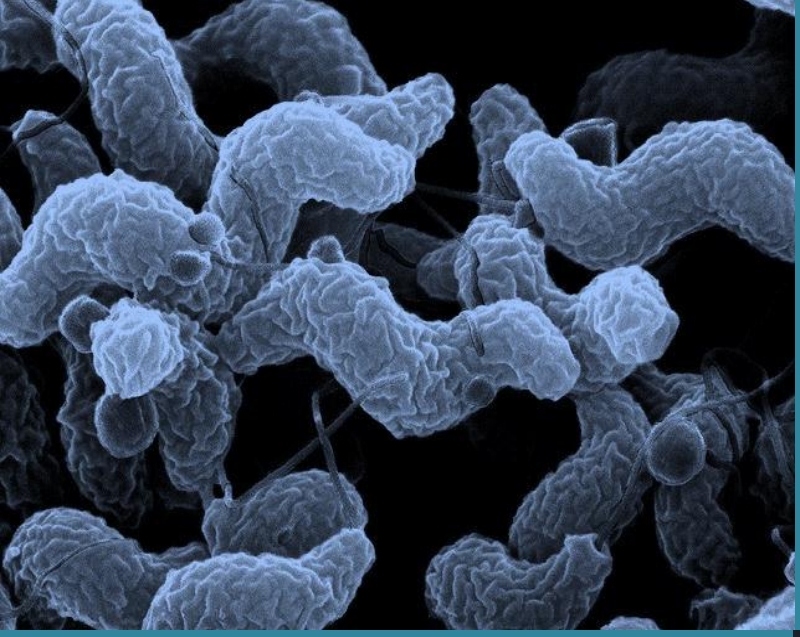
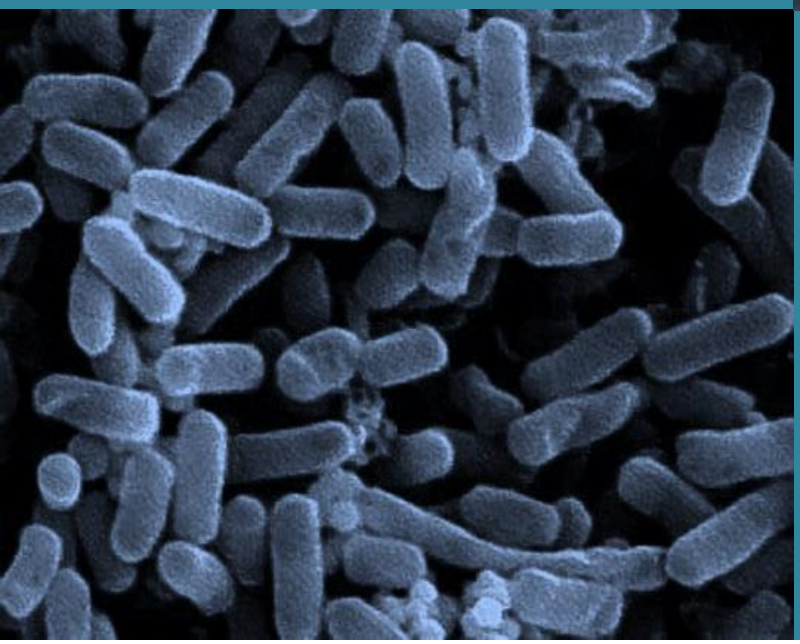


