

SEPSIS



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TRUST

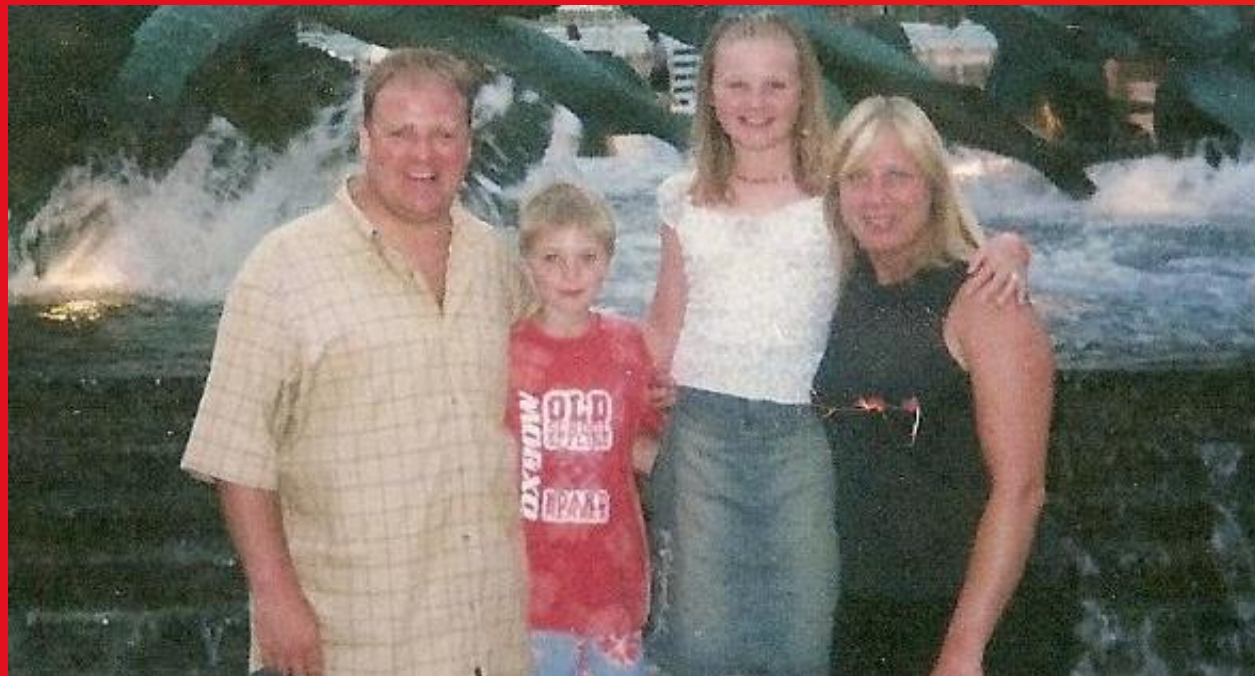
MAKING SENSE OF IT ALL

APRIL 18



@SepsisUK

Dr Ron Daniels B.E.M.
CEO, UK Sepsis Trust
CEO, Global Sepsis Alliance
Special Adviser to WHO



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SCALE AND BURDEN



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Special Adviser (maternal sepsis) to WHO

Breast cancer

Bowel cancer

Annual UK sepsis deaths



HOSPITAL EPISODE STATISTICS (HES)



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Publications & records | Sepsis:Written question - 10526

Government office region	2010-11	2011-12	2012-13	2013-14	2014-15
Total	91,881	101,015	114,285	122,822	141,772

‘Head counts’

Based on what is written in medical notes

Likely to capture only c. 40% of episodes

(NCEPOD ‘Just say Sepsis’ 2015, Rhee et al AJRCCM 2017)

'DEFINITE' SEPSIS CODES

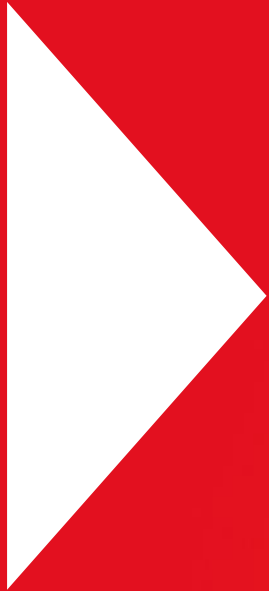


A41.0	Sepsis due to <i>Staphylococcus aureus</i>
A41.5	Sepsis due to other gram-negative organisms
A41.9	Sepsis, unspecified organism
R65.2	Severe sepsis or septic shock
P36.9	Bacterial sepsis of newborn
R65.2	Severe sepsis or septic shock
O85	Puerperal sepsis

