with sepsis (at least 1 sepsis-1 or sepsis-3 category applies)*****1. Demographic information**

a. Age			
_ _ Jahre			
b. Gender			
<input type="checkbox"/> 1 männlich <input type="checkbox"/> 2 weiblich			
c. Insurance status			
<input type="checkbox"/> 1 public health insurance <input type="checkbox"/> 2 private health insurance <input type="checkbox"/> 9 unknown			
d. Type of admission			
<input type="checkbox"/> 1 surgical emergency <input type="checkbox"/> 2 medical emergency <input type="checkbox"/> 3 elective surgery <input type="checkbox"/> 4 elective medical <input type="checkbox"/> 9 unknown			
<i>If 1d=1 or 1d=3, type of surgeries:</i>			
cardio-/thoracic surgery		<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
trauma surgery		<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
neurosurgery		<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
abdominal surgery		<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
gynecological/urological surgery		<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
other surgery		<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
e. Organ transplantation in the present case	<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes	<input type="checkbox"/> 9 unknown
	<i>If 1e = yes</i>	<input type="checkbox"/> 1 liver transplantation <input type="checkbox"/> 2 heart transplantation <input type="checkbox"/> 3 pancreas transplantation <input type="checkbox"/> 4 small intestine transplantation <input type="checkbox"/> 5 kidney transplantation <input type="checkbox"/> 6 lung transplantation <input type="checkbox"/> 7 other	
f. last localisation prior to admission to hospital			
<input type="checkbox"/> 1 other acute care hospital <input type="checkbox"/> 2 ICU of other hospital <input type="checkbox"/> 3 rehab hospital <input type="checkbox"/> 4 nursing home <input type="checkbox"/> 5 home <input type="checkbox"/> 6 outpatient ventilation home <input type="checkbox"/> 9 unknown			
g. preexisting dialysis			
<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown			
h. preexisting tracheostoma			
<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown			
i. preexisting mechanical ventilation			
<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown			

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j. preexisting need for long-term care	<input type="checkbox"/> ₀ no <input type="checkbox"/> ₁ yes <input type="checkbox"/> ₉ unknown
k. preexisting organ transplantation	<input type="checkbox"/> ₀ no <input type="checkbox"/> ₁ yes <input type="checkbox"/> ₉ unknown
l. preexisting asplenia (acquired or innate absence of spleen)	<input type="checkbox"/> ₀ no <input type="checkbox"/> ₁ yes <input type="checkbox"/> ₉ unknown

2. Comorbidities (Charlson- und Elixhauser Comorbidity Indices)

a. Myocardial infarction	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
b. Congestive heart failure	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
c. Cardiac arrhythmias	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
d. Valvular disease	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
e. Pulmonary circulation disorders	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
f. Peripheral vascular disorders	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
g. Cerebrovascular disease	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
h. Hypertension, uncomplicated	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
i. Hypertension, complicated	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
j. Dementia	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
k. Chronic pulmonary disease	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
l. Collagen vascular diseases/ Rheumatic disease	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
m. Peptic ulcer disease	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
n. Mild liver disease	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
o. Diabetes without chronic complication	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
p. Hemiplegia or paraplegia	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
q. Other neurological disease	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
r. Renal disease	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
s. Diabetes with chronic complication	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
t. Hypothyroidism	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
u. Solid tumor without metastasis	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
v. Leukemia	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
w. Lymphoma	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
x. Moderate or severe liver disease	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
y. Metastatic solid tumor	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
z. AIDS/HIV	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
aa. Coagulopathy	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
ab. Obesity	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown

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ac. Weight loss	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
ad. Fluid and electrolyte disorders	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
ae. Blood loss anemia	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
af. Deficiency anemia	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
ag. Alcohol abuse	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
ah. Drug abuse	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
ai. Psychoses	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
aj. Depression	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown

3. Treatments received

a. Ventilation including non-invasive	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes <input type="checkbox"/> ₉ unknown	if yes, duration <input type="checkbox"/> ₁ <24 h <input type="checkbox"/> ₂ ≥24 h <input type="checkbox"/> ₉ unknown
b. ECMO or other lung replacement therapy	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
c. Renal replacement therapy	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
d. Hepatic replacement therapy	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
e. Vasopressor therapy	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown
f. Tracheostoma	<input type="checkbox"/> ₀ no	<input type="checkbox"/> ₁ yes	<input type="checkbox"/> ₉ unknown

