

Annual Epidemiological Report

October 2019

Clostridioides difficile infection in Ireland, 2018

Key Facts

- In 2018, 2,053 cases of *Clostridioides difficile* infection (CDI) were notified to public health. Of these, 1,642 (80%) were classified as new cases, 149 (7%) as recurrent and 262 (13%) as unknown case type. The national crude incidence rate for new and recurrent CDI per 100,000 population was higher than that reported in 2017 (38.6 versus 32.4). 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=2,030; 99%) by 56 participating hospitals. Healthcare-associated (HCA) CDI accounted for the origin of 60% (n=1,218) of all cases, equating to a national incidence rate for new and recurrent HCA CDI combined, that originated within the participating hospital, of 2.4 per 10,000 bed days used (BDU), slightly higher than that of 2017 (2.2)
- Information on the patient's location at CDI symptom onset showed 40% of patients were in the community and 9% were in a long-term care facility
- Just 19% (n=395) of CDI cases reported to enhanced surveillance had associated ribotyping data, with 20 hospitals providing this information. The most frequently isolated ribotypes in 2018 were: 002 (n=87; 22%), 014 (n=44; 11%), 078 (n=42; 11%) and 015 (n=29; 7%)

Suggested citation: HSE Health Protection Surveillance Centre. *Clostridioides difficile* infection in Ireland 2018: Dublin HSE HPSC; 2019

© HSE Health Protection Surveillance Centre, 2019. Reproduction is authorised, provided source is acknowledged

Table of Contents

| | |
|---|----|
| Key Facts | 1 |
| Background..... | 3 |
| Epidemiology | 3 |
| Notifiable <i>C. difficile</i> infection | 3 |
| Enhanced surveillance of <i>C. difficile</i> infection..... | 4 |
| Origin of infection..... | 6 |
| Location at symptom onset..... | 7 |
| Severe CDI..... | 8 |
| PCR ribotyping | 8 |
| Discussion | 8 |
| Public health implications | 9 |
| Technical notes..... | 9 |
| Further information available on HPSC website | 9 |
| Acknowledgements | 10 |
| Report prepared by: | 10 |
| References | 10 |

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 notifiable¹.

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 protocol². By 2018, 56 acute hospitals (public: 45 and private: 11) participated in enhanced CDI surveillance.

Epidemiology

Notifiable *C. difficile* infection

In 2018, 2,053 CDI cases were notified to Departments of Public Health. The national crude incidence rate for new and recurrent CDI per 100,000 population was higher than that reported in 2017 (38.6 versus 32.4), as shown in Table 1.

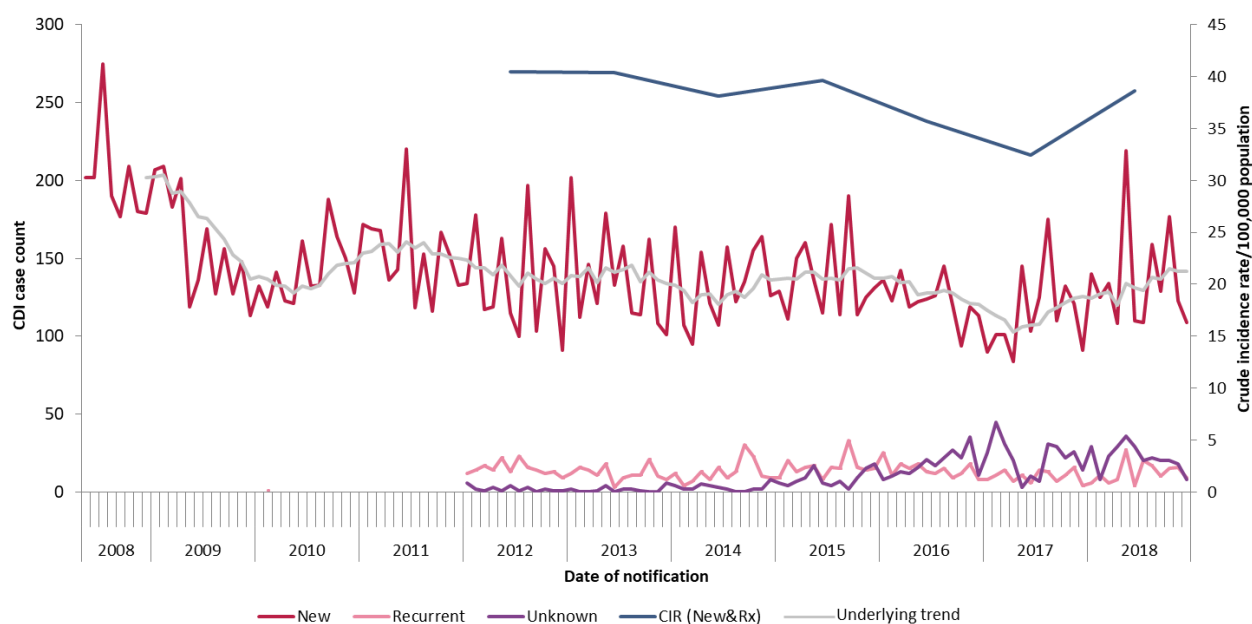
A reverse of a previously decreasing trend in both the incidence and number of CDI notifications observed up to 2017 continued throughout 2018, as shown in Figure 1. The proportion of notifications assigned a case type (new or recurrent) increased slightly from 85% in 2017 to 87% in 2018, while the proportion of those without an assigned case type decreased slightly from 15% in 2017 to 13% in 2018, higher than that in 2015 (5%).