'DEFINITE' SEPSIS CODES

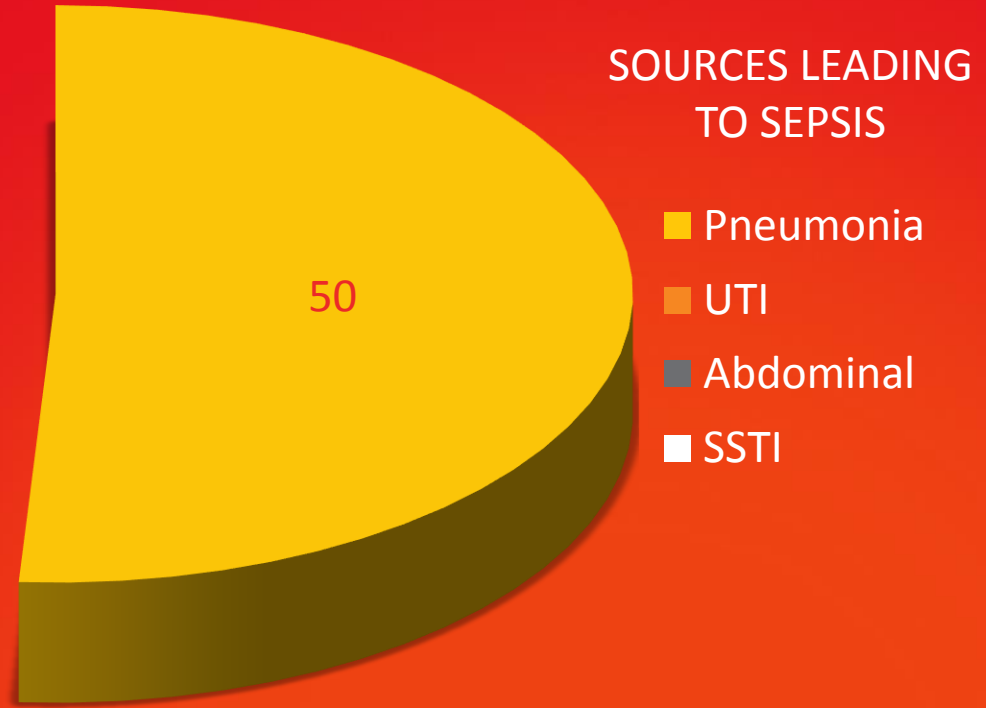
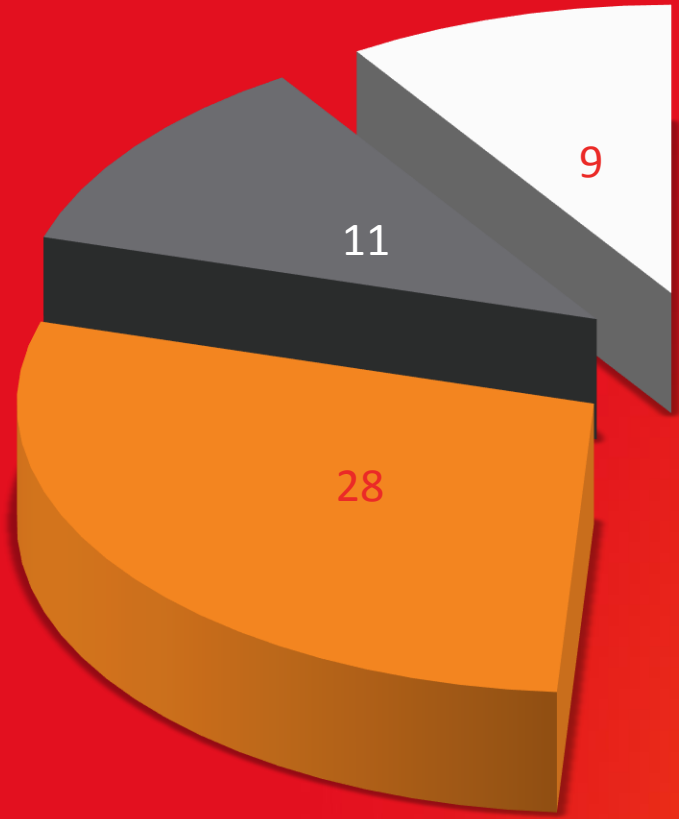