4. Microbiological findings

a. blood culture	<input type="checkbox"/> ₀ negative	<input type="checkbox"/> ₁ positive, but not sepsis relevant	<input type="checkbox"/> ₂ positive and sepsis relevant	<input type="checkbox"/> ₉ not taken/unknown
<i>If 4a = "positive and sepsis relevant"</i>		sepsis relevant pathogens (code):	_____	_____
			...	
b. culture from otherwise sterile compartments	<input type="checkbox"/> ₀ negative	<input type="checkbox"/> ₁ positive, but not sepsis relevant	<input type="checkbox"/> ₂ positive and sepsis relevant	<input type="checkbox"/> ₉ not taken/unknown
<i>If 4b = "positive and sepsis relevant"</i>		sepsis relevant pathogens (code):	_____	_____
			...	
c. microbiological findings of suspected source of infection	<input type="checkbox"/> ₀ negative		<input type="checkbox"/> ₂ positive and sepsis relevant	<input type="checkbox"/> ₉ not taken/unknown
<i>If 4c = "positive"</i>		sepsis relevant pathogens (code):	_____	_____
			...	

Supplementary Material 3

Pathogen codes**1 Gram-positive aerobic bacteria**

- ☐ 101 *Staphylococcus aureus* (MSSA)
- ☐ 102 *Staphylococcus aureus* (MRSA)
- ☐ 103 *Staphylococcus* spp. (Methicillin sensitiv)
- ☐ 104 *Staphylococcus* spp. (Methicillin resistant)
- ☐ 105 *Streptococcus pneumoniae*
- ☐ 106 *Streptococcus pyogenes*
- ☐ 107 *Streptococci* spp. (A, B, C group)
- ☐ 108 *Enterococcus faecium*
- ☐ 109 *Enterococcus faecalis*
- ☐ 110 *Erysipelothrix rhusiopathiae*
- ☐ 111 VRE (Vancomycin-Resistant Enterococci)
- ☐ 112 *Listeria*
- ☐ 113 *Corynebacterium*
- ☐ 114 *Bacillus anthracis*
- ☐ 115 *Bacillus* spp. (cereus)
- ☐ 116 *Nocardia*

2 Gram-negative aerobic bacteria

- ☐ 201 *Neisseria meningitidis*
- ☐ 202 *Neisseria gonorrhoeae*
- ☐ 203 *Escherichia coli*
- ☐ 204 *Klebsiella pneumoniae*
- ☐ 205 *Klebsiella granulomatis/aerogenes*
- ☐ 206 *Salmonella*
- ☐ 207 *Shigella*
- ☐ 208 *Yersinia*
- ☐ 209 *Proteus*
- ☐ 210 *Citrobacter*
- ☐ 211 *Acetobacter*
- ☐ 212 *Serratia*
- ☐ 213 *Enterobacter cloacae, aerogenes, ...)*
- ☐ 213 *Haemophilus influenzae*
- ☐ 214 *Haemophilus* spp. *ducreyi*
- ☐ 215 *Bordetella*
- ☐ 216 *Brucella*
- ☐ 217 *Francisella tularensis*
- ☐ 218 *Pasteurella*
- ☐ 219 *Helicobacter pylori*
- ☐ 220 *Pseudomonas aeruginosa*
- ☐ 221 *Pseudomonas mallei/pseudomallei*
- ☐ 222 *Pseudomonas* spp.
- ☐ 223 *Stenotrophomonas maltophilia*
- ☐ 224 *Campylobacter*
- ☐ 225 *Legionella*
- ☐ 226 *Bartonella*
- ☐ 227 *Vibrio cholerae*
- ☐ 228 *Vibrio* spp. (*haemolyticus/parahaemolyticus*)
- ☐ 229 *Moraxella*
- ☐ 230 *Morganella*
- ☐ 231 *Burkholderia mallei/Burkholderia pseudomallei*
- ☐ 232 *Burkholderia* spp.
- ☐ 233 *Spirillum minus/Streptobacillus moniliformes*

3 Anaerobic bacteria

- ☐ 301 *Clostridium difficile*
- ☐ 302 *Clostridium* spp.
- ☐ 303 *Actinomyces*
- ☐ 304 other gram-positive anaerobic bacteria (*Propionibacterium*)
- ☐ 305 gram-negative anaerobic bacteria (*Bacteroides, Fusobacterium, Prevotella*)

4 Atypical pathogens

- ☐ 401 *Mycobacterium*
- ☐ 402 *Chlamydia*
- ☐ 403 *Mycoplasma*
- ☐ 404 *Rickettsia*
- ☐ 405 *Bartonella*
- ☐ 406 *Coxiella*
- ☐ 407 *Borrelia*
- ☐ 408 *Leptospira*
- ☐ 409 *Treponema*
- ☐ 410 *Spirochaete* spp.

