Annual Epidemiological Report

February 2022

Clostridioides difficile infection in Ireland, 2020

Key Facts

- Due to the impact of the COVID-19 pandemic on both infection prevention, control and surveillance in Ireland, it was not possible to produce an annual report of *Clostridioides difficile* infection (CDI) in Ireland for 2019. This report while focusing on the epidemiology of CDI in Ireland in 2020, compares it with that of 2019 throughout
- In 2020, 1,733 cases of CDI were notified to public health. Of these, 1,422 (82%) were classified as new cases, 121 (7%) as recurrent and 190 (11%) as unknown case type. The national crude incidence rate for new and recurrent CDI per 100,000 population was lower than that reported in 2019 (31.8 versus 48.4). The majority of CDI was reported in patients aged ≥65 years (65%)
- The vast majority of notified cases of CDI were also reported to the voluntary enhanced CDI surveillance scheme (n=1,707; 99%) by 57 participating hospitals. Healthcare-associated (HCA) CDI accounted for the origin of 58% (n=984) of all cases, equating to a national incidence rate for new and recurrent HCA-CDI, that originated within the participating hospital, of 2.4 per 10,000 bed days used (BDU), which was lower than that of 2019 (2.8)
- Information on the patient's location at CDI symptom onset showed 44% of patients were in the community and 9% were in a long-term care facility
- Just 22% (n=379) of CDI cases reported to enhanced surveillance had associated ribotyping data, with 22 hospitals providing this information. The most frequently isolated ribotypes in 2020 were: 078 (n=56; 15%), 014 (n=54; 14%), 002 (n=53; 14%) and 020 (n=24; 6%)

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Background

New cases of *Clostridioides difficile* infection (CDI) in persons aged two years or older became notifiable in May 2008 to Departments of Public Health via the Computerised Infectious Disease Reporting (CIDR) system. In January 2012, recurrent CDI cases also became notifiable[1].

Since August 2009, enhanced data on CDI origin, onset and severity is captured through the voluntary national enhanced surveillance system, rather than on CIDR, according to a standardised surveillance protocol[2]. By 2020, 57 acute hospitals (46 publicly-funded and 11 private) participated in enhanced CDI surveillance.

Epidemiology

Notifiable *C. difficile* infection

In 2020, 1,733 CDI cases were notified to Departments of Public Health. The national crude incidence rate (CIR) for new and recurrent CDI per 100,000 population was lower than that reported in 2019 (31.8 versus 48.4), as shown in Table 1.

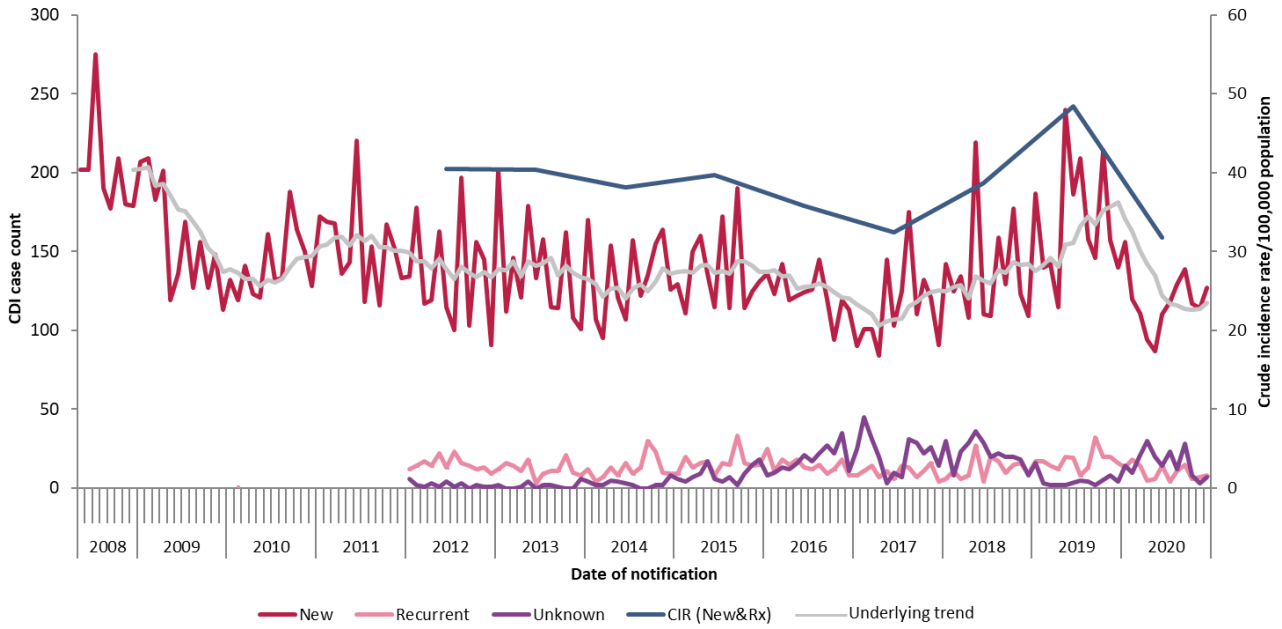
A drop in the rate of CDI notifications was evident in 2020, when compared with 2019, which had been higher than in recent years, as shown in Figure 1. The proportion of notifications assigned a case type (new or recurrent) decreased from 98% in 2019 to 89% in 2020, meaning that the proportion of those without an assigned case type increased from 2% in 2019 to 11% in 2020.

