



**Global Alliance for Infections in Surgery**

**Let's be careful of  
*Clostridium difficile***

**ACT NOW**

## ***Clostridium difficile* infection**

In the last two decades, the dramatic increase in incidence and severity of *Clostridium difficile* infection (CDI) in many countries worldwide, has made CDI a global public health challenge. CDI may be a particular concern in surgical patients, as surgery may predispose patients to CDI and surgery itself needs to treat severe cases of CDI. Optimization of CDI management in the peri-operative setting, has become increasingly necessary to decrease the cost, morbidity and mortality that may result from CDI.

*C. difficile* is an anaerobic, spore forming Gram-positive bacillus, which may form part of the normal intestinal microbiota in healthy newborns but which is rarely present in the gut of healthy adults. The organism is spread via the oral-fecal route and in hospitalized patients may be acquired through the ingestion of spores or vegetative bacteria spread to patients by healthcare personnel or from the environment. Since CDI is a toxin mediated infection, toxins negative *C. difficile* strains are non-pathogenic.

Risk factors for CDI may be divided into three general categories: host factors (immune status, co-morbidities), exposure to *C. difficile* spores (hospitalizations, community sources, long-term care facilities) and factors that disrupt normal colonic microbiome (antibiotics, other medications, surgery). Risk factors have included, age more than 65 years, comorbidity or underlying conditions, inflammatory bowel diseases, immunodeficiency (including human immunodeficiency virus infection), malnutrition, and low serum albumin level. Patients with inflammatory bowel disease are at increased risk of developing CDI, they may have worse outcomes, including higher rates of colectomy, and they experience higher rates of recurrence.

It is well known that antibiotics play a central role in the pathogenesis of CDI, presumably by disruption of the normal gut flora, thereby providing a perfect setting for *C. difficile* to proliferate and produce toxin. Although nearly all antibiotics have been associated with CDI, clindamycin, third-generation cephalosporins, penicillins and fluoroquinolones have traditionally been considered at greatest risk. A controversial risk factor is related to the exposure to gastric acid-suppressive medications, such as histamine-2 blockers and proton pump inhibitors (PPIs). Recent studies have suggested the association between use of stomach acid-suppressive medications, primarily PPIs, and CDI.