A41.0
A41.5
A41.9
R65.2
P36.9
R65.2
O85



200,000 cases (HES data 2017)

WHAT ELSE MIGHT BE SEPSIS?



'MIGHT BE' SEPSIS CODES

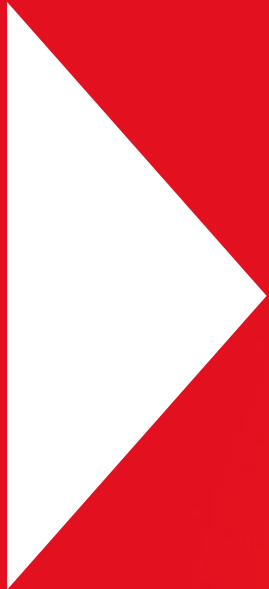


J18.0	Broncho <p>pneumonia</p> , unspecified organism
J18.1	Lobar <p>pneumonia</p> , unspecified organism
J18.9	<p>Pneumonia</p> , unspecified organism
K65.0	Generalised <p>peritonitis</p>
L03.9	<p>Cellulitis</p> , unspecified
L03.1	<p>Cellulitis</p> of limb
N39.0	<p>Urinary tract infection</p>

'MIGHT BE' SEPSIS CODES



J18.0
J18.1
J18.9
K65.0
L03.9
L03.1
N39.0



1,700,000 cases (HES data 2017)

Open Forum Infectious Diseases

MAJOR ARTICLE



Sepsis Incidence: A Population-Based Study

Lisa Mellhammar,¹ Sven Wullt,¹ Åsa Lindberg,² Peter Lanbeck,¹ Bertil Christensson,¹ and Adam Linder¹

¹Department of Clinical Sciences, Division of Infection Medicine, University of Lund, Sweden; ²Hallands Hospital Halmstad, Sweden

Background. Although sepsis is a major health problem, data on sepsis epidemiology are scarce. The aim of this study was to assess the incidence of sepsis, based on clinical findings in all adult patients treated with intravenous antibiotic in all parts of all hospitals in an entire population.

Methods. This is a retrospective chart review of patients ≥ 18 years, living in 2 regions in Sweden, who were started on an intravenous antibiotic therapy on 4 dates, evenly distributed over the year of 2015. The main outcome was the incidence of sepsis with organ dysfunction. The mean population ≥ 18 years at 2015 in the regions was 1 275 753. Five hundred sixty-three patients living in the regions were started on intravenous antibiotic treatment on the dates of the survey. Patients who had ongoing intravenous antibiotic therapy preceding the inclusion dates were excluded, if sepsis was already present.

Results. Four hundred eighty-two patients were included in the study; 339 had a diagnosed infection, of those, 96 had severe sepsis according to the 1991/2001 sepsis definitions, and 109 had sepsis according to the sepsis-3. This is equivalent to an annual incidence of traditional severe sepsis of 687/100 000 persons (95% confidence interval [CI], 549–824) or according to the sepsis-3 definition of 780/100 000 persons (95% CI, 633–926). Seventy-four patients had sepsis according to both definitions.

Conclusions. The incidence of sepsis with organ dysfunction is higher than most previous estimates independent of definition. The inclusion of all inpatients started on intravenous antibiotic treatment of sepsis in a population makes an accurate assessment of sepsis incidence possible.

Keywords. incidence; qSOFA; sepsis; SIRS.

Depending on the increase in guideline compliance- by 10%, 20% or 30%- the annual direct NHS savings range between £83 million, £166 million and £249 million

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WHAT DO WE KNOW?



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Special Adviser (maternal sepsis) to WHO

SEPSIS is a life-threatening condition that arises when the body's response to an infection injures its own tissues and organs.