In 2018, 16 outbreaks of CDI were notified, 15 of which were healthcare-associated; hospitals (n=12), long-term care facilities (n=3) and one outbreak involving two cases was reported in a daycare facility.

Table 1. CDI notifications reported to CIDR, 2017 & 2018

| Mandatory CIDR notifications to public health | 2018 | 2017 |
|---|--------------|--------------|
| Number of notifications | 2,053 | 1,763 |
| Number of new notifications | 1,642 (80%) | 1,378 (78%) |
| Crude incidence rate* (new & recurrent cases) | 38.6 | 32.4 |
| Number of outbreaks | 16 | 8 |

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

Figure 1. Number of CDI notifications by month and case type in Ireland, 2008 – 2018

Source: CIDR

Enhanced surveillance of *C. difficile* infection

There were 2,030 CDI cases reported to the voluntary enhanced surveillance scheme by 56 hospitals (96% of public and 92% of private hospitals reported patients with CDI) (Table 2). Since 2012, participation in enhanced CDI surveillance has stabilised, with all tertiary and general hospitals providing data. One tertiary hospital was unable to provide returns for Q4 2018, impacting on the reported rate for that quarter. Thus, the true burden of CDI in Q4 2018 may have been greater than that reported.

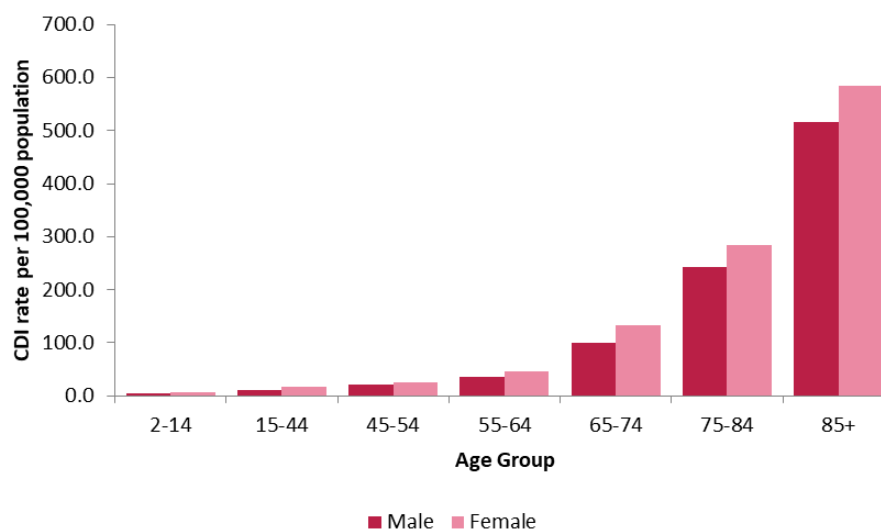
Of 2,030 cases reported in 2018, 1,737 (86%) were new, 9% recurrent and 5% of unknown case type. The majority of cases occurred in females (60%), as shown in Figure 2. The mean age was 66.6 years (range: 2-100), with the highest proportion (n=1,343; 66%) in patients ≥ 65 years.