Gastrointestinal Infections in Northern Ireland



Annual Surveillance Report 2015

HSC Public Health Agency

Gastrointestinal Infections in Northern Ireland Annual Surveillance Report 2015

Contents

Key Points

- The majority of gastrointestinal diseases displayed an increase in laboratory reports in 2015 compared to the previous year, with campylobacter and *E. coli* O157 the only exceptions.
- Notifications of food poisoning continued to increase in 2015, rising by 5% compared to 2014. The total number of food poisoning notifications has increased by 51% since 2008.
- *Campylobacter* infections decreased slightly in 2015 for the first time since 2008. This decrease occurred in the context of new testing methods that might have been expected to lead to higher rates of detection due to increased sensitivity.
- There was a large increase in *Cryptosporidium* infections in 2015 with the highest level recorded in the past 10 years and a 43% increase since 2014. This increase may be partially due to changes in testing for *Cryptosporidium* in two laboratories.
- There were 33 laboratory confirmed cases of *E. coli* O157 reported in 2015, the lowest number of reports in the past ten years. None of these cases were linked to outbreaks.
- *Giardia Lamblia* reports also increased substantially with 92 reports in 2015 compared to 48 in 2014. Again this may reflect changes in testing policy.
- The number of *Salmonella* infections reported increased from 113 in 2014 to 125 in 2015, representing an 11% increase. However the number of cases remains low compared to previous years. Due to the introduction of whole genome sequencing in Public Health England phage typing was ceased during 2014 and is no longer available. There was one small cluster associated with Salmonella typhimurium.
- The number of *Shigella* reports remains elevated compared to previous years. There were 31 culture confirmed cases reported in 2015 compared to 21 in 2014.
- Travel remains a significant risk factor for some gastrointestinal infections, with 34% of *Salmonella* infections being related to travel outside the UK in 2015.
- Similar to last year the number of outbreaks of gastrointestinal infection decreased substantially. The majority were spread through person-to-person transmission and suspected or confirmed as due to norovirus.
- Further changes in testing in some of the health service laboratories in Northern Ireland took place in 2015 possibly leading in increased ascertainment of certain gastrointestinal organisms. See Appendix 1 for further details.

Introduction

The Public Health Agency (PHA) has a lead role in protecting the population from infection and environmental hazards through a range of core functions including communicable disease surveillance and monitoring, operational support & advice, and education, training and research.

The effective management of infectious disease depends on high quality surveillance. Surveillance of communicable gastrointestinal infectious disease provides timely information so that public health action can result.

Epidemiological data is collated from a number of surveillance systems:

- Regional CoSurv for NI laboratories – all confirmed organisms/infections are reported electronically from seven laboratories to PHA.
- Reference laboratory reporting – selected organisms are sent by the local laboratories to reference laboratories in England for typing and the results are reported to PHA.
- Notifications of Infectious Diseases (NOIDS) – General Practitioners and Hospital Physicians have a statutory duty to report notifiable infectious diseases (e.g. food poisoning) to the PHA under the Public Health Act (NI) 1967.
- HP Zone – software package used in case management, contact tracing, and outbreak investigation & control. HP Zone facilitates the capture of data and collection of timely local and regional infectious disease intelligence.
- Enhanced surveillance systems for *E. coli* O157 - an active surveillance system is in place to assemble a comprehensive clinical, epidemiological and microbiological dataset on all primary indigenous *E. coli* O157 cases.

The range of surveillance outputs is broad and includes:

- Weekly surveillance – weekly internal report to the Health Protection team.
- Monthly/quarterly and annual returns – to various external bodies including the Food Standards Agency, European Centre and Disease Control, Epidemiology of Foodborne Infections Group and Department of Health, Social Services & Public Safety.
- Annual reports and data – published yearly on the PHA website.
- Analysis of outbreaks – descriptive and/or analytical epidemiological analysis.

This report presents the epidemiological data for selected gastrointestinal infections reported in Northern Ireland in the calendar year 2015.