SEPSIS NOMENCLATURE 2018



A worsening in 'SOFA' score of 2 points

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SCREENING PROMPTS

‘Quick-SOFA’, proposed by International Task Force

Based on retrospective analysis of data

>2 criteria carry higher predictive risk of death or ITU admission

Respiratory rate of 22/min or greater

Altered mentation (glasgow coma scale of less than 15)

Systolic blood pressure of 100 mm hg or less

qSOFA CRASHES & BURNS??

PulmCrit – Bad news for sepsis-3.0: qSOFA fails validation

October 1, 2016 by Josh Farkas — 9 Comments

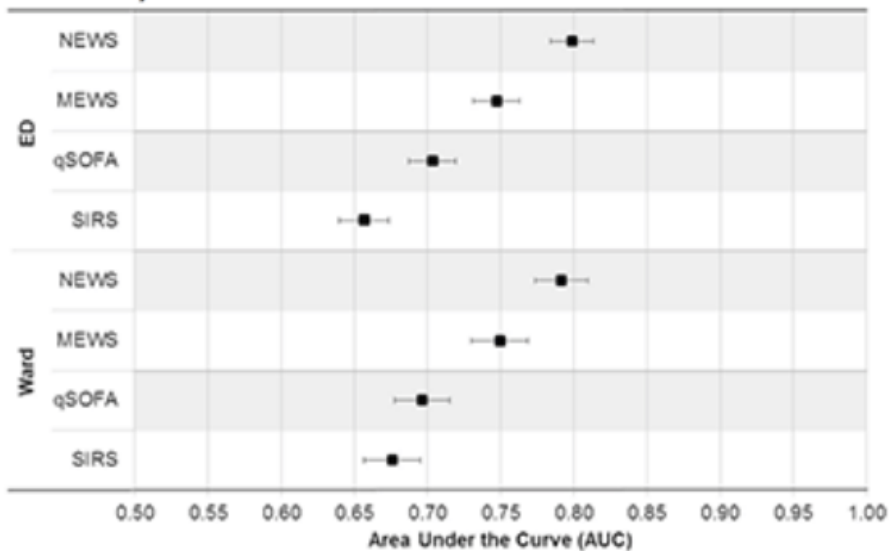


Sepsis 3.0 replaced the SIRS criteria with a new risk-stratification tool, qSOFA. qSOFA was initially developed *within* the Sepsis-3 publication itself. Until now, qSOFA has never been validated. The value of qSOFA vs. SIRS remains controversial.

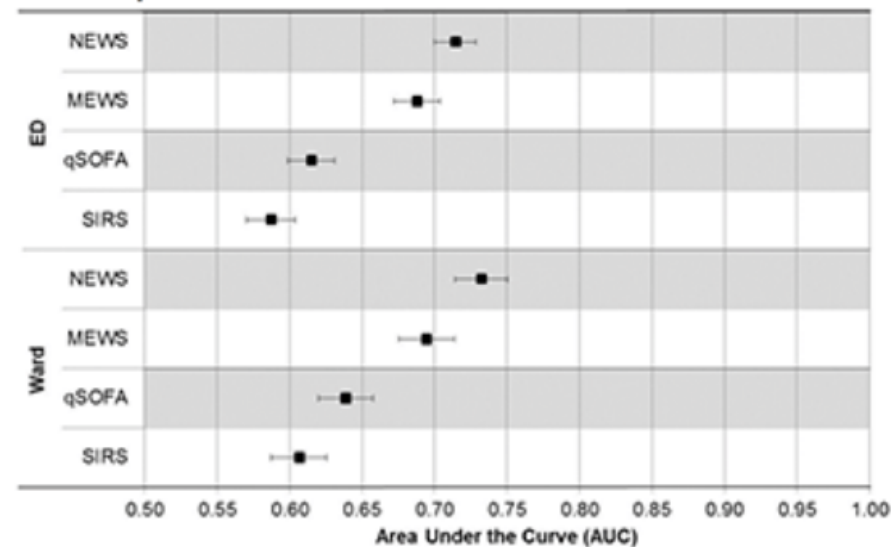
Churpek 2016: qSOFA, SIRS, and early warning scores for detecting clinical deterioration in infected patients outside the ICU.

