SUPPLEMENTS

Validation of automated sepsis surveillance based on the Sepsis-3 clinical criteria against physician record review in a general hospital population: observational study using electronic health records data

Valik JK, *et al. BMJ Qual Saf* 2020; 29:735–745. doi: 10.1136/bmjqs-2019-010123

Supplementary Methods 1. Rule-based algorithm definitions

Suspected infection

We defined suspected infection as having any culture taken and at least 2 doses of antimicrobial treatment (ATC code J01 and J04) newly administrated either by the oral or parental route within 6-48 hours between the doses[1]. Treatment with the antimicrobials pivmecillinam, nitrofurantoin and trimethoprim were excluded from the definition since they are solely used to treat lower urinary tract infections and not sepsis. Cultures included body fluid from: abdomen, blood, bone, bronchoalveolar lavage, cerebral spinal fluid, catheters/devices, nasopharynx, pleural space, skin/tissue, sputum, stool, synovial fluid and urinary tract. Culture types included only bacterial culture and testing for *C. difficile* toxin, *Mycoplasma pneumoniae* DNA, EHEC DNA and Legionella antigen in urine. Fungal cultures were included only if collected from blood. Viral and parasitic samples were excluded.

If the patient was admitted to the ICU prior to 24 hours, or died prior to 48 hours from the first dose of antimicrobial treatment, they were deemed to have suspected infection despite of only 1 dose given. Cultures had to be performed within 24 hours after the start of antimicrobial treatment. Antimicrobial treatment had to be started within 72 hours after culture[1]. Onset of infection was defined as which of these events occurred first.

Sensitivity analyses were done with different definitions of suspected infections: only blood cultures and 2 doses of antimicrobial treatment, any culture and 4 calendar days of antimicrobial treatment and only blood cultures and 4 calendar days of antimicrobial treatment. To fulfil the 4 calendar day antimicrobial treatment criteria, we used a modified version of the Center of Disease Control and Prevention (CDC) Hospital Tool Kit for Adult Sepsis Surveillance[2]. At least one dose had to be administered intravenously within the window period. Subsequent calendar days could be the same antimicrobial, or a different antimicrobial as long as the first dose of each antimicrobial in the sequence was new. A new antimicrobial did not have to be started within the window period to be counted as part of the 4 calendar days. A gap of a single calendar day between administrations of the same antibiotic was counted as part of the 4 calendar days as long as the gap was not greater than 1 day. If the patient were admitted to the ICU, died or was discharged prior to 4 calendar days of antimicrobial treatment, they were deemed to have suspected infection anyway.

Sequential Organ Failure Assessment (SOFA) score

Organ dysfunction was measured with SOFA score counted during a time window beginning 48 hours before (limited by time of data availability) until 24 hours after onset of infection (limited by death or discharge)[1]. Worst values were registered and missing values were considered to be normal. The baseline SOFA score was defined as the latest value measured before the 72-hour time window, and was assumed to be 0 in patients not known to have pre-existing organ dysfunction (see below).

- ***SOFA respiration:*** Calculated from PaO2/FiO2 (mm Hg). If PaO2 was not available it was calculated from peripheral capillary oxygen saturation (SpO2) obtained from pulse oximetry via a conversion table which has been previously validated[3]. Prior studies have demonstrated feasibility to impute SpO2 when calculating the SOFA respirator score[4]. If no data on oxygen therapy was registered, FiO2 was be assumed to be 0.21. FiO2 values for patients receiving supplemental oxygen were estimated assuming each 1 L/min of oxygen flow rate increased FiO2 by 0.03 for the first L/min and 0.04 for consecutively L/min over room air. We used scoring cut-offs: ≥400 mm Hg for 0 points, <400 mm Hg for 1 point, <300 mm Hg for 2 points, <200 mm Hg for 3 points and <100 mm Hg for 4 points. For baseline SOFA respiratory, the latest measured PaO2 or SaO2, prior to the suspected infection window, during the last 3 months was used. Registration of home oxygen and/or ventilator treatment (ICD-codes DG008 and DG009) during the previous 1 year was considered default SOFA respiratory 2 points for both baseline and suspected infection window.

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- ***SOFA cardiovascular:*** Calculated from the mean arterial blood pressure (MAP) (mm Hg). The MAP was calculated from systolic blood pressure (SBP) and simultaneously measured diastolic blood pressure (DBP) using formula (2*DBP+SBP)/3. We used scoring cut-offs: ≥70 mm Hg for 0 points and <70 mm Hg for 1 point. Since surveillance was performed outside ICUs, treatment with vasopressors were not used for the definition, meaning maximum score was 1. The baseline SOFA cardiovascular was the latest measured MAP before the suspected infection window. Only values measured during current hospitalization was used.

