C. difficile: An overview of the Irish surveillance system including the importance of whole genome sequencing.

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BACKGROUND

C. difficile **is a notifiable disease since 2008. In addition to laboratories reporting cases to public health, 98% of hospitals also participate in a voluntary enhanced *C. difficile* programme coordinated by the Health Protection Surveillance Centre (HPSC). The *C. difficile* National Reference Laboratory (NRL) based in The Public Health Laboratory Dublin, started providing whole genome sequencing (WGS) services to all hospitals in 2022. The HPSC and NRL work closely together in reporting CDI surveillance data in Ireland. As data are currently being collated for 2023, the focus of this poster is on results up to and including 2022.**

AIM

To collect more detailed epidemiological information on CDI cases, such as origin of infection, patient location at symptom onset, severity, and ribotype/whole genome sequencing in acute care hospitals.

METHOD

Participating hospitals provide CDI enhanced surveillance data on a standardised excel template to the HPSC biannually. This data is analysed and matched where possible to typing data provided by the NRL. Hospitals receive a local and national report with details on CDI incidence rates and burden of CDI (new and recurrent cases).

RESULTS

An overview of results from 2020 to 2022 can be seen in Table 1. More than half of cases reported each year are healthcare-associated, with most of these cases associated with the reporting hospitals. An increase in cases associated with community has also been observed. A similar picture can be seen for onset. An increase in severity of cases was observed from 2020 to 2021.

Enhanced surveillance system cases	2020	2021	2022
Cases reported to enhanced surveillance system	**1756**	**1774**	**1717**
Number of new cases	1,513 (86%)	1,542 (87%)	1477 (86%)
CDI incidence rate/10,000 Bed days Used	2.4	2.1	2.3
Origin: Location where infection was acquired			
- Healthcare-associated cases	993 (56%)	964 (54%)	993 (58%)
- Reporting hospital	840 (85%)	793 (82%)	840(85%)
- Long term care facility	80 (8%)	95 (10%)	74 (8%)
- Other hospital	67 (7%)	69 (7%)	65(7%)
- Unknown healthcare facility	6 (1%)	7 (1%)	14(1%)
- Community-associated cases	509 (29%)	591 (33%)	545 (32%)
- Discharged within 4-12 wks from HCF	138 (8%)	114 (6%)	124(7%)
- Unknown origin	116 (7%)	105 (6%)	55 (3%)
Onset: Location where patient symptoms occurred			
- Healthcare onset	924 (53%)	915 (52%)	927(54%)
- Reporting hospital	773 (84%)	764 (83%)	765(83%)
- Long term care facility	91 (10%)	97 (11%)	78 (8%)
- Other hospital	40 (4%)	37 (4%)	49 (5%)
- Unknown location	20 (2%)	17 (2%)	35 (4%)
- Community onset	774 (44%)	812 (46%)	773(45%)
- Unknown onset	58 (3%)	47 (3%)	17 (1%)
Severity			
Requiring ICU admission or colectomy	35 (2%)	51 (3%)	47(3%)

Table 1. Summary of CDI enhanced surveillance programme results 2020-2022.

CDI Outbreaks

There were 12 outbreaks in 2022, the majority from acute hospitals (Fig 1). In 2019, there was a national outbreak with ribotype 002. WGS data indicates the isolates belonged to Clade 1, ST8.