Overall test performance

Mortality outcome



Mortality or ICU admission



NEWS-2

Second version, created by Royal College of Physicians

Appears at least as predictive as q-SOFA in identifying patients with infection at risk of deterioration

NHS recommends ‘Think Sepsis’ if total NEWS-2 is 5 or above

NEWS key										FULL NAME																																							
0 1 2 3										DATE OF BIRTH										DATE OF ADMISSION																													
										DATE TIME										DATE TIME																													
A+B Respirations Breaths/min										≥25										3										≥25																			
										21–24										2										21–24																			
										18–20																				18–20																			
										15–17																				15–17																			
										12–14																				12–14																			
										9–11										1										9–11																			
										≤8										3										≤8																			
A+B SpO ₂ Scale 1 Oxygen saturation (%)										≥96																				≥96																			
										94–95										1										94–95																			
										92–93										2										92–93																			
										≤91										3										≤91																			
SpO₂ Scale 2* Oxygen saturation (%) Use Scale 2 if target range is 88–92%, eg in hypercapnic respiratory failure *ONLY use Scale 2 under the direction of a qualified clinician										≥97 on O ₂										3										≥97 on O ₂																			
										95–96 on O ₂										2										95–96 on O ₂																			
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										86–87										1										86–87																			
										84–85										2										84–85																			
										≤83%										3										≤83%																			
										Air or oxygen?										A=Air																				A=Air									
																				O ₂ L/min										2										O ₂ L/min									
C Blood pressure mmHg Score uses systolic BP only										≥220										3										≥220																			
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										≤30										≤30																													
D Consciousness Score for NEWS onset of confusion (no score if chronic)										Alert																				Alert																			
										Confusion																				Confusion																			
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										≤35.0*										3										≤35.0*																			
NEWS TOTAL																														TOTAL																			
Monitoring frequency																														Monitoring																			
Escalation of care Y/N																														Escalation																			
Initials																														Initials																			

NEWS & SEPSIS n=21,000

NEWS	Age	Mortality %
4+	68	20
6+	69	23
8+	71	29

NEWS & SEPSIS n=21,000

NEWS	Age	Mortality %
4+	68	20
6+	69	23
8+	71	29
4+ and lactate <2		15.9
4+ and lactate 2-4		21
4+ and lactate >4		32.5

NEWS & SEPSIS n=21,000

NEWS	%	Mortality %
4+ and lactate <2		15.9
4+ and lactate 2-4		21
4+ and lactate >4		32.5
5+	100	21
5+ and Red Flag	81.7	23
5+ no Red Flag	18.3	13

RISK FACTORS

- Extremes of age (<1, >75)

- Recent surgery, procedure or injury (within 6 weeks)

- Immunosuppressed/ taking immunosuppressant drugs
including e.g. diabetes, steroid use, asplenic

- Women who are pregnant (or have recently been)

Particularly after procedures, if have gestational diabetes, prolonged rupture of membranes, contact with GAS

- Neonates

Particularly if Mum has infection, history of/ current GBS, prolonged rupture of membranes

Most organisations recommend staff
Think Sepsis in any patient with **EITHER** a
NEWS2 score of 5 or higher **OR** a qSOFA
score of 2 or higher **AS WELL AS** in
patients with any **risk factors**

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TREATMENT PROMPTS



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General Practice Sepsis Decision Support Tool

To be applied to all non-pregnant adults & young people 12 years and over with fever (or recent fever) symptoms
N.B. there is no systems substitute for clinical experience & acumen, but Red Flag Sepsis will help with early identification of adults & older children with systemic response to infection



1. In the context of presumed infection, are any of the following true:

(common sources: chest, UTI, abdominal organs)

- Tick
- ☐ Patient looks very unwell
 - ☐ Family or carer is very concerned
 - ☐ There is ongoing deterioration
 - ☐ Physiology is abnormal for this patient

N

Low risk of sepsis. Consider other diagnoses.
Use clinical judgement and/or standard protocols.

Give safety netting advice: call 999 if patient deteriorates rapidly, or call 111 / arrange to see GP if condition fails to improve or gradually worsens. Signpost to available resources as appropriate.