Table 2. CDI cases reported to enhanced surveillance system in Ireland, 2017 & 2018

| Voluntary enhanced surveillance system cases | 2018 | 2017 |
|--|----------------------------|----------------------------|
| Cases reported to enhanced surveillance system | 2,030* | 1,906 |
| Number of new cases | 1,737 (86%) | 1,604 (84%) |
| Number of hospitals participating | 56 (45 public, 11 private) | 56 (45 public, 11 private) |
| CDI incidence rate** (all hospital-acquired cases) | 2.4 | 2.2 |
| Origin: Location where infection was acquired | | |
| • Healthcare-associated cases | 1,218 (60%) | 1,117 (59%) |
| – Reporting hospital | 943 (77%) | 883 (79%) |
| – Long-term care facility | 181 (15%) | 154 (14%) |
| – Other hospital | 88 (7%) | 72 (6%) |
| – Unknown healthcare facility | 6 (1%) | 8 (1%) |
| • Community-associated cases | 511 (25%) | 463 (24%) |
| • Discharged within 4-12 wks from HCF | 166 (8%) | 139 (7%) |
| • Unknown origin | 135 (7%) | 187 (10%) |
| Onset: Location where patient symptoms occurred | | |
| • Healthcare onset | 1,134 (56%) | 1,052 (55%) |
| – Reporting hospital | 884 (78%) | 835 (79%) |
| – Long-term care facility | 173 (15%) | 140 (13%) |
| – Other hospital | 58 (5%) | 52 (5%) |
| – Unknown location | 19 (2%) | 25 (2%) |
| • Community onset | 809 (40%) | 752 (40%) |
| • Unknown onset | 87 (4%) | 102 (5%) |
| Severity | | |
| Requiring ICU admission or colectomy | 45 (2.2%) | 44 (2.3%) |

*Data missing from one tertiary hospital in Q4 of 2018

**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)

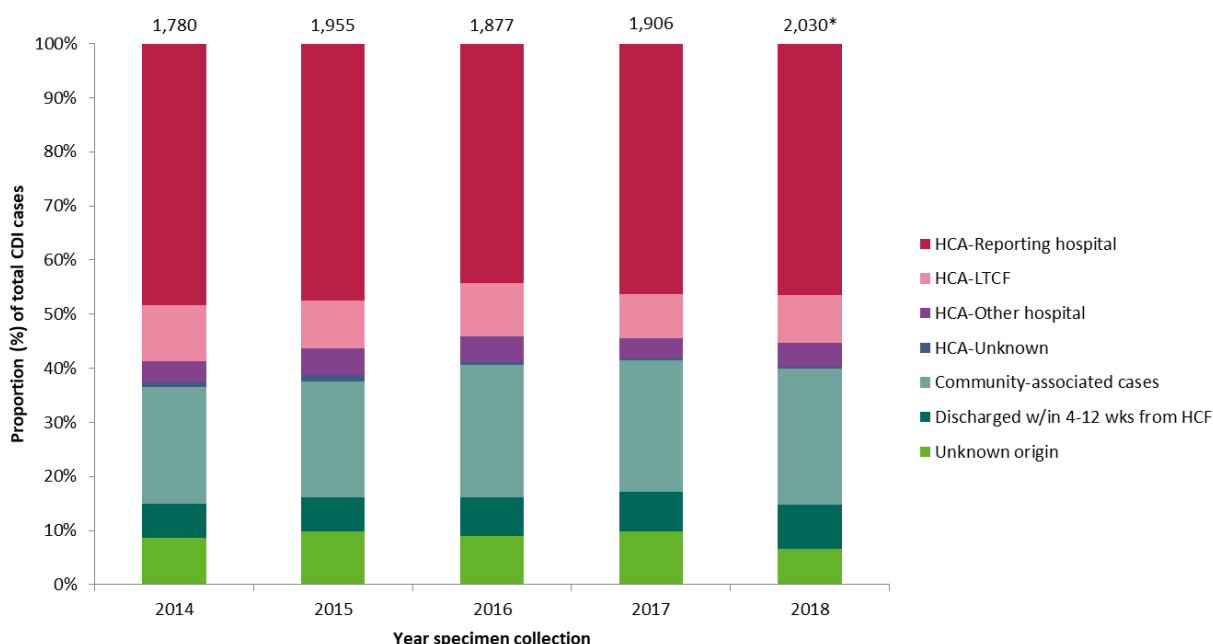
Figure 2. Age and gender distribution of CDI in Ireland, 2018

*Rates calculated using 2016 census data excluding children <2 years (Source: HPSC)

Origin of infection

Figure 3 displays annual trends in the breakdown of CDI origin. Of all cases of CDI (new, recurrent and unknown case type) reported in 2018, 1,218 (60%) originated within a healthcare facility (HCA), with 46% (n=943) of all cases originating within the reporting hospital. Slightly more CDI cases (n=511; 25%) were community-associated (CA) compared with 2017 (24%).

