



Gastroenteric and Zoonotic Diseases in Ireland, 2022

January 2024





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Additional thanks to our colleagues in the Public Health Laboratory (PHL) in Cherry Orchard and in the National Salmonella, Shigella and Listeria Reference Laboratory (NSSLRL) for ongoing collaboration, support and advice in the surveillance of gastroenteric and zoonotic diseases in Ireland.

These slides were prepared by Niamh Lynch, Helen Byrne, Anthony Ortiz, Aoife Colgan, Patricia Garvey and Paul McKeown from the Gastroenteric, Zoonotic and Vectorborne Diseases team in HPSC.

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1. Data are based on statutory notifications and were extracted from the Computerised Infectious Disease Reporting ([CIDR](#)) system on the indicated dates.
2. Data are provisional and subject to ongoing review, validation and update. As a result, figures in this report may differ from figures published at other times.
3. Population data were taken from the Central Statistics Office. In general, a 5 year rule of thumb was used, i.e. year of census and two years before and after. In situations where the census was cancelled/delayed (e.g. 2021), population estimates for the year(s) involved were reviewed, and the census with results most closely aligning to the estimates was applied.
4. CIR refers to the Crude Incidence Rate
5. Counties covered by each HSE Health Region are as follows:
 - **HSE Health Region Dublin & Northeast:** Cavan, Louth, Meath, Monaghan, Dublin North Central, Dublin North-West and Dublin North.
 - **HSE Health Region Dublin & Midlands:** Dublin South City, Dublin South-West, Dublin West, Kildare, Wicklow (West), Laois, Offaly, Longford and Westmeath.
 - **HSE Health Region Dublin & Southeast:** Dublin South-East, Dun Laoghaire, Carlow, Kilkenny, South Tipperary, Waterford, Wexford and Wicklow (East).
 - **HSE Health Region West & Northwest:** Galway, Mayo, Roscommon, Donegal, Sligo, Leitrim.
 - **HSE Health Region Mid-West:** Limerick, Clare, North Tipperary.
 - **HSE Health Region South West:** Cork and Kerry.



Preventing Gastroenteritis and other Zoonotic diseases

See HPSC website for information on prevention of gastroenteritis: [Gastroenteritis Fact Sheet](#)

- Ensure that you regularly wash your hands with soap under warm running water and especially:
 - After using or cleaning the toilet
 - After attending to anyone with diarrhoea or vomiting or touching anything contaminated by diarrhoea or vomiting
 - After handling household and garden waste or rubbish (including nappies)
 - After touching or handling pets or other animals
 - On returning to the house having been working in the garden or on the farm
 - Before handling, preparing, serving, or consuming food or drink
- Cook meats and eggs thoroughly before consumption.
- Clean kitchen work surfaces and utensils with soap and water immediately after they have been in contact with raw meat.
- Wash fruit and vegetables thoroughly in clean water, especially those that will not be cooked further.

See HPSC website for travel advice for international travellers: [Travel Health Fact Sheet](#)

- When on holiday, you should take extra travel precautions with your and your family's health and ensure your travel vaccinations are up to date.

If anyone in your house is suffering from vomiting or diarrhoea, the toilet and other areas should be cleaned and disinfected after use. Anyone who is ill with diarrhoea or vomiting should stay off work/school until they have been symptom free for 48 hours.

Additional information on minimising the risk of foodborne illness:

- www.safefood.net/food-safety
- www.fsai.ie/consumer-advice/food-safety-and-hygiene

Additional information on minimising the risk of zoonotic infection:

- www.hpsc.ie/a-z/zoonotic/petsandotheranimals/

Additional information on minimising the risk of travel-associated infection:

- www.ireland.ie/en/dfa/overseas-travel/advice/
- www.who.int/travel-advice
- www.hse.ie/eng/health/immunisation/pubinfo/travelvacc/

Additional information on minimising the risk associated with sexual transmission of shigellosis:

- www.sexualwellbeing.ie/sexual-health/sexually-transmitted-infections/types-of-stis/shigella-in-gbmsm.html
- man2man.ie/shigella/



The impact of the COVID-19 pandemic on gastroenteric and zoonotic diseases data in Ireland, 2020-2022



The COVID-19 pandemic affected gastroenteric and zoonotic disease notification in a number of different ways. Milder episodes of many diseases are likely to have gone undetected due to changes in healthcare seeking behaviour and reduced access to healthcare services, particularly during long periods of national lockdown.

Additionally, for many diseases which are largely associated with international travel, eating out or attendance at school/childcare, the introduction of COVID-19 restrictions and resulting behavioural changes are likely to have reduced acquisition of these infections. Conversely, diseases more associated with environmental exposures may have increased due to changes in work practice which led to migration from cities and the potential for more rural or agricultural exposures.

Finally, from a technical perspective, the COVID-19 pandemic, the 2021 HSE cyber-attack and associated burden on the healthcare system also affected the processes of data validation, data collection, reporting of enhanced data variables and outbreak notification.

Initiatives to improve data quality are underway but enhanced data and outbreak data for this time period should be interpreted with caution.

- During the COVID-19 pandemic, notification rates for giardiasis, listeriosis, norovirus, rotavirus, salmonellosis, shigellosis, paratyphoid, typhoid and toxoplasmosis in Ireland **decreased** compared to pre-pandemic levels
- During the COVID-19 pandemic, notification rates for campylobacteriosis, cryptosporidiosis, leptospirosis, VTEC and yersiniosis in Ireland **increased or remained unchanged** from pre-pandemic levels
- In 2022, most gastroenteric and zoonotic diseases returned to or remained at pre-pandemic levels:
 - Notification rates for cryptosporidiosis, giardiasis, listeriosis, salmonellosis, paratyphoid and VTEC **returned to or remained at pre-pandemic levels**
 - Notification rates for shigellosis and typhoid fever returned to the levels seen in 2019 but are considerably higher than notification rates prior to 2019
 - Notification rates for campylobacteriosis and yersiniosis were **higher** than before the pandemic
 - Notification rates for leptospirosis, norovirus, rotavirus and toxoplasmosis were **lower** than before the pandemic



Campylobacteriosis in Ireland





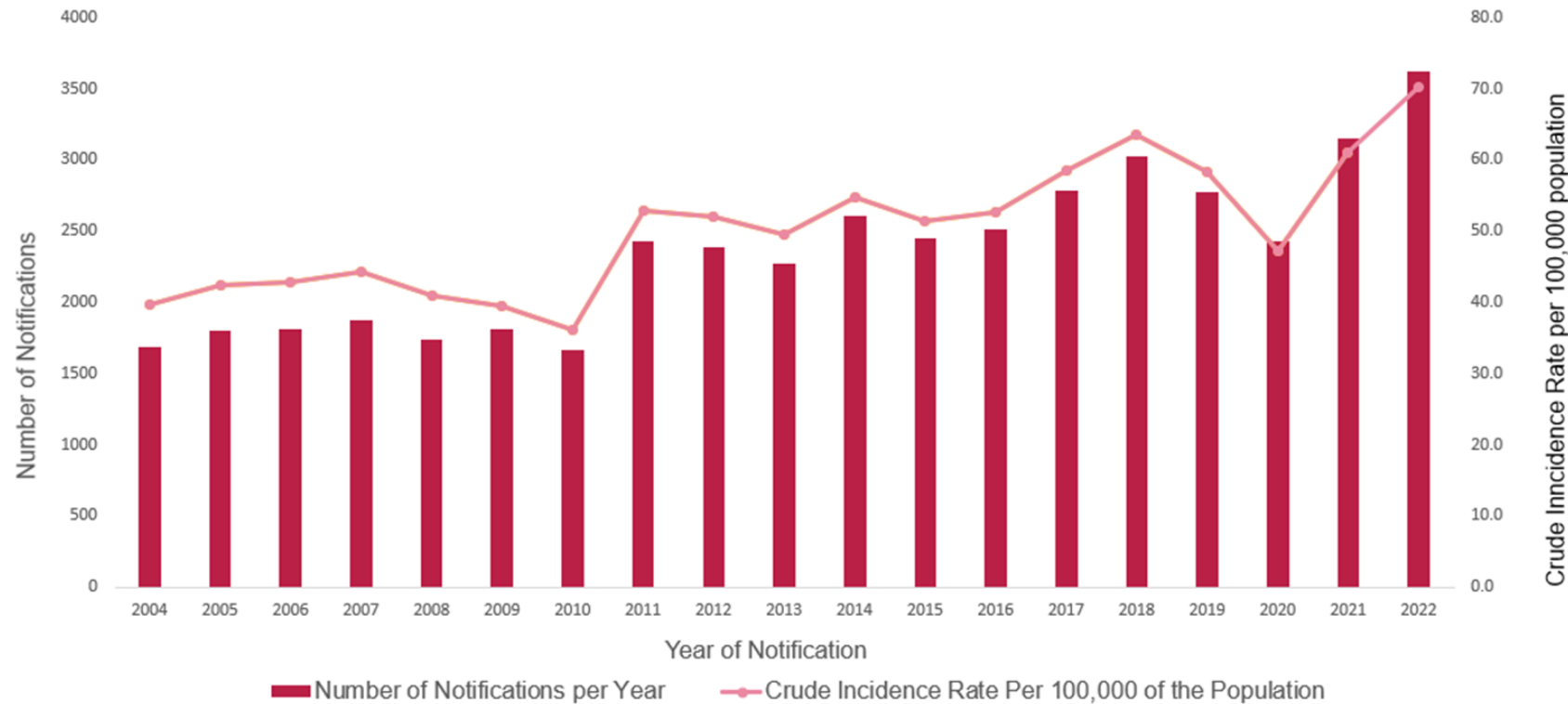
Campylobacteriosis in Ireland



- Campylobacteriosis is the most frequent cause of gastroenteritis in Ireland and across the EU
- At least a dozen species of *Campylobacter* have been implicated in human disease, with *C. jejuni* (80–90%) and *C. coli* (5-10%) being the most common
- Patients typically present with a self-limited diarrheal illness lasting 5 to 7 days
- In some cases, *C. jejuni* infection may lead to autoimmune conditions known as Guillain-Barré syndrome (GBS) and Miller Fisher syndrome.
- Campylobacteriosis infection is associated with the consumption of raw milk, undercooked poultry, and contaminated water
- Children aged under 5 years and people aged over 60 years, farm workers, food handlers and travellers to developing countries are the groups most at risk of infection
- There is a limited understanding of transmission routes in Ireland as enhanced surveillance is not collected for campylobacteriosis cases and a low number of outbreaks are reported. The last sporadic campylobacteriosis case control study in Ireland was undertaken in 2002, so further research is required to understand more about more recent exposures and vehicles of infection.

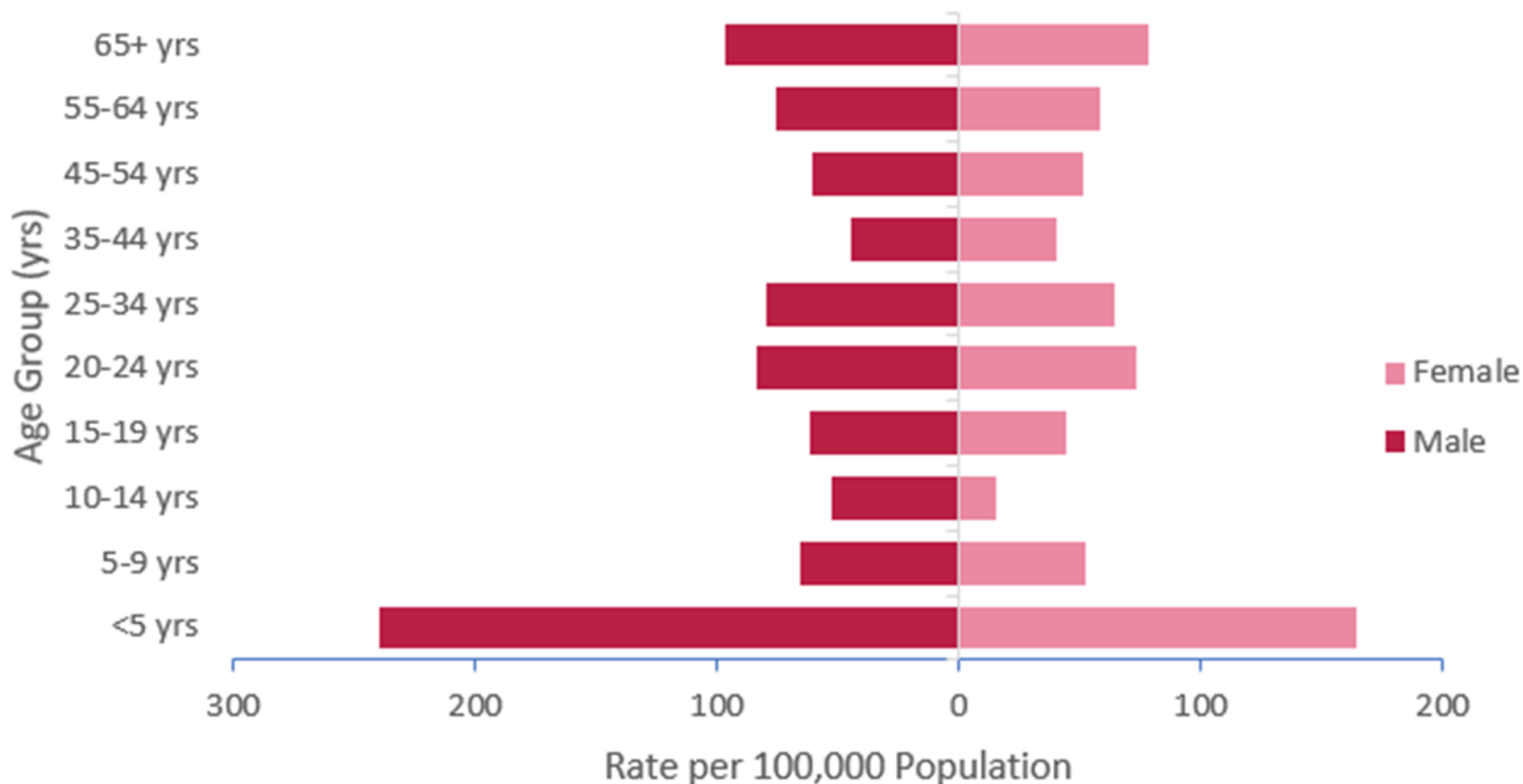
For more information on risk factors and precautions please see the [Campylobacteriosis Fact Sheet](#) on the HPSC website.

Campylobacteriosis in Ireland: trends, 2004-2022



In 2022, the CIR for campylobacteriosis increased 13% compared with 2021, and was preceded by an increase of 23% between 2020 and 2021. The incidence rates in 2021 and 2022 were the highest recorded in recent years and remained largely unaffected by the COVID-19 pandemic, apart from a slight decrease in cases notified in 2020.

Campylobacteriosis in Ireland: age and sex distribution, 2022



In 2022, 56% (n=2024) of cases were male and 44% (n=1593) were female.

The highest age-standardised incidence rate was among <5 year olds (175.7/100,000 population) with males accounting for 61% of the cases in this age group.

The incidence rate increased across all age groups in 2022 except among the 5-9 years and 10-14 years age groups which both decreased in 2022

Campylobacteriosis in Ireland: geographical distribution 2020-2022

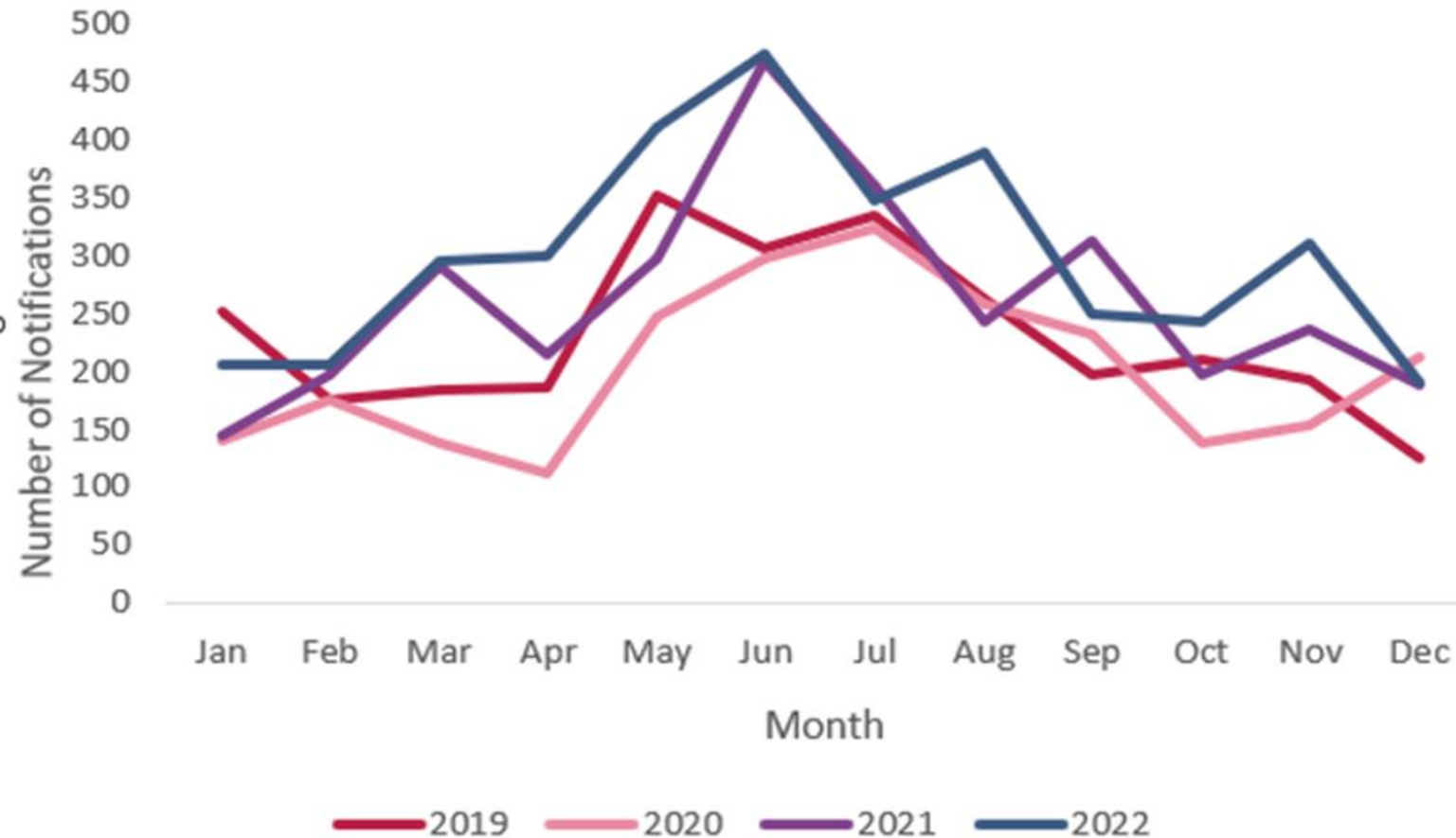


The Dublin & Southeast region had the highest rate of notifications (87.9/100,000) and the West and Northwest region had the lowest rate of notifications (54.8/100,000) in 2022.

The CIR of Campylobacteriosis increased in all Health regions except for the West and Northwest region, where a 5% (n=21) decrease in notifications was seen between 2021 and 2022.

*Trend data by HSE Health Region should be interpreted with caution due to the re-organisation of HSE Healthboards to HSE Health Regions in 2022.

Campylobacteriosis in Ireland: seasonal distribution 2019-2022

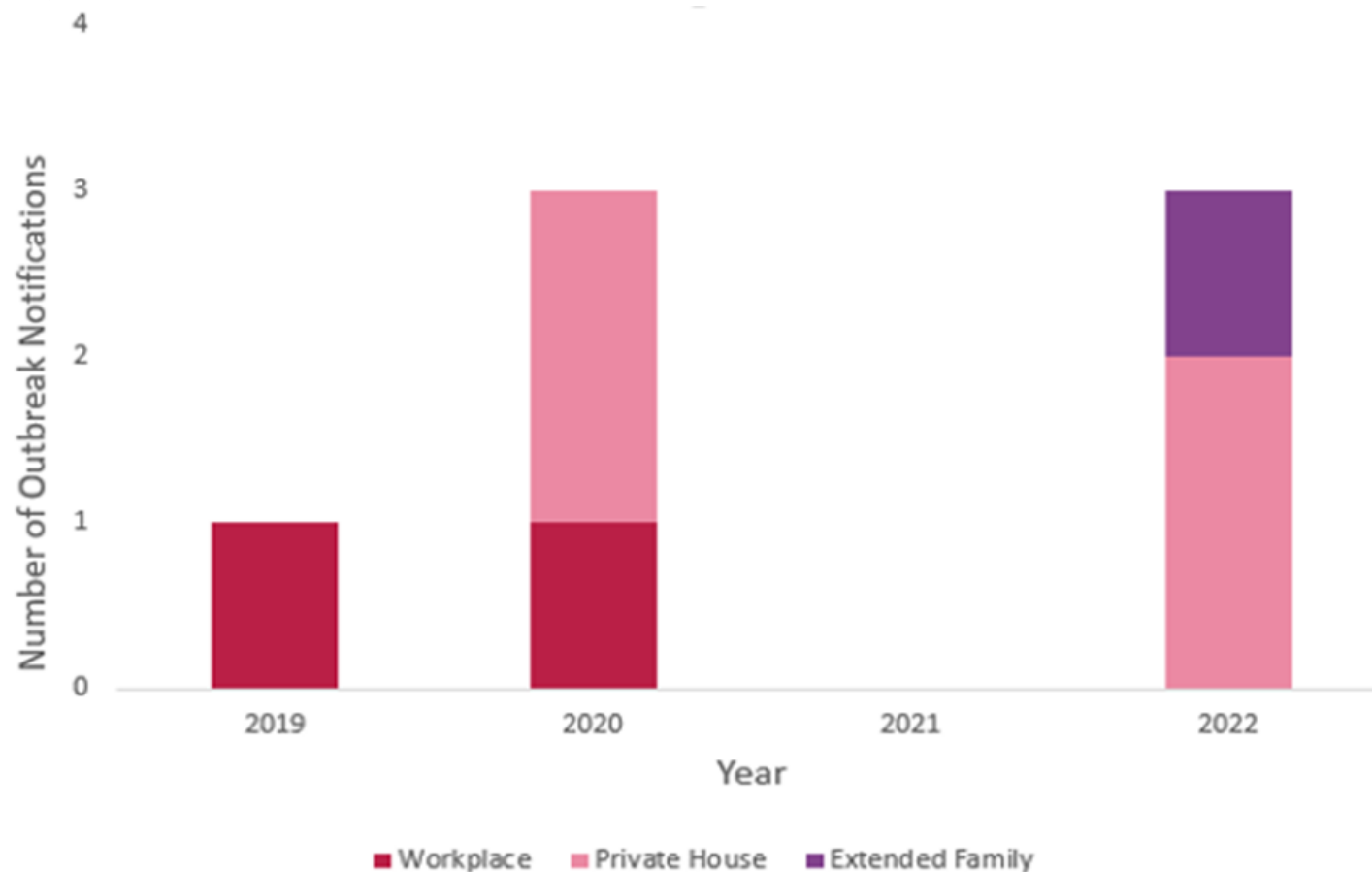


Campylobacteriosis notifications were higher in 2022 than 2019 and 2021 but followed similar seasonal trends.

In 2020, the first year of the SARS-CoV-2 pandemic, the number of Campylobacteriosis notifications fell particularly between February and April, coinciding with the first lockdown.

The highest number of Campylobacter notifications in 2022 was reported in June (n=474).

Campylobacteriosis in Ireland: outbreaks and clusters, 2019-2022



There were between 0 and 3 campylobacteriosis outbreak notifications a year in Ireland between 2019 and 2022.

Private house outbreaks were the most common types of campylobacteriosis outbreaks notified in Ireland between 2019 and 2022. In 2022, outbreaks ranged in size from 2 to 11, with a median of 3 people ill.

A sentinel *Campylobacter* Reference Service has been operating at the Public Health Laboratory in Cherry Orchard since 2019. Isolates from approximately 11% of campylobacteriosis cases notified in 2022 were sequenced¹ (84.0% were *C. jejuni*, 15.5% were *C. coli* and 0.5% were *C. fetus*). Most identified clusters were too diffuse geographically or temporally to require further public health action.