- ***SOFA central nervous system (CNS):*** Calculated from Glasgow Coma Scale (GCS). If GCS was not available, we used structured data on "alert" (interpreted as GCS score 15 points) or "not alert" (interpreted as GCS score 14 points). We used scoring cut-offs: GCS 15 for 0 points, GCS 13-14 for 1 point, GCS 10-12 for 2 points, GCS 6-9 for 3 points and GCS <6 for 4 points. The baseline SOFA CNS was the latest measured value before the suspected infection window. Only values measured during current hospitalization was used.

- ***SOFA coagulation:*** Calculated from platelets ($x10^3/\mu L$). We used scoring cut-offs: ≥150 $x10^3/\mu L$ for 0 points, <150 $x10^3/\mu L$ for 1 point, <100 $x10^3/\mu L$ for 2 points, <50 $x10^3/\mu L$ for 3 points and <20 $x10^3/\mu L$ for 4 points. For baseline SOFA coagulation, the latest measured platelets value, prior to the suspected infection window, during last 3 months was used.

- ***SOFA liver:*** Calculated from bilirubin (µmol/L). We used scoring cut-offs: <20 µmol/L for 0 points, 20-32 µmol/L for 1 point, 33-101 µmol/L for 2 points, 102-204 µmol/L for 3 points and >204 µmol/L for 4 points. For baseline SOFA liver, the latest measured bilirubin value, prior to the suspected infection window, during the last 3 months was used.

- ***SOFA renal:*** Calculated from creatinine (µmol/L). We used scoring cut-offs: <110 µmol/L for 0 points, 110-170 µmol/L for 1 point, 171-299 µmol/L for 2 points, 300-440 µmol/L for 3 points and >440 µmol/L for 4 points. For baseline SOFA renal, the latest measured creatinine value, prior to the suspected infection window, during last 3 months was used. Registration of chronic dialysis treatment (ICD-codes Z99.2, Z49.0, Z49.1 and Z49.2) during the previous 1 year was considered default SOFA renal 4 points for both baseline and suspected infection window. Urine output was not used as a measure due to data availability.

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Supplementary Methods 2. Definition of significant bloodstream infection

All pathogens were regarded as bloodstream infection except pre-define contaminants species, if these were isolated in only one bottle or only one set if more than one set of blood cultures were collected within 24 hours. One set was defined as 1 anaerobe blood culture bottle and 1 aerobe blood culture bottle.

List of possible blood culture contaminants:

- *Alloiococcus otitis*
- Anaerobic bacteria
- *Bacillus cereus*
- *Bacillus species*
- *Bifidobacterium species*
- Coagulase-negative staphylococcus (CoNS)
- *Corynebacterium jeikeium*
- *Corynebacterium species*
- *Dermabacter hominis*
- *Desulfovibrio species*
- *Gardnerella vaginalis*
- *Gemella sanguinis*
- Gram negative coccus, anaerobe
- *Lactobacillus acidophilus*
- *Lactobacillus casei*
- *Lactobacillus gasseri*
- *Lactobacillus species*
- *Lactococcus lactis*
- *Leptotrichia species*
- *Leuconostoc lactis*
- *Leuconostoc species*
- *Micrococcus luteus*
- *Micrococcus species*
- *Propionibacterium acnes*
- *Propionibacterium species*
- *Staphylococcus epidermidis*

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Supplementary Table 1. Reasons for imperfect algorithm performance of the surveillance algorithm in the validation sets

Reasons for imperfect sensitivity in patients with suspected infection (n=674)	**Number of cases (total n=23)**
Organ dysfunction only mentioned in free text	16[a]
Misclassified baseline SOFA and/or development of organ dysfunction related to the infection outside of 72-h suspected infection window	7
Reasons for imperfect specificity in patients with suspected infection (n=674)	**Number of cases (total n=39)**
No infection	29
Wrong baseline SOFA	7
Obvious measurement error of vital parameters in EHR	3
Reasons for imperfect sensitivity in patients without suspected infection (n=326)	**Number of cases (total n=2)**
Blood cultures performed by advanced home care services before arrival to the emergency department	1
Antimicrobial treatment not registered in the EHR medications module	1

[a]Among these, 6 was due to SOFA respiration, 5 was due to SOFA cns and 5 was due to combinations of SOFA respiration, cns and cardiovascular.