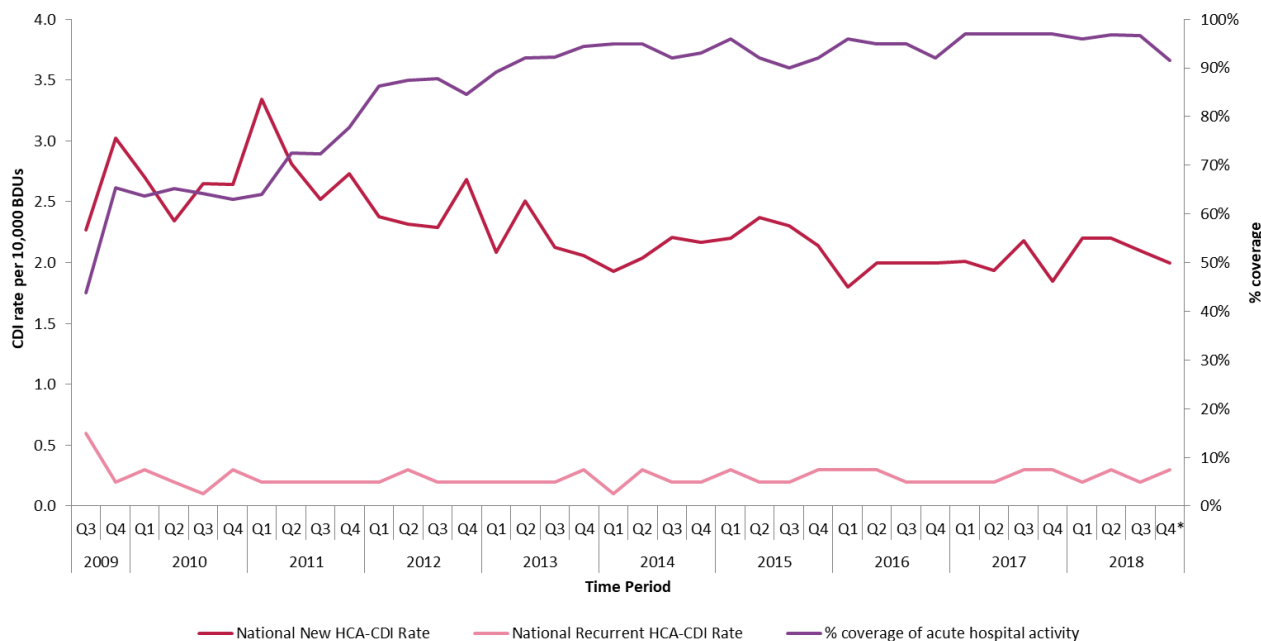
Figure 3. Origin of CDI in Ireland by facility type, 2014-2018



*Data missing from one tertiary hospital in Q4 2018 (Source: HPSC)

At 2.4 cases per 10,000 bed days used (BDU), the incidence of HCA-CDI was slightly higher than in 2017 (2.2), as displayed in Figure 4. The breakdown of HCA-CDI by case type remained stable compared with 2017.

Figure 4. Quarterly national rate of healthcare-associated CDI (new and recurrent) in Ireland, 2009-2018



Source: HPSC

*Data missing from one tertiary hospital in Q4 2018

Location at symptom onset

CDI symptom onset occurred in a healthcare facility (healthcare-onset; HO) for 56% (n=1,134), while 40% (n=809) had symptom onset in the community (community-onset; CO). The location at CDI onset was unknown for 4% (n=87). Of HO cases, 78% had onset in the reporting hospital, 5% in another hospital, 15% in a long-term care facility and for 2%, the type of healthcare facility was unknown. The proportion of CO cases increased from 34% (n=607) in 2014 to 40% (n=809) in 2018.

