



# WHAT IS SEPSIS?

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# AIMS AND OBJECTIVES

- **Define sepsis**
  - **Symptoms of Sepsis**
  - **Causes and those at risks**
  - **Outline the Investigations and Treatment**
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# SEPSIS

- Sepsis is now defined as life threatening organ dysfunction caused by a deregulated host response to infection.
- If not recognised early with prompt management, it can lead to septic shock, multiple organ failure and death. (Singer et al 2016)

## Pathology

Pathogen invades the body, Bacteria, fungus, or Virus.

Normal host response to infection is an inflammatory process with an aim to localise and control the Infection.

This inflammatory response is triggered when innate immune cells ie: macrophages recognise an invading pathogen, following binding to the infection site, the immune cells become activated to secrete pro-inflammatory cytokines.

The pro-inflammatory cytokines are responsible for recruiting polymorphonuclear cells to the infection site. Which release the pro-inflammatory cytokines which causes vasodilation and vascular permeability (capillary leak).

The normal host response the pro-inflammatory response is regulated and localised by simultaneous anti-inflammatory responses (Homeostasis).

Sepsis occurs when the normal bodies response exceeds its homeostatic constraint and becomes a generalised process.



# MISSED SIGNS Boy, 1, died days after doctors 'ignored' sepsis signs and told parents 'we're the professionals'

[Holly Christodoulou](#)

12 Dec 2019, 1:18 | Updated: 12 Dec 2019, 1:19

**'HE DIED IN MY ARMS'** Mum's agony as son, 4, dies less than 24 hours after being sent home from hospital despite 'sepsis' symptoms

## 'I WAS FRANTIC' Mum saves baby daughter from sepsis death by storming into doctors after 'eight HOUR' wait for call back

[April Roach](#)

5 Jan 2020, 15:39 | Updated: 6 Jan 2020, 11:49

Patients' lives are being put at risk because of delays giving them treatment for sepsis, experts are warning.

Hospitals are meant to put patients on an antibiotic drip within an hour when sepsis is suspected - but research by BBC News suggests a quarter of patients in England wait longer.

## Sepsis: How good are hospitals at treating 'hidden killer'?

By Nick Triggle  
Health correspondent

© 4 July 2019



# **SEPSIS IN PAEDIATRICS**

**Sepsis is the leading cause of mortality among children worldwide.  
(Kawasaki 2017).**

**1.2 million children suffer from sepsis globally every year. (WHO 2018).**

**In the USA, 72,000 children are hospitalized for sepsis with a 25% mortality rate. (Mathias et al 2016).**

**49% of children that develop sepsis have diagnosed co-morbidities, for example, CLD, Congenital heart disease, Neuromuscular disease.  
( Mathias et al 2016).**

**It has been recognised that more research is needed within the UK surrounding the reporting of sepsis to acknowledge the true burden.**



# SEPSIS SYMPTOMS

There are three stages of sepsis: sepsis, severe sepsis, and septic shock.

## **Sepsis**

Symptoms of sepsis include: a fever above 38°C or a temperature below 36°C

- Increased heart rate
- Increased breathing rate
- probable or confirmed infection

## **Severe sepsis**

Severe sepsis occurs when there's organ failure.

- decreased urination
- changes in mental ability
- problems breathing
- abnormal heart functions
- extreme weakness

## **Septic shock**

Symptoms of septic shock include the symptoms of severe sepsis, plus a very low blood pressure.

# TYPES OF INFECTION/ CAUSES

Any infection can trigger sepsis, but the following types of infections are more likely to cause sepsis:

Pneumonia

Abdominal Infection

Kidney Infection

Bloodstream Infection

**Pathogen invades the body, Bacteria, fungus, or Virus.**

# OBSERVATIONS AND DIAGNOSIS

**Systematic approach: Time line, Risk factors, Time lapse, Physical examination.**

**Full set of observations including blood pressure and capillary refill time (GCS if appropriate).**

**Blood samples, FBC, CRP, U+E's, Glucose, Blood Gas, Clotting, Blood Culture, LACTATE.**

**Urine sample**

**LP (If patient clinically stable).**

**Swabs of any surgical wound site or plastic FB(chest drain, Picc Line, PEG).**

**Senior review.**



# RISK GROUPS

Although some people have a higher risk of infection, anyone can get sepsis.