Table 1. CDI notifications reported to CIDR, 2019 & 2020

Mandatory CIDR notifications to public health	2020	2019
Number of notifications	**1,733**	**2,288**
Number of new notifications	1,422 (82%)	2,034 (89%)
Crude incidence rate* (new & recurrent cases)	31.8	48.4
Number of outbreaks	6	16

*Crude incidence rate is the number of new and recurrent notifications per 100,000 population. The 2019 rate was calculated using the 2016 census data and the 2020 rate using CSO population estimates for 2020, excluding children <2 years. (Source: CIDR)

Figure 1. Number of CDI notifications by month and case type in Ireland, 2008 – 2020

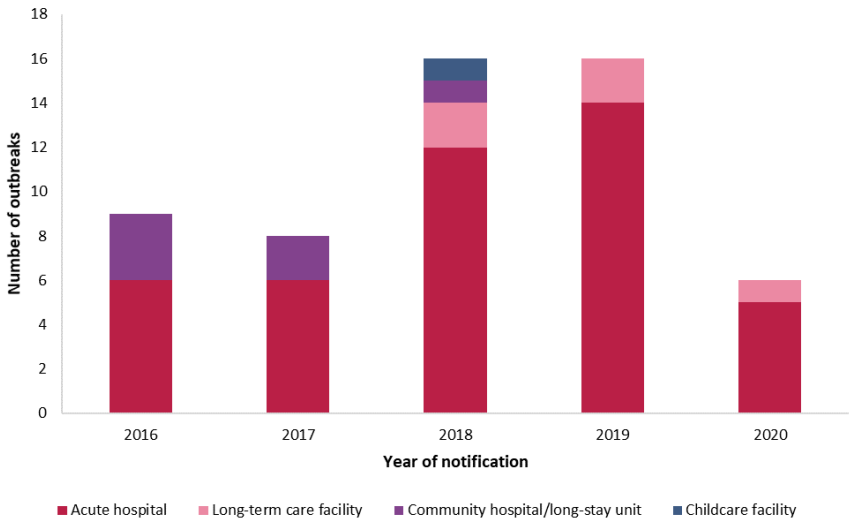


Source: CIDR

Outbreaks of CDI

In 2020, six outbreaks of CDI were notified, all of which were healthcare-associated: five were associated with acute hospitals and one outbreak was reported in a long-term care facility (Figure 2).

Figure 2. Number of CDI outbreaks by year and setting in Ireland, 2016 – 2020



Source: CIDR

Enhanced surveillance of *C. difficile* infection

There were 1,707 CDI cases reported to the voluntary enhanced surveillance scheme by 57 hospitals (96% of public and 92% of private hospitals reported upon patients with CDI) (Table 2). Since 2012, participation in enhanced CDI surveillance has stabilised, with all tertiary and general hospitals providing data.