Food Poisoning

Number of cases	**1,913**
Incidence rate	**103.3 per 100,000 population**

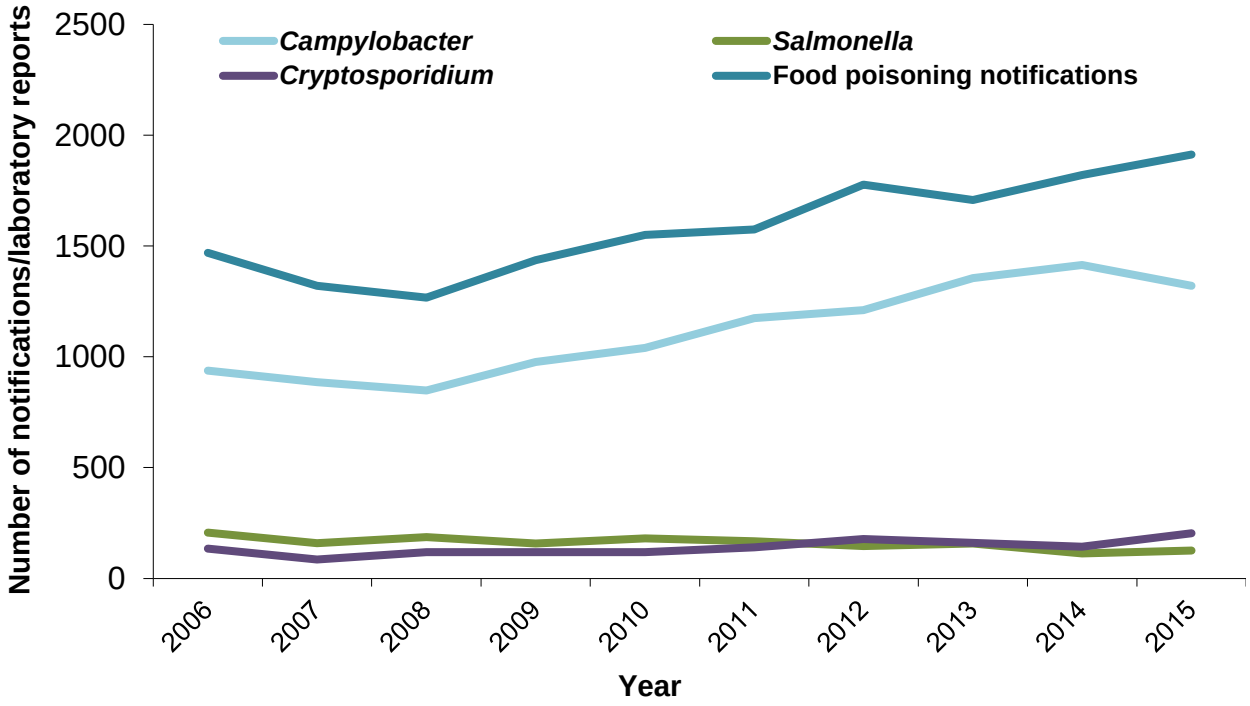
Food poisoning is a notifiable disease; however the cause of food poisoning can be one of a number of bacterial or viral infections. Food poisoning notifications continued to increase in 2015 although the overall increase was relatively small. However, due to the introduction of new testing methods by several laboratories in Northern Ireland the data in 2015 may not be directly comparable with previous years.

Due to the mild or even asymptomatic nature of many food poisoning infections most cases are not reported to the health service. This means that those cases reported to the Public Health Agency represent only a small percentage of total food poisoning incidents.

Salmonella and C*ampylobacter* commonly cause food poisoning. *Salmonella* cases have remained relatively stable over the past ten years with a slight downward trend. In contrast, C*ampylobacter* infections have been increasing since 2008, in line with increasing food poisoning notifications but reduced in 2015 despite more sensitive testing being introduced.

Cryptosporidium is a protozoa that is commonly acquired through the consumption of contaminated water and can cause food poisoning. Cases of *cryptosporidium* increased in 2015 although this may be due to the changes in testing methods.

Fig 1: Food Poisoning: Notifications and Laboratory Reports 2006 - 2015



Campylobacter

Number of cases	**1,320**
Incidence rate	**71.3 per 100,000 population**

Campylobacter is the most common bacterial cause of gastrointestinal infection in the UK and Europe. Campylobacteriosis is characterised by diarrhoea, abdominal pain, malaise, fever, nausea, and vomiting. Symptoms generally last for only a few days.

