

# SEPSIS & CLOSTRIDIoidES DIFFICILE (C.DIFF)



## WHAT IS SEPSIS?

Sepsis is a potentially life-threatening condition and should be treated as a medical emergency. It can develop from bacteria or a virus. The immune system's reaction to an infection can cause injury to body tissues that are not near the original infection site. At 11.7 million adults in the U.S. develop sepsis and at least 350,000 adults who develop sepsis die during their hospitalization or are discharged to hospice. Because MRSA and staph are so prevalent, many MRSA patients are at risk for sepsis and also for developing C. difficile. One in three patients who dies in a hospital had sepsis during their hospitalization.

## WHO IS AT RISK?

Adults who are 65 years old or older. People with weakened immune systems, chronic medical conditions such as diabetes, lung disease, cancer and kidney disease. Patients who recently had a severe illness or hospitalization, who survives sepsis and children younger than one year of age are at risk. Early and aggressive treatment increases the patient's chances of survival and close monitoring is required. Recovery from mild sepsis is common, but mortality rates are approximately 15% and mortality rate for severe sepsis or septic shock is approximately 50%. For MRSA patients the mortality rate is 20 - 50%.



Other terms that have been used besides sepsis are; bacteremia, septicemia and blood poisoning. It is important that sepsis be identified by the pathogen and treated as soon as possible, and ideally within the first hour of symptoms occurring. Sepsis that is not detected can affect organ function and lead to septic shock and dangerous drops in blood pressure.

Many patients who have MRSA infections can become septic while waiting for their clinical cultures to return from the lab to identify the pathogen (rapid testing is crucial for diagnosis) after admitted to the hospital. Prescribing IV antibiotics that react well to MRSA is imperative along with fluids. For this reason, it is strongly recommended that rapid DNA PCR testing for MRSA (screening) be used by hospitals and labs to detect the correct organism or pathogen.

Most sepsis cases occur in patients within the hospital and in the intensive care unit (ICU). Risk factors are age, race (black), compromised immune system, hospitalization with invasive medical devices (i.e. breathing tubes, urinary catheter, artificial joints), pneumonia, diabetes and severe injuries. Infections and sepsis can develop after the patient is home from surgery and patients must call their surgeon right away and go to the emergency room. Using rapid testing will save lives and reduce the effects and damage caused by sepsis.

## SYMPTOMS



Fever & sweating



Heart rate faster than 90 beats per minute



Fast respiratory rate



Edema (swelling)



Probable or confirmed infection



Altered mental state (disorientated/coma)

## SEVERE SEPSIS

Severe sepsis has occurred if one of the following categories is exhibited and indicates organ dysfunction:

- Difficulty in breathing
- Abnormal heart function
- Rapid change in mental status
- Difficulty in breathing
- Abnormal heart function
- Rapid change in mental status

## SEPSIS SHOCK

Severe sepsis can turn into septic shock, which includes the above-mentioned severe sepsis symptoms besides extremely low blood pressure.

## DETECTION

Sepsis diagnosis can be difficult to detect. Symptoms and signs can be from various disorders. Doctors may order the following tests to determine the underlying infection.

- Blood tests
- Urine Tests
- Imaging Scans - x-rays, CT, MRI or ultrasound

## COMPLICATIONS

As sepsis increases and worsens, blood flow to vital organs (heart, kidneys, brain, etc.) decreases and can cause blood clots to form in organs and in the extremities. This can lead to varying degrees of organ failure and tissue death (gangrene).

## TREATMENT

Antibiotics by IV are given immediately along with fluids and possibly vasopressors or other medications to modify the immune system and maintain stable sugar levels. A machine for breathing, dialysis or surgery to remove sources of infection can also be implemented.

## RESEARCH

New research in the U.S. and in Europe are working on new compounds that may have a better effect for patients and help to hinder the infection reaching vital organs.

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LINK TO CDC CONSUMER BROCHURE [https://www.cdc.gov/sepsis/pdfs/consumer\\_infographic\\_-four-ways-to-get-ahead-of-sepsis-p.pdf](https://www.cdc.gov/sepsis/pdfs/consumer_infographic_four-ways-to-get-ahead-of-sepsis-p.pdf)

## WHAT IS C.DIFF?

Clostridioides difficile, also known as C. difficile or C. diff is a gram-positive bacterium that can cause a range of symptoms such as diarrhea, abdominal cramping and tenderness and fever. C. diff affects older adults in healthcare facilities, but healthy people and those who have not been in a healthcare facility or taken antibiotics can be affected also and at any age.