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Supplementary Table 2. Performance of the surveillance algorithm stratified by ICU admission

	Entire hospital cohort (n=82 653)		**Suspected infection validation cohort (n=674)**	
	Episodes without ICU admission (n=78 318)	**Episodes with ICU admission (n=4335)**	**Episodes without ICU admission (n=603)**	**Episodes with ICU admission (n=71)**
Sensitivity [95% CI]	0.879 [0.793-0.952]	0.952 [0.881-1.000]	0.922 [0.888-0.952]	0.952 [0.881-1.000]
Specificity [95% CI]	0.988 [0.983-0.992]	0.938 [0.907-0.969]	0.913 [0.883-0.942]	0.655 [0.476-0.828]
PPV [95% CI]	0.895 [0.860-0.931]	0.800 [0.712-0.894]	0.895 [0.860-0.931]	0.800 [0.712-0.894]
NPV [95% CI]	0.985 [0.973-0.994]	0.987 [0.967-1.000]	0.936 [0.908-0.960]	0.905 [0.737-1.000]

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Supplementary Table 3. Availability of SOFA score components in episodes with suspected infection

Table 4a. Baseline SOFA score availability[a] and timing, stratified by onset of infection

		SOFA respiration [b]	SOFA coagulation	SOFA cardio.	SOFA cns[c]	SOFA liver	SOFA renal
Community-onset	Percentage (%) of suspected infections	49.6	60.5	7.0	3.2	34.2	60.9
	Days before suspected infection for SOFA baseline measurement, med [IQR]	13.5 [3-35.2]	10.0 [2.5-26.5]	0.2 [0.1-0.5]	1.0 [0.4-1.5]	17.8 [6.2-39.4]	11.3 [3.3-28.0]
Hospital-onset	Percentage (%) of suspected infections	96.0	98.2	95.4	36.7	71.4	99.2
	Days before suspected infection for SOFA baseline measurement, med [IQR]	0.4 [0.1-2.0]	1.3 [0.4-3.3]	0.3 [0.1-0.9]	6.5 [3.5-13.1]	3.6 [1.1-10.3]	1.0 [0.3-2.2]

Table 4b. Suspected infection SOFA score (72-h window) availability[a], stratified by onset of infection

		SOFA respiration [b]	SOFA coagulation	SOFA cardio.	SOFA cns[c]	SOFA liver	SOFA renal
Community-onset	Percentage (%) of suspected infections	93.3	92.0	95.0	55.0	38.3	92.7
	Mean number of measurements	4.9	1.7	5.1	1.3	1.4	1.7
Hospital-onset	Percentage (%) of suspected infections	81.5	73.2	86.2	3.0	30.2	85.4
	Mean number of measurements	6.6	2.1	7.0	2.4	1.8	2.1

[a]Avaliability of SOFA score is presented as % of total number of suspected infections (n=21 201) with available data on the SOFA score component in 19 479 hospital admissions containing at least one suspected infection. Suspected infection episodes were registered up to and including an episode where there was sepsis, otherwise until discharge or death.

[b]In cases where baseline SOFA respiration was measured, SOFA respiration measurements were based on PaO2 in 0.012% and 0.025% of infections for CO and HO, respectively (1 case each). Within windows, SOFA respiration measurements were based on PaO2 in 0.019% and 0.087% of SOFA measurements for CO and HO infections, respectively (3 measurements each)

[c]In cases where baseline SOFA cns was measured, SOFA cns measurements were based on the Glasgow Coma Scale (GCS) in 7.0% and 6.1% of infections for CO and HO, respectively (38, 94 cases). Within windows, SOFA cns measurements were based on GCS in 8.9% and 5.5% of SOFA measurements for CO and HO infections, respectively (833, 7 measurements).

Supplementary Table 4. Paired missingness (baseline vs. suspected infection) for each of the SOFA components, stratified by place of acquisition

		SOFA respiration[b]	SOFA coagulation	SOFA cardio[c]	SOFA cns[c, d]	SOFA liver	SOFA renal
Community-onset	Measurement of SOFA score in both baseline and suspected infection (%)[a]	46.5	55.0	6.3	0.3	18.1	56.0
	Measurement of SOFA score in baseline only (%)[a]	3.4	5.5	0.7	2.9	16.0	5.0
	Measurement of SOFA score in suspected infection only (%)[a]	46.8	36.9	88.7	54.7	20.2	36.7
	Measurement of SOFA score in neither baseline nor suspected infection (%)[a]	3.3	2.5	4.4	42.1	45.6	2.3
Hospital-onset	Measurement of SOFA score in both baseline and suspected infection (%)[a]	79.8	72.5	84.3	2.0	27.0	85.1
	Measurement of SOFA score in baseline only (%)[a]	16.3	25.7	11.1	34.8	44.4	14.2
	Measurement of SOFA score in suspected infection only (%)[a]	1.8	0.6	1.9	1.1	3.2	0.4
	Measurement of SOFA score in neither baseline nor suspected infection (%)[a]	2.2	1.2	2.7	62.2	25.4	0.4

[a]Presented as % of total number of suspected infections (n=21 201) with available data on the SOFA score component in 19 479 hospital admissions containing at least one suspected infection. Suspected infection episodes were registered up to and including an episode where there was sepsis, otherwise until discharge or death.