N

3. Is any ONE Amber Flag present?

- Tick
- ☐ Relatives worried about mental state/ behaviour
 - ☐ Acute deterioration in functional ability
 - ☐ Immunosuppressed (without recent chemotherapy)
 - ☐ Trauma, surgery or procedure in last 6 weeks
 - ☐ Respiratory rate 21-24 OR dyspnoeic
 - ☐ Systolic B.P 91-100 mmHg
 - ☐ Heart rate 91-130 OR new dysrhythmia
 - ☐ Not passed urine in last 12-18 hours
 - ☐ Tympanic temperature $\leq 36^{\circ}\text{C}$
 - ☐ Clinical signs of wound, device or skin infection

If under 18 & immunity impaired treat as Red Flag Sepsis

Y

Sepsis likely

Use clinical judgment to determine whether patient can be managed in community setting. If treating in the community, consider:

- planned second assessment +/- blood results
- brief written handover to colleagues
- specific safety netting advice

2. Is ONE Red Flag present?

- Tick
- ☐ New deterioration in GCS/ AVPU
 - ☐ Systolic B.P ≤ 90 mmHg (or ≥ 40 mmHg below normal)
 - ☐ Heart rate ≥ 130 per minute
 - ☐ Respiratory rate ≥ 25 per minute
 - ☐ Needs oxygen to keep SpO_2 92% (88% in COPD)
 - ☐ Non-blanching rash or mottled/ ashen/ cyanotic
 - ☐ Not passed urine in last 18 hours
 - ☐ Urine output less than 0.5 ml/kg/hr if catheterised
 - ☐ Recent chemotherapy (within last 6 weeks)

N

Y

Red Flag Sepsis!

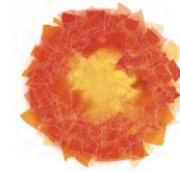
Immediate actions:

- Dial 999
- Arrange blue light transfer
- Administer oxygen to maintain saturations $> 94\%$

Communication:

- Write a brief clear handover including observations and antibiotic allergies where present
- Ensure Paramedics pre-alert as 'Red Flag Sepsis'

General Practice Sepsis Decision Support Tool



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To be applied to all non-pregnant adults & young people 12 years and over with fever (or recent fever) symptoms

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☐

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☐

There is ongoing deterioration

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Physiology is abnormal for this patient

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3. Is any ONE Amber Flag present?

Tick

2. Is **ONE** Red Flag present?

New deterioration in GCS/ AVPU

Tick

☐

Systolic B.P ≤ 90 mmHg (or ≥ 40 mmHg below normal)

☐

Heart rate ≥ 130 per minute

☐

Respiratory rate ≥ 25 per minute

☐

Needs oxygen to keep SpO_2 92% (88% in COPD)

☐

Non-blanching rash or mottled/ ashen/ cyanotic

☐

Not passed urine in last 18 hours

☐

Urine output less than 0.5 ml/kg/hr if catheterised

☐

Recent chemotherapy (within last 6 weeks)

☐

N

Y

Red Flag Sepsis!

Immediate actions:

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Write a brief clear handover including observations and antibiotic allergies where present

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Relatives worried about mental state/ behaviour

Tick
☐

Acute deterioration in functional ability

☐

Immunosuppressed (without recent chemotherapy)

☐

Trauma, surgery or procedure in last 6 weeks

☐

Respiratory rate 21-24 OR dyspnoeic

☐

Systolic B.P 91-100 mmHg

☐

Heart rate 91-130 OR new dysrhythmia

☐

Not passed urine in last 12-18 hours

☐

Tympanic temperature $\leq 36^{\circ}\text{C}$

☐

Clinical signs of wound, device or skin infection

☐

*If under 18 & immunity impaired treat
as Red Flag Sepsis*



Sepsis likely

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- brief written handover to colleagues
- specific safety netting advice

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INTERVENTIONS



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Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016

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THE SEPSIS SIX

1. Give O2 to keep SATS above 94%
2. Take blood cultures
3. Give IV antibiotics
4. Give a fluid challenge
5. Measure lactate
6. Measure urine output

JUST ASK
"COULD IT BE SEPSIS?"
IT'S A SIMPLE QUESTION, BUT IT COULD SAVE A LIFE.