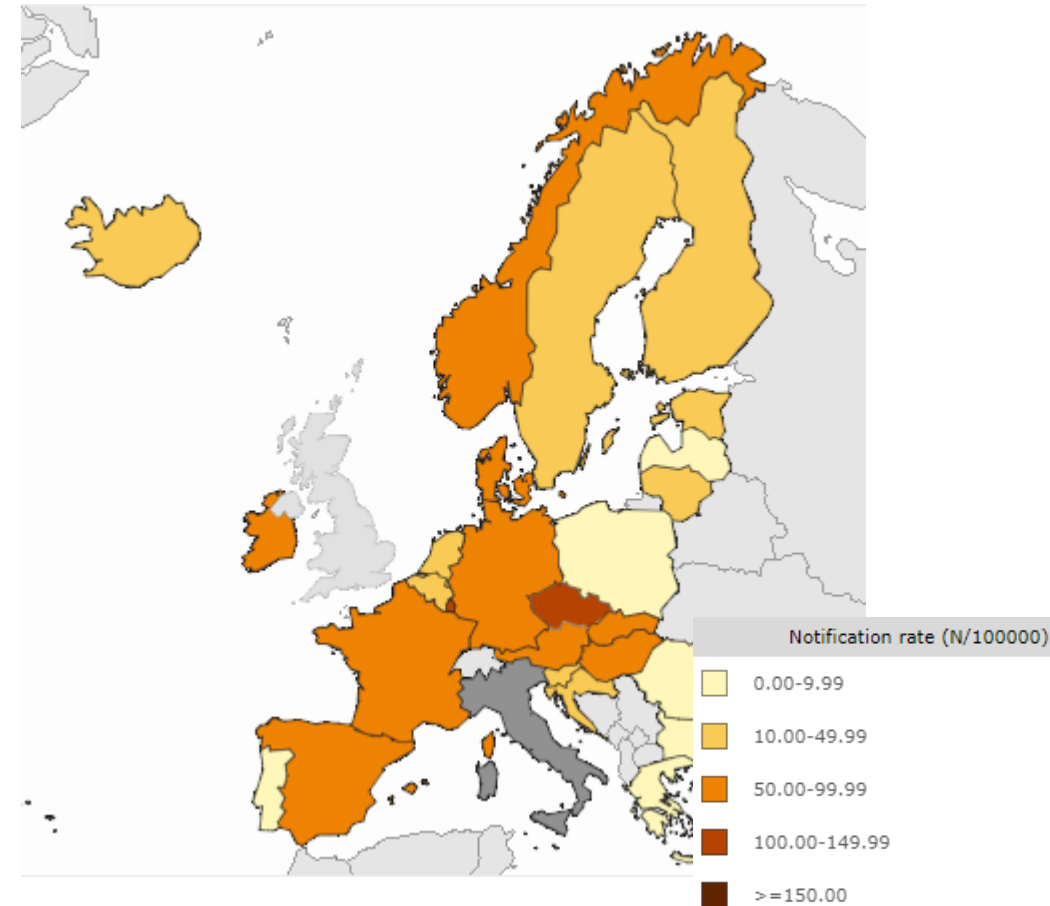
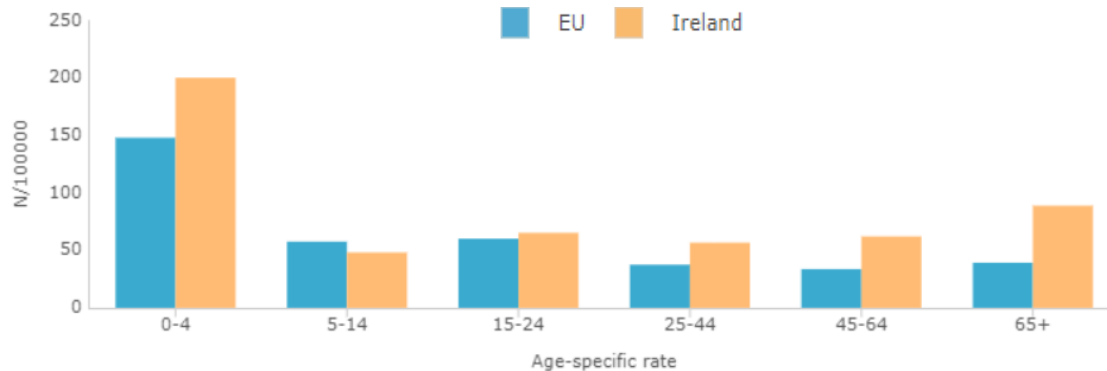
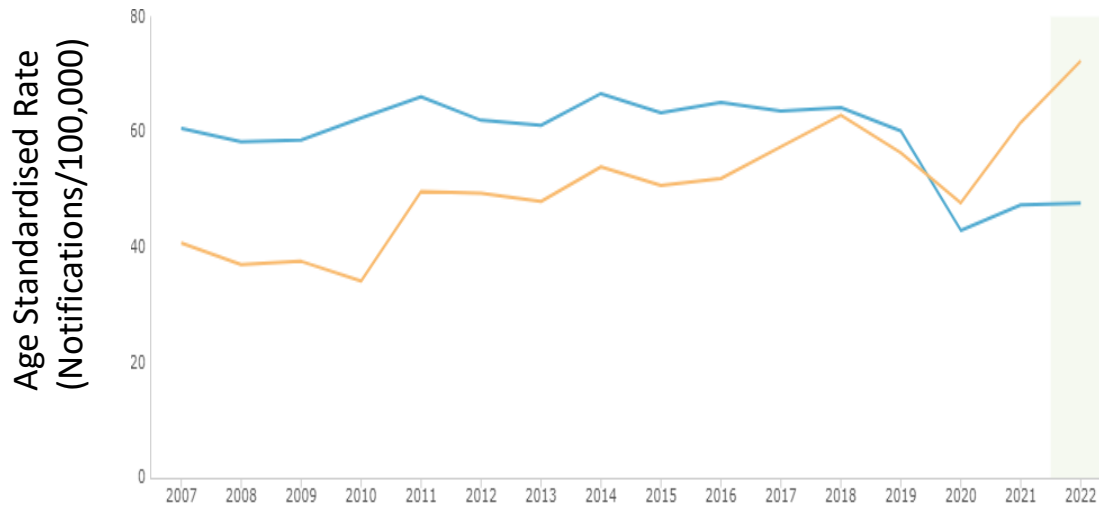
Data source: Computerised Infectious Diseases Reporting System (CIDR) 14/09/2023 and Public Health Laboratory Cherry Orchard

¹[Public Health Laboratory Dublin/national reference laboratory campylobacter annual report 2022](#)



Campylobacteriosis in the EU/EAA, 2007-2022

Campylobacteriosis notification rates in Ireland were lower compared to the rest of Europe between 2007 and 2018. From 2018 until 2020 rates were similar and from 2020 until 2022 notification rates in Ireland have increased to well above the EU average. This trend was seen in all age groups except for the 5-14 years age group where the CIR for the EU was 57.6/100,000 compared to 48/100,000 in Ireland.





Campylobacteriosis in Ireland: 2022 summary



- There were 3,617 cases of campylobacteriosis notified in Ireland in 2022.
- The crude incidence rate (CIR) of notifications increased from 61/100,000 in 2021 to 70/100,000 in 2022, which was higher than pre-pandemic rates.
- The highest age-specific notification rate was among those aged <5 years.
- Overall, 56% of campylobacteriosis notifications in Ireland were male in 2022.
- The Dublin and Southeast area had the highest notification rate in 2022.
- May, June and July were the peak months for campylobacteriosis notifications in 2022, similar to previous years.
- Notifications rates in Ireland (71/100,000) are currently well above the EU average (46/100,000), in all age groups except for 5-14 year olds (48/100,000 in Ireland compared to 57/100,000 in the EU).



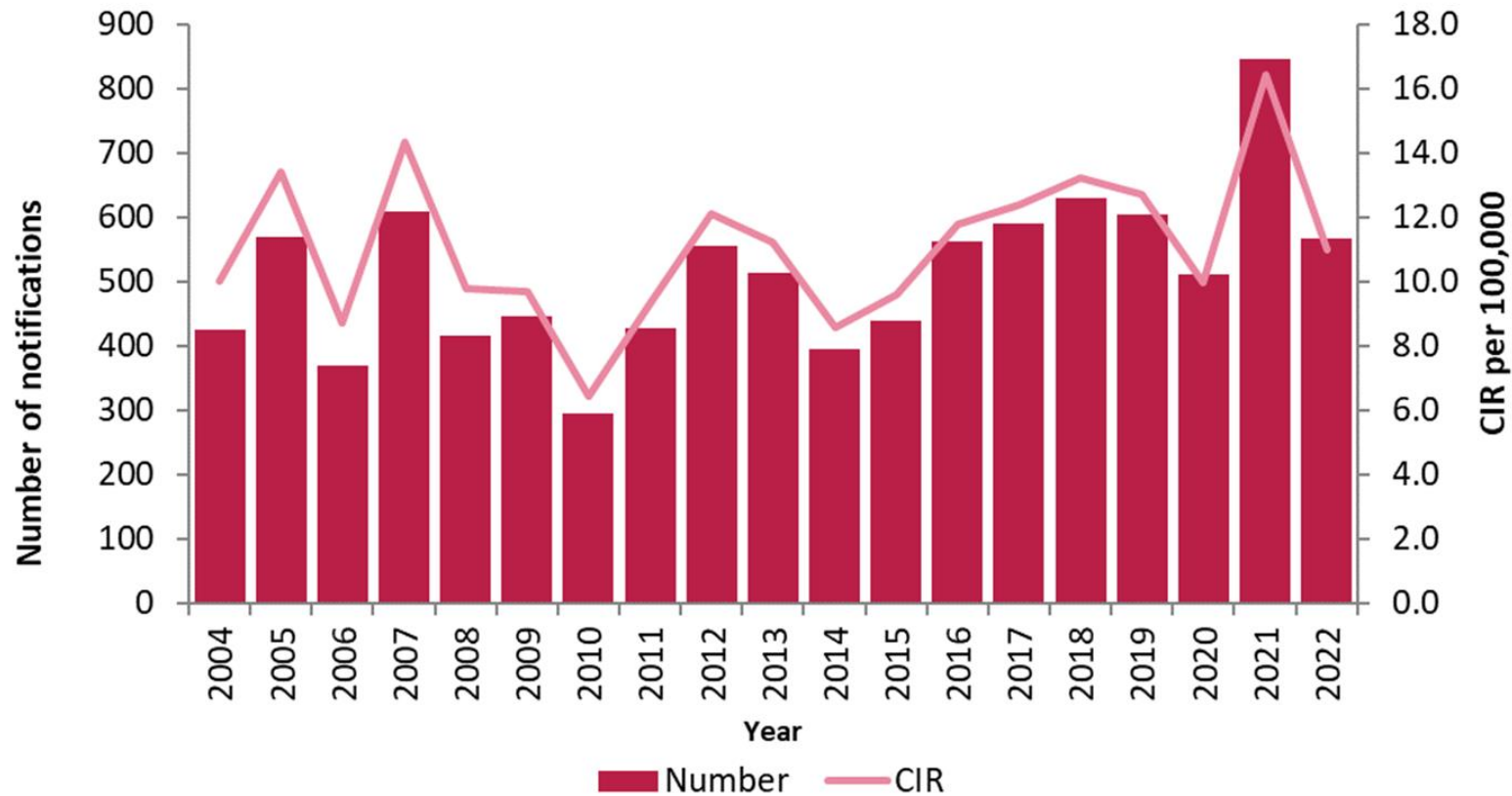
Cryptosporidiosis in Ireland



- Cryptosporidiosis is a diarrhoeal disease caused by a parasite (Cryptosporidium). The parasite is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it very resistant to chlorine-based disinfectants. It can survive temperatures greater than 70°C.
- Cryptosporidiosis is a mild disease in healthy people. The most common symptom of cryptosporidiosis is watery diarrhoea. Other symptoms include dehydration, weight loss, stomach cramps or pain, fever, nausea and vomiting. Symptoms usually last about 1 to 2 weeks in persons with healthy immune systems. Some people with cryptosporidiosis will have no symptoms at all.
- Cryptosporidium lives in the intestine of infected humans or animals. Millions of parasites can be released in a bowel movement from an infected human or animal. It is therefore found in soil, food, water, or surfaces that have been contaminated with human or animal faeces. It is a common cause of waterborne outbreaks of gastroenteritis.

For more information on risk factors and precautions please see the [Cryptosporidiosis Fact Sheet](#) on the HPSC website.

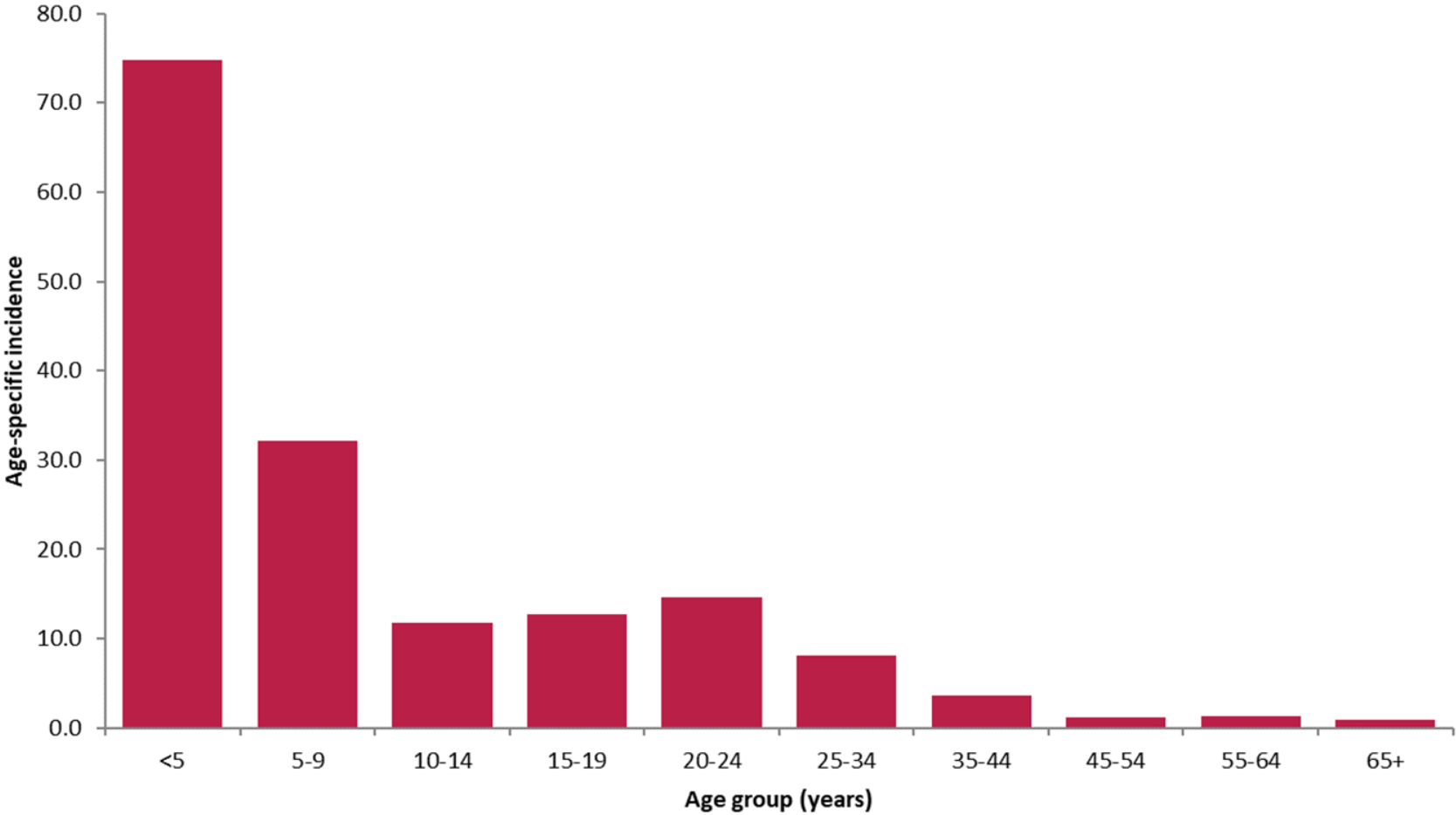
Cryptosporidiosis in Ireland: trends, 2004-2022



The CIR for cryptosporidiosis reduced in 2022 (11.0/100,000) when compared to 2021 (16.4/100,000).

The CIR in 2021 was the highest recorded in recent years, while the CIR in 2022 was similar to pre-pandemic rates.

Cryptosporidiosis in Ireland: Age-specific incidence rate, 2022



The highest age-specific incidence rate was in children under five years of age, with 75 cases per 100,000 population in this age group.

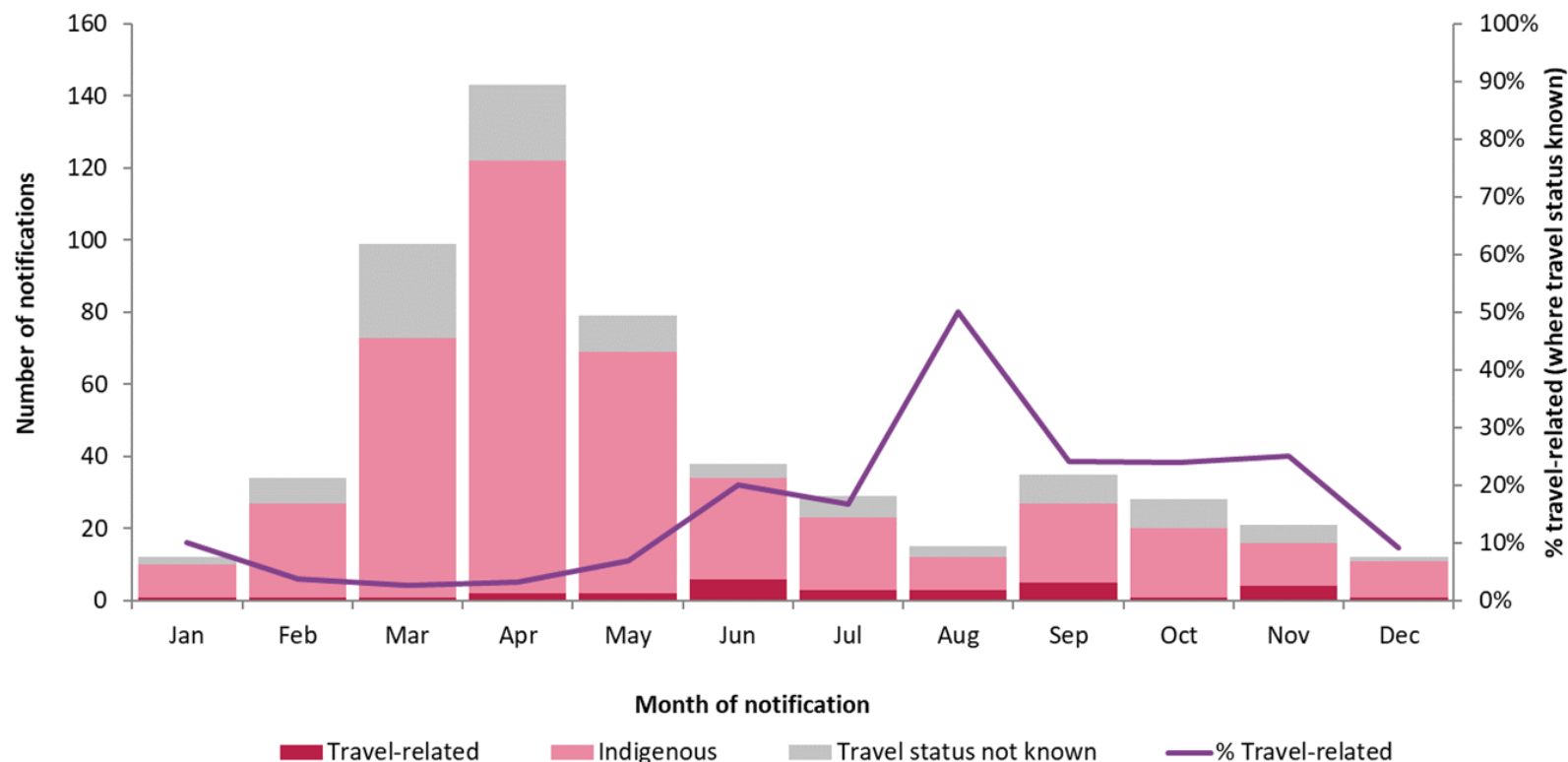
Cryptosporidiosis in Ireland: geographical distribution, 2020-2022



The CIR for cryptosporidiosis in 2020 the CIR was highest in Region Dublin & Southeast while in 2021 and 2022 the CIR was highest for HSE Health Region Midwest and West & Northwest.

*Trend data by HSE Health Region should be interpreted with caution due the re-organisation of HSE Healthboards to HSE Health Regions in 2022.

Cryptosporidiosis in Ireland: Seasonal distribution of cases by travel status, 2022



The highest number of cases were notified in springtime (March-May). A second less intense peak in September was seen, following an increase in the proportion of travel-related cases*.

*Travel-related cases are cases who reported international travel in the 2 weeks before onset of illness or where country of infection is recorded as a country other than Ireland.



Cryptosporidiosis in Ireland: cases by travel status, 2018-2022

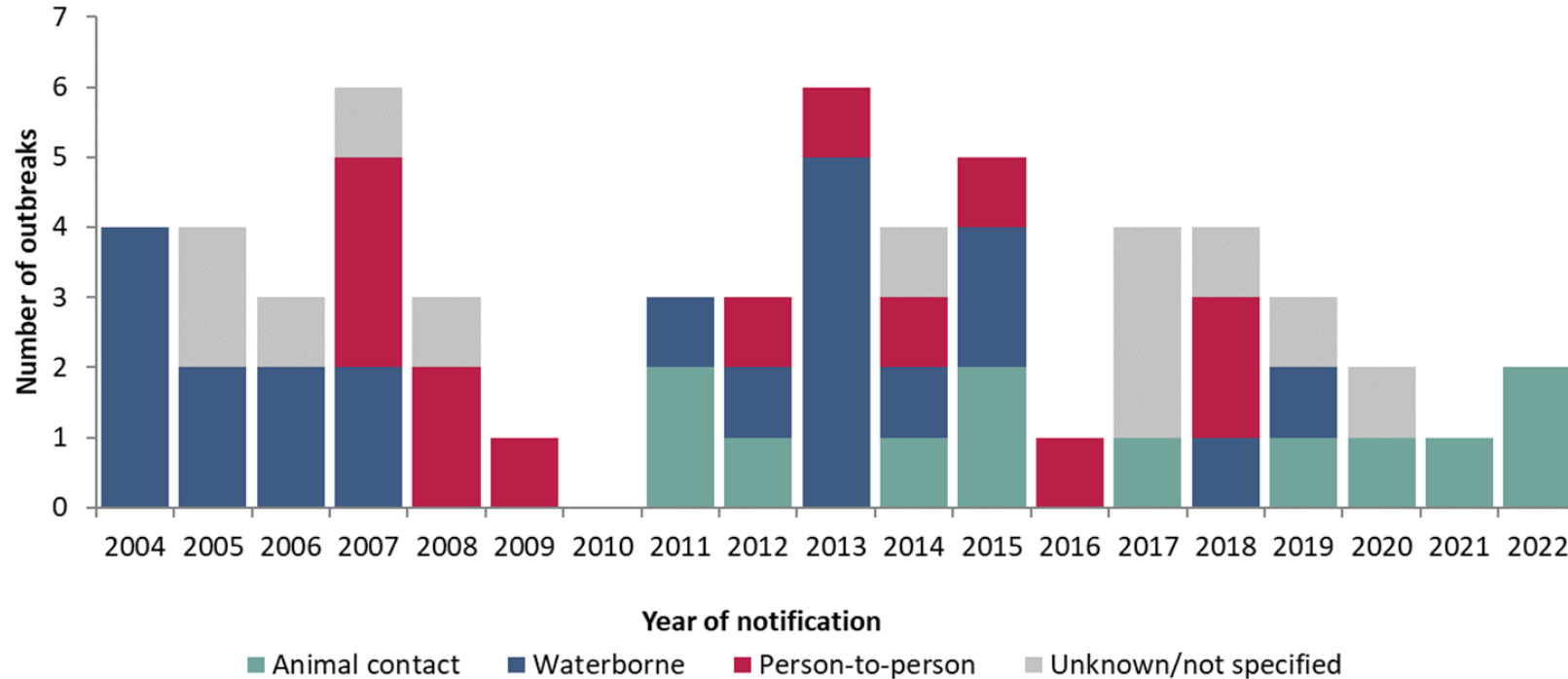


In 2022, 11% of cases were travel-related*, similar to 2018 (12%) but lower than in 2019 when 18% of cases were travel-related. During the pandemic years 2020 and 2021, 2% of cases each year were reported as travel-related*.

Disease Name	2018		2019		2020		2021		2022	
	N	% where known	N	% where known	N	% where known	N	% where known	N	% where known
Indigenous	505	88%	429	82%	324	98%	556	98%	414	89%
Travel-related	69	12%	92	18%	6	2%	10	2%	51	11%
Travel status not known	55	n/a	85	n/a	181	n/a	279	n/a	101	n/a
Total	629		514		505		835		515	

* Travel-related cases are cases who reported international travel in the 2 weeks before onset of illness or where country of infection is recorded as a country other than Ireland.

Cryptosporidiosis in Ireland: outbreaks, 2004-2022



The number of general outbreaks notified in 2022 (n=2) was low compared to recent years. The route of transmission was via animal contact for both general outbreaks notified in 2022. Both outbreaks occurred in Third level institutions settings with a total of 6 people ill (range 2-4).