Of 1,218 cases associated with a healthcare facility, 1,065 (87%) experienced onset of CDI symptoms at least 48 hours following admission to a healthcare facility (HO, HCA). A further 12% experienced symptom onset in the community within four weeks of discharge from a healthcare facility (CO, HCA).

Of 511 CA cases, 478 (94%) 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-two (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).

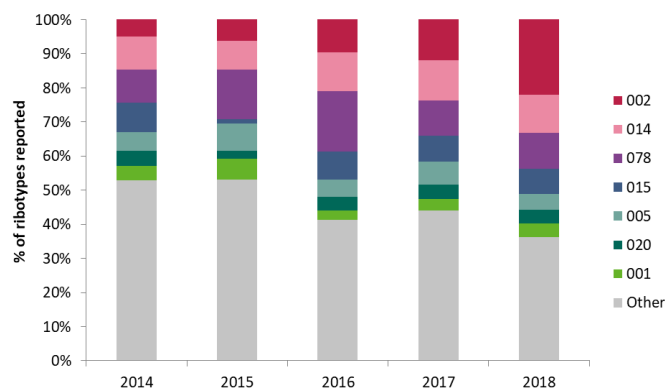
Severe CDI

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 45 severe CDI cases (2.2%) reported in 2018, similar to the 44 (2.3%) reported in 2017. Twenty-one patients required ICU admission without surgery, eleven patients required surgery without ICU admission, 10 required ICU admission with surgery status reported as unknown and three patients required both surgery and an ICU admission.

PCR ribotyping

Ribotyping information was reported for just 395 (19%) cases of CDI reported to enhanced surveillance. As Ireland has no designated national *C. difficile* reference laboratory, microbiology laboratories refer specimens to reference laboratories abroad for ribotyping. The most frequent ribotypes reported in 2018 were; 002 (22%), 014 and 078 with equal frequency (11% each), 015 (7%) and 005 (5%). This is a similar national profile to that of recent years (Figure 5), but an almost two-fold increase in ribotype 002 was observed in comparison with 2017 when it accounted for 12% of ribotyped isolates.

Figure 5. Most frequently reported *C. difficile* ribotypes in Ireland: 2014-2018



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 has increased in the past five years, along with a

reversal in 2018 of a previously decreasing trend for the population CDI rate and a stabilising of the recent reduction in the hospital-acquired CDI rate.

Unusually in 2018, slightly more CDI cases were notified to Public Health than were reported to the enhanced surveillance scheme, but this is most likely due to missing data from one tertiary hospital in Q4. Enhanced surveillance provides added value, demonstrating that the highest proportion of CDI cases originate in acute hospitals, but this is a trend which has reduced over time. Missing data from one tertiary hospital in Q4 2018 would impact on the rate of HCA-CDI.

The proportion of cases associated with long-term care facilities has also reduced over time to 9% in 2018.

The proportion of community-associated CDI has been increasing from 22% in 2014, to 25% of all cases originating in the community in 2018.

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 Ireland³ 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 24/09/2019.

Crude incidence rates were calculated using census of the population denominator data (available from the Central Statistics Office www.cso.ie). The population aged 2 years and above was taken from Census 2016 for analysis of the 2014-2018 data. The data was 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

HPSC would like to sincerely thank all who have contributed to this report: Microbiology Surveillance Scientists, Infection Prevention and Control Nurses, Microbiology Laboratory Scientists, Clinical Microbiologists, along with all the staff of the Departments of Public Health across Ireland.

Report prepared by:

Tara Mitchell and Karen Burns, HPSC

References

1. Irish Statute Book. Schedule to the Infectious Diseases (Amendment) Regulations 2011 (S.I. No. 452 of 2011). 13th September 2011.
Available from: <http://www.irishstatutebook.ie/eli/2011/si/452/made/en/print>
Case definition available from: <https://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/clostridioidesdifficile/casedefinitions/>
2. Health Protection Surveillance Centre. Enhanced Surveillance of *Clostridium difficile* infection in Ireland. Protocol for Completion of Enhanced Surveillance Information v3.5. July 2014.
Available from: https://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/clostridioidesdifficile/enhancedsurveillance/File_13927.en.pdf
3. Health Protection Surveillance Centre. Surveillance, Diagnosis and Management of *Clostridium difficile* Infection in Ireland. National Clinical Guideline No. 3. 2014.
Available from: https://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/clostridioidesdifficile/guidelines/File_13950.en.pdf