[b]No infections had both baseline and suspected infection SOFA respiration measurements based on PaO2. For CO infections, 0.2% (1 case) of those with SOFA respiration at baseline only were based on PaO2 and 0.04% (3 cases) of those with SOFA respiration in suspected infection only were based on PaO2. For HO infections, 0.1% (1 case) of those with SOFA respiration at baseline only were based on PaO2 and 4.0% (3 cases) of those with SOFA respiration in suspected infection only were based on PaO2.

[c]Only measurements during the current hospital admission was used

[d]For CO infections, no infections had both baseline and suspected infection SOFA cns measurements based on GCS, 7.7% (38 cases) of those with SOFA cns at baseline only were based on GCS and 9.0% (833 cases) of those with SOFA cns in suspected infection only were based on GCS. For HO infections, 1.2% (1 case) of those with both baseline and suspected infection SOFA cns measurements were based on GCS, 6.3% (93 cases) of those with SOFA cns at baseline only were based on GCS and 13.0% (6 cases) of those with SOFA cns in suspected infection only were based on GCS.

Supplementary Table 5. The burden of hospital-onset sepsis and in-hospital mortality depending on definition of suspected infection

	Any culture and 2 doses of antimicrobials				Any culture and 4 days of antimicrobials				Blood cultures and 2 doses of antimicrobials				Blood cultures and 4 days of antimicrobials			
Ward	**n/N[a]**	**/1000d[b]**	**CIF[c]**	**Mortality (%)**	**n/N**	**/1000d**	**CIF**	**Mortality (%)**	**n/N**	**/1000d**	**CIF**	**Mortality (%)**	**n/N**	**/1000d**	**CIF**	**Mortality (%)**
Haematology	156/2379	9.5	0.061	12.2	152/2387	9.1	0.061	9.9	159/2410	9.6	0.063	11.3	153/2416	9.1	0.060	9.2
Transplant	71/902	8.6	0.078	8.5	73/956	8.0	0.075	8.2	63/981	6.6	0.064	11.1	63/983	6.5	0.063	9.5
Neurosurgery	70/3393	4.3	0.018	2.9	67/3399	4.1	0.017	1.5	42/3455	2.4	0.011	7.1	39/3457	2.3	0.010	5.1
Thoracic surgery	47/2151	3.7	0.013	2.1	39/2171	3.0	0.010	2.6	25/2180	1.9	0.006	4.0	21/2190	1.6	0.005	4.8
Oncology	66/5540	2.6	0.012	15.2	61/5553	2.4	0.011	16.4	59/5604	2.2	0.011	13.6	57/5616	2.2	0.010	14.0
Surgery	217/22563	2.4	0.009	7.4	213/22608	2.3	0.009	7.5	177/22825	1.9	0.007	9.0	170/22861	1.8	0.007	8.2
Internal medicine	324/32456	2.0	0.009	17.3	314/32670	2.0	0.009	17.5	253/33315	1.5	0.007	18.6	243/33477	1.5	0.007	18.5
Urology	23/4013	1.7	0.006	13.0	21/4013	1.5	0.005	14.3	20/4075	1.4	0.005	15.0	18/4078	1.3	0.004	16.7
Geriatrics	75/4315	1.5	0.017	28.0	73/4340	1.5	0.016	27.4	54/4494	1.0	0.011	31.5	52/4503	1.0	0.011	30.8
Orthopaedics	23/5254	0.9	0.004	4.3	24/5310	0.9	0.005	4.2	18/5359	0.7	0.003	5.6	17/5367	0.6	0.003	5.9
All wards[d,e]	1106/82653	2.6	0.013	12.7	1071/82653	2.5	0.013	12.5	899/82653	2.0	0.011	14.0	860/82653	1.9	0.010	13.4

[a] Number of hospital-onset sepsis episodes/number of hospital admissions. Note that the denominator changes in the same ward depending on definition of suspected infection. This is due to the fact that alterations in definition of suspected infection also affects the number of community-onset sepsis episodes. In the study, only the first sepsis episode is recorded.

[b] Hospital-onset sepsis episodes per 1000 patient days at risk.

[c] Cumulative incidence function (CIF) at day 30 accounting for competing risks: ICU-admission, discharge or death. CIF-curves using the Sepsis-3 clinical criteria are presented in Figure 1

[d] The number of hospital-onset sepsis episodes/number of hospital admissions are not the exact sum of all cases above. This is due to the fact that some sepsis cases, which fulfilled the definition of hospital-onset sepsis, had not yet been assigned a specific hospital ward at onset of sepsis, and that it was possible for single hospital admissions to be counted in the denominator of more than one ward.