Cryptosporidiosis in Ireland, 2022 summary



- 566 cases of cryptosporidiosis notified.
- Notification rate decreased from 16.4/100,000 in 2021 to 11.0/100,000 population in 2022.
- Almost 40% of cases were under 5 years.
- The highest number of cases were notified in springtime (March-May), corresponding to peak lambing/calving season, where most cases are indigenous. A second less intense peak in September is seen, following an increase in the proportion of travel-related cases.
- The number of general cryptosporidiosis outbreaks reported in 2022 was low, compared to previous years.
- When compared to other EU/EEA countries, Ireland's notification rate was above the EU/EEA average (2.3 per 100,000 population) and ranked 3rd highest in 2022.
- Ireland's cryptosporidiosis notification rate decreased in 2022 while other EU countries observed an increase in 2022 when compared to 2021 (Belgium, Luxembourg, Malta & Norway).
- The high notification rate in 2021 can be largely attributed to an increase in cases among children (aged 0-12 years) in March and April 2021 and may reflect changes in daily activities and increased environmental exposures for children as a result of school closures in the first quarter of 2021.
- The increase in cryptosporidiosis notification rate in Ireland during the pandemic in 2021 was not reported elsewhere in Europe.



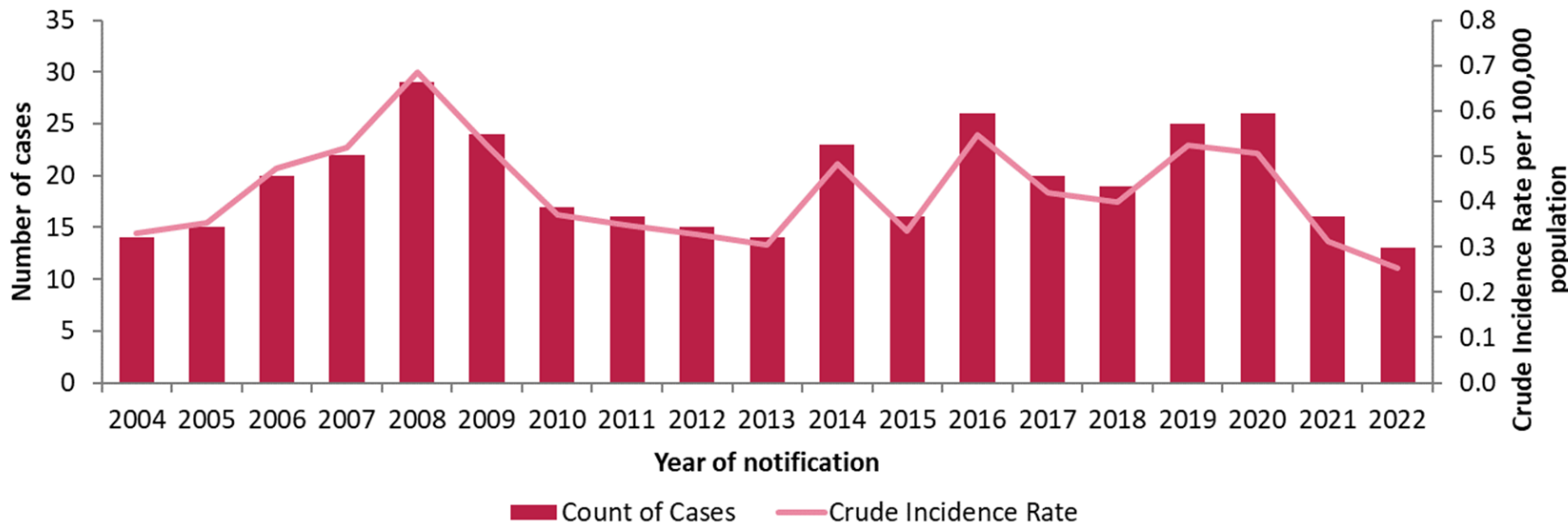
Leptospirosis in Ireland



- Leptospirosis is a bacterial infection frequently found both in domestic and wild animals which can spread to humans. Mild cases present as a flu-like illness, with a persistent and severe headache. However more severe disease can develop with meningitis and occasionally with liver and kidney failure. This can be fatal in a small proportion of cases.
- Leptospirosis in Ireland is generally acquired from contact with rats or items contaminated with rat urine. A milder form can also be acquired from contact with cattle or dogs. Infected urine or water contaminated with urine can be found in sewers, ditches, ponds, canals and slow-flowing rivers and riverbanks. High risk water includes stagnant, dirty-looking or obviously polluted fresh water found in ditches, drains, ponds, lakes or rivers. Sea water poses less risk.
- People at greatest risk of acquiring leptospirosis include those who fish, swim or use water for other recreational purposes. This includes people who engage in outdoor pursuits that brings them in contact with at-risk water such as canoeing, hiking, pot-holing or golfing. Occupations at risk include veterinary surgeons, farmers, meat inspectors, butchers, abattoir and sewer workers.

For more information on risk factors and precautions please see the [Leptospirosis Fact Sheet](#) on the HPSC website.

Leptospirosis in Ireland: trends, 2004-2022



There were 13 cases of leptospirosis notified in Ireland in 2022 this is a decrease of 19% from 2021.

The CIR of leptospirosis in Ireland in 2022 was 0.3 per 100,000 population. This was higher than the EU average which was 0.2 per 100,000 population in 2022.

Case numbers decreased during 2021 and 2022, compared to 2019 and 2020.



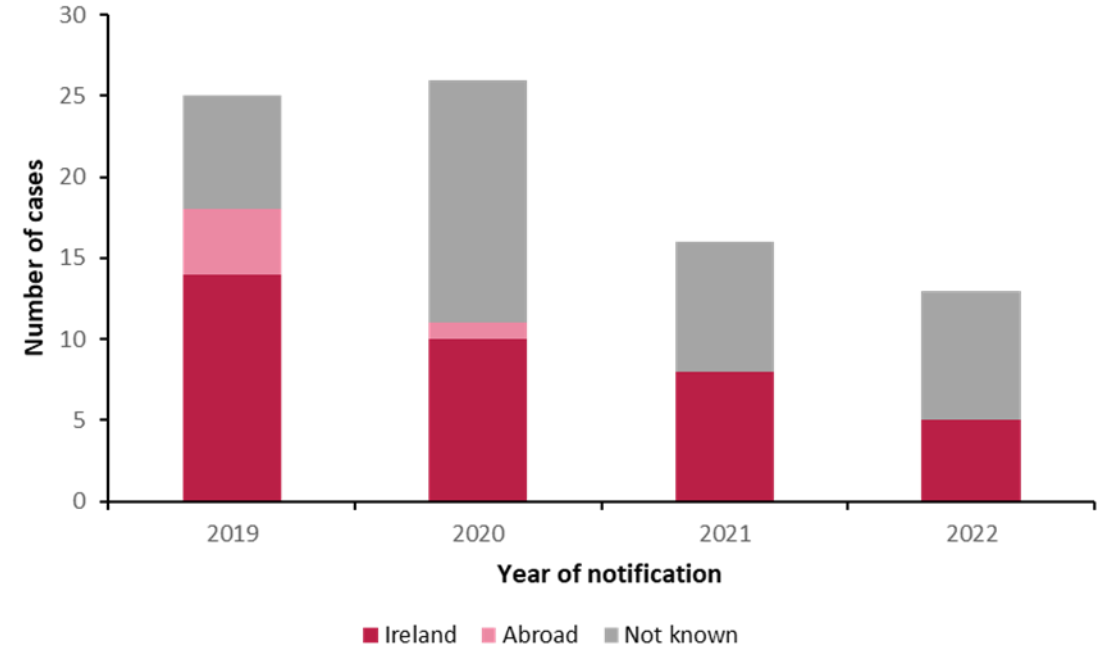
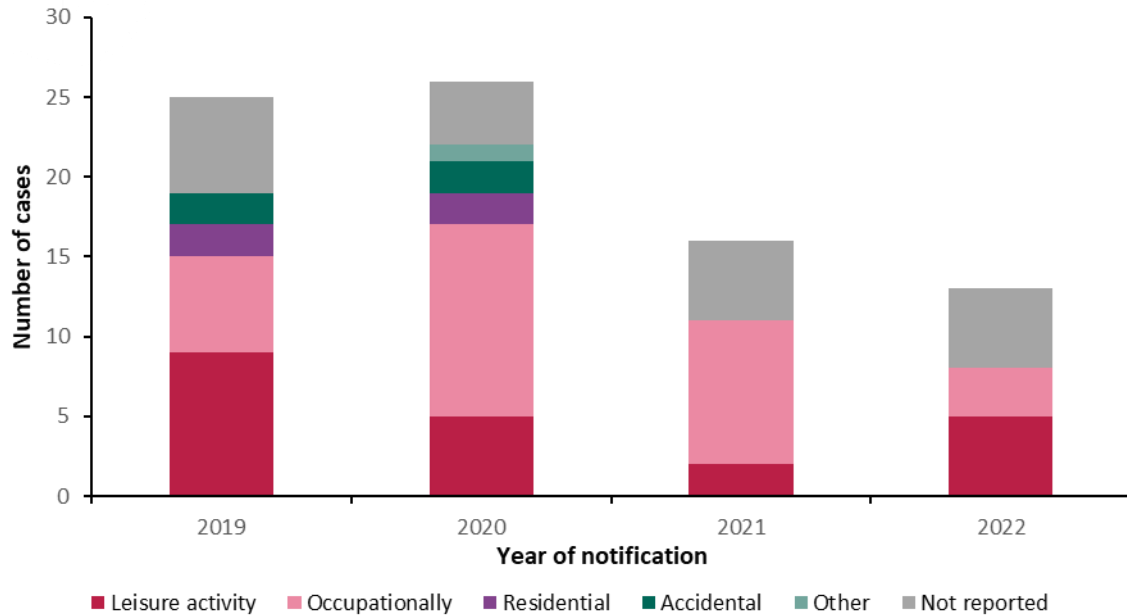
Leptospirosis in Ireland: summary of cases, 2019 - 2022



	2019	2020	2021	2022
Total cases	25	26	16	13
Male cases	20	20	15	9
Female cases	5	6	1	4
M:F Ratio	4.0	3.3	15.0	2.3
Crude Incidence Rate (per 100,000)	0.5	0.5	0.3	0.3
Median age (range)	31 (12-76)	46 (18-68)	39 (20-70)	44 (18-75)
Hospitalised cases	20	14	12	8
Percent hospitalised	80.0%	53.9%	75.0%	61.5%



Leptospirosis in Ireland: summary of cases, 2019 - 2022



- The most commonly reported transmission source were leisure activities in 2019 and 2022 and were occupational in 2020 and 2021*
- Where data on country of infection were available, most cases of leptospirosis were acquired domestically

*Leisure activities included activities such as swimming and canoeing in slow moving rivers and lakes, occupational activities included exposure to rats or sewage/faeces during routine work



Leptospirosis in Ireland, 2022 summary



- 13 cases of leptospirosis notified.
- Notification rate remained stable from 0.3/100,000 in 2021 to 0.3/100,000 population in 2022.
- Leisure activities were the most common likely source of transmission in 2022 compared to 2021 when occupational activities were the most reported likely source of transmissions. However, due to low numbers of cases caution is required when interpreting these data.
- Where data on country of infection were available, most cases of leptospirosis were acquired domestically.
- When compared to other EU/EEA countries, Irelands notification rate was slightly above the EU/EEA average (0.2 per 100,000 population) and ranked 7th highest in 2022.
- Ireland's leptospirosis notification rate remained stable in 2022 compared to 2021.



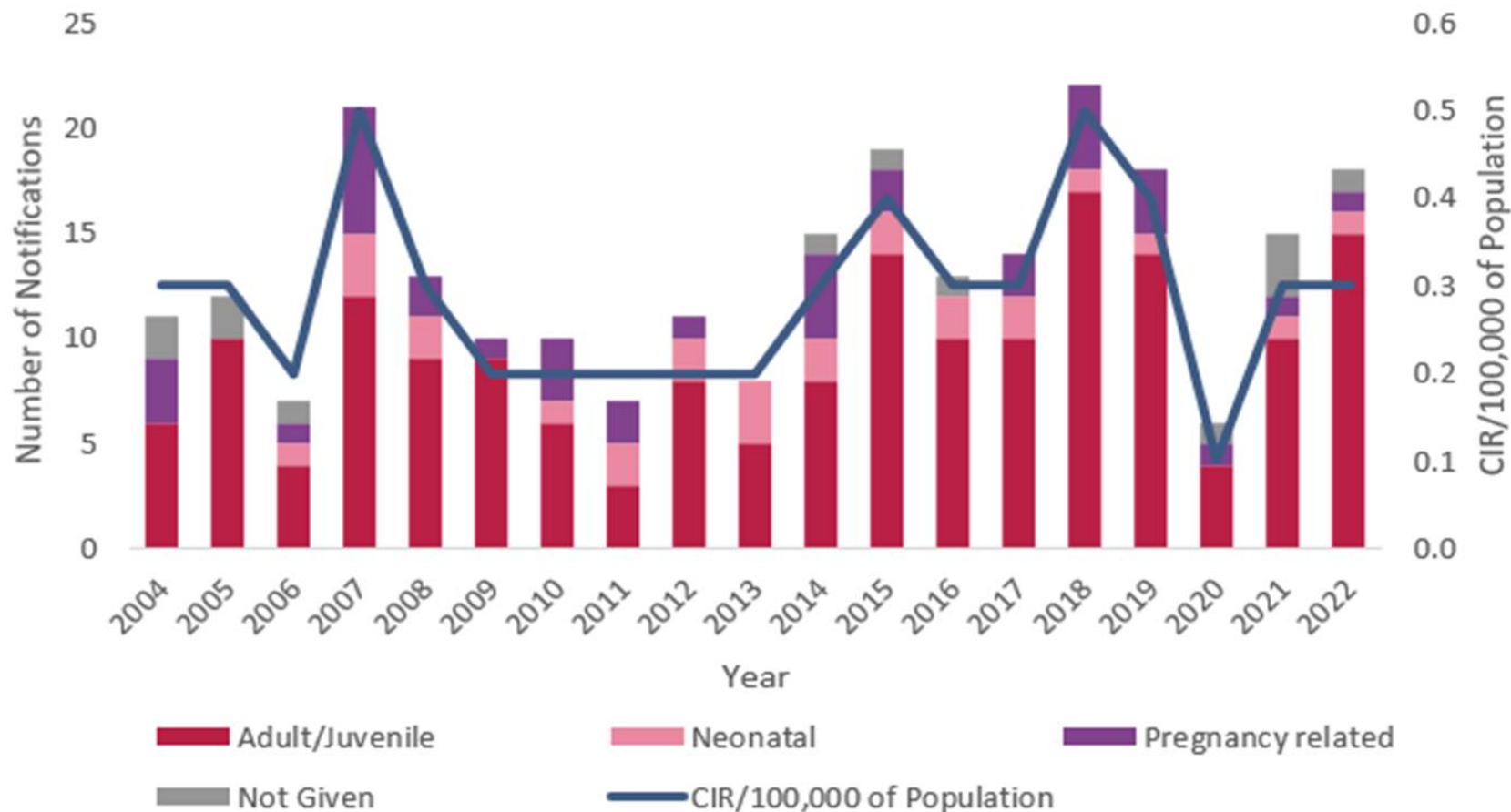
Listeriosis in Ireland



- Listeriosis is a serious infection usually caused by eating food (chilled ready to eat foods or processed foods) and unpasteurised milk and dairy products contaminated with the bacterium *Listeria monocytogenes*
- Healthy individuals infected with *L. monocytogenes* typically have a self-limiting gastrointestinal infection with fever and diarrhoea. However, in neonates, elderly people, and immunocompromised people, listeria can cause septicaemia and meningitis
- Pregnant women are also at risk: although illness may be mild for the woman, infection during pregnancy can lead to premature labour, meningitis in the newborn or miscarriage
- Although the number of cases of listeriosis notified annually in Ireland is small, the high rate of death associated with this infection makes it a significant public health concern

For more information on risk factors and precautions please see the [Listeriosis Fact Sheet](#) on the HPSC website.

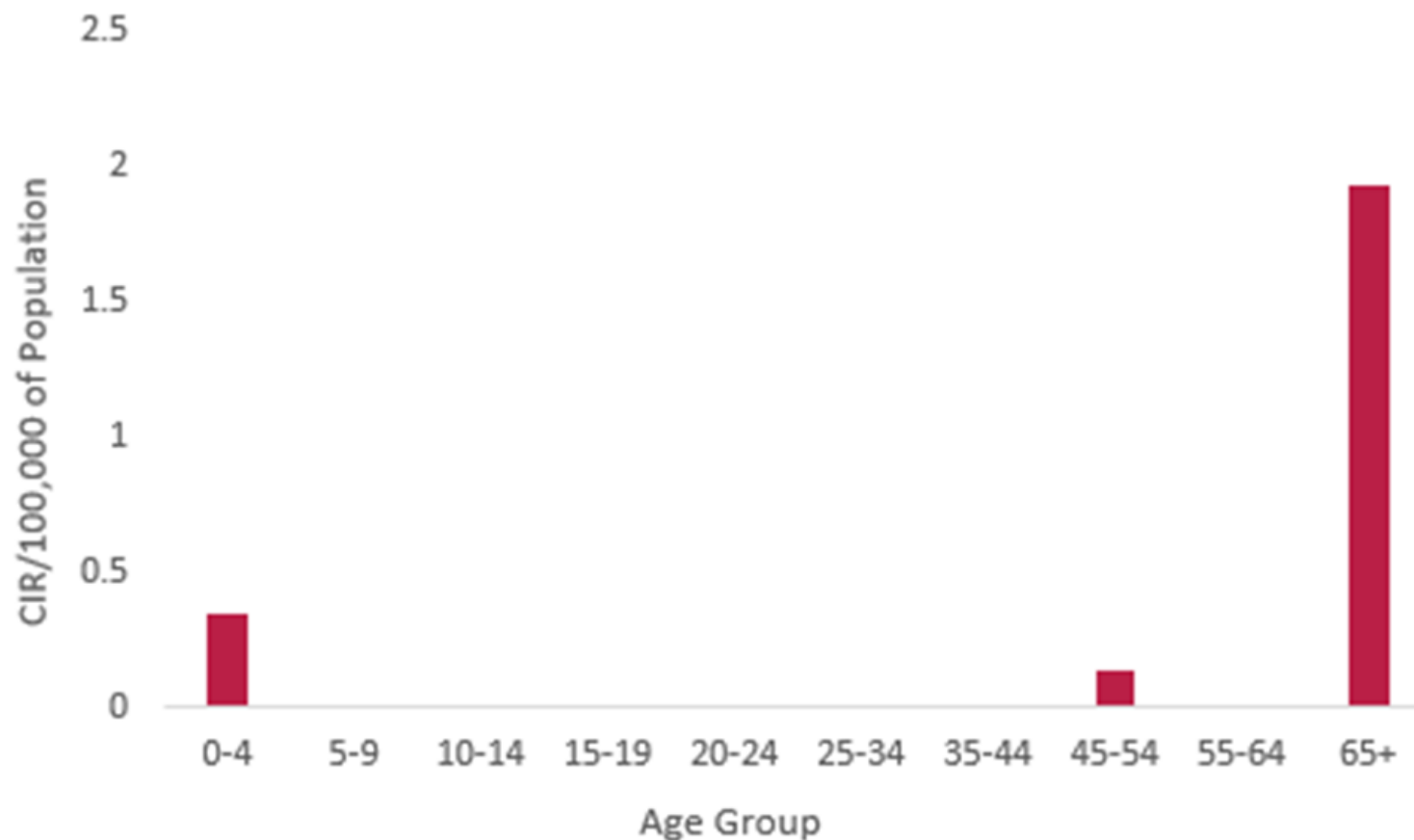
Listeriosis in Ireland: trends, 2004-2022



The annual listeriosis CIR has typically been between 0.3 and 0.5/100,000 in recent years but dropped to 0.1 in 2020. The notification rate returned to pre-pandemic levels in 2022, with a CIR of 0.3 in 2022.

7% and 6% of notifications were pregnancy related in 2021 and 2022 respectively, compared to 17% in 2019 and 2020.

Listeriosis in Ireland: age specific incidence rates, 2022



Excludes cases where age was unknown (n=1)

In 2022 the highest incidence of listeriosis occurred in persons aged greater than 65 years old. This is likely due to greater disease severity and higher testing rates in the over 65 years age group.

There were also two cases of listeriosis notified in the 0-4 year age group in 2022.

Listeriosis in Ireland: subtyping, 2019- 2022



Serotype	2019	2020	2021	2022
1/2a	4	2	3	3
1/2b	3	1	0	1
4b	9	2	5	6
Total	16	5	8	10

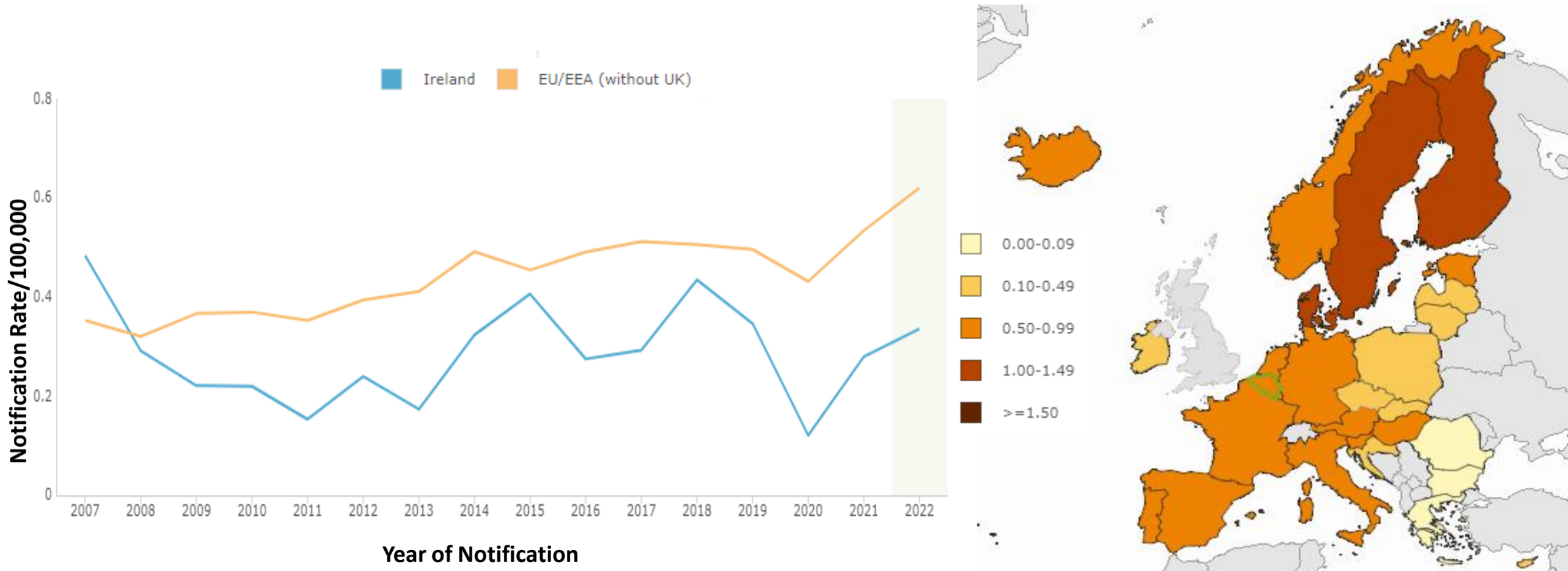
In 2022, isolates from 10 (56%) of the 18 cases notified were referred to NSSLRL for further typing.

The serotype 4b was the most common serotype reported in Ireland in 2019 (n=9), 2021 (n=5) and 2022 (n=6).



Listeriosis in the EU/EEA, 2007-2022

Since 2008, Ireland has had a lower crude incidence rate of listeriosis compared to the the EU/EEA average. In 2022, the notification rate in Ireland was 0.34/100,00 compared to 0.62/100,000 in the EU/EEA.





Listeriosis in Ireland, 2022 summary



- There were 18 cases of listeriosis notified in Ireland in 2022, a notification rate of 0.3/100,000 population.
- Listeriosis notifications initially decreased in 2020 (n=6) but returned to usual levels in 2021 and 2022. Older and immunocompromised people are typically the group most at risk of listeriosis in Ireland and these were the group most strongly advised to cocoon in response to the COVID-19 pandemic. These data suggest a link between listeriosis and socialising or eating out.
- In 2022 the highest incidence of listeriosis occurred in persons aged 65 years and older.
- There was one pregnancy-related listeriosis notification in 2022, as in 2020 and 2021. Awareness of the risks of consuming unpasteurised dairy products and other high risk foods during pregnancy be a contributing factor to these low numbers.
- The serotype 4b remained the most common serotype found in Ireland in 2022.
- Notification rates of listeriosis in Ireland in 2022 were approximately half the average notification rate in EU/EEA.
- To assist public health detection and investigation of outbreaks and/or food incidents, referral of all *Listeria* isolates for further typing in the NSSLRL is encouraged.