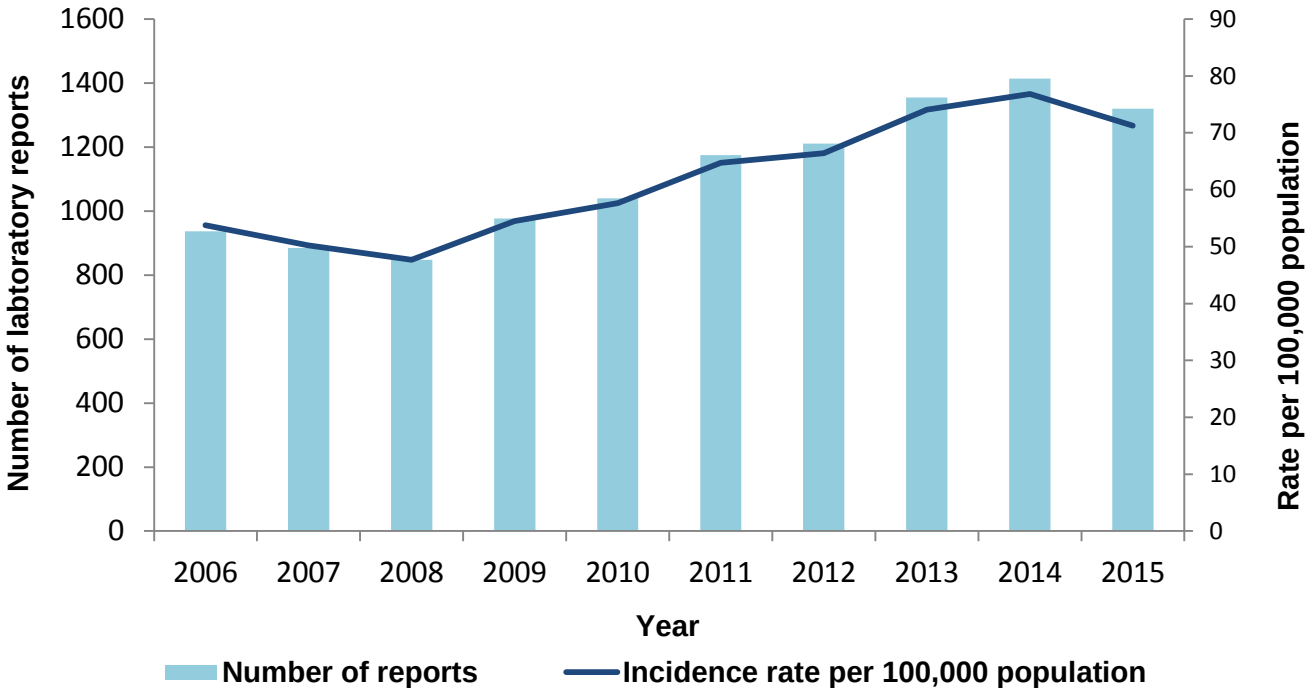
Despite decreasing from 2014, C*ampylobacter* remains the most common bacterial gastrointestinal infection in Northern Ireland with 1,320 laboratory reported cases in 2015, a decrease of 94 cases (7%) compared to 2014 (n=1,414 cases). This increase is despite the introduction of PCR testing in a further two laboratories in 2015 which might have been expected to lead to increased ascertainment.

The incidence of C*ampylobacter* infections in 2015 was 71.3 per 100,000 population. Cases of C*ampylobacter* have been increasing since 2008 with 2015 being the first year since then that a reduction has been seen (Table 1, Figure 2).

Table 1. No of laboratory reports of *Campylobacter*, 2006 - 2015

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
937	885	848	977	1040	1175	1211	1355	1414	1320