5 Fungi

- ☐ 501 *Candida albicans*
- ☐ 502 *Candida* spp.
- ☐ 503 *Aspergillus*
- ☐ 504 *Pneumocystis carinii*
- ☐ 505 *Cryptococcus*
- ☐ 506 other fungi

6 Viruses

- ☐ 601 Influenza viruses A,B,C,D
- ☐ 602 Herpes simplex virus (HSV)
- ☐ 603 Varicella zoster virus (VZV)
- ☐ 604 Cytomegalovirus (CMV)
- ☐ 605 Epstein Barr virus (EBV)
- ☐ 606 Tick-borne encephalitis virus (TBEV)
- ☐ 607 Rubella virus
- ☐ 608 Mumps rubulavirus
- ☐ 609 Measles morbillivirus
- ☐ 610 Hepatitis virus (A,B,C,D,E)
- ☐ 611 Norovirus
- ☐ 612 Rotavirus
- ☐ 613 Dengue virus
- ☐ 614 Rabies virus/Lyssavirus (rabies)
- ☐ 615 Coxsackievirus/human parvovirus
- ☐ 616 Yellow fever virus
- ☐ 617 Orthopoxvirus
- ☐ 618 Other viruses (*Chikungunya virus, Venezuelan equine encephalitis virus, West Nile virus, Phlebovirus, Oropouche virus, Pappataci fever viruses, Colorado tick fever virus, Piry virus, Indiana vesiculovirus, Arbovirus*)
- ☐ 619 Virus with hemorrhagic fever (*Argentinian mammarenavirus, Machupo mammarenavirus, Lassa mammarenavirus, Arenavirus, Crimean-Congo hemorrhagic fever virus, Flavivirus, Marburg virus, Ebolavirus, Kyasanur Forest-Disease virus, Hantavirus*)

7 Parasites

- ☐ 701 *Plasmodium falciparum/vivax/malariae*
- ☐ 702 *Toxoplasma gondii*
- ☐ 703 *Trichomonas vaginalis*
- ☐ 704 *Entamoeba histolytica*
- ☐ 705 Other parasites

d. If 4a or 4b = "positive and sepsis relevant" or 4c= „positive“ proof of multidrug-resistant pathogens

☐ 0 no

☐ 1 yes ☐ 9 unknown

If 4d = yes,

☐ 1 Gram+
☐ 2 Gram-
☐ 9 unknown

if Gram-

MRGN classification

☐ 3 3
☐ 4 4
☐ 9 unbekannt

Supplementary Material 3

6. Other risk factors

a. chemotherapy in current stay	<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes	<input type="checkbox"/> 9 unknown
b. stroke therapy in current stay	<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes	<input type="checkbox"/> 9 unknown
c. palliative care in current stay	<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes	<input type="checkbox"/> 9 unknown
d. cardiopulmonary resuscitation prior to beginning of sepsis in current treatment	<input type="checkbox"/> 0 no	<input type="checkbox"/> 1 yes	<input type="checkbox"/> 9 unknown

C. Sepsis as coded in inpatient administrative health data (documented by data manager)

Type of coded sepsis (sepsis-1)	<input type="checkbox"/> 1 no sepsis <input type="checkbox"/> 2 sepsis without organ dysfunction <input type="checkbox"/> 3 sepsis with organ dysfunction without shock <input type="checkbox"/> 4 septic shock <input type="checkbox"/> 5 sepsis with organ dysfunction but with < 2 SIRS criteria
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D. Reasons for false positive coding of sepsis (documented by study nurses)**1. if sepsis without organ dysfunction coded, but no sepsis according to sepsis-1 based on review of medical chart**

a. have there been at least 2 SIRS criteria during the stay (also not related to infection!)?	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
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2. if sepsis with organ dysfunction (without shock) coded, but no sepsis according to sepsis-1 based on review of medical chart

a. have there been at least 2 SIRS criteria during the stay (also not related to infection!)?	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
b. Has there been at least 1 organ dysfunction during the stay (also not related to infection!)?	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown

3. if septic shock coded, but no sepsis according to sepsis-1 based on review of medical chart

a. have there been at least 2 SIRS criteria during the stay (also not related to infection!)?	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
b. Has there been a shock during the stay (also not related to infection!)?	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown

4. if sepsis with organ dysfunction (without shock) coded, but sepsis without organ dysfunction according to review of medical chart

a. Has there been at least 1 organ dysfunction during the stay (also not related to infection!)?	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
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5. if septic shock coded, but sepsis without organ dysfunction or sepsis with organ dysfunction (without shock) according to review of medical chart

a. Has there been a shock during the stay (also not related to infection!)?	<input type="checkbox"/> 0 no <input type="checkbox"/> 1 yes <input type="checkbox"/> 9 unknown
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