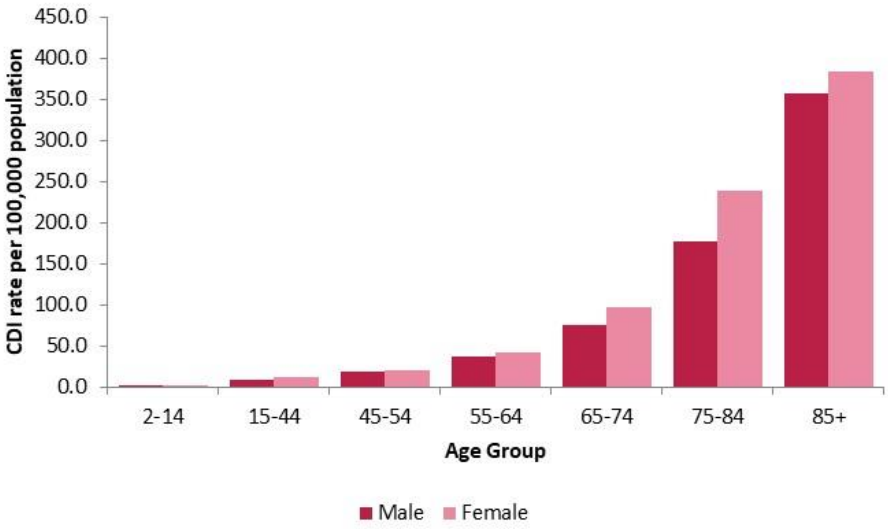
Of 1,707 cases reported in 2020, 1,469 (86%) were new, 9% recurrent and 5% of unknown case type. The majority of cases occurred in females (58%), as shown in Figure 3. The mean age was 68.1 years (range: 2-100), with the highest proportion (n=1,136; 67%) in patients ≥65 years.

Table 2. CDI cases reported to enhanced surveillance system in Ireland, 2019 & 2020

Voluntary enhanced surveillance system cases	2020	2019
Cases reported to enhanced surveillance system	**1,707**	**2,185**
Number of new cases	1,469 (86%)	1,883 (86%)
Number of hospitals participating	57 (46 public, 11 private)	57 (46 public, 11 private)
CDI incidence rate** (all hospital-acquired cases)	2.4	2.8
Origin: Location where infection was acquired		
• Healthcare-associated cases	984 (58%)	1,417 (65%)
– *Reporting hospital*	*831 (84%)*	*1,130 (80%)*
– *Long-term care facility*	*80 (8%)*	*167 (12%)*
– *Other hospital*	*67 (7%)*	*111 (8%)*
– *Unknown healthcare facility*	*6 (1%)*	*9 (1%)*
• Community-associated cases	480 (28%)	498 (23%)
• Discharged within 4-12 wks from HCF	138 (8%)	127 (6%)
• Unknown origin	105 (6%)	143 (6%)
Onset: Location where patient symptoms occurred		
• Healthcare onset	905 (53%)	1,290 (59%)
– *Reporting hospital*	*765 (85%)*	*1,041 (81%)*
– *Long-term care facility*	*80 (9%)*	*164 (13%)*
– *Other hospital*	*40 (4%)*	*57 (4%)*
– *Unknown location*	*20 (2%)*	*28 (2%)*
• Community onset	744 (44%)	824 (38%)
• Unknown onset	58 (3%)	71 (3%)
Severity		
Requiring ICU admission or colectomy	35 (2.1%)	36 (1.6%)

**CDI rate is the number of new and recurrent cases per 10,000 bed days used. Bed days used data provided by HSE Business Information Unit (Source: HPSC)