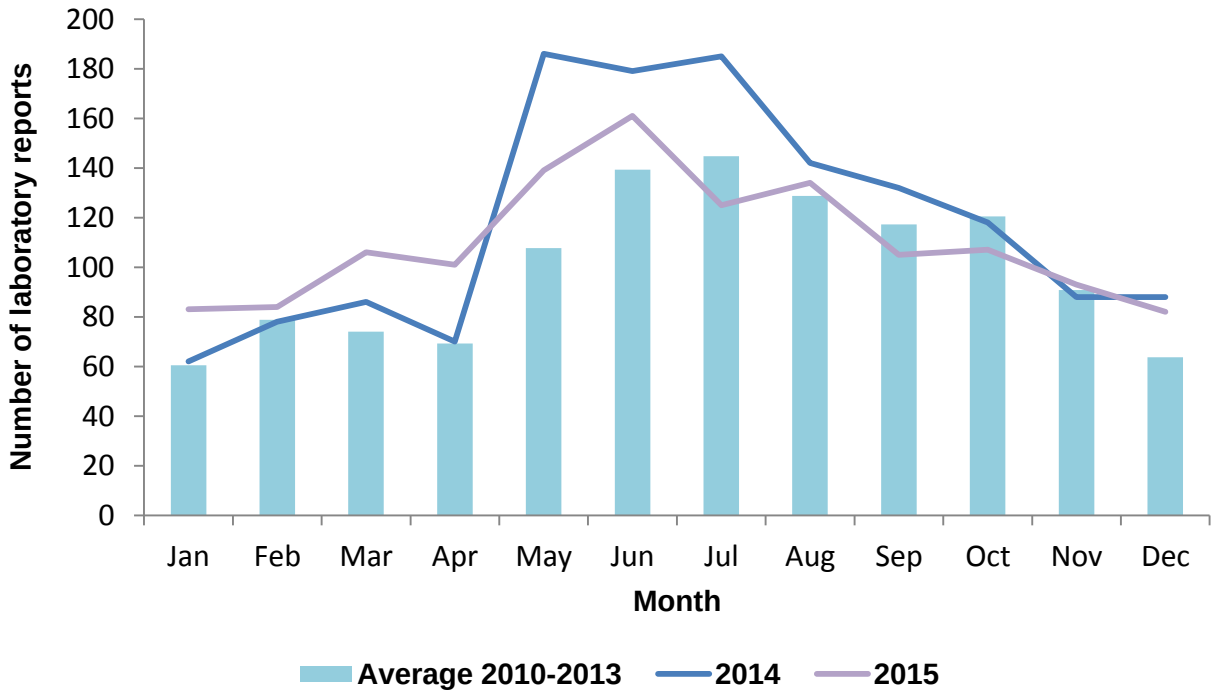
Fig 2: Laboratory reports and incidence rate of *Campylobacter*, 2006 - 2015



Cases of C*ampylobacter* follow a seasonal pattern with the number of cases generally increasing in May with a peak in June/July and declining from September onwards.

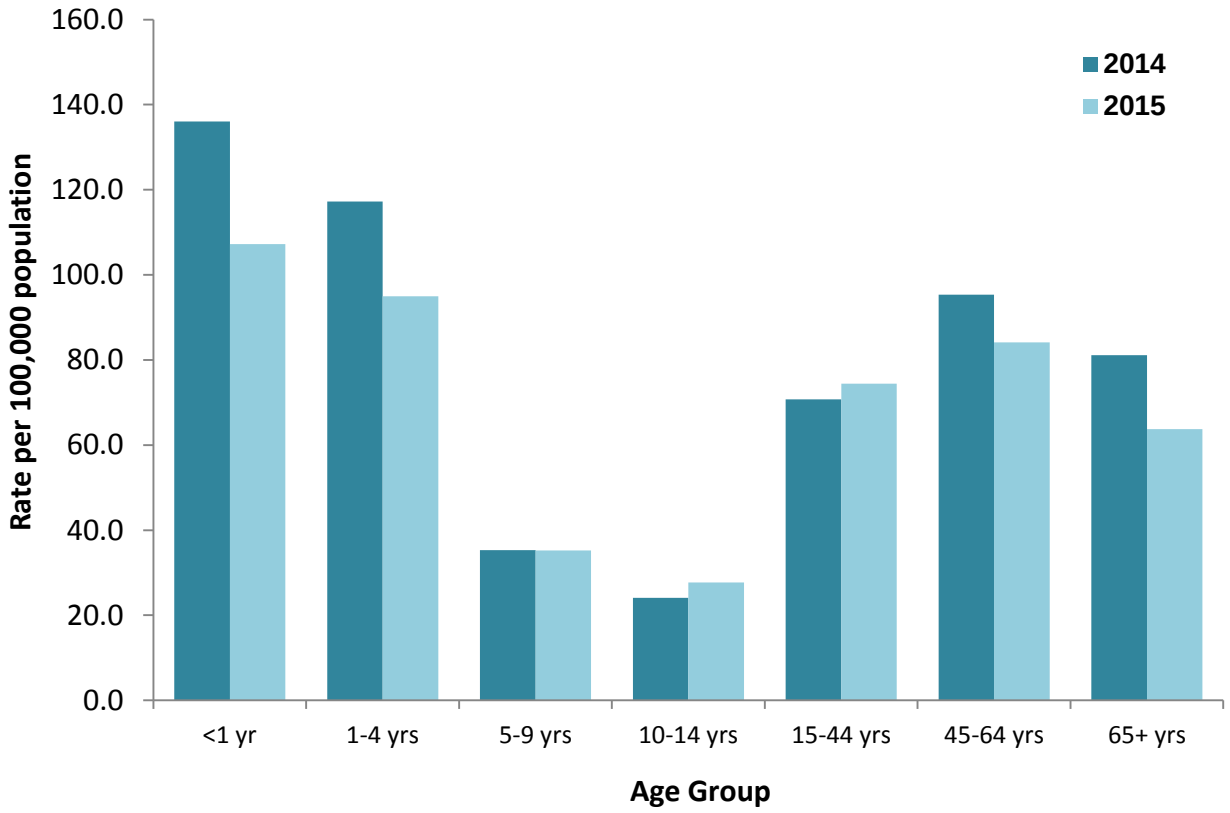
Case numbers were higher in the period January to April compared to 2014 but during the summer period were significantly lower with case numbers peaking in June, (Figure 3).

