

# About *Clostridium difficile* infection (CDI)

## What is CDI?

'Super-bug' *Clostridium difficile* infection (CDI) is a recurring and preventable bacterial infection of the colon that causes severe and potentially deadly diarrhoea.<sup>1,2,3</sup> CDI is also referred to as a healthcare-associated infection or 'HAI'<sup>4</sup> and is listed as an immediate public health threat requiring urgent and aggressive action by the Centers for Disease Control and Prevention in the U.S.<sup>5</sup>

*C. difficile* bacteria are naturally present in the gut of up to 3% of healthy adults, usually without any problems. This is because the bacteria are normally kept under control by the 'good gut bacteria'.<sup>2</sup> An alteration in the balance of the gut microflora, often caused by broad-spectrum antibiotics, can reduce the number of 'good' bacteria allowing *C. difficile* to multiply and cause inflammation, severe diarrhoea and potentially life-threatening complications.<sup>1,2</sup>

In Europe the incidence and severity of CDI is increasing,<sup>6,7,8,9,10</sup> with nearly 125,000 cases a year,<sup>11</sup> posing a major threat to healthcare systems and patients.

~125,000

CDI cases a year<sup>11</sup>



## What are the symptoms?

Symptoms of CDI include:<sup>2</sup>

- diarrhoea
- abdominal cramps
- fever

Severe cases can require bowel surgery and even lead to death.<sup>1,2</sup>

## How does it spread?

*C. difficile* bacteria produce spores which are shed in the faeces.<sup>1,12</sup> These spores can live outside the human body for weeks, or even months,<sup>2</sup> and are resistant to common disinfectants and alcohol.<sup>2</sup> CDI is highly infectious; spores can be passed from person to person, infecting anyone who touches a contaminated surface.<sup>2,12</sup> One infection can therefore spread rapidly throughout the hospital environment.<sup>12</sup>

## Who is at risk?

CDI is a highly infectious disease that can affect anyone who touches a contaminated surface and transfers spores to their mouth.<sup>2,12</sup> However, it is more common in;

### Those taking antibiotics

CDI is most common in patients taking broad-spectrum antibiotics that disrupt the normal gut microflora, allowing *C. difficile* bacteria to multiply and start producing toxins.<sup>2,12</sup> CDI therefore threatens those who are frequently prescribed antibiotics.<sup>1,2,12,13</sup>

### The elderly

This risk of contracting CDI increases with age meaning that the elderly are particularly vulnerable,<sup>2,12,14</sup> with those over 65 most at risk.<sup>12</sup>

CDI results in death for around one in seven (14%) elderly patients (>90yrs)<sup>15</sup> and almost half (45%) of intensive care patients over the age of 65.<sup>16</sup> The elderly are also more susceptible to recurrence.<sup>17</sup>

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## Those in hospital

The risk of contracting CDI increases with time spent in hospitals or nursing homes,<sup>1</sup> meaning those who experience prolonged periods of hospitalisation are more vulnerable to infection.<sup>1,2,12</sup>

CDI is one of the top 10 HAIs in Europe<sup>11</sup>, and is estimated to be three times as deadly as MRSA.<sup>13,18</sup>

People in hospital with CDI are up to three times more likely to die in hospital (or within a month of infection) than those without CDI.<sup>19,20</sup>

One in 20 patients going into hospital will acquire a nosocomial (hospital-acquired) infection, with CDI being one of the most severe forms of these.<sup>12</sup>

## What is the risk of recurrence?

Recurrence has been identified as the most important problem in the treatment of CDI.<sup>26</sup>



**Recurrent infection of CDI occurs in up to 25% of patients<sup>27, 28, 29</sup>**

Recurrent infection of CDI occurs in up to 25% of patients within 30 days of initial treatment with commonly used antibiotics (metronidazole and vancomycin) which have a broad impact on the gut microflora.<sup>27,28,29</sup>

CDI may re-occur from the same strain or as a result of reinfection with a different strain,<sup>26</sup> and is associated with worse outcomes including increased mortality rates, longer length of hospital stay and greater healthcare resource utilisation.<sup>30,31</sup>

Vancomycin and metronidazole, antibiotics frequently used to treat CDI, have an unintentional effect, damaging the protective 'good' bacteria of the gut microflora<sup>3,12,32</sup> and increasing the risk of recurrent disease.<sup>1,3,32,33</sup>

Repeated infections could be significantly reduced with a targeted treatment, killing only the *C. difficile* bacteria while sparing the 'good' bacteria in the gut that are important to protect against recurrent infection and capable of offering a sustained cure.<sup>29,34,35</sup>

CDI is **3x**  more deadly than MRSA<sup>13,18</sup>

## Those with underlying diseases

CDI also threatens those with serious underlying diseases including patients with renal impairment or immunocompromised patients, such as cancer patients receiving chemotherapy.<sup>1,14</sup>

CDI and CDI recurrences can have a particularly adverse impact for patients with underlying diseases such as cancer, resulting in delays of treatment and a prolonged stay in hospital.<sup>21</sup>

## Transplant patients

Transplant patients are also at increased risk of CDI and recurrence,<sup>22</sup> with incidence significantly higher in lung<sup>23</sup> and kidney transplant patients<sup>24</sup> and higher mortality rates among liver transplant patients.<sup>25</sup>

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