[e] Effect on number of sepsis episodes and in-hospital mortality depending on different definitions of *suspected infection* are showed for both hospital-onset and community-onset sepsis in Figure 3**.**

Supplementary Figure 1. Illustration of how Sequential Organ Failure Assessment (SOFA) score was calculated in the algorithm

A DATA INPUT FROM ELECTRONIC HEALTH RECORDS

SOFA	ICD CODE DEFAULT	BASELINE	TIME 0	TIME 1	TIME 2	TIME 3	TIME 4	TIME 5
RESPIRATION	2	2	1	1	1	1	1	1
CARDIOVASCULAR	-	0	1	0	0	0	0	0
CNS	-	0	0	0	0	0	0	0
COAGULATION	-	1	0	0	0	0	0	2
LIVER	-	3	1	1	1	1	3	1
RENAL	0	2	1	1	3	4	2	1
TOTAL	2	8	4	3	5	6	6	5

B TRANSFORMATION OF DATA INPUT TO FIT SEPSIS CRITERIA

SOFA	ICD CODE DEFAULT	BASELINE	TIME 0	TIME 1	TIME 2	TIME 3	TIME 4	TIME 5
RESPIRATION	2	2	2	2	2	2	2	2
CARDIOVASCULAR	-	0	1	1	1	1	1	1
CNS	-	0	0	0	0	0	0	0
COAGULATION	-	1	0	0	0	0	0	2
LIVER	-	3	1	1	1	1	3	3
RENAL	0	2	1	1	3	4	4	4
TOTAL	2	8	5	5	7	8	10*	12

* Sepsis criteria fulfilled

The example illustrates a mock-up patient. Figure A shows an example of how data input could be collected from the electronic health record. Figure B shows an example of how data input was transformed to calculate a maximum total SOFA score. SOFA score was calculated during two time periods, at baseline and during a time window beginning 48 hours (h) before until 24 h after onset of infection. The baseline SOFA score was defined as the latest value measured before the 72-h time window, and was assumed to be 0 in patients not known to have pre-existing organ dysfunction. For SOFA respiration, SOFA coagulation, SOFA liver and SOFA renal, measurements during the last 3 months were used to calculate the baseline SOFA. For SOFA cardiovascular and SOFA central nervous system (CNS) only measurements during the current hospitalization were used to calculate the baseline SOFA. To be able to calculate maximum SOFA score during the infection time window, worst values were carried forward and missing values were assumed to be 0. Pre-defined ICD-codes for SOFA respiratory and SOFA renal score during the previous year resulted in a default value.