Your logo

Sepsis Six Pathway



To be applied to all adults and young people over 12 years of age with suspected or confirmed Red Flag Sepsis

Make a treatment escalation plan and decide on CPR status
Inform Consultant (*use SBAR*) patient has **Red Flag Sepsis**

Time zero

Consultant informed? (tick)

☐

Initials



Action (complete ALL within 1 hour)

Time complete

Initials

Reason not done/variance

1. Administer oxygen

Aim to keep saturations > 94%
(88-92% if at risk of CO₂ retention e.g. COPD)

2. Take blood cultures

At least a peripheral set. Consider e.g. CSF, urine, sputum
Think source control! Call surgeon/ radiologist if needed
CXR and urinalysis for all adults

3. Give IV antibiotics

According to Trust protocol
Consider allergies prior to administration

4. Give IV fluids

If hypotensive/ lactate $>2\text{mmol/l}$, 500 ml stat. May be repeated if clinically indicated- do not exceed 30ml/kg

5. Check serial lactates

Corroborate high VBG lactate with arterial sample

If lactate $>4\text{mmol/l}$, call Critical Care and recheck after each 10ml/kg challenge

6. Measure urine output

May require urinary catheter

Ensure fluid balance chart commenced & completed hourly

Not applicable- initial lactate <2 ☐

If after delivering the Sepsis Six, patient still has:

- systolic BP <90 mmHg
- reduced level of consciousness despite resuscitation
- respiratory rate over 25 breaths per minute
- lactate not reducing

or if patient is clearly critically ill at any time

Space available for local short antimicrobial guideline/ escalation policy

OUTCOMES

	COHORT SIZE (%)	MORTALITY (%)	'RRR' (%)
Total	567 (100)	34.7	-
No Sepsis Six	347 (61.2)	44.0	
Sepsis Six	220 (38.8)	20.0	46.6 (4.16)

SEPSIS

IN CHILDREN



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Special Adviser (maternal sepsis) to WHO

G.P. Paediatric Sepsis Decision Support Tool



To be applied to all children **under 5 years** who have a suspected infection
or have clinical observations outside normal limits

I. In the context of presumed infection, are any of the following true:

(consider pneumonia, meningitis/encephalitis, urinary tract infection, intra-abdominal infection, acquired bacteraemia (e.g. Group B Strep))

Tick

Patient looks very unwell

☐

Parent or carer is very concerned

☐

There is ongoing deterioration

☐

Physiology is abnormal for this patient

☐

Low risk of sepsis. Consider other diagnoses.

Use clinical judgment and/or standard protocols.

2. Is **ONE** Red Flag present?

Tick

Unresponsive to social cues/ difficult to rouse

☐

Health professional very worried

☐

Weak, high pitched or continuous cry

☐

Grunting respiration or apnoeic episodes

☐

SpO₂ < 90%

☐

Severe tachypnoea (see table)

☐

Severe tachycardia (see table)/ bradycardia < 60

☐

No wet nappies/ not passed urine in last 18 h

☐

Non-blanching rash or mottled/ ashen/ cyanotic

☐

Temperature < 36°C

☐

If under 3 months, temperature > 38°C

☐

2. Is **ONE** Red Flag present?

Unresponsive to social cues/ difficult to rouse

Tick

☐

Age	Tachypnoea		Tachycardia	
	Severe	Moderate	Severe	Moderate
< 1 y	≥ 60	50-59	≥ 160	150-159
1-2 y	≥ 50	40-49	≥ 150	140-149
3-4 y	≥ 40	35-39	≥ 140	130-139

Temperature < 36°C

☐

If under 3 months, temperature > 38°C

☐

SEPSIS



THE UK
SEPSIS
TRUST

FIXING THE SYSTEM



@sepsisuk

Dr Ron Daniels B.E.M.
CEO, UK Sepsis Trust
CEO, Global Sepsis Alliance
Special Adviser (maternal sepsis) to WHO

OUT OF HOURS (OOH)/ TELEPHONE TRIAGE

+

COMMUNITY SERVICES

+

GENERAL PRACTICE

+

PREHOSPITAL CARE/ AMBULANCE SERVICES

+

EMERGENCY MEDICINE AND ACUTE MEDICAL UNITS

+

ACUTE HOSPITAL INPATIENTS

+

LABORATORY SERVICES

+

DENTAL SERVICES

+





Raising awareness of sepsis

Sepsis awareness

Sepsis is a common and potentially life-threatening condition triggered by an infection which causes the body's immune system to go into overdrive, and if not treated quickly, it can lead to multiple organ failure and death. It claims more lives than lung cancer, and is the second biggest killer after cardiovascular disease. There are an estimated 123,000 cases of sepsis per year in England, and around 36,800 associated deaths. In many cases however, sepsis is avoidable and treatable and early identification is key to successfully treating sepsis.

