

***Clostridium Difficile* Infection (CDI) in the UK**

What is CDI?

Clostridium difficile infection (formerly known as *Clostridium difficile* associated disease or CDAD) is recognised as one of the most important, and avoidable healthcare-associated infections.

Clostridium difficile Infection (CDI) is a recurring and preventable bacterial infection caused by the bacterium *Clostridium difficile* (*C. diff*).¹ CDI usually affects patients whose immune systems are compromised, making the elderly and already ill most vulnerable, and can result in a range of serious symptoms, including diarrhoea.² In the most severe cases CDI is associated with considerable mortality.³

CDI has surpassed MRSA as a leading cause of healthcare-associated infection in the UK, and has serious implications for both patients and healthcare systems across the UK.^{4,5,6,7,8,9}

How does CDI occur & who is at risk?

C. diff bacteria are naturally present in the gut of up to 3% of healthy adults, usually without any problems.¹⁰ An alteration in the balance of bacteria in the gut can reduce the number of 'good' bacteria, allowing *C. diff* to multiply and grow to unusually high levels.^{10,11} Once this overgrowth occurs, spores (seeds) from the bacteria are passed out in the faeces. These spores can live outside the human body for weeks, or even months, can be passed from person-to-person, and infect anyone who touches a contaminated surface and then transfers the spores to their mouth.¹¹ CDI is highly infectious, and once an outbreak starts, can be spread rapidly throughout the hospital environment.¹⁰

Predominantly caused by the use of broad-spectrum antibiotics and/or prolonged use of antibiotics, CDI threatens the most vulnerable including those patients with a prolonged length of stay in hospital such as cancer patients receiving chemotherapy, and those receiving other high-risk interventions such as repeated enemas, prolonged nasogastric tube insertion, and gastric surgery.^{1,10,12}

CDI risk factors¹¹

- Use of broad-spectrum antibiotics
- Prolonged use of antibiotics
- Elderly (> age 65)
- Severe underlying illness
- Use of proton pump inhibitors (medicines used for heartburn)

What is the impact & burden of CDI in the UK?

In the UK, serious outbreaks of the disease occurred in 2007/8¹³ which led to the uptake of various infection control measures.¹⁴ Despite annual declines in recent years following this, the infection remains an important public health matter, an indicator of hospital performance,¹⁵ and a challenge

for policy makers and government to ensure everything is being done to minimise the patient and healthcare system costs associated with CDI.

Number of cases

Between April 2013 and March 2014 16,947 cases of CDI were recorded in the UK^{16,17,18,19} and in 2012, CDI contributed to almost 1,900 deaths.^{14,20,21} Following significant public health efforts to combat CDI, the reported incidence of infections in hospitals has been decreasing, however the rate varies across the UK (see figure 1.)^{17,22}

Figure 1. Variation in *Clostridium difficile* rates across the UK, 2013

Rate per 100,000 population (ave)	
England	22.9 ²²
Northern Ireland	28.8 ²²
Scotland	35.0 ¹⁷
Wales	25.4 ²²

Burden and cost to the NHS

CDI remains a huge priority across the whole of the UK due to the impact on patients and the cost to the health service. CDI often results in extended hospitalisation with an extra 2.8 - 21.3 days compared to patients without CDI.^{9,23} Recurrence of the infection is also a major challenge in CDI treatment, with studies reporting that patients who have already had one recurrence have a 45% risk of a further episode.²⁴

It is estimated that each initial episode of CDI adds at least an additional £10,000 to the NHS²⁵ through increased length of inpatient stay and treatment costs, with recurrences adding significantly more to this estimate.²⁶ CDI also has significant associated mortality rates through infection recurrence (9-38% mortality within 30 days²⁷ and in excess of 40% at 180 days).²⁸

Treatment and management

Until the launch of fidaxomicin, a first-in-class, narrow-spectrum (targeted) antibiotic developed specifically for the treatment of CDI in 2012, treatment had changed little in the past 20 years.²⁹

Prior to fidaxomicin, the standard of care for CDI was a 10-day treatment regimen with antibacterial agents vancomycin or metronidazole, depending on the severity of the disease. However, these broad-spectrum antibiotics neglect to address the growing issue of recurrent CDI, and destroy both the *C. difficile* bacteria, and the 'good' bacteria present in the gut.^{30,31,32}

The challenges of treating CDI have also grown in recent years with the expansion of resistance to traditional broad-spectrum therapies.^{33,34} These challenges are only expected to increase in the coming years.

Guidance from Public Health England recommends fidaxomicin as an initial treatment option for severe cases of CDI in patients at high risk of recurrence and as the preferred treatment for recurrent CDI.³⁵

The *Five Year Antimicrobial Resistance Strategy* and guidance to the NHS on effective antimicrobial stewardship states that doctors should prescribe the right drug, at the right dose at the right time and for the right duration in order to limit unnecessary antibiotic exposure.³⁶ Clinicians are advised to use a narrow-spectrum rather than a broad-spectrum treatment when one is available – i.e. a

treatment which targets the bacteria responsible for the infection, rather than a host of different bacteria.³⁶

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