Fig 3: Monthly laboratory reports of *Campylobacter*, 2010 – 2015



Similar to 2014, the highest incidence rate of laboratory reported C*ampylobacter* infections in 2015 was in the under 1 year old age group (107.2 per 100,000 population). This represents a drop compared to the previous year with only 26 reports in 2015 compared to 33 in 2014 (Figure 4). Rates in the youngest and oldest age groups (<1, 1-4, 45-64 and over 65) were reduced compared to 2014 with the other age groups showing a proportionally smaller increase. The proportion of reported cases that were male was 54% (n=719), slightly lower than in 2014.

Fig 4: Laboratory reports of *Campylobacter*, age-specific incidence rate, 2014 - 2015



Cryptosporidium

Number of cases	**204**
Incidence rate	**11.0 per 100,000 population**

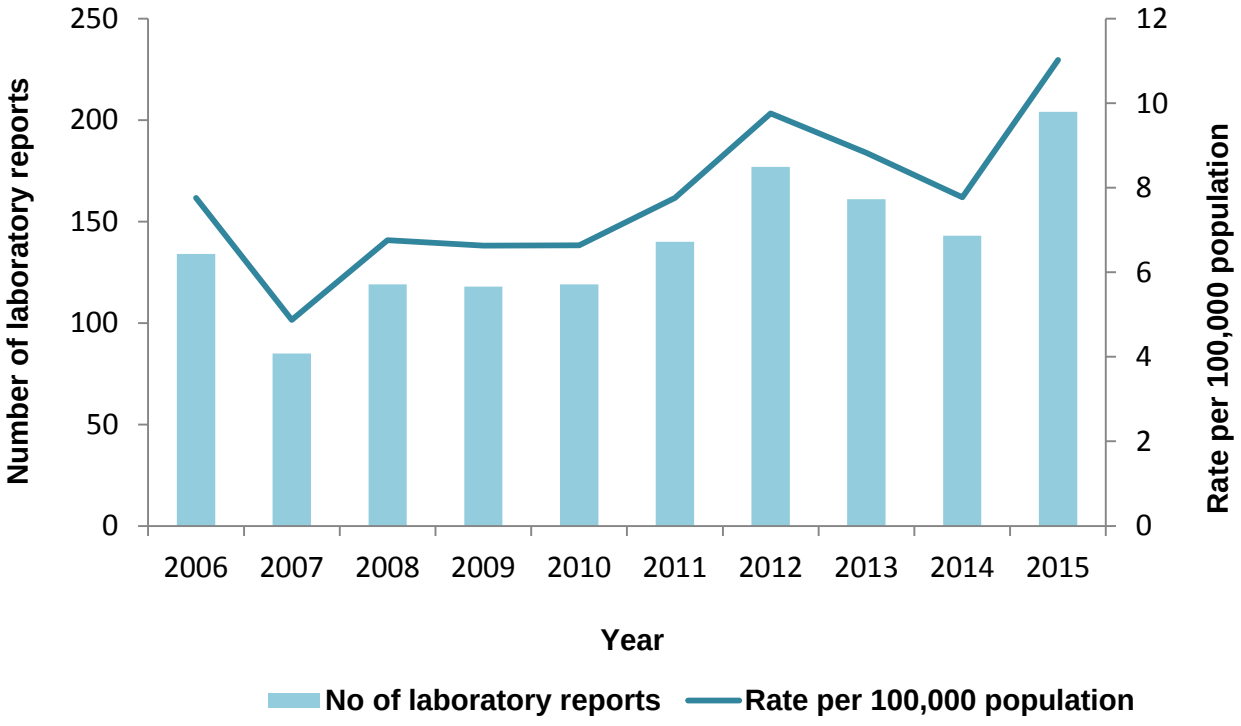
Cryptosporidium is a protozoal parasite that causes a diarrhoeal illness that can last between 2 days and 4 weeks. The infection can be a more serious illness in people who are immunosuppressed. *Cryptosporidium* is found in lakes, streams, rivers, untreated water and occasionally in swimming pools.