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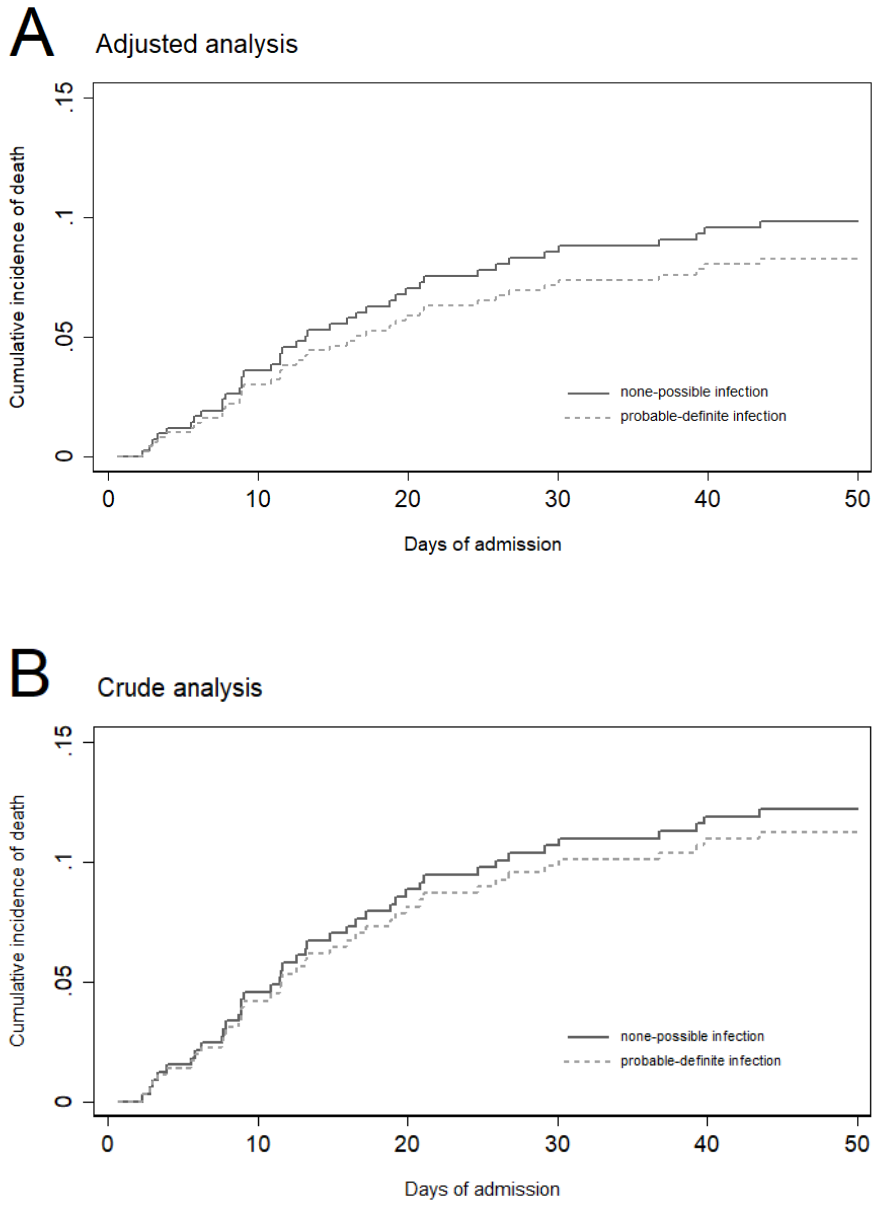
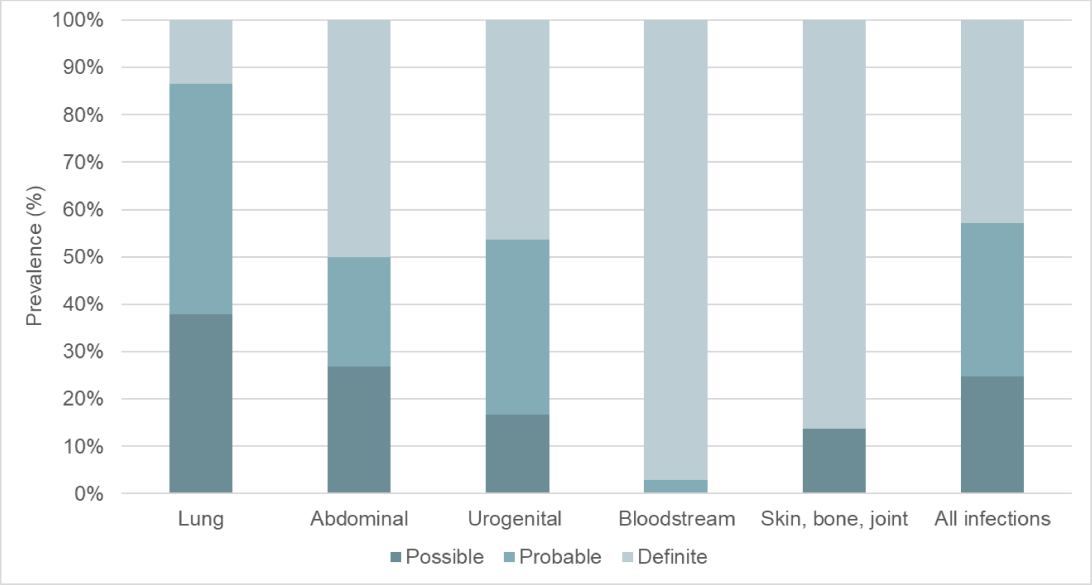
Supplementary Figure 2. Cumulative incidence of death in sepsis cases stratified by likelihood of infection



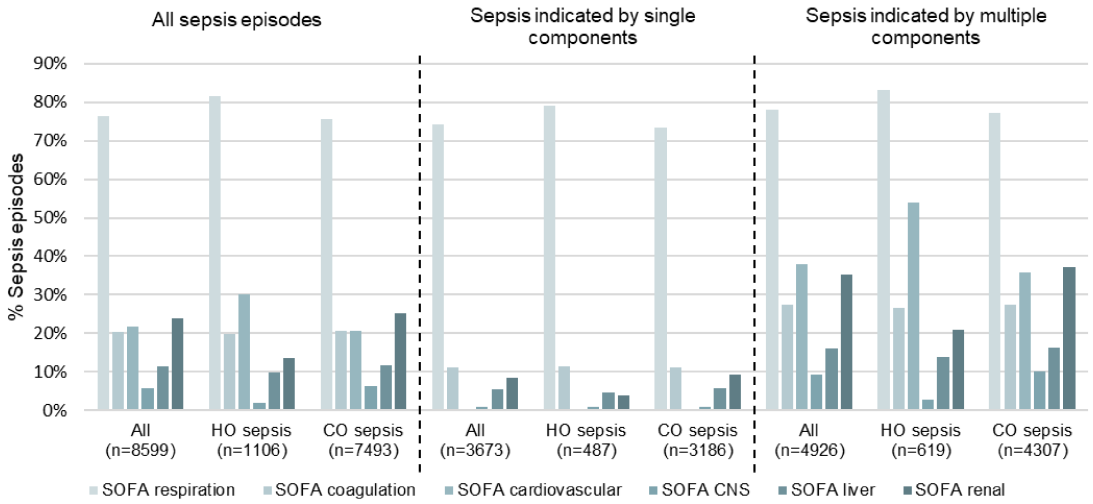
Cumulative incidence function (CIF) of death with discharge as competing risk and stratified by likelihood of infection (n=340 sepsis episodes from patients with suspected infection). Subjects were censored at day 50 (n=12). Figure A shows CIF adjusted for age, Charlson comorbidity index and community-/hospital-onset sepsis. Figure B shows the unadjusted CIF. In the adjusted model the CIF curves did not differ significantly (p=0.515).