Norovirus infection in Ireland





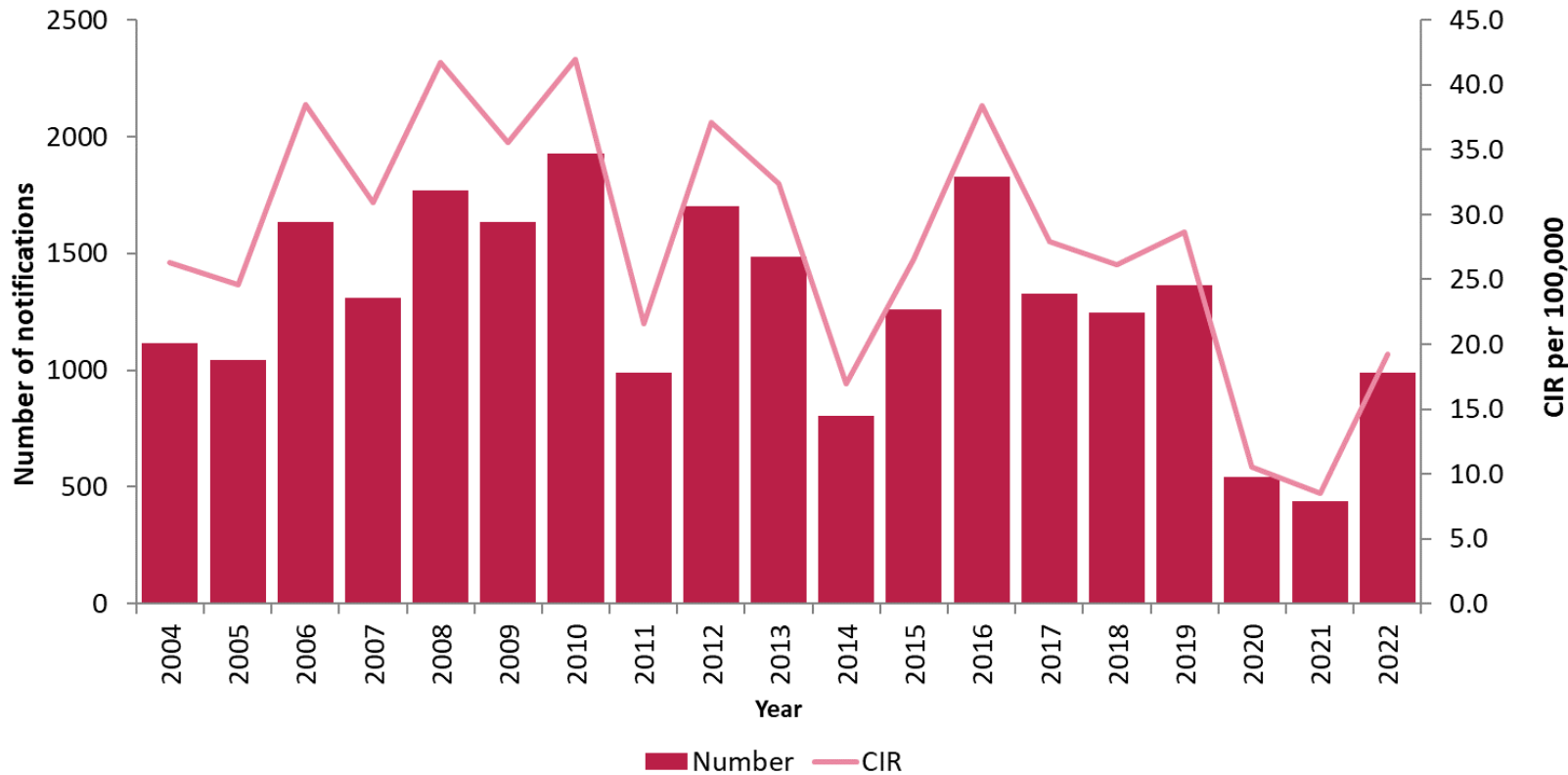
Norovirus infection in Ireland



- Norovirus, also known as the “winter vomiting bug” is a common and very contagious virus causing symptoms of nausea, vomiting and watery diarrhoea.
- Symptoms begin around 12 to 48 hours after becoming infected, usually lasting only about one or two days. Some people (usually the very young or elderly) may become very dehydrated and require hospital treatment.
- Noroviruses are very contagious and can spread easily from person to person. Both faeces and the vomit of an infected person contain the virus and are infectious. Contaminated surfaces, objects or hands, as well as consumption of contaminated food or water, can lead to spread of the virus.
- Norovirus often causes outbreaks because it is spread so easily from person-to-person and can survive in the environment for a number of days.
- Outbreaks of norovirus are reported frequently anywhere that large numbers of people congregate for periods of several days. Healthcare settings (hospitals and nursing homes) tend to be particularly affected by outbreaks of norovirus.

For more information on risk factors and precautions please see the [Norovirus Fact Sheet](#) on the HPSC website.

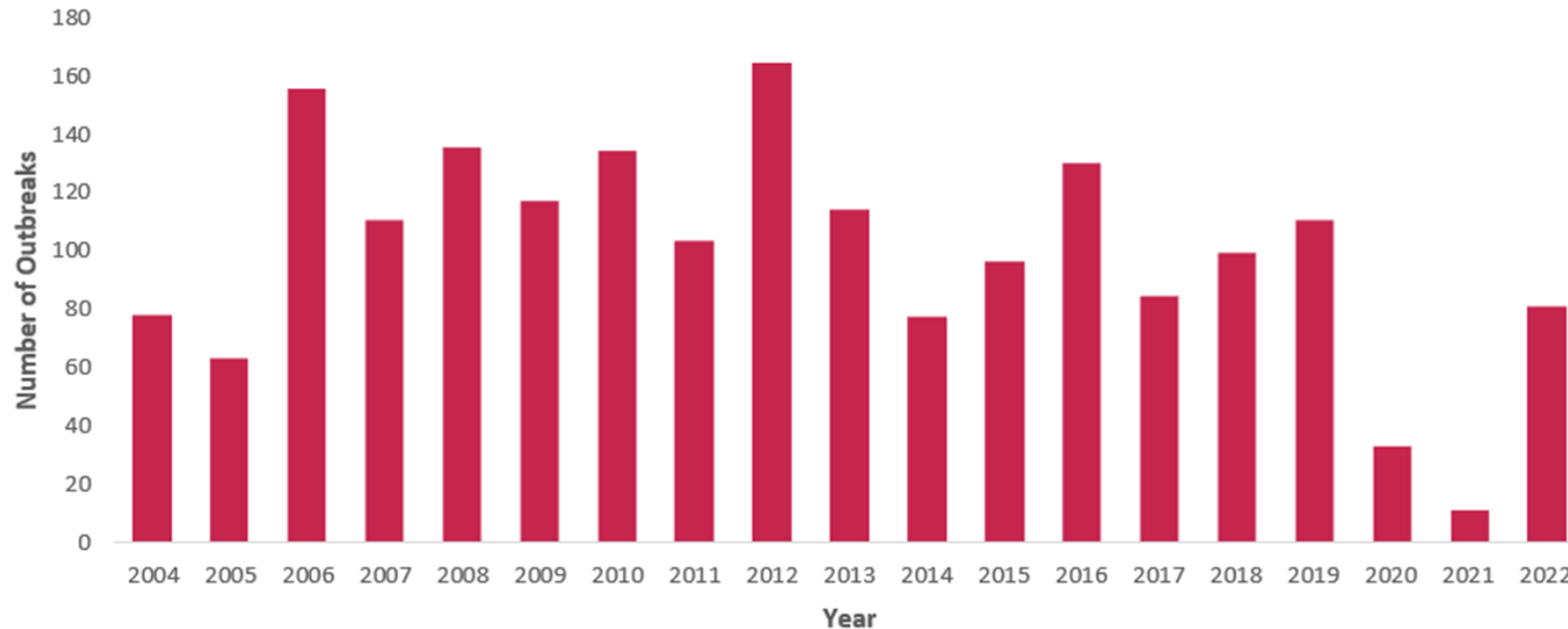
Norovirus in Ireland: trends, 2004-2022



The CIR for norovirus case notification increased in 2022 (19.2/100,000), when compared to pandemic years 2020 (10.6/100,000) and 2021 (8.5/100,000) but remained lower than pre-pandemic years (2004-2019, except for 2014).

990 cases of norovirus were notified in 2022, 74% (n=730) were linked to norovirus outbreaks.

Norovirus in Ireland: outbreak trends, 2004-2022



The number of notified norovirus outbreaks decreased in 2020 (n=33) and 2021 (n=11) compared to 2019 (n=110).

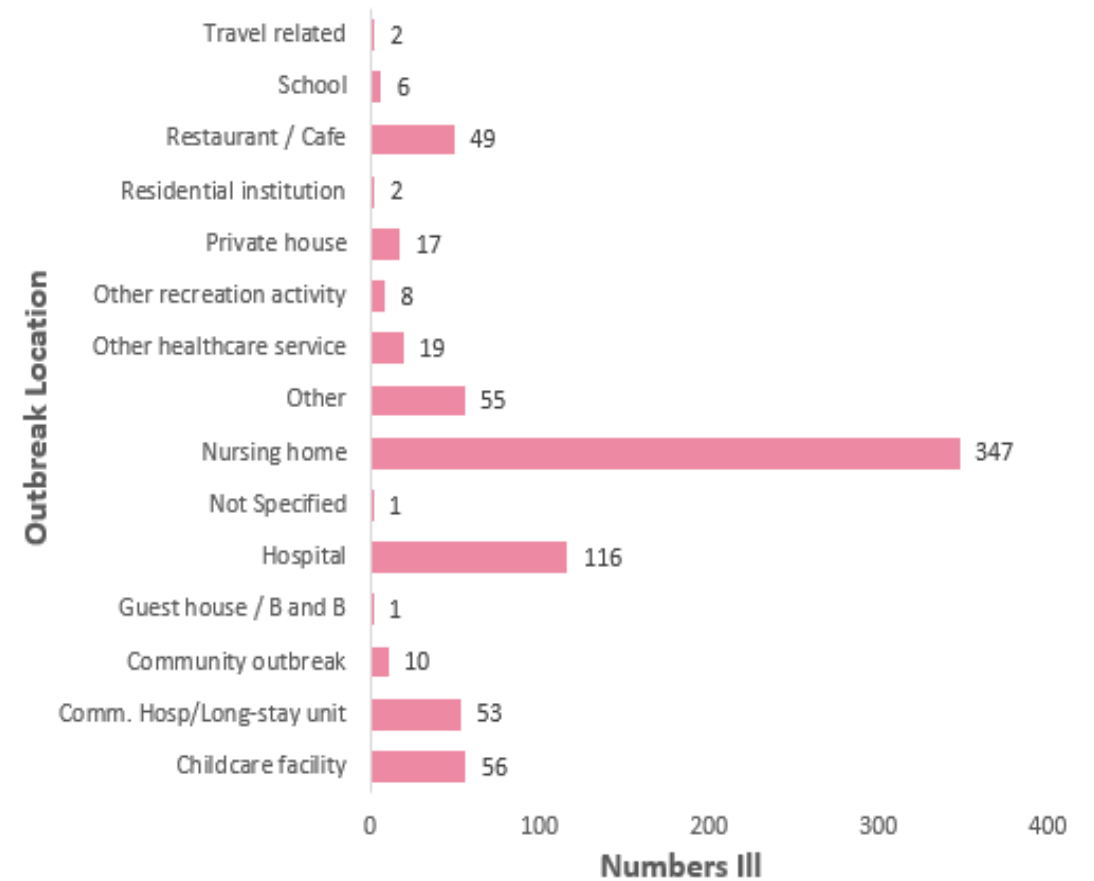
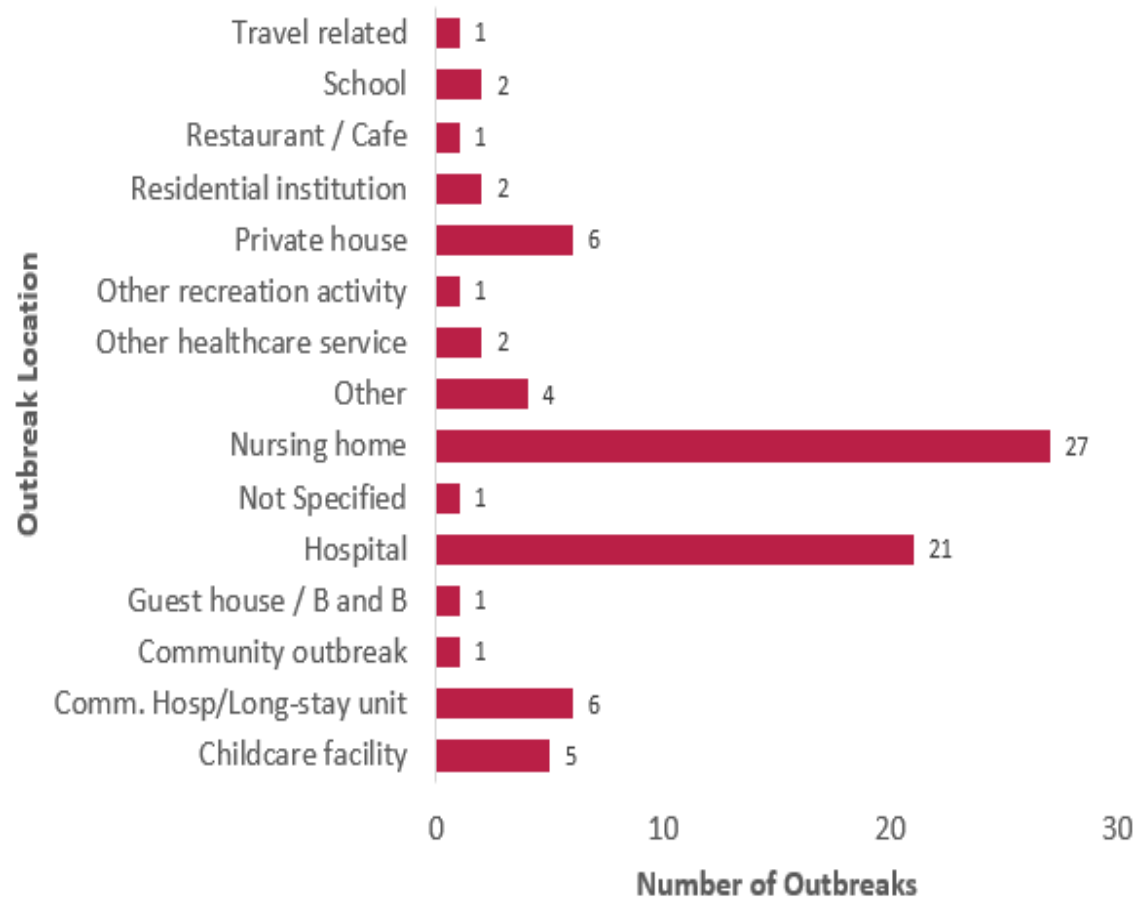
In 2022 the number of outbreaks increased, returning to pre-pandemic levels (n=81).



Norovirus in Ireland: outbreaks, 2022



Norovirus outbreak notifications were reported most frequently in nursing homes (33%; n=27, with a total of 347 people ill) and hospitals (26%; n=21 with a total of 116 people ill) in 2022.





Norovirus in Ireland, 2022 summary



- 990 cases of norovirus notified in 2022.
- Notification rate increased from 8.5/100,000 in 2021 to 19.2/100,000 population in 2022, but this rate still remains lower than the pre-pandemic notification rate for norovirus infection.
- Over 70% of norovirus cases notified in 2022 were linked to an outbreak.
- 81 norovirus outbreaks were notified in 2022, similar to the number of outbreak notified annually before the pandemic.
- Norovirus outbreaks were most frequently reported in nursing homes and hospitals.
- Reduced visitation, increased use of personal protective equipment (PPE) in healthcare settings, social distancing and cohorting of residents in nursing homes to limit the spread of COVID-19 in these settings likely led to the reduction in the number of norovirus cases and outbreaks that were reported during the pandemic years of 2020 and 2021.



Salmonellosis in Ireland





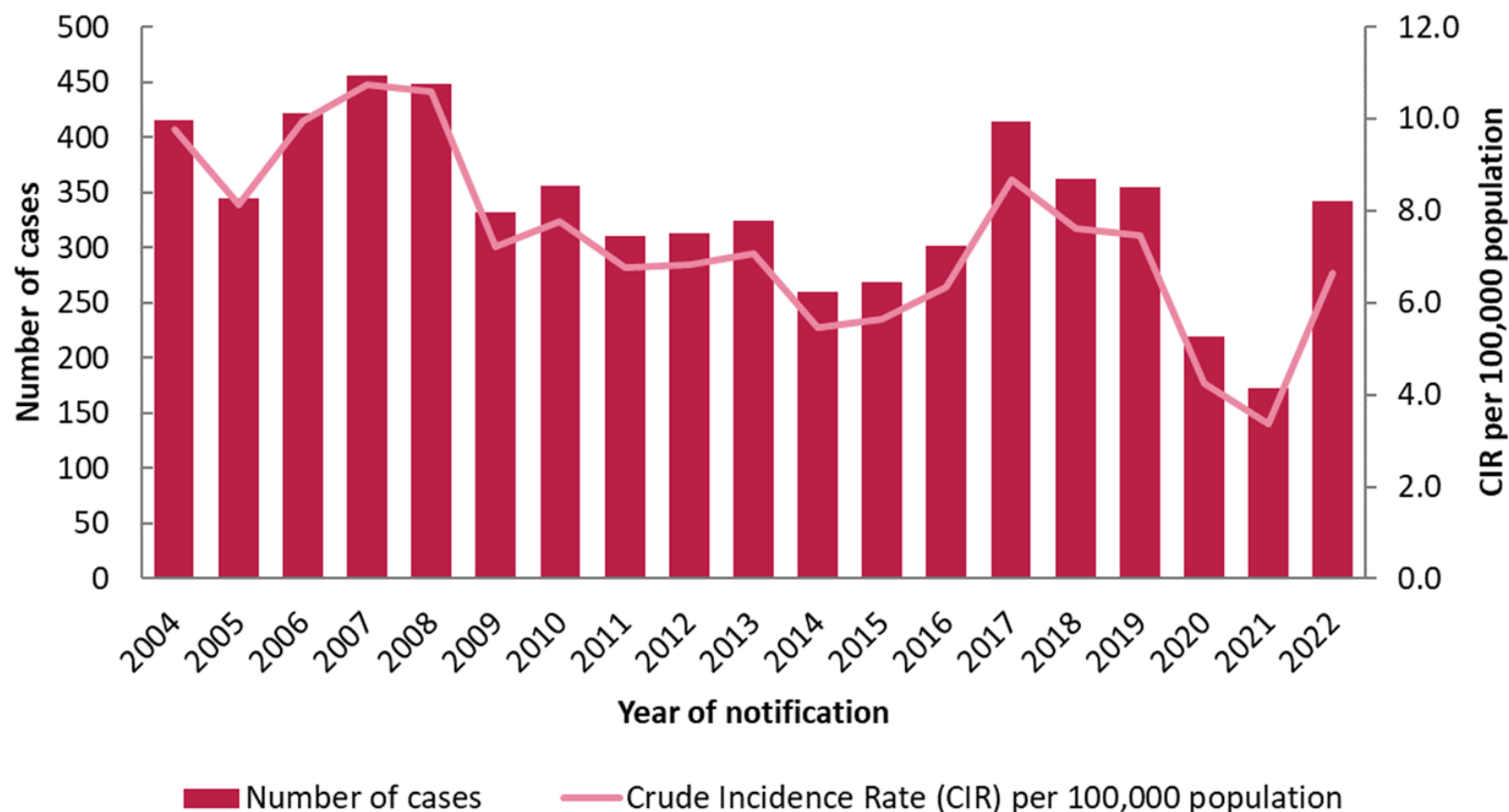
Salmonellosis in Ireland



- Salmonellosis is a gastroenteric infection caused by bacteria from the genus *Salmonella*. *Salmonella enterica* is the species that causes human disease.
- Non-typhoidal serovars (NTS) of this species cause symptoms such as diarrhoea (sometimes bloody), fever, headache and abdominal pain. Symptoms usually last for less than a week and most people recover without treatment. However, symptoms can occasionally be severe enough to warrant hospital admission. The elderly, infants, and those with impaired immune systems are more likely to have a severe illness. In a minority of cases, salmonellosis can also become a systemic infection.
- The intestinal tract of wild and domestic animals and birds is a common reservoir for *Salmonella*, which can result in foodstuffs of both animal and plant origin becoming contaminated with faeces. Humans become infected through consumption of contaminated ready-to-eat or poorly-cooked foods.
- In Ireland, *Salmonella*-control measures are present at all stages of food supply, from production to distribution and consumption

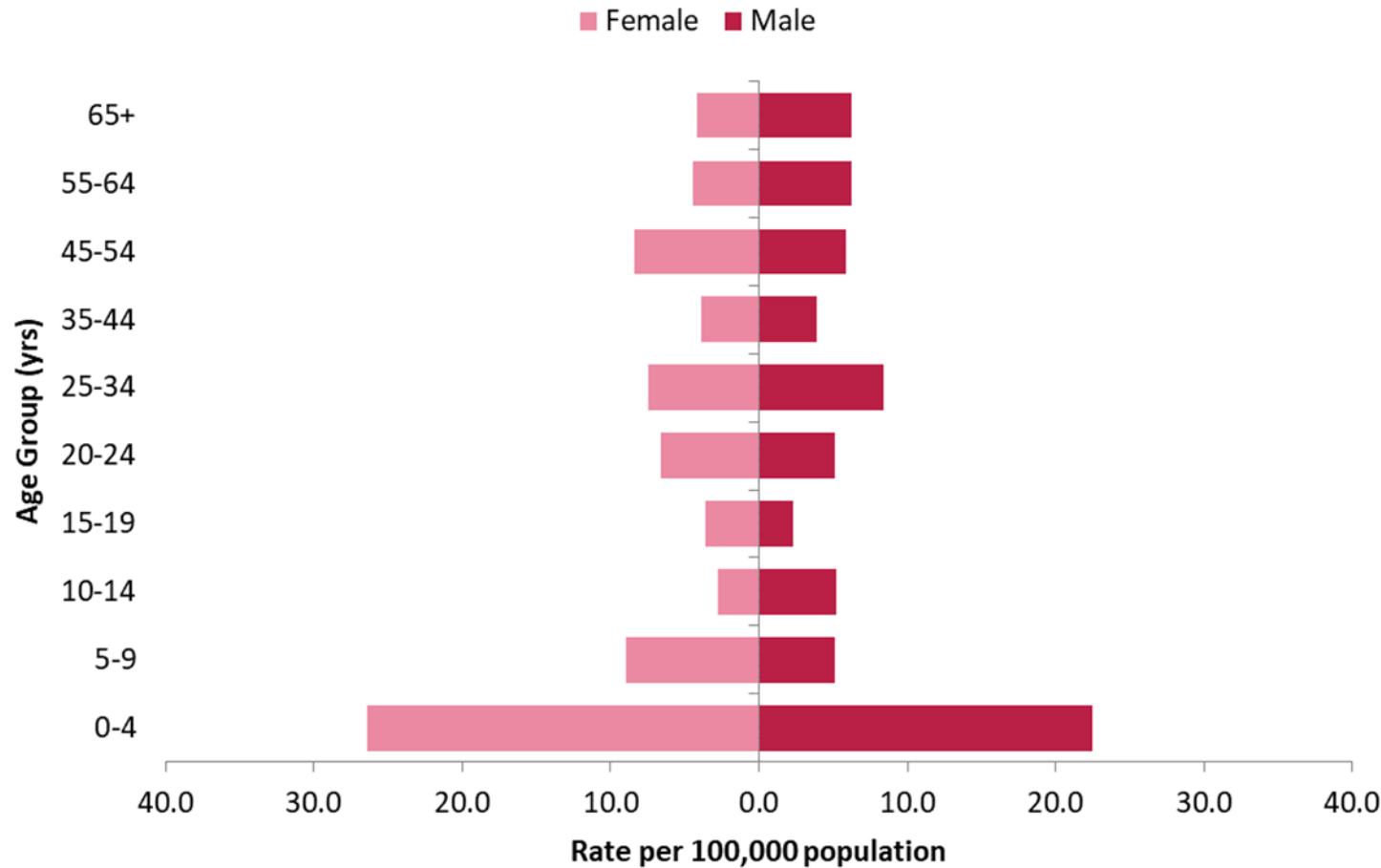
For more information on risk factors and precautions please see the [Salmonellosis Fact Sheet](#) on the HPSC website.

Salmonellosis in Ireland: trends, 2004-2022



The CIR for salmonellosis decreased in 2020 and 2021 during the COVID-19 pandemic. In 2022 the CIR (6.6/100,000) almost doubled from the CIR in 2021 (3.4/100,000) but was similar to pre-pandemic rates.

Salmonellosis in Ireland: age and sex distribution, 2022



In 2022, 51% (n=174) of cases were female and 49% (n=168) were male.

The highest age-standardised incidence rate was among 0-4 year olds (24.4/100,000 population)

Salmonellosis in Ireland: geographical distribution, 2020-2022



In 2022, the salmonellosis CIR increased in all HSE regions, compared to 2021.