Following the introduction of PCR testing by several laboratories in Northern Ireland the reported cases of *Cryptosporidium* infection increased substantially, with 204 cases in 2015 compared to 143 in 2014, representing a 43% increase (Table 2, Figure 5). This increase likely represents some increased ascertainment as two of the laboratories who introduced PCR testing had not previously tested faecal specimens for cryptosporidium routinely. The incidence rate of C*ryptosporidium* infection was 11.0 per 100,000 population. No outbreaks of C*ryptosporidium* were identified in 2015 and only 19 cases (9%) were thought to be associated with travel outside the United Kingdom.

Table 2. No of laboratory reports of *Cryptosporidium*, 2006 - 2015

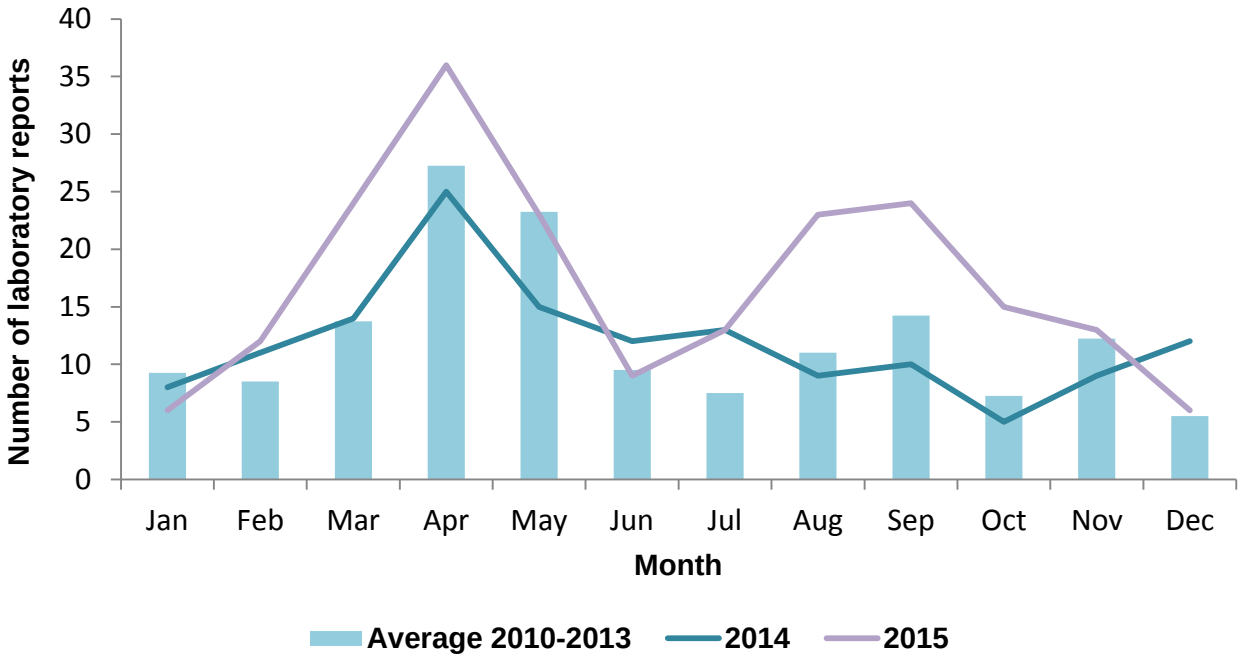
2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
134	85	119	118	119	140	177	161	143	204