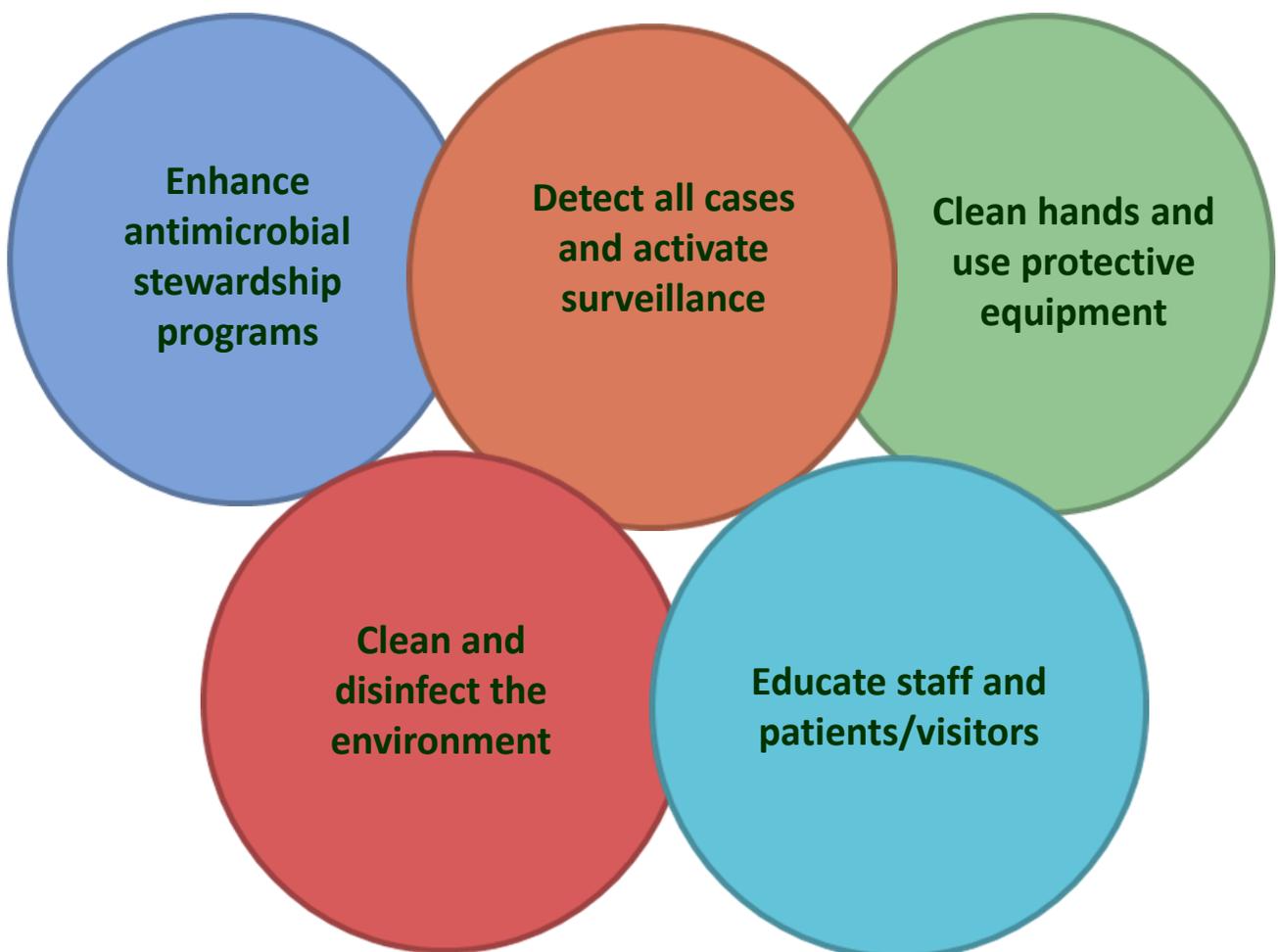
The spectrum of symptomatic CDI ranges from mild diarrhea to severe disease or fulminant colitis and as many as 30% of patients may develop recurrent CDI. Diarrhea is the hallmark symptom, however, patients may not present with initial symptoms of diarrhea due to colonic dysmotility either from previous underlying conditions or possibly from the disease process itself. Diarrhea may in fact be absent. This is especially important in surgical patients who may have a concomitant ileus. Therefore it is important to have a high index of suspicion. Diarrhea usually may be accompanied by abdominal pain and cramps and if prolonged may result in altered electrolyte balance and dehydration.

Severe forms of the disease are associated with increased abdominal cramping and pain and signs of systemic inflammation, such as fever, leukocytosis, and hypoalbuminemia. Diarrhea may be absent in some patients with CDI. Sometimes, it may signal the progression of the infection to its fulminant form. The progression to fulminant *C. difficile* colitis is quite infrequent (1%–3% of all CDI); however, mortality in this group of patients remains high due to the development of toxic megacolon and colonic perforation, peritonitis and septic shock, and subsequent organ dysfunction. Prompt and precise diagnosis is an important aspect of effective management of CDI. Early identification of CDI allows early treatment and can potentially improve outcomes. Rapid isolation of infected patients is important in controlling the transmission of *C. difficile*.

This is particularly important in reducing environmental contamination as spores can survive for months in the environment, despite regular use of environmental cleaning agents. Contact (enteric) precautions patients with CDI should be maintained until the resolution of diarrhea, which is demonstrated by passage of formed stool for at least 48 hours. Patients with known or suspected CDI should ideally be placed in a private room with ensuite hand washing and toilet facilities. If a private room is not available, as often occurs, known CDI patients may be cohort nursed in the same area though the theoretical risk of transfection with different strains exists.

Hand hygiene with soap and water and the use of contact precautions along with good cleaning and disinfection of the environment and patient equipment, should be used by all health-care workers contacting any patient with known or suspected CDI. Hand hygiene is a cornerstone of prevention of nosocomial infections, including *C. difficile*. Alcohol-based hand sanitizers are highly effective against non-spore-forming organisms, but they may not kill *C. difficile* spores or remove *C. difficile* from the hands. The most effective way to remove them from hands is through hand washing with soap and water.

## **A proposal for a bundle for the prevention of *Clostridium difficile* infection**



***Clostridium difficile***  
**infection**