The area reporting the highest incidence rate in 2022 was HSE Dublin and Northeast region (7.6/100,000), while HSE Southwest reported the lowest incidence in 2022 (5.4/100,000).

*Trend data by HSE Health Region should be interpreted with caution due the re-organisation of HSE Healthboards to HSE Health Regions in 2022.

Salmonellosis in Ireland: disease severity, 2022

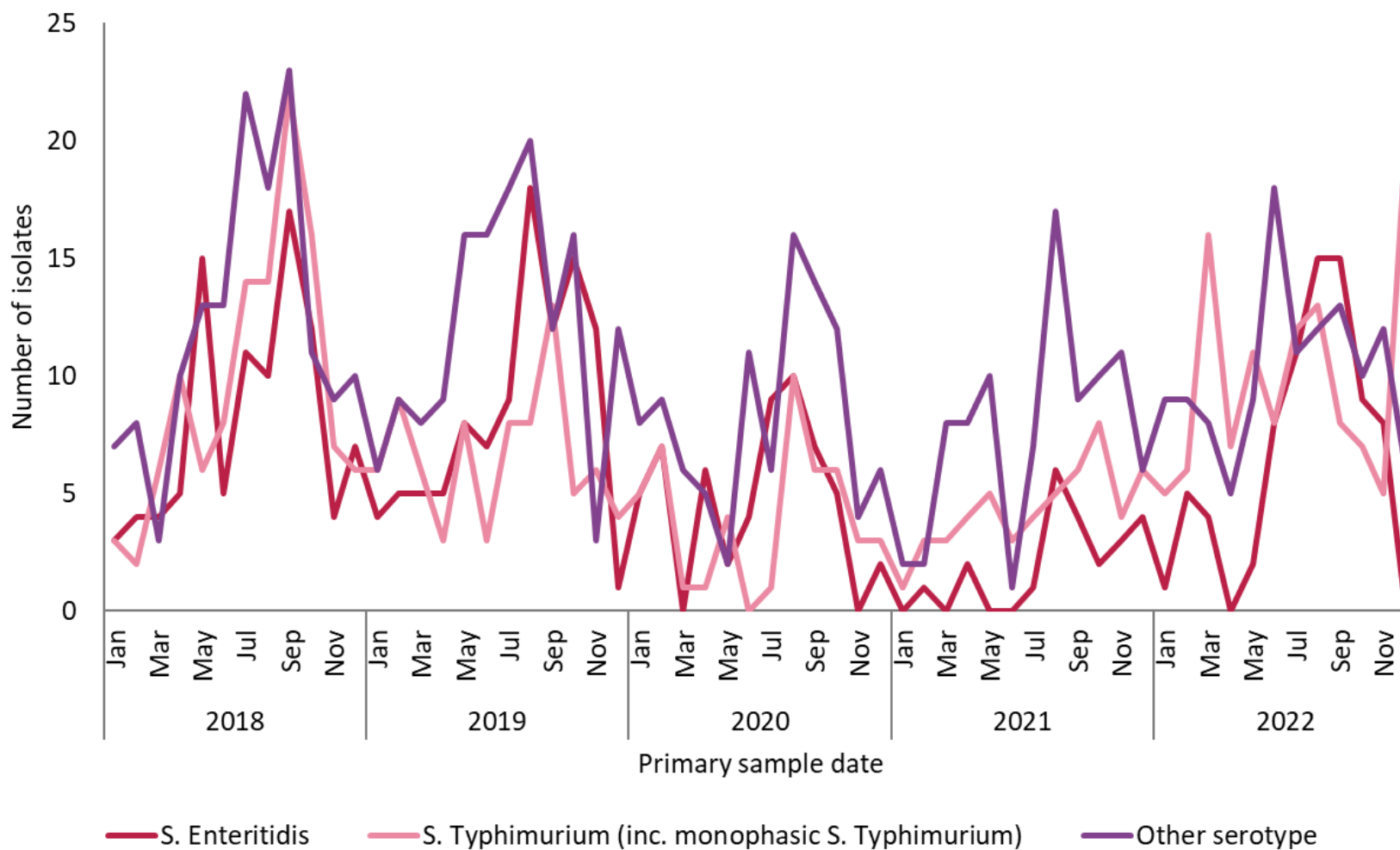


Symptom	Symptom present (n)	Symptom not present (n)	Unknown (n)	% with symptoms (where known)
Diarrhoea	268	14	60	95%
Abdominal pain	222	35	0	86%
Fever	189	73	0	72%
Nausea	152	90	100	63%
Vomiting	135	137	152	50%
Headache	90	118	0	43%
Bloody diarrhoea	92	156	0	37%
Myalgia	73	133	136	35%
Rash	13	206	123	6%

Diarrhoea (95%) followed by abdominal pain (86%) and fever (72%) were the most common symptoms reported among cases notified in 2022.

Where information on hospitalisation was available, 42% (142/338) of cases in 2022 were recorded as having been hospitalised, a decrease from 48% in 2021 and 47% in 2020.

Salmonellosis in Ireland: serotypes, 2018-2022



Excludes cases where isolates were not referred to the Reference Laboratory for further typing.

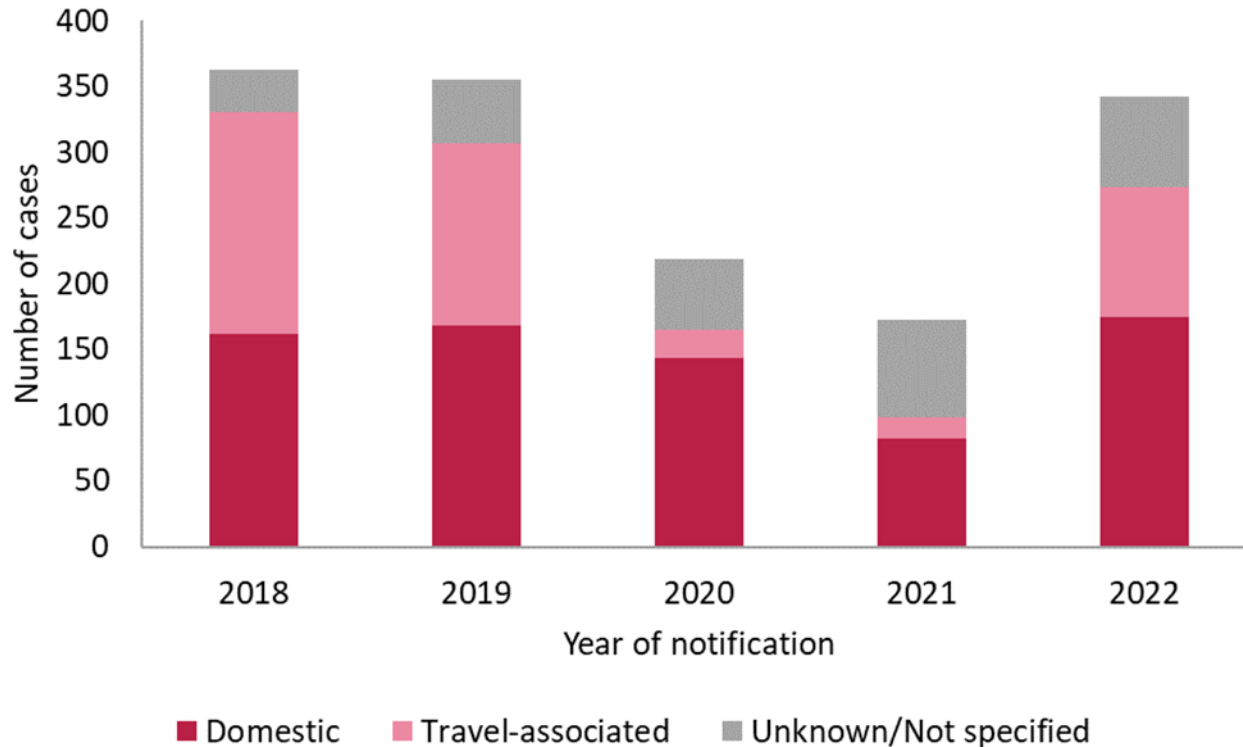
The NSSLRL analysed 319 human non-typhoidal *Salmonella* isolates referred for further typing in 2022.

S. Typhimurium (including monophasic *S. Typhimurium*) (37%) and *S. Enteritidis* (24%) were the most common serotypes in 2022. These proportions were comparable to the proportions seen prior to the COVID-19 pandemic but the proportion of cases of *S. Enteritidis* decreased to 14% in 2021, likely reflecting the reduction in travel-associated acquisition.

Other frequently seen serotypes in 2022 included *S. Newport*, *S. Poona*, *S. Mbandaka* and *S. Infantis*.

Salmonellosis in Ireland: international travel 2018-2022

In Ireland, international travel is typically considered a risk factor for acquiring salmonellosis but travel restrictions and limited data collection/validation during the COVID-19 pandemic reduced the proportion of cases reported as travel-associated during 2020-2022



Information on international travel was available for 80% of cases notified in 2022

Data source: Computerised Infectious Diseases Reporting system (CIDR) 21/11/2023



Where data were available, 36% (n=99) of cases in 2022 reported country of infection outside of Ireland, decreased from 45% and 51% of cases in 2019 and 2018, respectively.

13% and 16% of cases were reported as travel-associated during the pandemic years of 2020 and 2021, respectively.

Spain, Portugal and Turkey were the most commonly reported countries of infection among travel-associated cases in 2022.

S. Typhimurium (inc. monophasic *S. Typhimurium*), accounted for 41% (n=72) of domestic cases compared to 23% (n=23) of travel-associated cases in 2022. *S. Enteritidis* accounted for 41% (n=41) of travel-associated cases, compared to 14% (n=24) of domestic cases in 2022

HE Salmonellosis in Ireland: outbreaks and clusters, 2022



17 outbreaks of salmonellosis were notified in 2022 (5 general and 12 family outbreaks), increased from 11 and 6 outbreaks notified in 2020 and 2021, respectively, but unchanged from the number of outbreaks notified in 2019.

- 3 general outbreaks were investigated as national outbreaks
 - 16 laboratory-confirmed cases of Monophasic *S. Typhimurium* associated with a wider multi-country outbreak linked to consumption of chocolate products^{1, 2, 3}
 - 27 laboratory-confirmed cases who were resident on or who visited the island of Ireland⁴
 - A smaller outbreak, comprising 5 cases and the source was not identified
- 2 general outbreaks were investigated as regional outbreaks
 - One involved 3 people ill and was travel-associated; this information was not available for the other
- Whole genome sequencing analysis performed at the NSSLRL confirmed that most *Salmonella* isolates typed in 2022 were not genetically linked but a further 25 non-typhoidal *Salmonella* genetic clusters were identified by NSSLRL in 2022 in addition to those notified as national outbreaks
 - The newly identified clusters were generally small, with a median of 2 cases per cluster (range: 2-6)
 - The majority of these clusters were too diffuse geographically or temporally to require further public health action

¹ [EPI INSIGHT. Vol 23 Issue 5, July 2022.](#)

² [Nielsen et al. Public Health Chall.2023;2:e116](#)

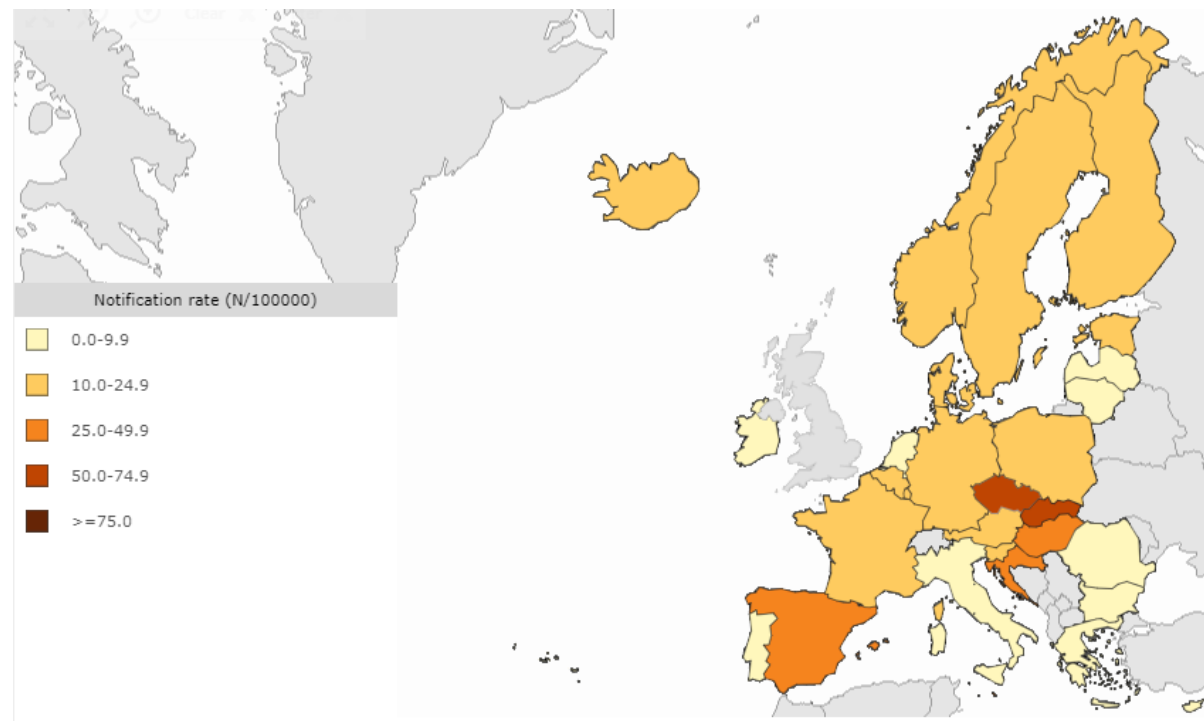
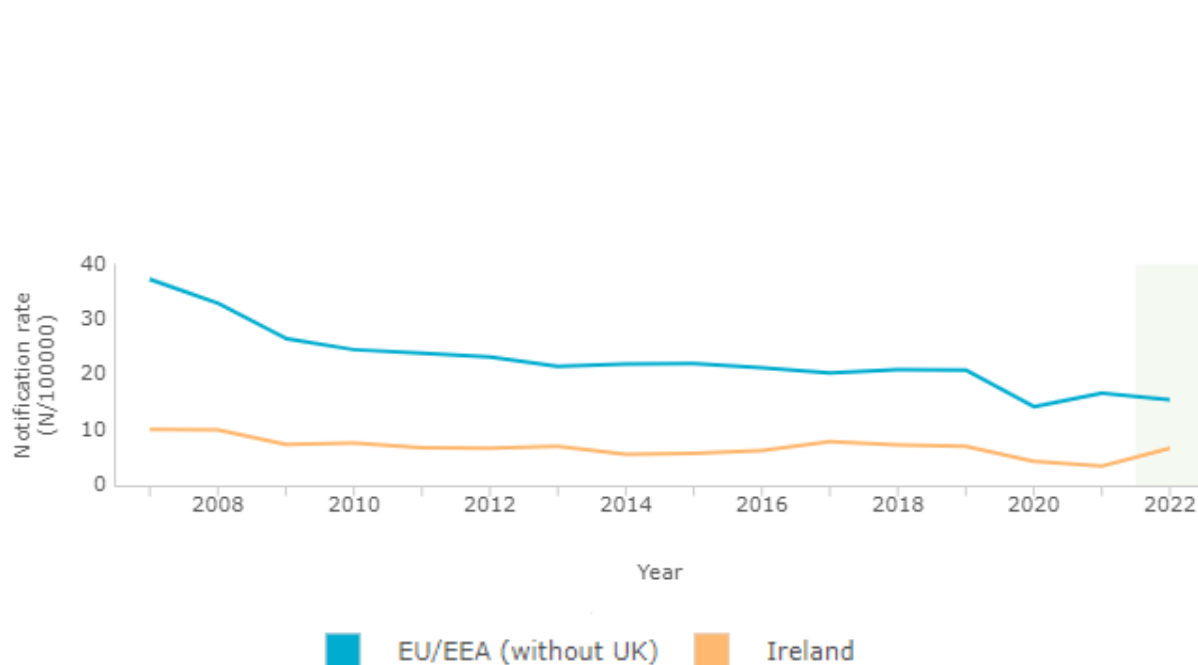
³ [Larkin et al. Eurosurveillance. Vol 27, Issue 15, April 2022.](#)

⁴ [EPI INSIGHT. Vol 24 Issue 3, March 2023.](#)



Salmonellosis in the EU/EAA, 2007-2022

In 2022, the salmonellosis notification rate in Ireland remained lower than the EU average notification rate (15.5/100,000) and was among the lowest rates in Europe.





Salmonellosis in Ireland, 2022 summary



- 342 cases of salmonellosis notified in 2022.
- Notification rate increased from 3.4/100,000 in 2021 to 6.6/100,000 population in 2022, similar to the pre-pandemic notification rate for salmonellosis.
- 21% of cases were children aged under 5 years.
- HSE Dublin and Northeast region had the highest CIR (7.6/100,000).
- *S. Enteritidis* and *S. Typhimurium* continued to be the most commonly reported serotypes, with *S. Enteritidis* more likely among travel-associated cases and *S. Typhimurium* more likely among domestic cases.
- There was a decrease in travel-associated cases reported in 2022, which may reflect that international travel had not yet returned to pre-pandemic levels but may also be also be an artefact of a lower level of completeness of the “country of infection” variable due to the impact of the pandemic on surveillance data collection (75%, 57% and 80% in 2020, 2021 and 2022 vs. 86% and 90% in 2019 and 2018, respectively).
- 3 national outbreaks of salmonellosis were notified in 2023, including one linked to a larger multi-country outbreak.
- When compared to other EU/EEA countries, Irelands notification rate was below the EU/EEA average.



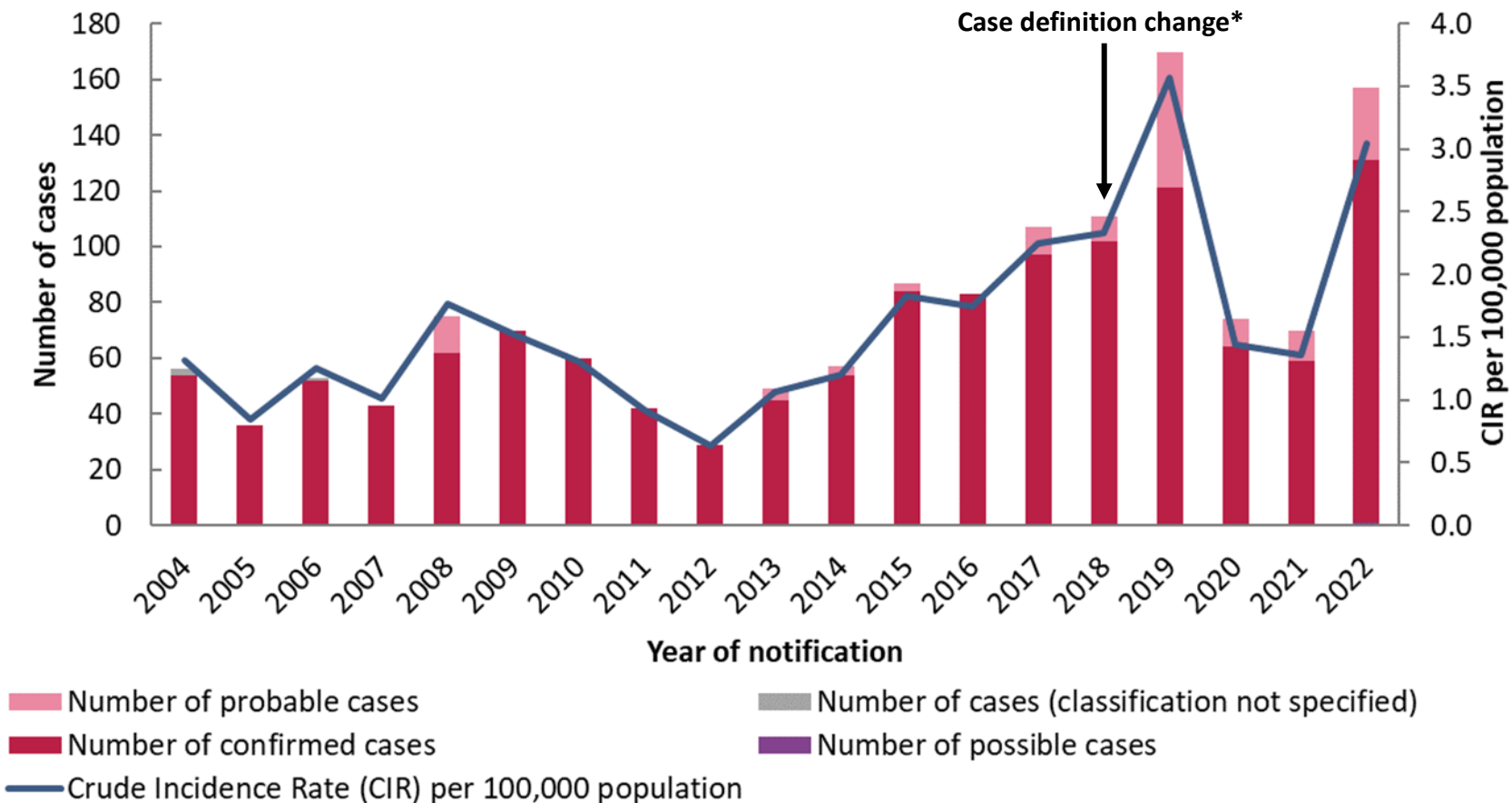
Shigellosis in Ireland



- Shigellosis is an infection of the gastrointestinal tract caused by one of four species of the bacterial genus *Shigella*. The bacteria are only found in humans.
- Anyone can get shigellosis, but those who are at greater risk include children attending childcare facilities and their parents, overseas travellers and gay, bisexual and other men who have sex with men (gbMSM).
- Infection typically presents as diarrhoea (sometimes bloody), nausea and vomiting, fever and abdominal cramps. Shigellosis symptoms can range from being mild and self-limiting to more serious complications, including colitis, sepsis and haemolytic uraemic syndrome, in a minority of cases. Shigellosis may also be asymptomatic but remains transmissible by asymptomatic carriers.
- *Shigella* bacteria are transmitted via the faecal-oral route, either through consumption of contaminated food or water, oral contact with contaminated objects or through direct person-to-person spread. Shigellosis is highly transmissible with a very low infectious dose.

For more information on risk factors and precautions please see the [Shigellosis Fact Sheet](#) on the HPSC website.

Shigellosis in Ireland: trends, 2004-2022

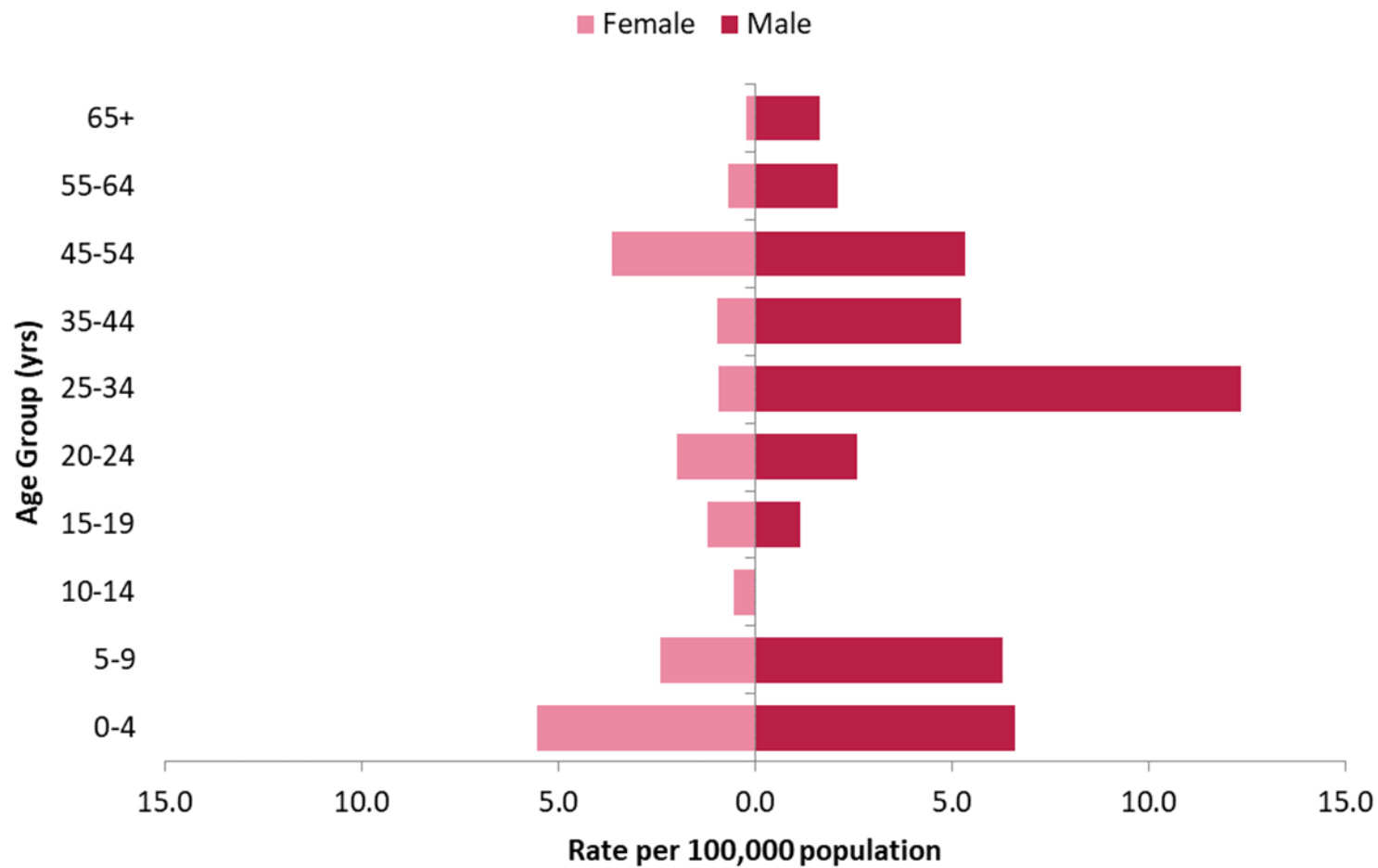


The CIR for shigellosis has been showing an increasing trend since 2013 and was at the highest recorded rate in 2019 (3.6/100,000).