Many healthcare facilities are seeing C. diff infection rates rising and are more difficult to treat. The infection rate for C. diff continues to rise as does the rate of most MDRO's – multi drug resistant organisms. Many MRSA patients also contract C. diff because of their heavy use of antibiotics, which strips the natural flora from the intestines. When healthcare facilities get serious about controlling MRSA and staph infections, then also you will see a big reduction in C. diff infections. Many MRSA patients struggle with their infection and then contract C. diff and do not survive from the second infection.

In the U.S., C. diff has caused as many as many as 500,000 infections every year. 3 in 10 people who get C. diff will have a recurring infection. 8 in 10 people who have a recurring infection were hospitalized within 12 months.



## SYMPTOMS

Some people with C. diff never become sick from it, but they can help to spread the infection. C. diff infections usually occur during or right after a course of antibiotics has been taken. It may take weeks or months for symptoms or signs of infection to occur. When patients have a mild infection from C. diff, they may get better when they stop taking antibiotics, but patients with more severe symptoms require treatment with another antibiotic.



### SYMPTOMS FOR MILD TO MODERATE CASES ARE:



Mild abdominal cramping and tenderness



Watery diarrhea several times a day and lasting two or more days

## SYMPTOMS FOR SEVERE CASES IN THE COLON CAUSING IT TO BECOME INFLAMED (COLITIS) ARE:



Fever



Abdominal cramping and pain,  
can be severe



Watery diarrhea 10 -15 times a day



Blood or pus in the stool



Nausea



Dehydration



Loss of appetite



Weight loss

See your doctor if your symptoms last for several days.

## PREVENTION

To help prevent the spread of C .diff in healthcare facilities, healthcare workers must follow strict infection control guidelines. Patients, patient advocates or caregivers must insist that no healthcare worker (this includes doctors) touch a patient without first washing their hands and then donning gloves. All equipment such as stethoscopes, blood pressure cuffs, etc. should be wiped down before being used. The following preventative measures must be followed:

- Hand Hygiene (hand washing) Use of soap and warm water or alcohol-based sanitizers. Healthcare workers and patient visitors must wash their hands.
- Contact precautions – patients are put in a private room and healthcare workers and patient visitors must don gloves and gowns before entering the room.

- Decontaminating of surfaces – All surfaces and equipment must be carefully cleaned with a hospital-grade disinfectant.
- Prudent use of antibiotics – Doctors must be good stewards of antibiotics and not prescribe them to patients with viruses, even though the patient may insist. Doctors must explain to the patient why the prudent use of antibiotics is better for the patient and helps to stop antimicrobial resistance. Antibiotics should be prescribed with a narrow range and for the shortest time possible.

## TRANSMISSION

C. diff can be found in the environment – in air, soil, water and human and animal feces. C. diff is mostly found in healthcare facilities, where more people are carriers of the bacteria.

Your intestines have millions of bacteria in it and many protect your body from infection. When you take antibiotics to treat an infection, the antibiotic can destroy the normal and helpful bacteria causing an infection. C. diff can rapidly go out of control and the antibiotics that most often cause a C. diff infection are; clindamycin, penicillin, cephalosporins and fluoroquinolones.

C. diff can produce toxins that attack the lining of the intestines and the toxins destroy cells and produce patches of inflammatory cells in the colon.



## TESTING

Patients who are suspected of having C. diff may have one or more of the following tests.

- Stool tests – Toxins can be usually detected in a stool sample and some hospitals have rapid testing available.
- Colon Exam – an exam of your colon may be needed to look for areas of inflammation
- Imaging Testing – a CT scan may show a thickening of the wall of your colon.

## COMPLICATIONS

C. diff complications are:

Severe diarrhea can lead to loss of fluids and it makes the body hard to function normally and may cause blood pressure to drop dramatically to low levels. In some cases, kidney function may deteriorate and cause kidney failure. Bowel perforation may occur in the large intestines and dump bacteria from the colon into your abdominal cavity and cause a major infection. Even in mild to moderate C. diff cases, infections can spread quickly if not treated in a timely fashion.



# RESEARCH

## **Microbiome**

What is the microbiome? Gut microbiome or gut flora are the microorganisms that live in the digestive tract. The balance of these organisms can occur during and after the use of antibiotics causing a C. diff infection.

The U.S. Dept. of Health and Human Services are working with companies on research to develop better treatments and therapies to improve better outcomes for patients. A better understanding is needed of how antibiotics effect the microbiome. The microbiome can be disrupted and become unbalanced from antibiotics and cause a C. diff infection.

## **Fecal Transfer**

Recurring C. diff infections are a serious medical condition and can be life threatening. One therapy that is being used is fecal transfer. Fecal transfer is a procedure that takes healthy bacteria from the feces of a screened donor and transfers it to the colon of the recipient patient. The procedure is performed through a colonoscopy or by an upper endoscopy.

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CDC FACT SHEET FILE

<https://www.cdc.gov/cdiff/pdf/Cdiff-Factsheet-P.pdf>