Through the cross-system expert sepsis board, led by NHS England, we have contributed to this cross-system work which led to the publication of an action plan in December 2015 for improving outcomes for patients with sepsis. Our work is supported by external partners



‘The same muscle and effort should be put into sepsis as for meningitis, MRSA and C Diff’



World Health
Organization

EXECUTIVE BOARD
140th session
Provisional agenda item 7.2



Global
Sepsis
Alliance

EB140/12
9 January 2017

Improving the prevention, diagnosis and clinical management of sepsis

Report by the Secretariat

1. Sepsis arises when the body's response to infection injures its own tissues and organs. It can lead to septic shock, multiple organ failure and death, if not recognized early and managed promptly. It is a major cause of maternal and neonatal morbidity and mortality in low- and middle-income countries and affects millions of hospitalized patients in high-income countries, where rates of sepsis are climbing rapidly. The present report summarizes the problem of sepsis as a key issue for global health, describes the Secretariat's actions to address it and briefly outlines priority actions for the future.
2. An international consensus has recently recommended that sepsis should be defined as "life-



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Improving the prevention, diagnosis and clinical management of sepsis

PP3. Recognizing that sepsis as a syndromic response to infection is the final common pathway to death from most infectious diseases worldwide;

lead to septic shock, multiple organ failure and death, if not recognized early and managed promptly. It is a major cause of maternal and neonatal morbidity and mortality in low- and middle-income countries and affects millions of hospitalized patients in high-income countries, where rates of sepsis are climbing rapidly. The present report summarizes the problem of sepsis as a key issue for global health, describes the Secretariat's actions to address it and briefly outlines priority actions for the future.

2. An international consensus has recently recommended that sepsis should be defined as “life-



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Organization



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Urging member states to

Promote public awareness by using the term “sepsis” in communication with the public

Engage in activities to promote sepsis awareness by supporting activities promoting such as including but not restricted to World Sepsis Day

Apply and improve the use of the **International Classification of Diseases** system to establish the prevalence of sepsis

All member states to report to WHO DG by May 2020....






THE UK
SEPSIS
TRUST









IF YOU'RE FEVERISH OR SHIVERING
AND FEELING REALLY UNWELL

NHS

**JUST
ASK
"COULD
IT BE
SEPSIS?"**

IT'S A SIMPLE QUESTION,
BUT IT COULD SAVE LIVES.

SEPSIS IS A LIFE-THREATENING CONDITION.
IT'S HARD TO TELL WHAT IT IS, BUT YOU CAN ASK FOR HELP.
ASKING FOR HELP IS THE FIRST STEP TO GETTING THE RIGHT TREATMENT.
IF YOU OR SOMEONE YOU KNOW IS AT RISK OF SEPSIS, OR IF YOU
ARE CONCERNED ABOUT YOUR OWN OR SOMEONE ELSE'S HEALTH,
PLEASE SUPPORT OUR WORK BY DONATING NOW AT www.sepsistrust.org

SEPSIS TRUST







It is safer to stay on the train than attempting to get off
Follow instructions from staff or emergency services
Do not take any risks

Zone 1 Zone 2 Zone 3 Zone 4 Zone 5

IF YOU'RE GOING DOWNHILL FAST,

JUST ASK "COULD IT BE SEPSIS?"

Sepsis is easily mistaken for a bad stomach bug or flu. 8,000-44,000 a year in the UK. But it's treatable if caught early.

For a symptom checklist, text SEPSIS to XXXXX

www.sepsistrust.org

NHS

THE UK SEPSIS TRUST







SEPSIS



THE UK
SEPSIS
TRUST

TOGETHER WE CAN
SAVE 14,000 LIVES