The CIR decreased in 2020 and 2021 during the COVID-19 pandemic but in 2022 the CIR (3.0/100,000) more than doubled compared to 2021.

*During 2018 the [shigellosis case definition](#) changed to facilitate the reporting of PCR positive, culture negative cases as Probable cases

Shigellosis in Ireland: age and sex distribution, 2022



In 2022, 74% (n=116) of cases were male and 26% (n=41) were female.

The highest age-standardised incidence rate (ASIR) was among 25-34 year olds (6.5/100,000), with males accounting for 93% of cases among this age group.

The next highest ASIR was among 0-4 year olds (6.1/100,000).

Shigellosis in Ireland: geographical distribution, 2020-2022

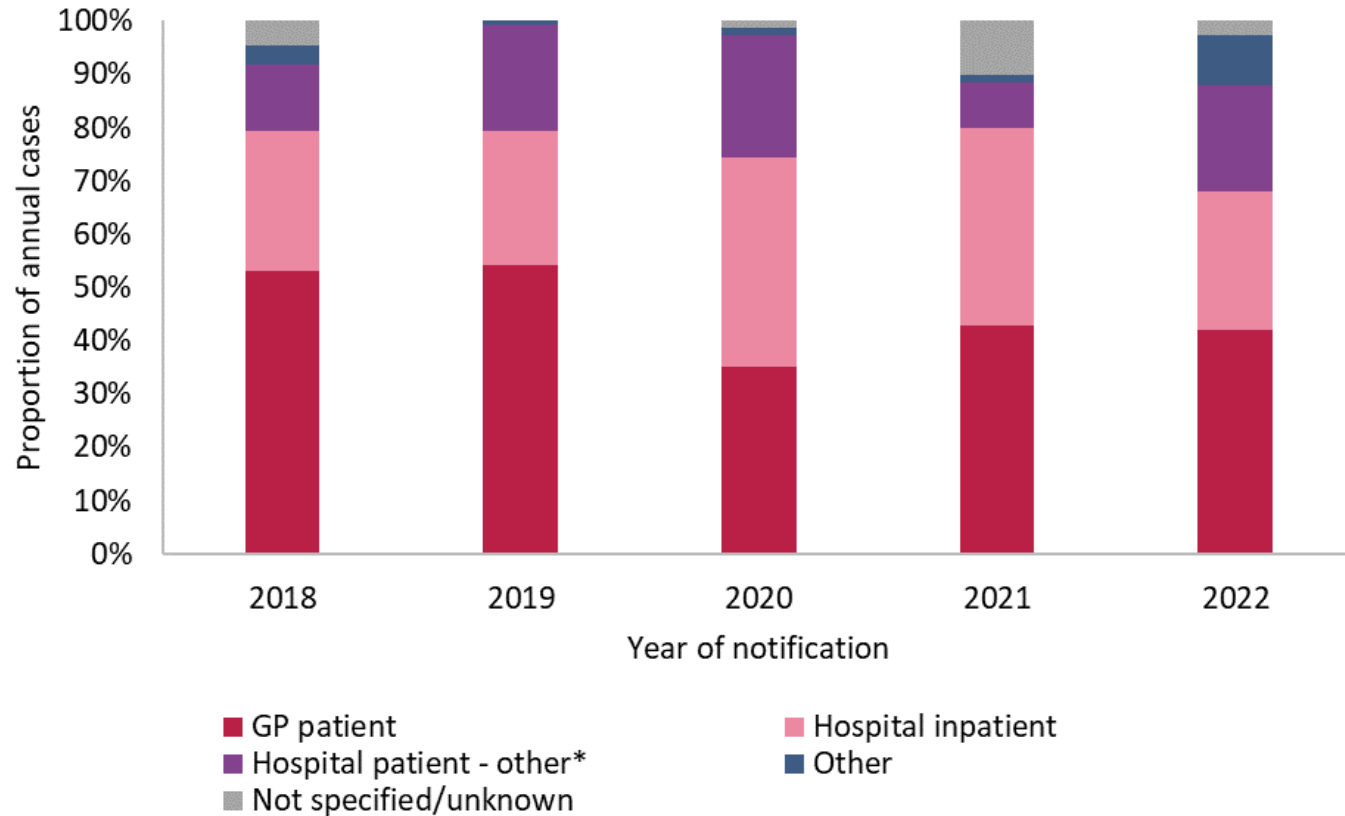


In 2022, the shigellosis CIR increased in all HSE regions.

The area reporting the highest incidence rate in 2022 was the HSE Midwest region (4.4/100,000), while HSE West and Northwest reported the lowest incidence in 2022 (1.1/100,000).

*Trend data by HSE Health Region should be interpreted with caution due the re-organisation of HSE Healthboards to HSE Health Regions in 2022.

Shigellosis in Ireland: disease severity, 2018-2022



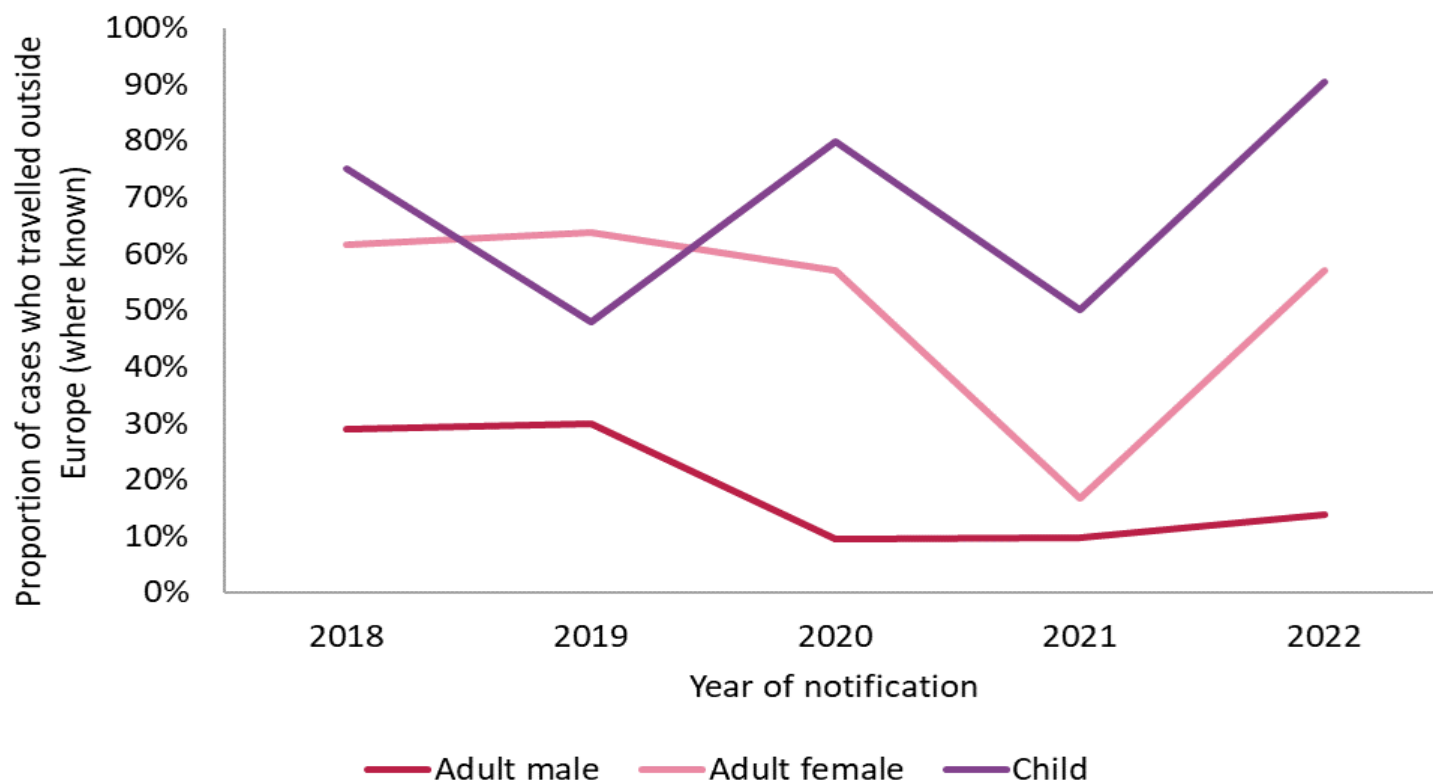
26% of shigellosis patients were reported as hospital inpatients in 2022, comparable with 2018 and 2019.

The proportion of hospitalised shigellosis cases was higher during the COVID-19 pandemic (39% and 37% in 2020 and 2021, respectively), likely reflecting the under-ascertainment of milder cases during this time.

*"Hospital patient – other" refers to cases where patient type was recorded on CIDR as "A & E patient", "Hospital outpatient" or "Hospital day patient"

Shigellosis in Ireland: international travel, 2018-2022

Historically, shigellosis cases in Ireland were associated with travel to destinations outside of Europe and this remains the case among children and adult females. Conversely, there has been an increasing trend of domestically-acquired infections or infections acquired in other European countries among adult males.



Information on international travel was available for 68% of cases notified in 2022

Data source: Computerised Infectious Diseases Reporting System (CIDR) 22/11/2023



Where information on international travel was available, 49% (n=53) of cases reported country of infection outside of Ireland in 2022, comparable to 51% of cases in 2019 but a decrease from 61% of cases in 2018.

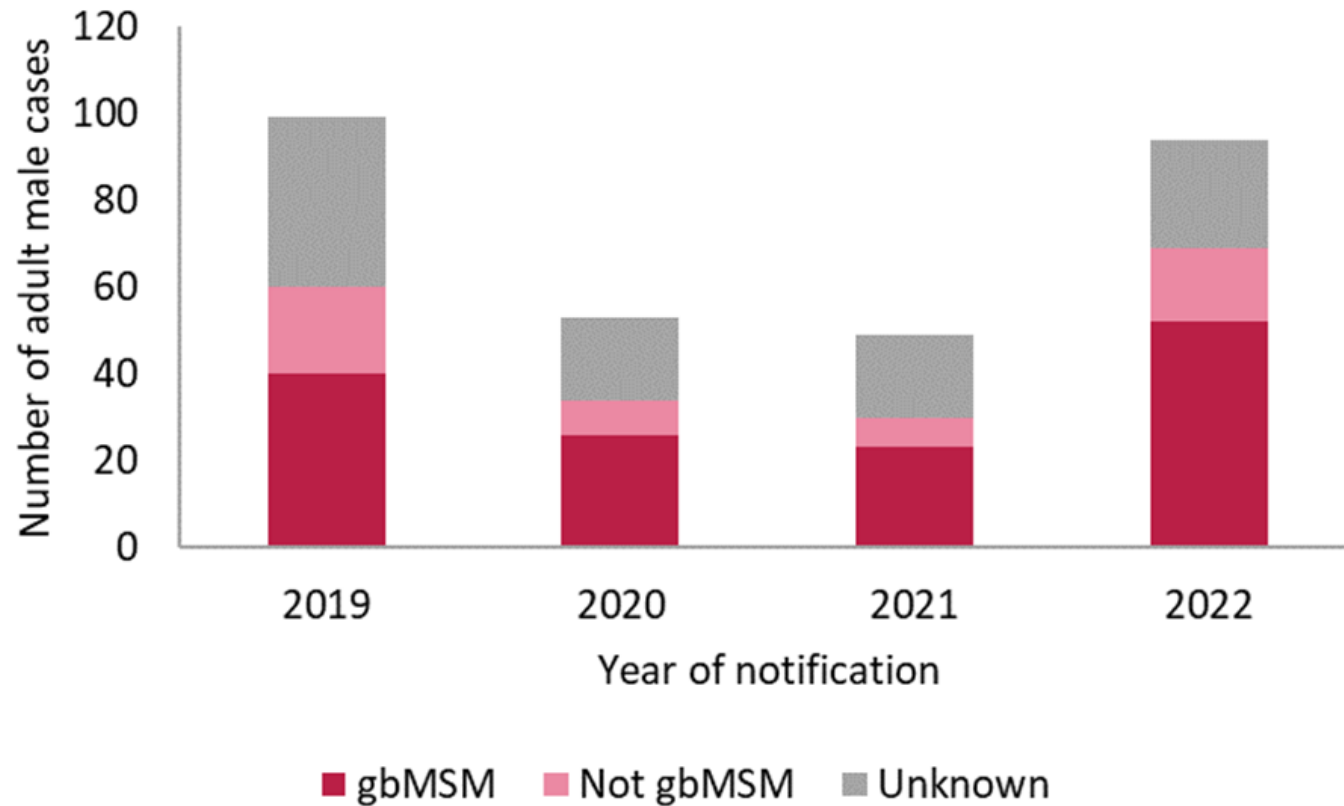
Of the cases who travelled in 2022, 70% (n=37) travelled to destinations outside of Europe, most commonly India and Pakistan.

Among cases who travelled to Europe in 2022, the most commonly reported countries of infection were Spain and the UK.

From 2018-2022, acquisition outside Europe was more common for children (69%; n=53) and adult females (58%; n=52) than for adult males (20%; n=52). From 2018-2022, domestic acquisition of infection was more common for adult males (64%), than adult females (39%) and children (27%), where information was known.

Shigellosis in Ireland: sexual transmission 2019-2022

Sexual transmission among gay, bisexual and other men who have sex with men (gbMSM) is a key feature of shigellosis in Ireland and elsewhere



Data source: Computerised Infectious Diseases Reporting System (CIDR) 22/11/2023



60% (n=94) of shigellosis cases notified in 2022 were adult males, reduced from 70% and 72% in 2021 and 2020, respectively but comparable to 58% of cases notified in 2019.

Sexual orientation was reported as gbMSM for 55% (n=52) of adult male cases notified in 2022, increased from 47% (n=23) in 2021, 49% (n=26) in 2020 and 40% (n=40) in 2019.

Further information on sexual transmission of shigellosis infections among gbMSM in Ireland is available here:

<https://www.hpsc.ie/a-z/gastroenteric/shigellosis/epidemiologicaldata/>

HF Shigellosis in Ireland: *Shigella* species and antimicrobial resistance, 2022



- The NSSLRL analysed 83 human non-duplicate *Shigella* isolates referred for further typing in 2022, representing 64% of cases notified as confirmed cases in 2022:
 - *Shigella flexneri* identified in 61% (n=51) of cases
 - *S. sonnei* identified in 35% (n=29) of cases
 - *S. boydii* identified in two cases and *S. dysenteriae* identified in one case
- Antimicrobial resistance is predicted based on whole genome sequencing (WGS) analysis carried out in the NSSLRL. Of cases notified in 2022, where isolates were characterised by WGS:
 - 37% (n=31) encoded resistance determinants for third generation cephalosporins (either blaCTX-M-15 or blaCTX-M-27 genes present)
 - 36% (n=30) encoded resistance determinants for azithromycin (mph(A) gene present)
 - 63% (n=52) encoded resistance determinants for quinolones (either chromosomal or plasmid-borne genes present)
 - 18% (n=15) encoded resistance determinants for all three classes of antimicrobials
 - This has increased from 4% of isolates sequenced in 2018

Further information on antimicrobial resistant shigellosis infections in Ireland is available here:

<https://www.hpsc.ie/a-z/gastroenteric/shigellosis/epidemiologicaldata/>

HE Shigellosis in Ireland: outbreaks and clusters, 2022



Three outbreaks of shigellosis were notified in 2022 (2 general and 1 family outbreak), increased slightly from one and two outbreaks notified in 2020 and 2021, respectively, and decreased from 5 outbreaks notified in 2019

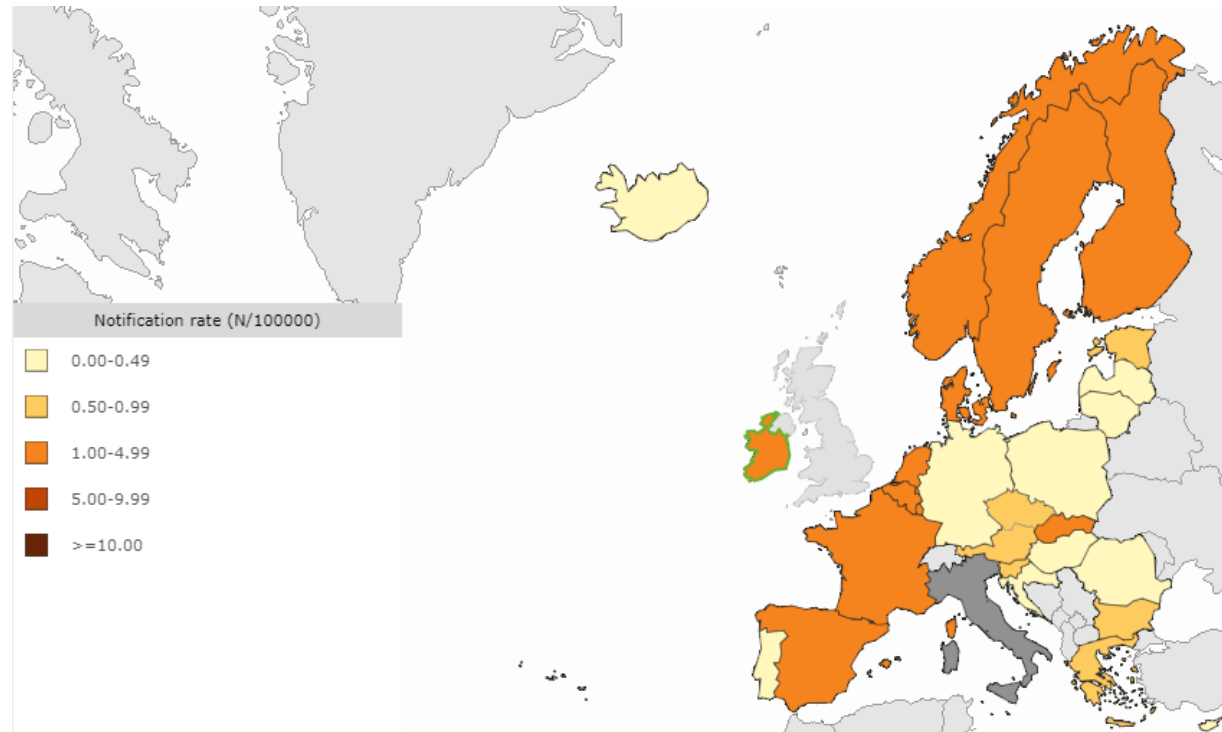
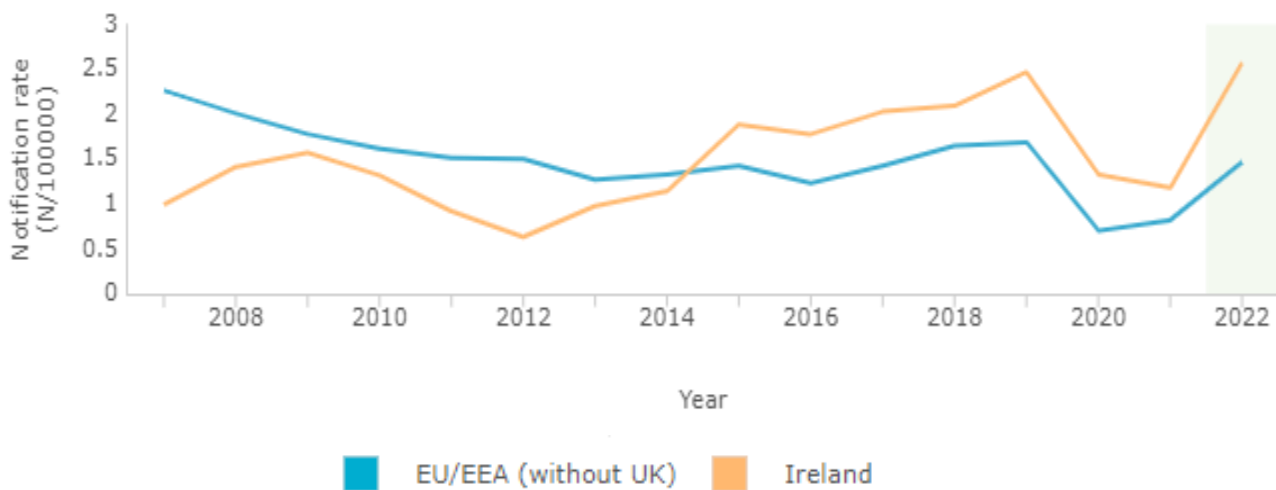
- All outbreaks notified in 2023 were small, ranging in size from two to six cases
 - Of the general outbreaks one occurred in a hospital, while the other was notified as a community outbreak
- Whole genome sequencing analysis performed at the NSSLRL confirmed that only 28% (n=23) of shigella isolates typed in 2022 were not genetically linked
- 72% (n=60) of *Shigella* isolates clustered within four new and eight previously identified distinct microbiological clusters
 - The newly identified clusters were generally small, consisting of 2-3 cases
 - The previously identified clusters tended to be larger, some with the earliest identified cases dating to 2017 and 2018, and with cases largely among gbMSM
 - In 2023, a multi-sectoral Incident Management Team was established to investigate antimicrobial resistant *Shigella* clusters among gbMSM in Ireland¹

¹ [EPI INSIGHT. Vol 24 Issue 9, December 2023.](#)



Shigellosis in the EU/EEA, 2007-2022

The shigellosis notification rate in Ireland has been higher than the EU average notification rate since 2015 and remained higher than the EU average of 1.47/100,000 in 2022.





Shigellosis in Ireland, 2022 summary



- 157 cases of shigellosis notified in 2022.
- Notification rate increased from 1.4/100,000 in 2021 to 3.0/100,000 population in 2022, similar to the pre-pandemic shigellosis notification rate.
- 60% of cases were adult males.
- The HSE Midwest region reported the highest CIR in 2022.
- *S. flexneri* was the most commonly reported species in 2022.
- Infection associated with international travel outside Europe was more common among children and adult females, while domestically-acquired infection was more common among adult males, suggesting that international travel remains strong risk for shigellosis among children and adult females, while sexual transmission is important risk factor for shigellosis in adult males.
- 3 small outbreaks of shigellosis were notified in 2023, however a number of distinct microbiological clusters were identified. Investigation of these clusters, as well public health and clinical interventions are ongoing in 2023.
- When compared to other EU/EEA countries, Irelands notification rate was above the EU/EEA average.