Figure 3. Age and gender distribution of CDI in Ireland, 2020

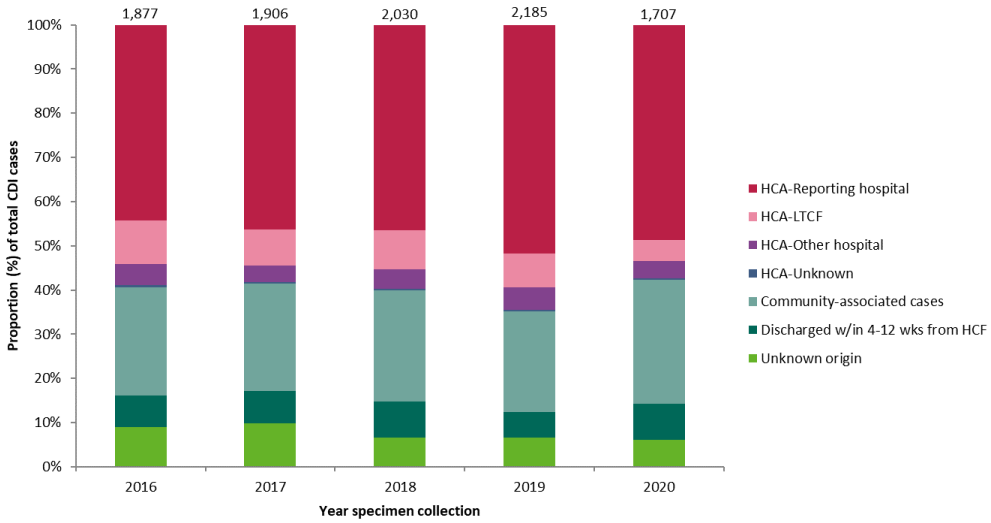


*Rates calculated using CSO population estimates for April 2020 excluding children <2 years (Source: HPSC)

Origin of infection

Figure 4 displays annual trends in the breakdown of CDI origin. Of all cases of CDI (new, recurrent and unknown case type) reported in 2020, 984 (58%) originated within a healthcare facility (HCA), compared with 65% in 2019, with 49% (n=831) of all cases in 2020 originating within the reporting hospital. A greater proportion of CDI cases (n=480; 28%) in 2020 were community-associated (CA) compared with 2019 (23%).

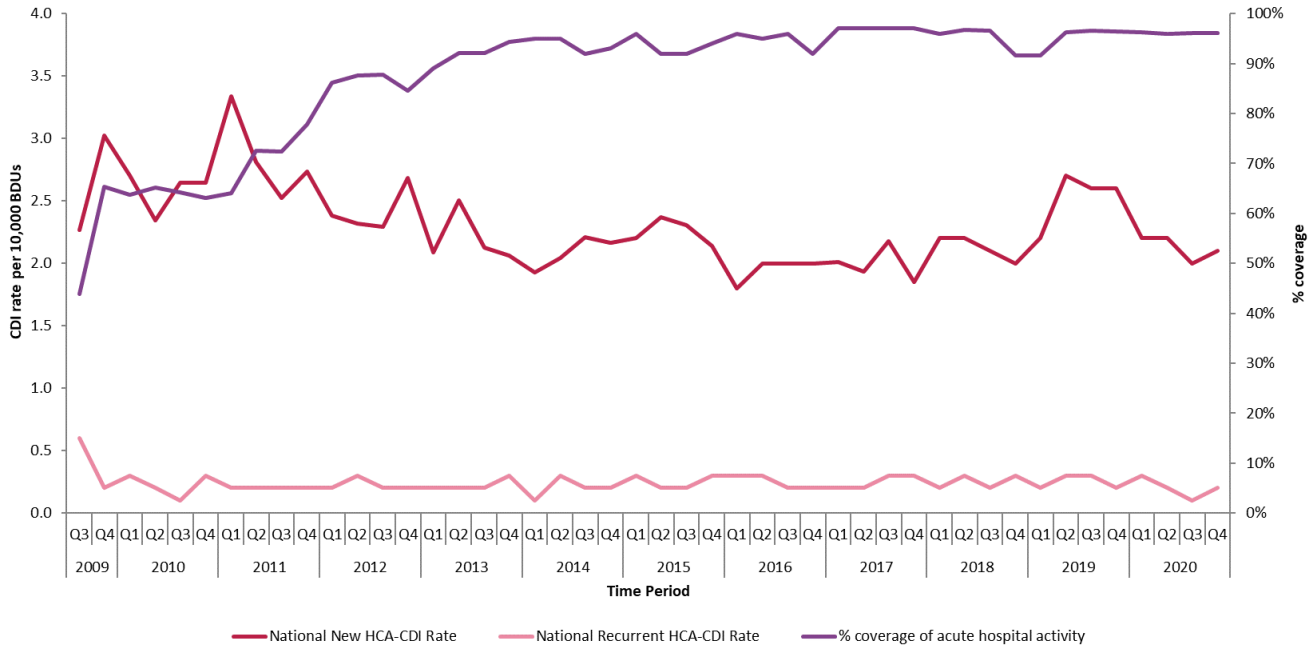
Figure 4. Origin of CDI in Ireland by facility type, 2016-2020



Source: HPSC

At 2.4 cases per 10,000 bed days used (BDU), the incidence of HCA-CDI was lower than in 2019 (2.8), as displayed in Figure 5. The rate of new HCA-CDI had increased in 2019 and returned to previous levels in 2020.

