Microbe of the month

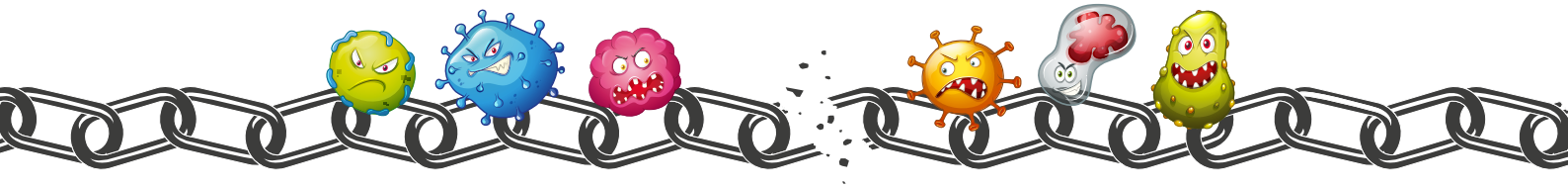
Breaking The Chain of Infection

Cutimed®

FEBRUARY 2021

Newsletter

Compiled by Helen Loudon IPC Consultant



Featured this month:

SEPSIS

Every 3 seconds, someone dies from sepsis!

Hello readers!

Sepsis is the body's extreme response to an infection. It is a life-threatening medical emergency. Sepsis happens when an infection you already have triggers an immune-mediated chain reaction throughout your body. Without timely treatment, sepsis rapidly leads to tissue damage, organ failure, and death. Almost any type of infection can lead to sepsis. Infections that lead to sepsis most often start in the lung, urinary tract, skin, or gastrointestinal tract. Sepsis cannot be spread to other people. However, sepsis can be a result of an infection, and therefore, some infections can be spread to others. Most sepsis is caused by bacterial infections – however, it can also be a result of other infections, including viral infections, such as COVID-19 or influenza. The term 'sepsis' is derived from the Greek word '***sepo***' which means 'I rot'; and had its first use in the medical context in Homer's poems, and in the writings of Hippocrates, a physician and philosopher, around 400 BC.

'Sepsis' is a preventable and devastating condition resulting from **a dysregulated host response to infection which leads to organ failure and death.** *'Septic shock'* is a subset of sepsis with circulatory and cellular/metabolic dysfunction associated with a higher risk of mortality.

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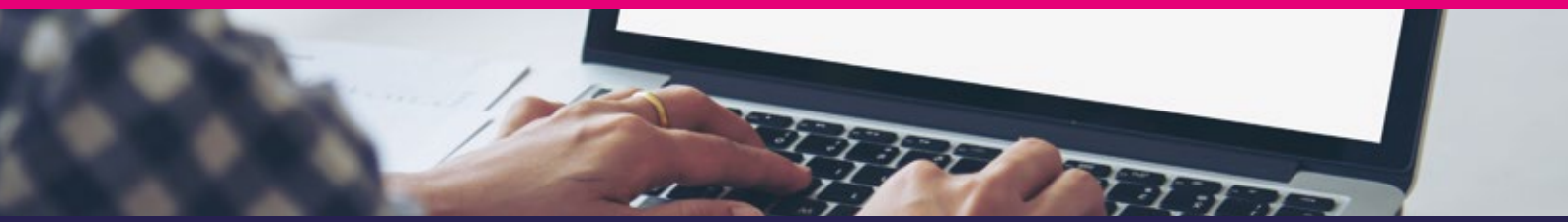

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YouTube

WHO IS AT RISK OF DEVELOPING SEPSIS?

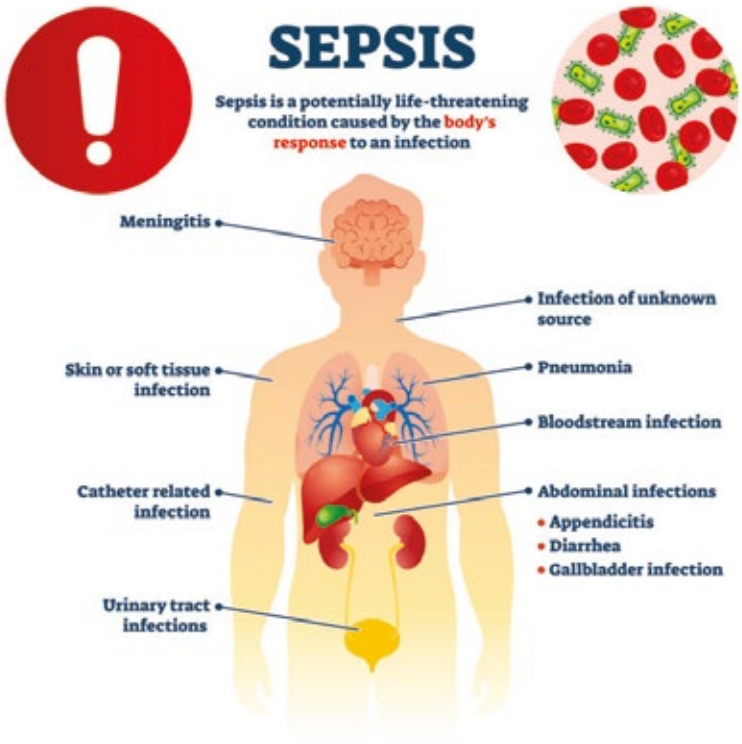
- adults 65 years and older
- pregnant or recently pregnant women
- neonates
- hospitalised patients
- patients in intensive care units
- people with HIV/AIDS
- people with liver cirrhosis
- people with cancer
- people with kidney disease
- people with autoimmune diseases
- people with diabetes mellitus
- people with no spleen