Typhoid and Paratyphoid in Ireland

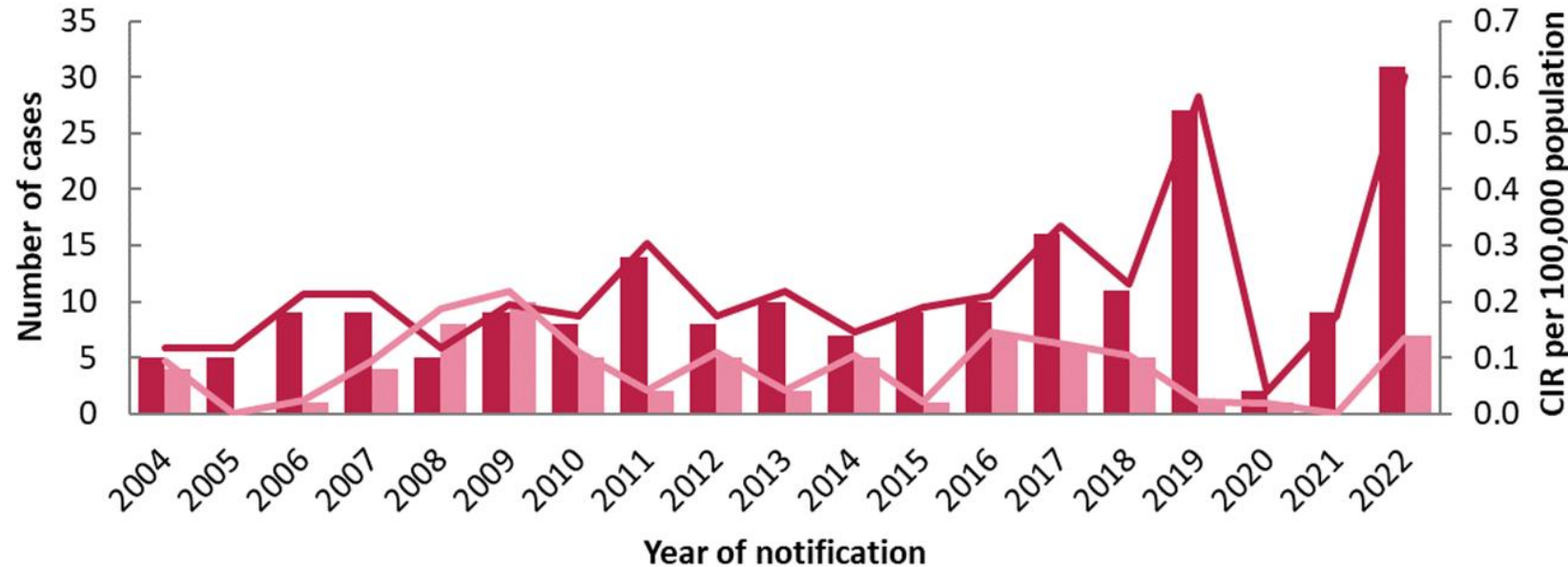


- Typhoid fever is a potentially life-threatening systemic disease caused by the bacteria *Salmonella* Typhi
- Humans are the only reservoir for *S. Typhi* and infection usually spreads through contaminated food and water. People who recover may become chronic carriers and may shed the bacteria in their faeces for long periods of time.
- Initial symptoms will usually include prolonged fever, headache, malaise, nausea, abdominal pain, diarrhoea or constipation, a cough and a rash. Severe cases may progress to development of complications or death.
- Paratyphoid is an illness caused by a similar bacterium, *Salmonella* Paratyphi. However, illness is generally milder, of shorter duration and with fewer complications.
- Typhoid and paratyphoid are not endemic in Ireland but are endemic in parts of the world where sanitation is poor and that lack clean drinking water. A small number of typhoid and paratyphoid cases are reported in Ireland annually. These are almost always associated with travel to countries where the disease is endemic.
- Since November 2016, Pakistan has been experiencing a continuous surge of extensively drug resistant *S. Typhi*, with acquired resistance determinants to multiple clinically-relevant antimicrobials. In June 2023 HPSC issued advice for vaccination and typhoid precautions for travellers to Pakistan, Afghanistan and other countries where typhoid is endemic. Advice was also issued to healthcare services to be aware of the potential for limited treatment options for typhoid patients returning from these areas¹.

For more information on risk factors and precautions please see the [Typhoid and Paratyphoid Fact Sheet](#) on the HPSC website.

1. [Antimicrobial resistant typhoid fever in Ireland. Epi Insight Vol 24 Issue 6, June 2023.](#)

Typhoid and Paratyphoid in Ireland: trends 2004-2022



- Number of cases - Typhoid
- Number of cases - Paratyphoid
- Crude Incidence Rate (CIR) per 100,000 population - Typhoid
- Crude Incidence Rate (CIR) per 100,000 population - Paratyphoid

The CIR for typhoid was at the highest recorded rate in 2019 (0.57/100,000) but decreased during the COVID-19 pandemic due to restrictions on international travel. In 2022 the CIR increased above pre-pandemic levels (0.60/100,000).

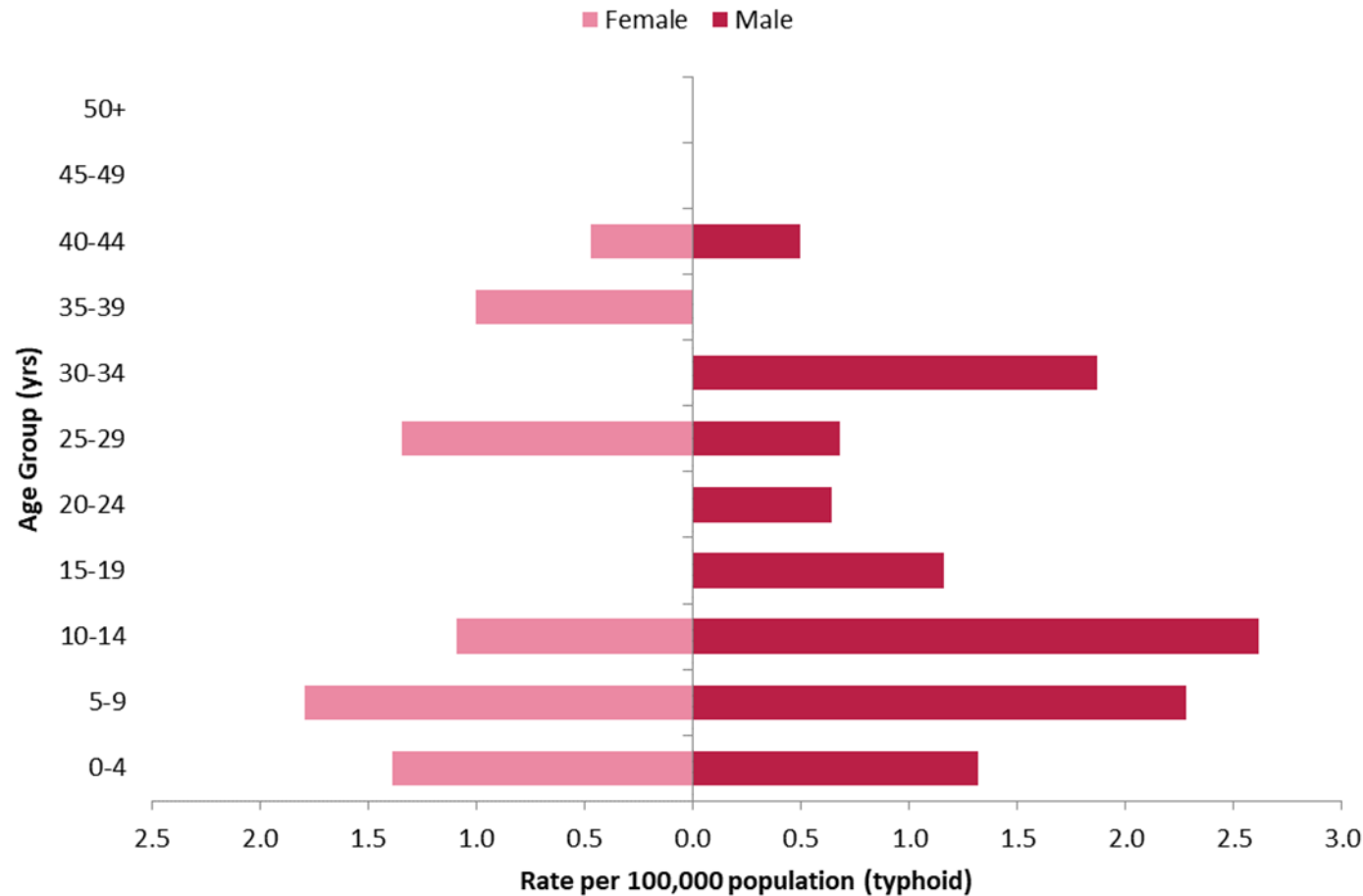
The CIR for paratyphoid was 0.14/100,000 in 2022, comparable to pre-pandemic levels.

Typhoid and Paratyphoid in Ireland: age and sex distribution, 2022

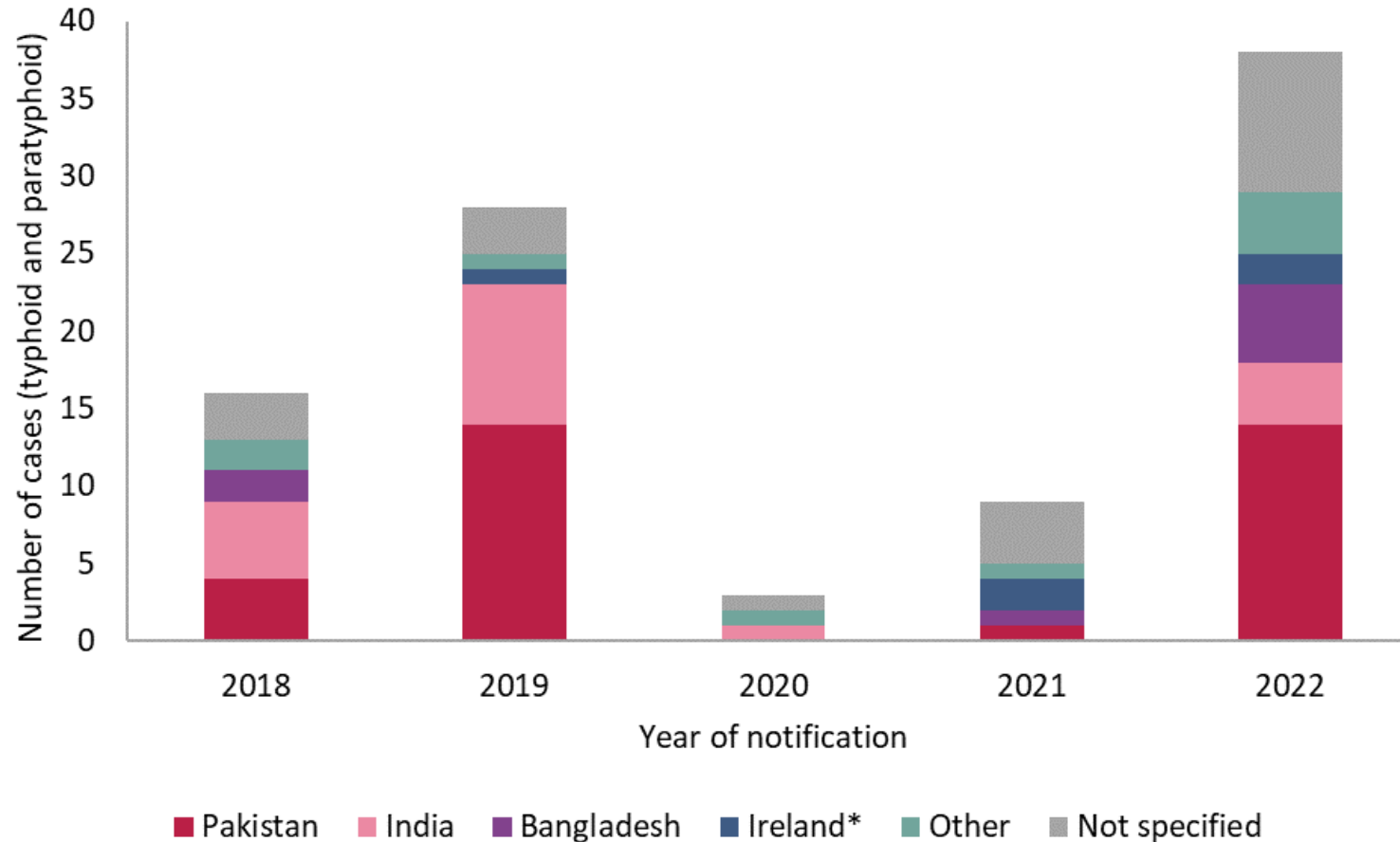


In 2022, 61% (n=19) of typhoid cases were male and 39% (n=12) were female. Cases ranged in age from 1 to 44 years and 61% of cases were children, aged less than 17 years.

Paratyphoid cases notified in 2022 ranged in age from 3 to 52 years. Three cases were male and four were female.



Typhoid and Paratyphoid in Ireland: country of infection, 2018-2022



Country of infection was reported for 79% of typhoid and paratyphoid cases notified from 2018 to 2022.

Pakistan has been reported as the country of infection for 45% of cases reported during that time period.

In 2022, country of infection was reported as Pakistan for 48% (n=14), Bangladesh for 17% (n=5) and India for 14% (n=4) of cases, where country of infection was known.

Other countries of infection in 2022 included Afghanistan, Iraq and Nigeria.

* Ireland was reported as country of infection for a small number of cases. These infections were typically secondary infections, following return of a close contact from an endemic country or were laboratory-acquired infections.

Data source: Computerised Infectious Diseases Reporting System (CIDR) 22/11/2023



Typhoid and Paratyphoid in Ireland: 2022 summary



- 31 cases of typhoid and 7 cases of paratyphoid were notified.
- Notification rate for typhoid increased from 0.17/100,000 in 2021 to 0.60/100,000 population in 2022, comparable to the rate in 2019 but increased from the annual average rate reported prior to 2019.
- Notification rate for paratyphoid increased from no cases notified in 2021 to 0.14/100,000 in 2022, comparable to the pre-pandemic rate.
- The highest age-standardised incidence rates of typhoid were reported among children.
- Pakistan was the most commonly reported country of infection in 2022, followed by Bangladesh and India.
- Travellers to Pakistan and other countries where typhoid is endemic should be encouraged to avail of vaccination before travel and to take precautions with hand hygiene, food and drink while abroad to minimise risk of catching typhoid fever.
- Healthcare providers caring for those presenting with suspected typhoid infection and associated with recent foreign travel should be aware of high levels of resistance to key antimicrobial agents used to treat typhoid fever. Based on current data, it is particularly important in relation to those who have travelled to Pakistan or Afghanistan but other countries in the region may be similarly affected.
- Further information available here: [Antimicrobial resistant typhoid fever in Ireland. Epi Insight Vol 24 Issue 6, June 2023.](#)



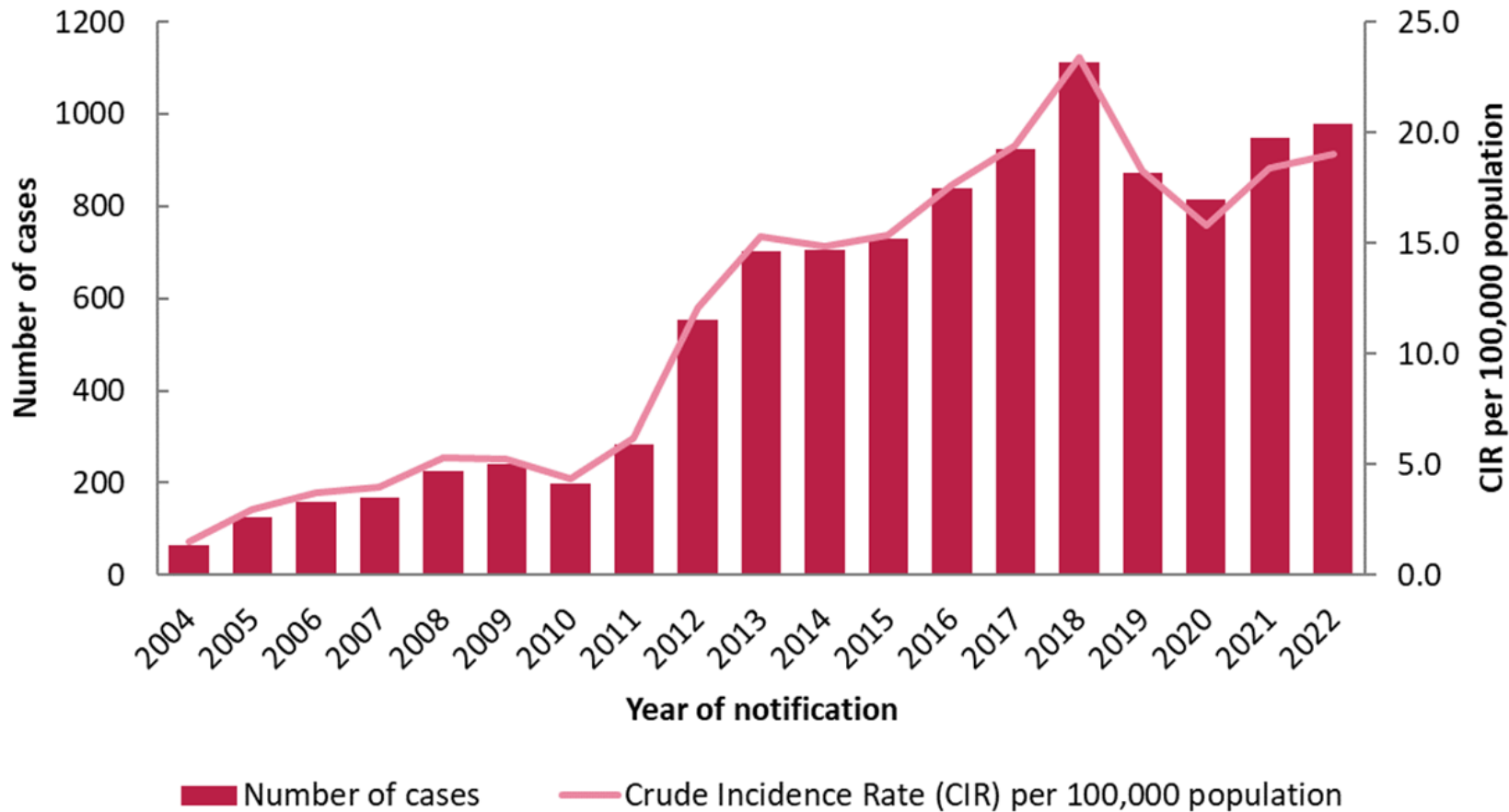
VTEC in Ireland



- Verotoxigenic *Escherichia coli* (VTEC) are specific strains of *E. coli* that produce toxins which can cause severe illness, particularly in children aged under five and the elderly.
- The main reservoir of VTEC is grass-feeding animals, in particular cattle. Human infection is regularly related to the consumption of undercooked beef, contaminated during processing, or other contaminated food such as unpasteurised milk and dairy products, vegetables, and poorly managed private drinking water supplies.
- VTEC may also be spread person-to-person, particularly if hygiene or handwashing habits are inadequate, for example among very young children.
- VTEC infection causes abdominal cramps and diarrhoea but can sometimes cause bloody diarrhoea. In some cases, VTEC infection can be asymptomatic.
- In some persons, particularly children under 5 years of age and the elderly, VTEC infection can also cause a complication called haemolytic uraemic syndrome (HUS), in which the red blood cells are destroyed and the kidneys can stop working properly. HUS is a life-threatening condition. With intensive care, the death rate for those who have HUS is 3%-5%.

For more information on risk factors and precautions please see the [VTEC Fact Sheet](#) on the HPSC website.

VTEC in Ireland: trends, 2004-2022

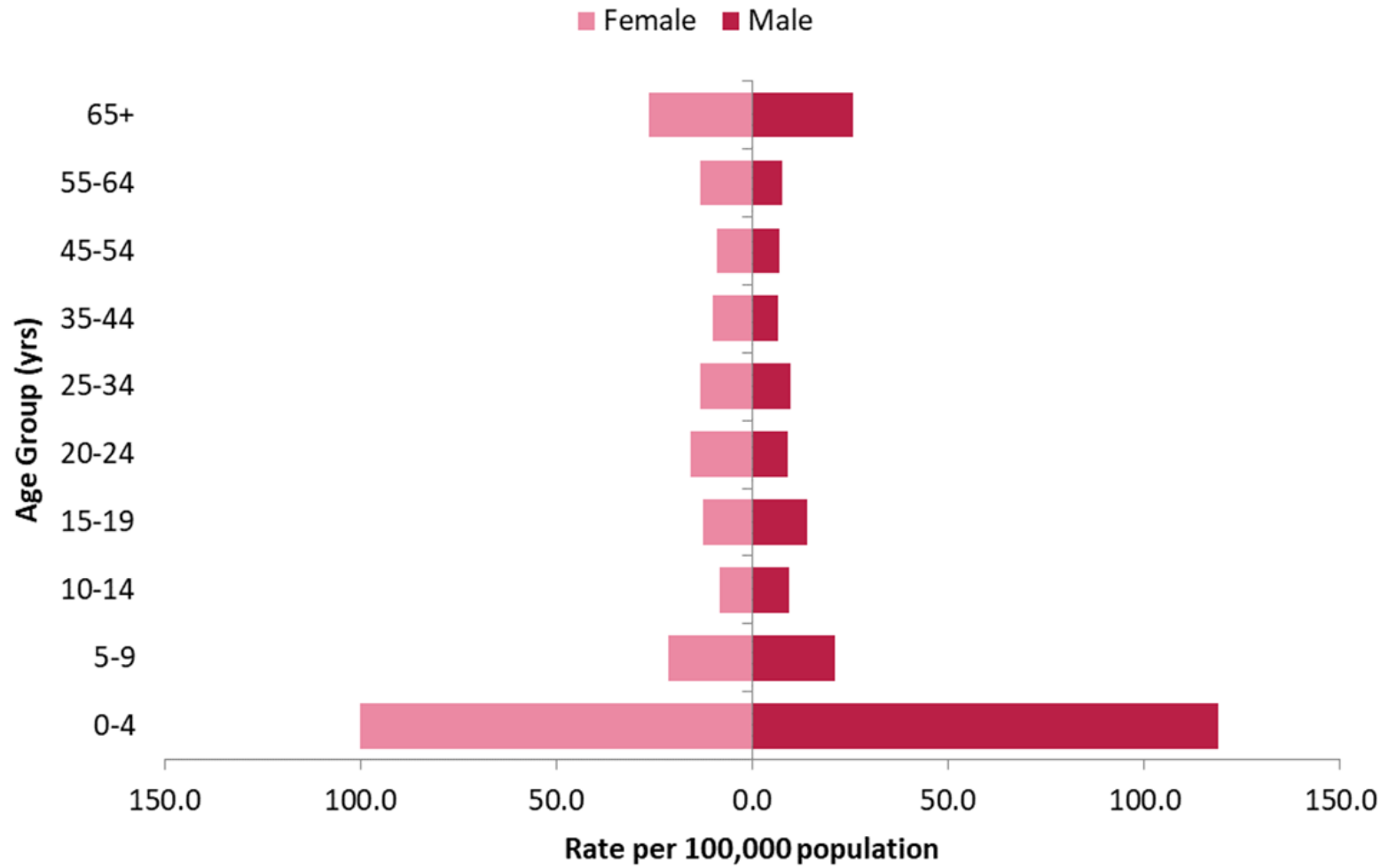


Since 2010 the VTEC CIR had been showing a generally increasing trend and was at the highest recorded rate in 2018 (23.4/100,000) but decreased to 18.3/100,000 in 2019.

The VTEC CIR remained largely unaffected by the COVID-19 pandemic and has continued to show an increasing trend since 2020.

In 2022 the CIR for VTEC was 19.0/100,000, a 3% increase compared to the rate in 2021.

VTEC in Ireland: age and sex distribution, 2022



In 2022, 52% (n=503) of cases were female and 48% (n=469) were male*.

The highest age-standardised incidence rate was among 0-4 year olds (109.7/100,000 population), followed by those aged over 65 years (26.0/100,000 population).

*Excludes cases where age or gender was not reported on CIDR (n=8)

VTEC in Ireland: geographical distribution, 2020-2022



In 2022, the highest VTEC CIR was reported in the HSE Midwest region (32.9/100,000), representing an 8% decrease in the incidence rate in this area compared to 2021.

The area reporting the lowest incidence rate in 2022 was HSE Dublin and Northeast region (12.2/100,000).

*Trend data by HSE Health Region should be interpreted with caution due the re-organisation of HSE Healthboards to HSE Health Regions in 2022.