Supplementary Figure 3. Likelihood of infection in patients fulfilling Sepsis-3 clinical criteria divided by source of infection



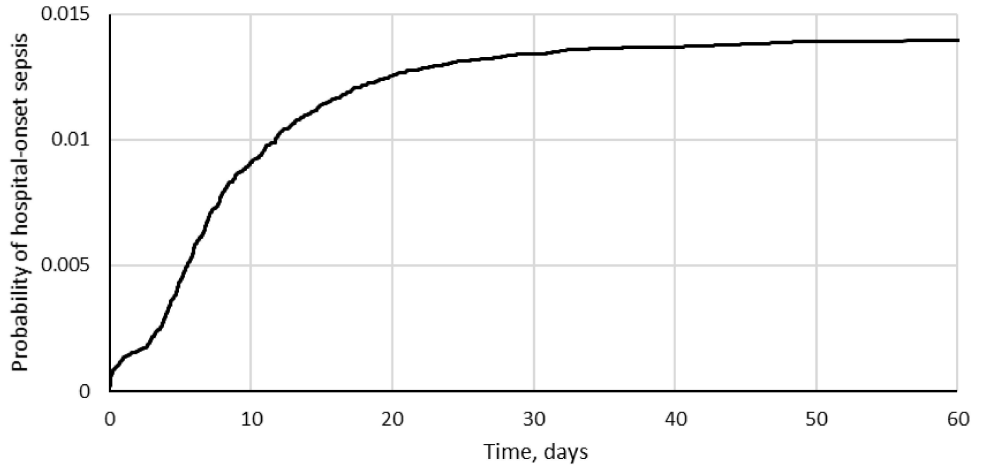
Likelihood of infection in patients fulfilling Sepsis-3 criteria in non-intensive care wards, judged by physician review of medical records. Only patients meeting the definitions for possible, probable and definite infection are presented (n=313/343). Likelihood of infection is divided by the most common sources of infection: lung (pneumonia, lung abscess/empyema, lower respiratory tract infections and upper respiratory tract infections), abdominal (peritonitis, biliary tract, intra-abdominal infection/abscess, pancreatic and gastrointestinal), urogenital (urinary tract infection and reproductive organs), bloodstream (primary bloodstream infection, vascular device infection and endocarditis), skin and bone infections (superficial skin infections, cellulitis, wound infection, bone and joint infection) and all infectious sources combined.

Supplementary Figure 4. Distribution of Sequential Organ Failure Assessment (SOFA) score triggers



The percentage of sepsis episodes where each of the SOFA score components contributed to the sepsis classification are shown for all sepsis episodes (left), those where a single component was responsible for the sepsis classification (centre) and those where multiple components were responsible for the classification (right). Abbreviations: Hospital-onset (HO) and community-onset (CO).

Supplementary Figure 5. Cumulative incidence function curve of hospital-onset sepsis in all wards



N at risk	78236	10423	2819	1021	433	227	133
N sepsis (after)	1096	384	114	47	25	8	5

Supplementary Figure 6. Table of p-values for pairwise significance testing of differences in cumulative incidence function between wards

	Haematology	Transplant	Neuro-surgery	Thoracic surgery	Oncology	Surgery	Internal medicine	Urology	Geriatrics	Orthopaedics
Haematology		0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Transplant			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Neuro-surgery				0.08	0.01	<0.01	<0.01	<0.01	0.68	<0.01
Thoracic surgery					0.61	0.03	0.03	<0.01	0.16	<0.01
Oncology						0.08	0.09	<0.01	0.04	<0.01
Surgery							0.83	0.02	<0.01	<0.01
Internal medicine								0.02	<0.01	<0.01
Urology									<0.01	0.36
Geriatrics										<0.01
Orthopaedics										

p-value <0.05

p-value >0.05

Supplementary Figure 7. Monthly sepsis incidence surveillance in the whole hospital and selected wards