Unsurprisingly, the burden of sepsis, both in incidence and mortality, is found in low and middle-income countries [2,3,6,8]. Neonatal sepsis can cause up to half a million newborn deaths every year, and maternal sepsis accounts for about one in ten maternal deaths. Sepsis also frequently results from avoidable infections acquired in healthcare settings, one of the most frequent adverse events during healthcare delivery.[2,3,8]

Did You Know?

Sepsis resulting from surgical procedures accounts for 30% of all sepsis in healthcare.[3]

Global estimates of the burden of sepsis cases and deaths worldwide are hampered by the scarcity of data available - especially from low and middle-income countries (especially sub-Saharan Africa), which makes it difficult to estimate the true burden of sepsis.[8]



The Global Sepsis Alliance (GSA) is dedicated to reducing the impact of sepsis on the health of children and adults and coordinates national and international efforts against sepsis.

The first **World Sepsis Day** (as well as the first 'World Sepsis Declaration') was commemorated in 2012. At the time, it was surprising to note that there were no sepsis related statistics on the websites of national public health entities, and sepsis did not feature in the **Global Burden of Disease (GBD) Report**.

The GBD is a comprehensive regional and global research programme which assesses mortality and disability from major diseases, injuries, and risk factors, and is a collaboration of over 3600 researchers from 145 countries.

SIGNS AND SYMPTOMS OF SEPSIS

S	Shivering, feeling very cold, fever
E	Generalised body pain, which may be severe
P	Pale or discoloured skin
S	Sleepiness and/or mental confusion
I	'I feel like I may die'
S	Shortness of breath

Increased awareness, reporting, and improved infection prevention standards should be prioritised to prevent sepsis in the first place!

THE 'GOLDEN HOUR' AND THE SEPSIS TREATMENT BUNDLE [4,5]

The concept of the 'Golden Hour' is well established - the window of opportunity when effective and concerted interventions are more likely to alter the trajectory of the disease, save lives, and reduce subsequent disability.

Extensive evidence demonstrates substantially improved patient outcomes if sepsis and septic shock are recognised and treated within no more than one hour for septic shock and up to three hours for sepsis, respectively. **Each hour of delay in the delivery of the 'sepsis treatment bundle' is associated with an 8% increase in mortality**.

Since its inception in 2002, the **Surviving Sepsis Campaign** has sought to improve the quality of sepsis care, improve survival for patients with sepsis, and increase awareness of sepsis to those working in the healthcare sector as well as the public. Directed by experts in critical care medicine from both the Society of Critical Care Medicine (SCCM) and the European Society of Intensive Care Medicine, **a revised bundle was published in 2018**.

The **'Hour-One Bundle'** [4,5] includes **5 steps** which should be begun immediately upon presentation in all patients with clinical elements suspicious for sepsis or septic shock:

1. Measure serum lactate level (repeat lactate if initial lactate is elevated >2mmol/L).
2. Obtain blood cultures before administering antibiotics.
3. Administer broad-spectrum antibiotics.
4. Begin rapid administration of 30ml/kg crystalloid for hypotension or lactate 4mmol/L.
5. Apply vasopressors if the patient remains hypotensive during or after fluid resuscitation to maintain a mean arterial pressure ≥ 65mm Hg.

In children, the observed effect of sepsis bundle delivery within one hour resulted in a 41% relative mortality risk reduction! [5]

SEPSIS AND ANTIMICROBIAL STEWARDSHIP

Timely and appropriate antimicrobial therapy represents the cornerstone of effective sepsis management; and at the same time, meets a key requirement for antimicrobial stewardship.

However, sepsis is also a major driver of broad-spectrum antibiotic use and therefore contributes to the emerging global threat of **antimicrobial resistance (AMR)**. In turn, AMR negatively affects individuals with sepsis by decreasing the effectiveness of available antimicrobial therapy.

The **'Surviving Sepsis Campaign'** recommends initiating treatment with broad-spectrum antibiotics covering the most likely pathogens, followed by narrowing to targeted therapy if a pathogen or source is identified; and stopping antimicrobial therapy altogether, if bacterial or fungal infection is not likely to be the cause. Failure to initiate appropriate empiric therapy in patients with sepsis and septic shock is associated with a substantial increase in morbidity and mortality.