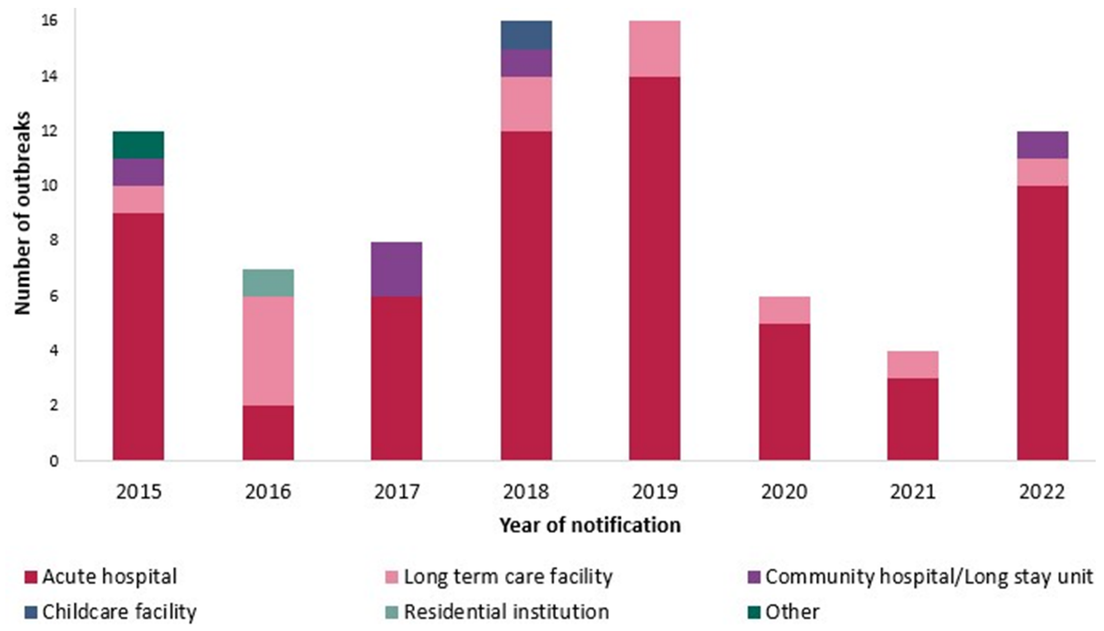

Figure 1. Summary of CDI outbreaks by year and setting.

WGS and phylogenetic analysis are invaluable when investigating outbreaks for relatedness and transmission dynamics.

WGS cases matched to HPSC cases

From Q2 2022, cases sent to the HPSC are matched to cases sent to the NRL and the most common sequence type (ST) results are reported (Fig 2).

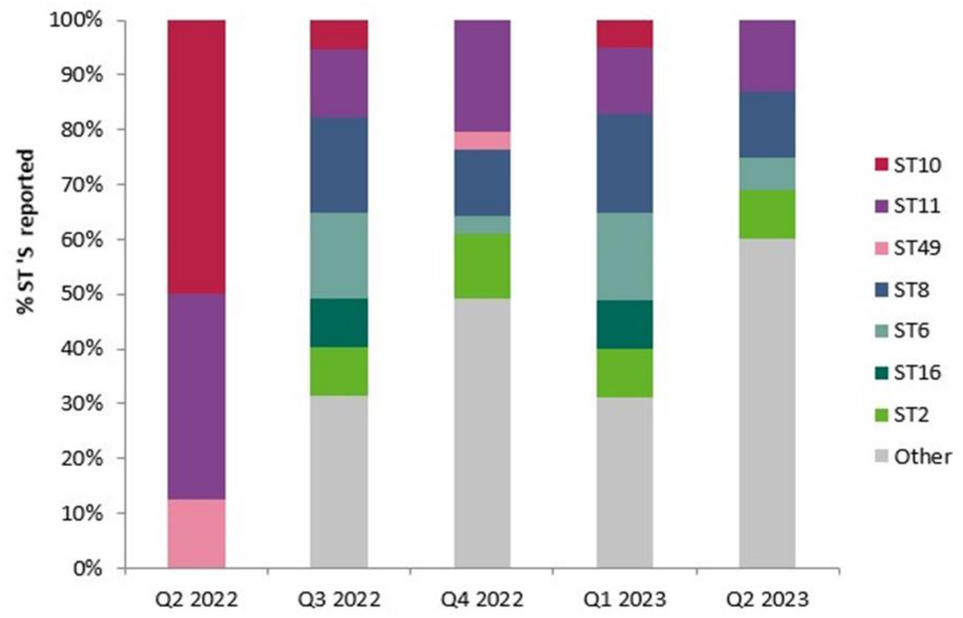

Figure 2. Summary of ST of submitted C. difficile isolates.

DISCUSSION

WGS results significantly adds to the understanding of the epidemiology of CDI. It is hoped to optimise matching of cases sent to HPSC and NRL in 2024. Separately, an increase in community associated cases has been noted. It is planned to investigate this area further in 2024. Hospitals not yet participating in the programme will be also invited to join this year.

CONCLUSION

This valuable programme provides a detailed epidemiological view of CDI in Ireland. This data will be used to identify priority areas in the prevention and control of CDI, for antimicrobial stewardship and for future targeted incidence surveillance.

Acknowledgements
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