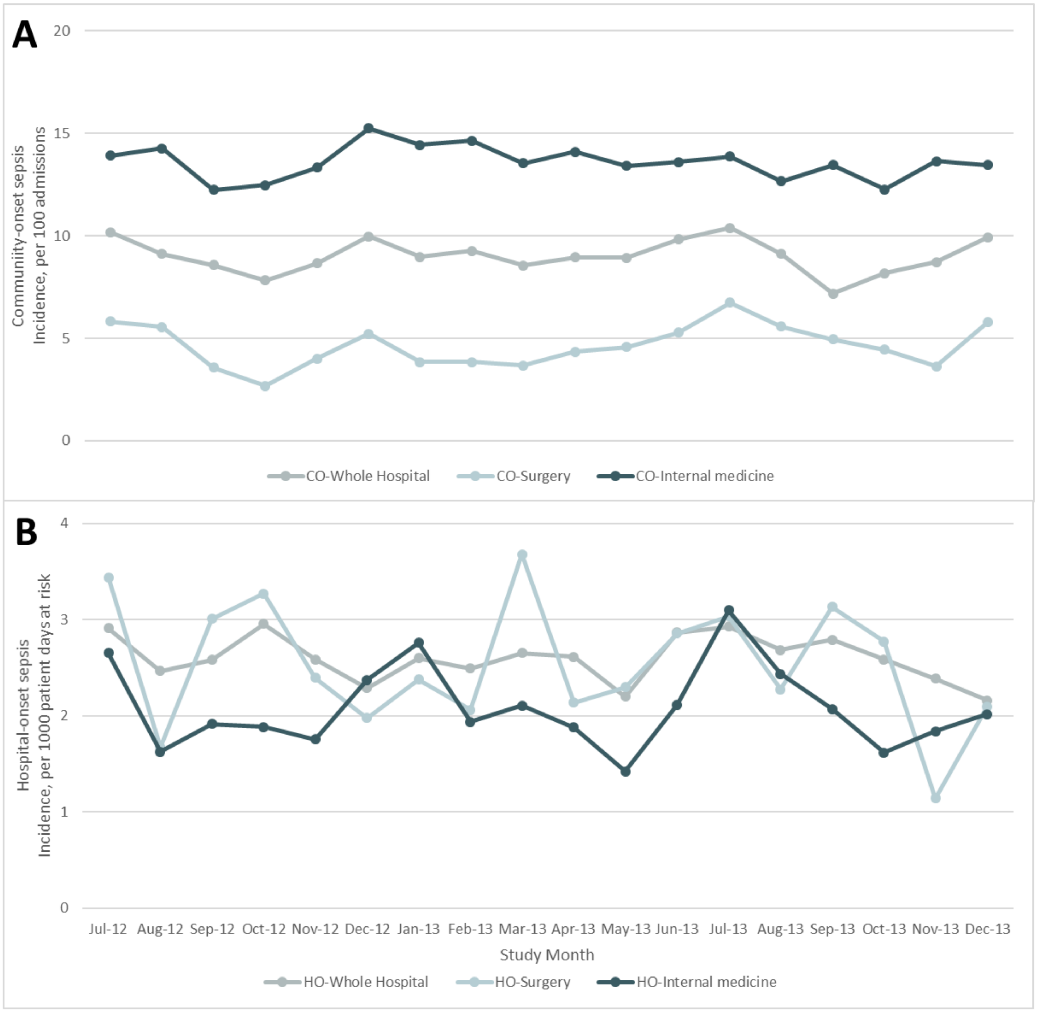


Illustration of changes in community-onset sepsis incidence (A) and hospital-onset sepsis incidence (B) during the study period. Community-onset sepsis incidence is presented per 100 admissions. Hospital-onset sepsis incidence is presented per 1000 patient days at risk. Monitoring curves are displayed for the whole hospital, surgical wards and internal medicine wards. Abbreviations: Community-onset (CO) and hospital-onset (HO).

Supplementary References

1. 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.
2. Centers for Disease Control and Prevention. Hospital Toolkit for Adult Sepsis Surveillance. 2018.https://www.cdc.gov/sepsis/clinicaltools/index.html (accessed 10 Jul 2019).
3. Aakre C, Franco PM, Ferreyra M, *et al.* Prospective validation of a near real-time EHR-integrated automated SOFA score calculator. *Int J Med Inform* 2017;103:1–6.
4. Pandharipande PP, Shintani AK, Hagerman HE, et al. Derivation and validation of Spo2/Fio2 ratio to impute for Pao2/Fio2 ratio in the respiratory component of the Sequential Organ Failure Assessment score. *Crit Care Med*. 2009;37(4):1317-1321.