People who are at risk include :young children and seniors.

people with weaker immune systems, such as those with HIV or those in chemotherapy treatment for cancer

people being treated in an intensive care unit (ICU)

people exposed to invasive devices, such as intravenous catheters or breathing tubes



# UK SEPSIS SCREENING TOOL. (SEPSIS TRUST 2015).

**YOUR LOGO**

**Inpatient Paediatric Sepsis Screening & Action Tool**

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

**THE UK SEPSIS TRUST**

Staff member completing form:  
 Date (DDMMYY):  
 Name (print):  
 Designation:  
 Signature:

1. Has PEWS triggered?  
 OR is child feverish or looking sick?  
 OR is parent/carer very worried?

2. Could this be an infection?  
 Yes, but source unclear at present  
 Pneumonia/ likely chest source  
 Meningitis/ encephalitis  
 Urinary Tract Infection  
 Abdominal pain, drawing legs up, or distension  
 Acquired bacteraemia (e.g. Group B strep)  
 Other (specify):

3. Is ONE Red Flag present?  
 Unresponsive to social cues/ difficult to rouse  
 Health professional very worried  
 Weak, high pitched or continuous cry  
 Grunting respiration or apnoeic episodes  
 SpO<sub>2</sub> < 90%/ new need for oxygen  
 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  
 Capillary lactate > 2mmol/l

4. Any Amber Flag criteria?  
 Abnormal response to social cues/ not smiling  
 Reduced activity, very sleepy, or abnormal behaviour  
 Moderate tachypnoea (see table)  
 SpO<sub>2</sub> < 91% OR nasal flaring  
 Moderate tachycardia (see table)  
 Capillary refill ≥ 3 seconds  
 Reduced urine output (< 1mL/kg if catheterised)  
 Pale or flushed  
 Leg pain or cold extremities  
 Immunocompromised

Send bloods if 2 criteria present, consider #1  
 Lactate, blood cultures, FBC, U&Es, CRP (tag)  
 Immediate call to Paeds/EM ST4+  
 For review within 1hr

Time clinician attended

Is lactate > 2? (mmol/l) YES NO

Reassess hourly, clinician to make antibiotic decision within 3h

Discharge at discretion of senior  
 With appropriate safety netting?

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

**Red Flag Sepsis!!**  
 Start Sepsis 6 pathway NOW

Sepsis Six and Red Flag Sepsis are copyright to and intellectual property of the UK Sepsis Trust, registered charity no. 1158843. [sepsistrust.org](http://sepsistrust.org)

**YOUR LOGO**

**Paediatric Sepsis Six Pathway**

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

**THE UK SEPSIS TRUST**

Inform Consultant Paediatrician and PICU.  
 Consider transfer to paediatric centre. State patient has Red Flag Sepsis

Time zero  
 Consultant/ paed unit informed? (tick) Initials

Action (complete ALL within 1 hour)

1. Give high flow oxygen  
 Unless contraindicated

2. Obtain IV/IO access, take bloods  
 Blood cultures, blood glucose, lactate, FBC, U&Es  
 Lumbar puncture if indicated clinically

3. Give IV/IO antibiotics  
 According to Trust protocol- basic guideline below  
 Consider allergies prior to administration

4. Consider IV/IO fluids  
 If hypotensive/lactate < 2mmol/l, up to 20ml/kg (10ml/kg in neonates)  
 If lactate > 4mmol/l also call PICU  
 Beware fluid overload! Examine for hepatomegaly, creps, gallop

5. Ensure senior doctor attends  
 Senior Fellow or Consultant

6. Consider inotropic support  
 If normal physiology is not restored after ≥ 20ml/kg fluid (10ml/kg in neonates). Consider PICU admission.  
 Dopamine or epinephrine agents of choice, may be given via PVC/IO

Reason not done/variance

If after delivering the Sepsis Six, child still has:  
 - Reduced consciousness despite resuscitation  
 - Severe tachycardia or tachypnoea  
 - Lactate remains over 2 mmol/l after 1 hour.  
 Or is clearly critically ill at any time  
 Then call Consultant Paediatrician immediately!!

Space available for local short antimicrobial guideline/ escalation policy

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# RECOVERY

**Recovery depends on severity of your condition and any pre-existing conditions you might have.**

**Many people who survive will recover completely, however some will report lasting effects.**

**The UK Sepsis Trust says it can take up to 18months before survivors start to feel like their normal self.**



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# **SUMMARY**

**Sepsis is the leading cause of Mortality in children worldwide.**

**Early recognition and management is crucial for improving outcomes..**

**Systematic approach and senior review is paramount.**

**Screening tools and procedures shall be changing in a hospital near you!.**

**Thank you**

**Any Questions?**