Figure 5. Quarterly national rate of healthcare-associated CDI (new and recurrent) in Ireland, 2009-2020



Source: HPSC

Location at symptom onset

CDI symptom onset occurred in a healthcare facility (healthcare-onset; HO) for 53% of cases (n=905), while 44% (n=744) had symptom onset in the community (community-onset; CO). The location at CDI onset was unknown for 3% (n=58). Of HO cases, 85% had onset in the reporting hospital, 9% in a long-term care facility, 4% in another hospital and for 2%, the type of healthcare facility was unknown. The proportion of CO cases increased from 38% (n=824) in 2019 to 44% (n=744) in 2020.

Of 984 cases associated with a healthcare facility, 839 (85%) experienced onset of CDI symptoms at least 48 hours following admission to a healthcare facility (HO, HCA). A further 14% experienced symptom onset in the community within four weeks of discharge from a healthcare facility (CO, HCA).

Of 480 CA cases, 448 (93%) experienced CDI symptom onset while outside a healthcare facility and without history of discharge from a healthcare facility within the previous 12 weeks (CO, CA). Thirty (6%) cases experienced symptom onset within the first 48 hours of admission to a healthcare facility, without a history of admission to, or residence in, a healthcare facility within the previous 12 weeks (HO, CA).

Severe CDI

A severe case is defined as (i) a patient requiring admission to an intensive care unit (ICU) for treatment of CDI or its complications or (ii) requiring colectomy surgery or (iii) death within 30 days after diagnosis. Information on patient outcome is not currently collected in CDI enhanced surveillance, so two markers of severity, surgery and ICU admission are captured. There were 35 severe CDI cases (2%) reported in 2020, similar in number to the 36 (1.6%) reported in 2019. Thirty patients required ICU admission without surgery, two patients required surgery without ICU admission, two required ICU admission with surgery status reported as unknown and one patient required both surgery and an ICU admission.