The choice of empiric antimicrobial therapy depends on complex issues related to the patient's history, clinical status, and local epidemiologic factors.

Key patient factors include the nature of the clinical syndrome or site of infection, concomitant underlying diseases, chronic organ disease and medication, invasive devices, the presence of immunosuppression, recently known infection or colonisation with specific pathogens, and receiving antimicrobials within the previous three months.

In addition, the patient's location at the time of infection acquisition (i.e., community, chronic care institution or acute care hospital), local pathogen prevalence, and the susceptibility patterns of common local pathogens must be factored into the choice of therapy.

Potential drug intolerances and toxicity must also be considered.

The principles of prudent antibiotic prescribing[1]

Right Antibiotic
- What organisms could be infecting this patient?
- What risk factors for resistance does this patient have?
- Does this antibiotic penetrate to the site of infection?

Right Patient
- Does this patient have a true infection vs colonisation?

Right Time
- Did we obtain cultures prior to initiating antibiotics?
- Was this patient administered antibiotics within an hour?

Right Route
- Is this patient a candidate for oral treatment?

Least Harm
- Are we choosing the most narrow spectrum antibiotic?
- Are we choosing the minimum duration of treatment?
- Are we choosing the antibiotic with the least amount of side efects?

The most common pathogens implicated in septic shock are both Gram-negative and Gram-positive bacteria, or even mixed bacterial microorganisms. ***Unfortunately, many of these opportunistic bacterial infections occur in patients hospitalised for COVID-19 as a secondary complication of corticosteroid and broad-spectrum antibiotic therapy.***

Patients who develop a healthcare-associated infection (HAI) are more prone to sepsis with methicillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant Enterococci (VRE). Neutropenic patients are especially vulnerable to antibiotic resistant Pseudomonas, Klebsiella or Acinetobacter sp., E. coli and fungal Candida species.

Other risk factors for invasive Candida infections include immunocompromised status (e.g., HIV, cytotoxic chemotherapy, organ transplantation, diabetes mellitus, chronic liver and renal failure), prolonged use of invasive vascular devices such as haemodialysis and central venous catheters, necrotising pancreatitis, recent major surgery (particularly abdominal), prolonged administration of broad-spectrum antibiotics, extended hospital/ICU admission, recent fungal infection, and multisite colonisation with Candida species.

Scan QR code to watch this informative video (3 mins) from WHO on the prevention of sepsis.

World Health Organization

Although it is estimated that more than 80% of cases originate in the community, the **2020 WHO Global Report on the Epidemiology and Burden of Sepsis** indicates that little is known about the incidence, mortality, attributable length of hospital stay, and microbiological profile of healthcare-associated sepsis (HA-sepsis).

The published evidence (mainly from high income countries) on the epidemiology of HA-sepsis found that **1 in 4 cases of sepsis were acquired in the hospital**, increasing to **1 in 2 cases in ICUs** for sepsis with organ dysfunction. ICU-acquired sepsis was associated with a higher risk of mortality (40.5%), and **at least 1 in 3 cases of HA-sepsis was caused by drug-resistant bacteria**.

Furthermore, many 'sepsis survivors' experience significant consequences such as impaired quality of life (e.g., organ failure and amputation), depression and anxiety, poor cognitive function and shortened life expectancy.

Sepsis FACTS

Sepsis arises when the body's response to an infection injures its own tissues and organs. It may lead to shock, multi-organ failure, and death – especially if not recognized early and treated promptly. Sepsis is the final common pathway to death from most infectious diseases worldwide, including viruses such as SARS-CoV-2.

47 - 50 million cases per year[1]

At least **11 million** deaths per year[2]

1 in 5 deaths worldwide is associated with **sepsis**[3]

Sepsis is the number 1

- Cause of death in hospitals[4]
- Cause for hospital readmissions[5]
- Healthcare cost[6]

(e.g. $62 billion is spent on sepsis healthcare costs in the US alone)

Up to **50%** of sepsis survivors suffer from long-term physical and/or psychological effects[7]

40% of cases are children **under 5**[8]

80% of sepsis cases occur **outside** of a hospital[9]

SEPSIS is always caused by an **infection** like pneumonia or diarrheal illness[10]

SEPSIS is a medical **emergency** - if you or someone you know shows signs of sepsis, seek medical care immediately. Every hour counts.[11]

These signs may indicate sepsis:

Slurred Speech or Confusion

Extreme Shivering or Muscle Pain /Fever

Passing No Urine All Day

Severe Breathlessness

It Feels Like You're Going to Die

Skin Mottled or Discolored

September 13

You can help #StopSepsis and #SaveLives

Get involved at worldsepsisday.org

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Last updated: November 2020

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Tel: +27 (0)31 710 8111

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- No known mechanism of resistance has been described

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