VTEC in Ireland: case classification, 2022



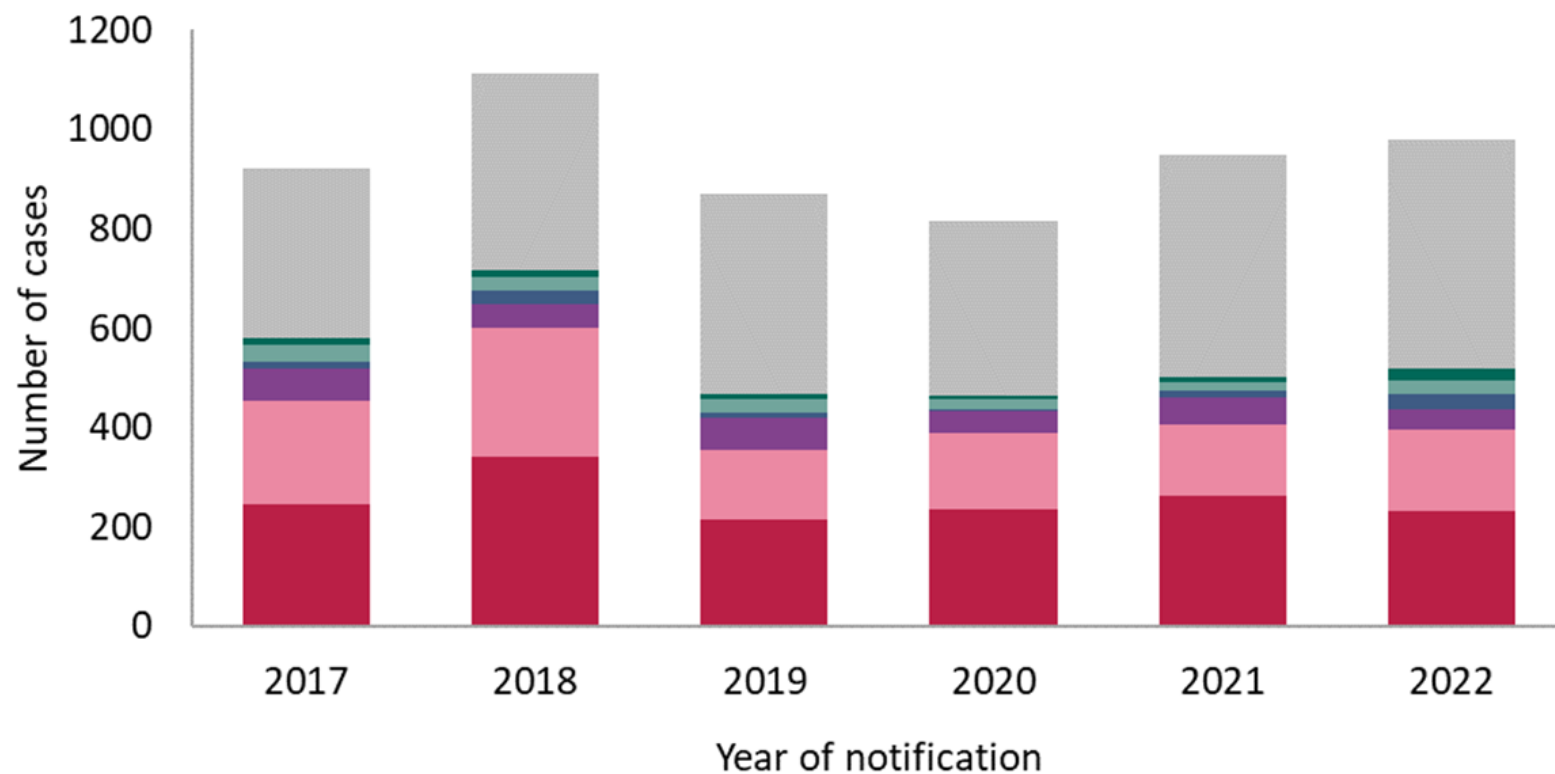
Of the 980 cases of VTEC notified in 2022, 97% (n=958) were notified on CIDR as confirmed cases; 75% of these by culture confirmation, 21% by PCR confirmation only and 3% where the criteria for notification was not reported. 2% (n=20) of all cases were reported as probable and there were two cases classified as possible, based on meeting the clinical criteria for HUS but without laboratory confirmation of VTEC infection. See [VTEC case definition](#) on HPSC website.

Criteria for diagnosis	Confirmed	Probable	Possible	Total
Laboratory confirmation by culture	723	9	0	732
Laboratory confirmation by PCR only	204	7	0	211
Epidemiological link only	0	2	0	2
Clinical HUS not meeting lab or epi criteria	0	0	2	2
Unknown	31	2	0	33
Total	958	20	2	980

*Symptomatic culture confirmed cases are classified as confirmed cases, while asymptomatic culture confirmed cases are classified as probable cases

*Symptomatic PCR-confirmed cases are classified as confirmed cases, while asymptomatic PCR-confirmed cases are classified as probable cases

VTEC in Ireland: serogroups, 2017-2022

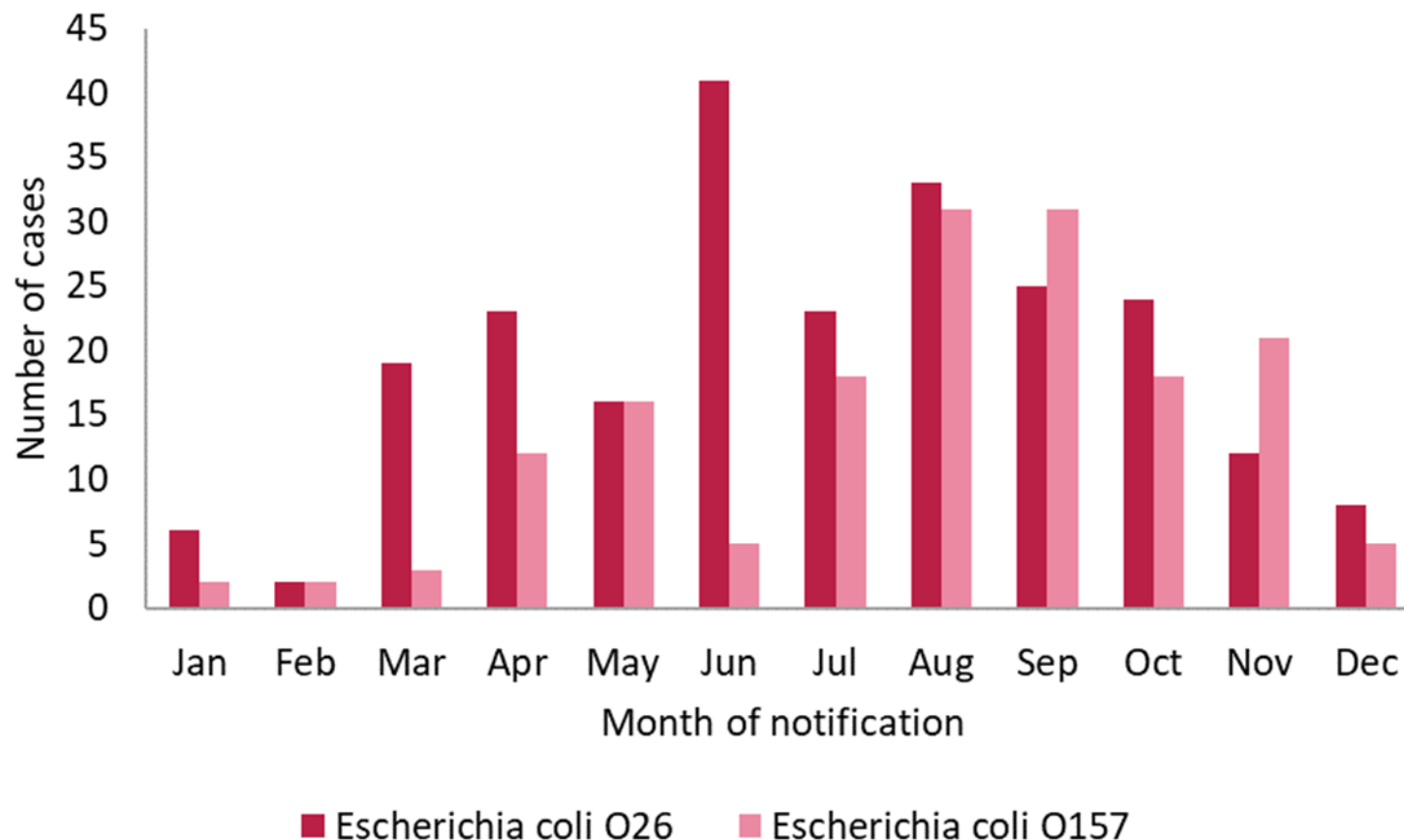


The most common serogroup reported among culture confirmed cases in 2022 was O26 (24%; n=232), followed by O157 (17%; n=164). These proportions have remained largely unchanged since 2019.

Other commonly reported serogroups in 2022 were O145, O146, O103 and O91.

*Other includes cases notified as PCR positive culture negative as well as culture positive notifications with serogroups other than those listed.

VTEC in Ireland: seasonality of serogroups, 2022



Infections caused by VTEC O26 were more common earlier in the year, peaking in June, while infections caused by VTEC O157 became more common later in the year, exceeding the number of VTEC O26 infections in September and November.

This seasonal pattern is typical for both serogroups.



VTEC in Ireland: severity of illness, 2022



- In 2022, 84% (n=819) of cases were reported as symptomatic, comparable to previous years
- Of those reported as symptomatic and where data were known, diarrhoea was the most commonly reported symptom in 91% (n=724) of cases
- 33% (n=322) of all cases were hospitalised
 - 29% (n=68) of VTEC O26 cases
 - 32% (n=53) of VTEC O157 cases
 - 45% (n=15) of VTEC O146 cases
- Four deaths occurred among VTEC cases in 2022; two deaths were not caused by the VTEC infection, while cause of death was not known for the other two cases. All cases who died were aged over 60 years.
- 24 cases of HUS were reported (2.4% of all cases), similar to 2.3% of cases reported in 2021 but a reduction from 4.4% of cases reported in 2020
 - 4% of O26 (n=10), O157 (n=6) and O103 (n=1) cases developed HUS
 - 3% of O145 (n=1) cases developed HUS
 - None of O146 and O91 cases developed HUS
 - Other HUS cases were caused by VTEC O5 (n=1) and O55 (n=1), were confirmed by PCR only (n=2) or were diagnosed based on being HUS cases without any lab or epi criteria confirming VTEC infection (n=2)



VTEC in Ireland: HUS cases by serogroup and VT type, 2022



Details of serogroup, verotoxin and HUS status of 2022 cases are shown in the table below. Among cases who developed HUS, 58% (n=14) were male and 50% (n=12) were aged under 5 years.

Criteria for reporting	Serogroup	Verotoxin	HUS	Non-HUS	Total	% with HUS
Laboratory confirmation by culture	Escherichia coli O26	VT1	1	45	46	2%
		VT2	2	18	20	10%
		VT1+VT2	7	159	166	4%
	Escherichia coli O157	VT1	0	0	0	0%
		VT2	5	61	66	8%
		VT1+VT2	1	96	97	1%
		Not reported	0	1	1	0%
	Other, mixed or ungroupable	VT1	1	148	149	1%
		VT2	3	113	116	3%
		VT1+VT2	0	77	77	0%
	Laboratory confirmation by PCR only	VT1	0	53	53	0%
		VT2	1	83	84	1%
VT1+VT2		1	52	53	2%	
Not reported		0	19	19	0%	
Reported on the basis of Epi link only	N/A	N/A	0	2	2	0%
Clinical HUS w/o Lab or Epi criteria	N/A	N/A	2	0	2	100%
Total			24	927	951	3%

*Excludes 29 cases where data on serogroup, verotoxin and criteria for diagnosis were not available. These were non-HUS cases.



VTEC in Ireland: risk factors, 2019 and 2022



In Ireland, key risk factors for VTEC infection include exposure to private well water, animal/environmental exposures and attendance at a childcare facility (CCF). The proportions who reported these exposures in 2022 were similar to the pre-pandemic proportions reported in 2019. Food and international travel play only minor roles in VTEC infection in Ireland, with most infections (95%) being non-travel related in 2022.

Risk Factor	2019			2022		
	Number	Number for which data were available	% where known	Number	Number for which data were available	% where known
Animal/Environmental contact ¹	113	250	45%	162	339	48%
Exposure to private well water (home source) ²	206	762	27%	222	833	27%
Child <5yrs attending a CCF ³	165	784	21%	195	865	23%
Foodborne ¹	21	250	8%	39	339	12%
Travel-associated ⁴	44	696	6%	35	660	5%

¹Analysis based on “Suspected mode of transmission” enhanced variable

²Analysis based on “Home drinking water” enhanced variable

³Analysis based on “Risk group” enhanced variable

⁴Analysis based on “Country of infection” core variable

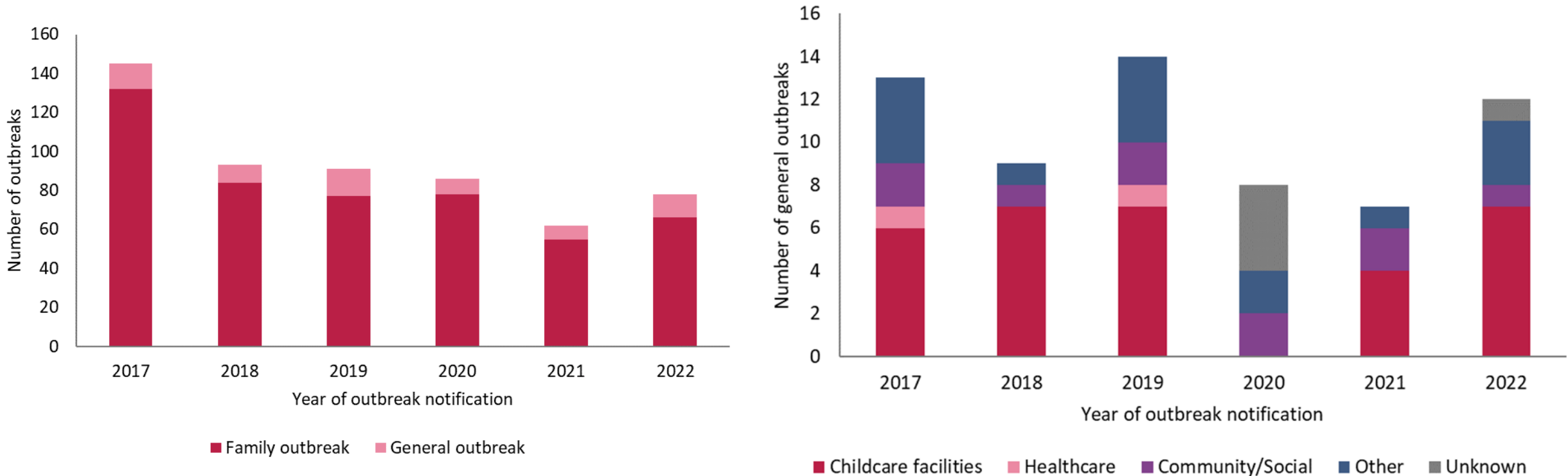


VTEC in Ireland: outbreaks, 2017-2022



78 VTEC outbreaks, with a total of 208 people ill were notified in 2022 (12 general (126 ill) and 66 family (82 ill) outbreaks), increased from 62 outbreaks notified during 2021, but slightly lower than the numbers of outbreaks typically reported pre-pandemic.

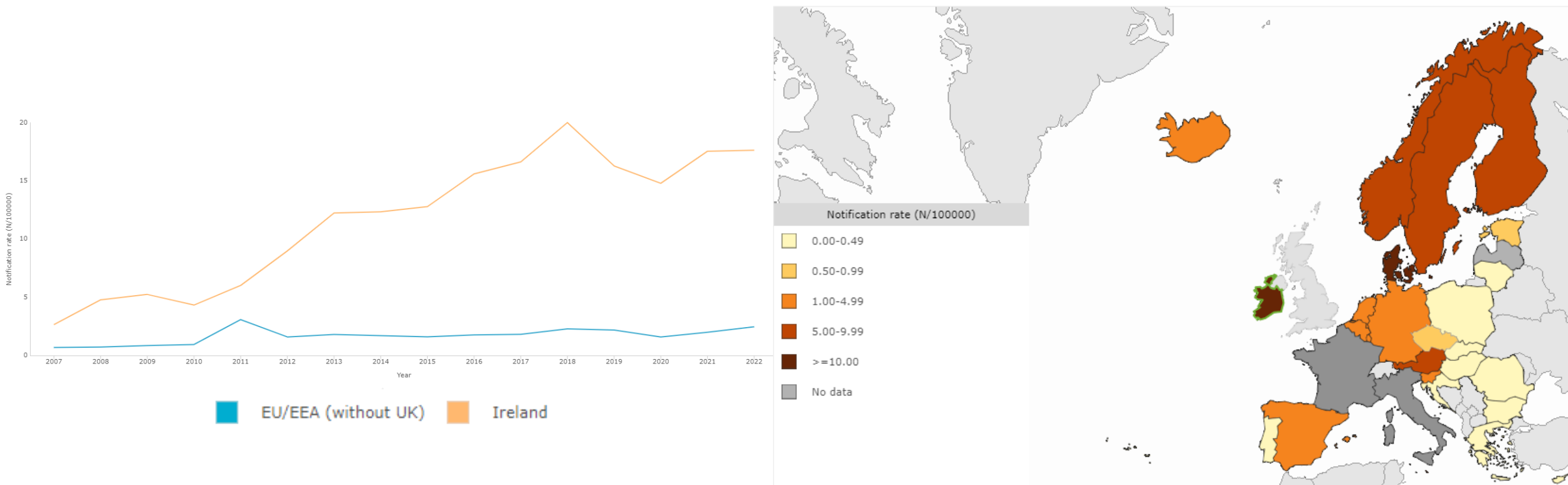
CCFs were the location where general VTEC outbreaks were most frequently reported (7 CCF outbreaks with a total of 70 people ill notified in 2022). CCF VTEC outbreaks decreased during the COVID-19 pandemic (none in 2020 and 4 in 2021). This is likely due to a combination of CCF closures during periods of national lockdown and the cohorting of children in “pods”, resulting in reduced person-to-person spread of VTEC, when CCFs re-opened.





VTEC in the EU/EEA, 2007-2022

In 2022, the VTEC notification rate in Ireland remained higher than the EU average notification rate (2.47/100,000) and was among the highest rates in Europe. In 2022, only the notification rate in Denmark was higher than Ireland.





VTEC in Ireland, 2022 summary



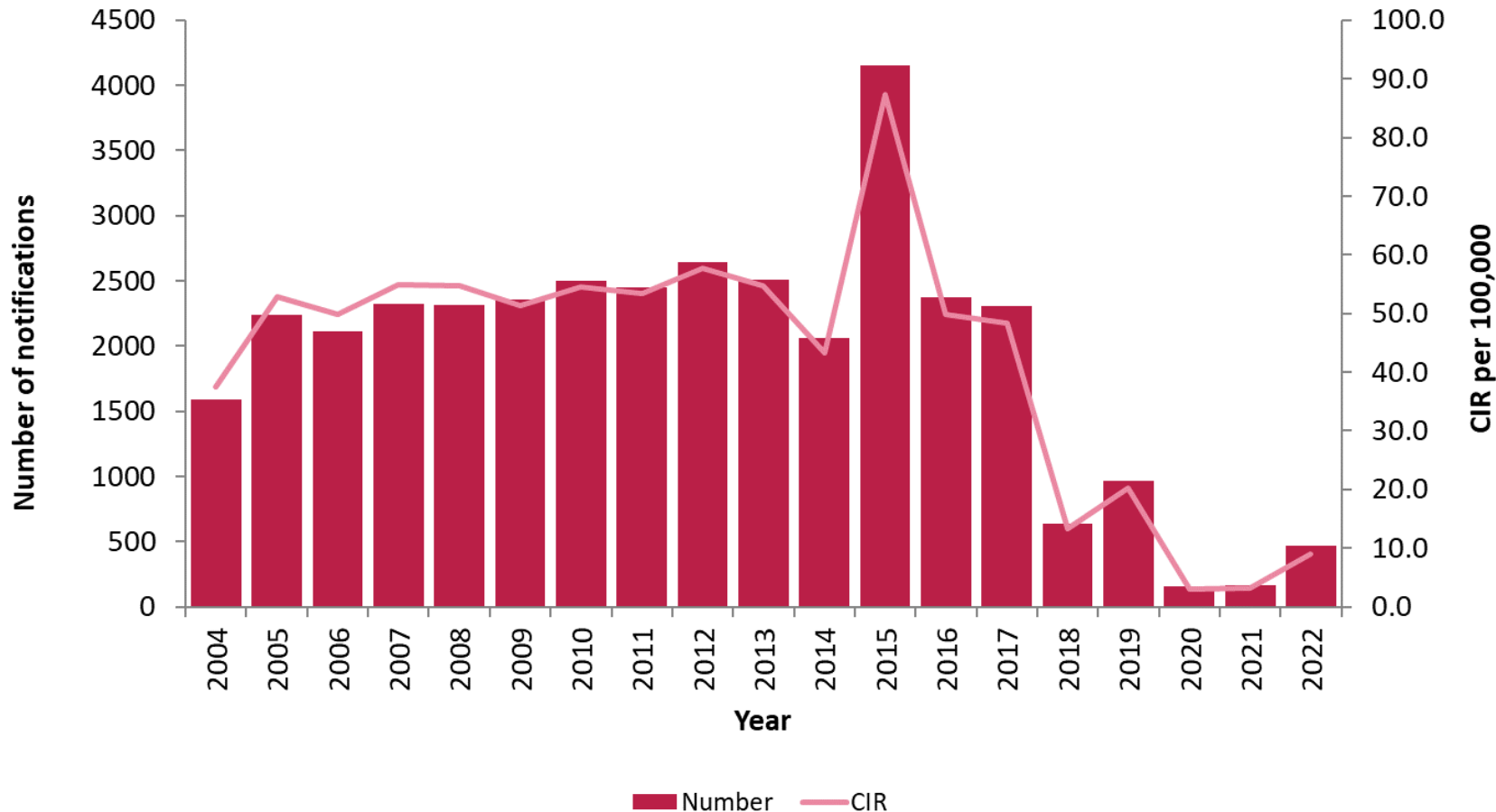
- 980 cases of VTEC notified in 2022.
- Notification rate increased 3% from 18.4/100,000 in 2021 to 19.0/100,000 in 2022.
- 33% of cases were children aged under 5 years and 21% were adults aged over 65 years.
- The HSE Midwest region has reported the highest incidence rate since 2020.
- VTEC O26 and O157 were the most commonly reported serogroups in 2022, unchanged from recent years.
- 33% of all VTEC cases in 2022 were hospitalised.
- 2.4% of all VTEC cases in 2022 developed HUS.
- HUS was more frequently associated with VTEC O26 VT2 and VTEC O157 VT2 infections.
- Animal/environmental exposures and exposure to private well water remained the most commonly reported risk factors among VTEC cases in 2022.
- The number of VTEC outbreaks notified remained high in 2022 but the majority of outbreaks were small family outbreaks; childcare facilities remained the location where general VTEC outbreaks were most frequently notified.
- The Irish VTEC notification rate remained one of the highest in Europe in 2022.



Other IID in Ireland



Rotavirus in Ireland: trends, 2004-2022



The CIR for Rotavirus in 2022 was 9.1/100,000, which is an increase on the CIR during the pandemic years 2020 (3.1/100,000) and 2021 (3.2/100,000) but lower than pre-pandemic years (2004-2019).

Rotarix™ vaccine was introduced in Ireland in December 2016 for all babies born from 1st October 2016 onwards, likely accounting for the sharp decline in cases seen in 2018.



Other IID in Ireland, 2019-2022



Disease Name	2019	2020	2021	2022
Bacillus cereus food-borne infection or intoxication	1	1	0	3
Botulism	0	0	0	2
Clostridium perfringens (type A) food-borne disease	1	3	0	3
Giardiasis	252	163	160	261
Yersiniosis	9	13	18	17
Total	263	180	178	286

No cases of cholera or staphylococcal food poisoning were notified between 2019-2022



Other non-IID zoonoses in Ireland





Other Non-IID Zoonoses in Ireland, 2019-2022



Disease Name	2019	2020	2021	2022
Brucellosis	0	0	0	1
Echinococcosis	0	0	1	1
Q fever	2	2	0	0
Toxoplasmosis	47	21	19	16
Total	49	23	20	18

No cases of anthrax, plague, rabies, or trichinosis were notified between 2019-2022



Conclusions Part 1



- Many of the last COVID-19 restrictions were lifted in early 2022, permitting a return to normal work, education, socialising and international travel. The effects that the COVID-19 restrictions and their subsequent removal had on the notifications of gastroenteric and zoonotic disease notifications in Ireland varied.
- Salmonellosis and shigellosis are strongly influenced by international travel. Salmonellosis is also associated with eating out while shigellosis is associated with sexual transmission. Notifications of these diseases decreased during 2020 and 2021, due to reduced international travel, closure of restaurants, reduced social interactions and reduced access to healthcare. In 2022, notifications of these diseases returned to pre-pandemic levels.
- Typhoid and paratyphoid notifications in Ireland also returned to pre-pandemic levels in 2022 with the resumption of international travel.
- Prior to the pandemic, notifications of both shigellosis and typhoid had been trending upwards and were both at their highest recorded levels in 2019. In 2022, notifications of both diseases returned to these higher notification rates and specific interventions were put in place for management of both diseases during 2023^{1,2}.

¹ [EPI INSIGHT. Vol 24 Issue 9, December 2023.](#)

² [EPI INSIGHT. Vol 24 Issue 6, June 2023.](#)



- Notifications of listeriosis decreased initially in 2020 but had returned to pre-pandemic levels by 2021. Older and immunocompromised people are typically the group most at risk of listeriosis in Ireland and, as these were the group most strongly advised to cocoon during the COVID-19 pandemic, this is suggestive that behavioural changes led to a reduction in listeriosis cases early in the pandemic. Further investigation would be required to better understand these trends better.
- Norovirus outbreaks are most frequently associated with healthcare or residential settings and these reduced significantly during the COVID-19 pandemic, likely due to the enhanced infection prevention and control measures which were put in place in these settings as part of the COVID-19 response.
- Diseases, such as campylobacteriosis, cryptosporidiosis and VTEC which are more strongly associated with environmental exposures and where young children are typically the group most affected did not decrease during the pandemic and remained at pre-pandemic (or higher) levels in 2022. Educational and recreational settings for children were closed or were operating at reduced capacity, and cohorting of children was in place in many of these settings when they re-opened, during 2020 and 2021. This reduced the risk of person-to-person spread of gastroenteric infections among children, however the increased opportunity for environmental exposures, exposure to farms and farm animals and consumption of poorly managed private well water are likely to have occurred as a result of changes to daily life brought about by the pandemic restrictions.