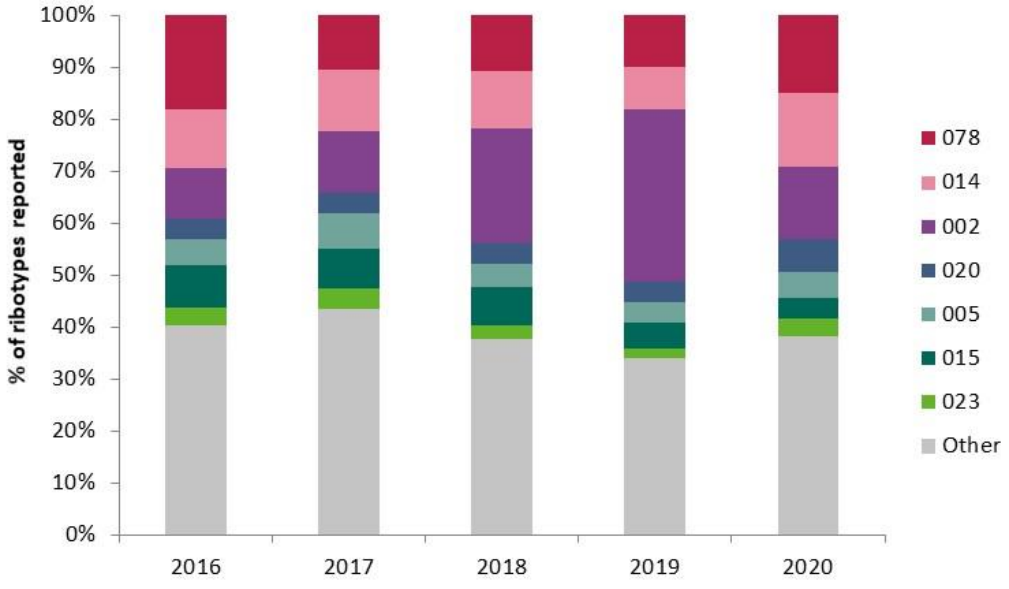
C. difficile PCR ribotyping

Ribotyping information was reported for just 379 (22%) cases of CDI reported to enhanced surveillance. As Ireland had no designated national *C. difficile* reference laboratory in 2020, microbiology laboratories referred specimens to reference laboratories abroad for ribotyping. The most frequently reported ribotypes in 2020 were: 078 (15%), 014 and 002 with equal frequency (14% each), 020 (6%) and 005 (5%).

While the national profile of the most frequently detected ribotypes was similar in recent years (Figure 6), the increase in ribotype 002 nationally which became evident in 2018 at 22% of ribotyped cases (increasing from 12% in 2017) peaked at 33% in 2019 (where 27%, n=581 of all cases were ribotyped). By 2020, this proportion fell to 14% which was similar to historical levels.

Two cases of the virulent ribotype 027 were detected in Ireland in 2020 and two in 2019.

Figure 6. Most frequently reported *C. difficile* ribotypes in Ireland: 2016-2020



Source: HPSC

Discussion

The collation of national CDI data through notifications and the enhanced surveillance system has provided a valuable insight into its epidemiology and burden in Ireland. The number of cases reported to both systems, which had continued to increase up to 2019, dropped by 25% in 2020. As 2020 saw the impact of the COVID-19 pandemic in Ireland, the simultaneous reduction in the reporting of CDI to both systems suggests that the reduction was not associated with the collection of enhanced surveillance data in hospitals, but likely a true reduction in hospitalisations and related infections. However, we would advise caution in interpreting the rates and trends for 2020, given how atypical the healthcare seeking behaviour was thought to be, due to the pandemic.

A reduction in the proportion of hospital-acquired CDI was seen in 2020 with a concurrent rise in the proportion of cases originating in the community (28% of all cases). This reflects the trend of previous years, with the exception of 2019, which showed an increase in the overall number of CDI cases and proportion of those originating in acute hospitals. This may have been related to the rise in hospital-associated ribotype 002 which became evident with the reporting of outbreaks by acute hospitals in late-2018 and in 2019. At the time, a pilot project was undertaken by the NCPERLS laboratory in Galway using whole genome multi-locus sequence typing and this provided much needed information on the dissemination of the ribotype in Ireland.

Whether the COVID-19 pandemic in 2020 had an impact on the setting of patients who would normally have been transferred for treatment to acute hospitals, or the control of ribotype 002 resulted in the decrease seen that year, needs to be further analysed.

Without a national reference laboratory in Ireland, an up-to-date picture of the epidemiology of *C. difficile* in Ireland is not available.

The increase in number of cases reported by departments of public health without an assigned case type in 2020 may have been impacted by the pressure of COVID-19 on laboratory and public health surveillance colleagues.

The proportion of cases associated with long-term care facilities has continued to fall over time to just 5% of all (8% of healthcare-associated) cases in 2020.

The true implications of the burden of COVID-19 on surveillance of CDI in Ireland need to be further analysed.

Public health implications

The continued excellent participation in the voluntary CDI enhanced surveillance scheme ensures that valuable additional information is collected regarding the epidemiology and burden of CDI in Ireland. The National Clinical Guidelines on the Surveillance, Diagnosis

and Management of CDI in Ireland[3] were updated in 2013 and endorsed by the National Clinical Effectiveness Committee in 2014.

Technical notes

Data used in this report were extracted from CIDR on 20/12/2021.

Crude incidence rates were calculated using census of the population denominator data or population estimates (available from the Central Statistics Office (CSO) www.cso.ie). The population aged 2 years and above was taken from Census 2016 for analysis of the 2016-2019 data and from CSO population estimates of April 2020 for analysis of the 2020 data. The data were presented per 100,000 population.

Hospital acquired rates of CDI were calculated using the denominator of bed days used (BDU) per quarter/year. BDU data for publicly-funded hospitals were provided by the Business Information Unit of the HSE. The figures were presented per 10,000 BDU.

Further information available on HPSC website

https://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/clostridioidesdifficile/

Acknowledgements

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