Fig 5: Laboratory reports of *Cryptosporidium*, 2006 - 2015



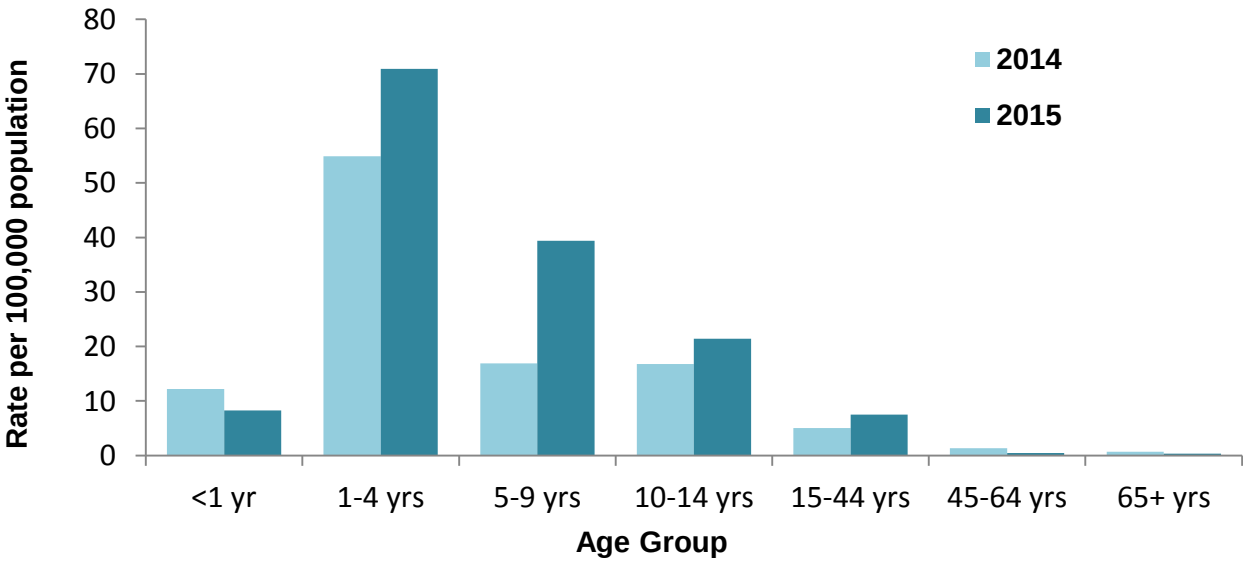
The spring peak in 2015 was much higher than in 2014 with a much more pronounced secondary peak in August and September than would be usual (Figure 6).

Fig 6: Monthly laboratory reports of *Cryptosporidium*, 2014 - 2015



Similar to previous years the highest incidence rate was in the 1-4 years old age group (70.9 per 100,000 population) (Figure 7). Most of the age groups have seen an increase in incidence rate during 2015 with the exception of the under 1, 45-64 and over 65 age groups where numbers were extremely small (total of only 5 cases in these age groups). Overall 53% of cases were males in 2015; however, the proportion was generally higher in the younger age groups, with 61% being male in the 1-4 year olds.

Fig 7: Laboratory reports of *Cryptosporidium*, Age-Specific Rate (per 100,000 population), 2014 - 2015



E. coli O157

Number of cases	**33**
Incidence rate	**1.8 per 100,000 population**

Escherichia coli O157 is a bacterial cause of gastroenteritis. Symptoms can range from mild gastroenteritis to severe bloody diarrhoea. A small proportion of patients can develop haemolytic uraemic syndrome (HUS) which is a serious life-threatening condition resulting in kidney failure. PCR testing for this organism has been introduced in recent years, however only culture confirmed cases of *E. coli* are currently considered for surveillance purposes to ensure consistency when comparing to previous years.

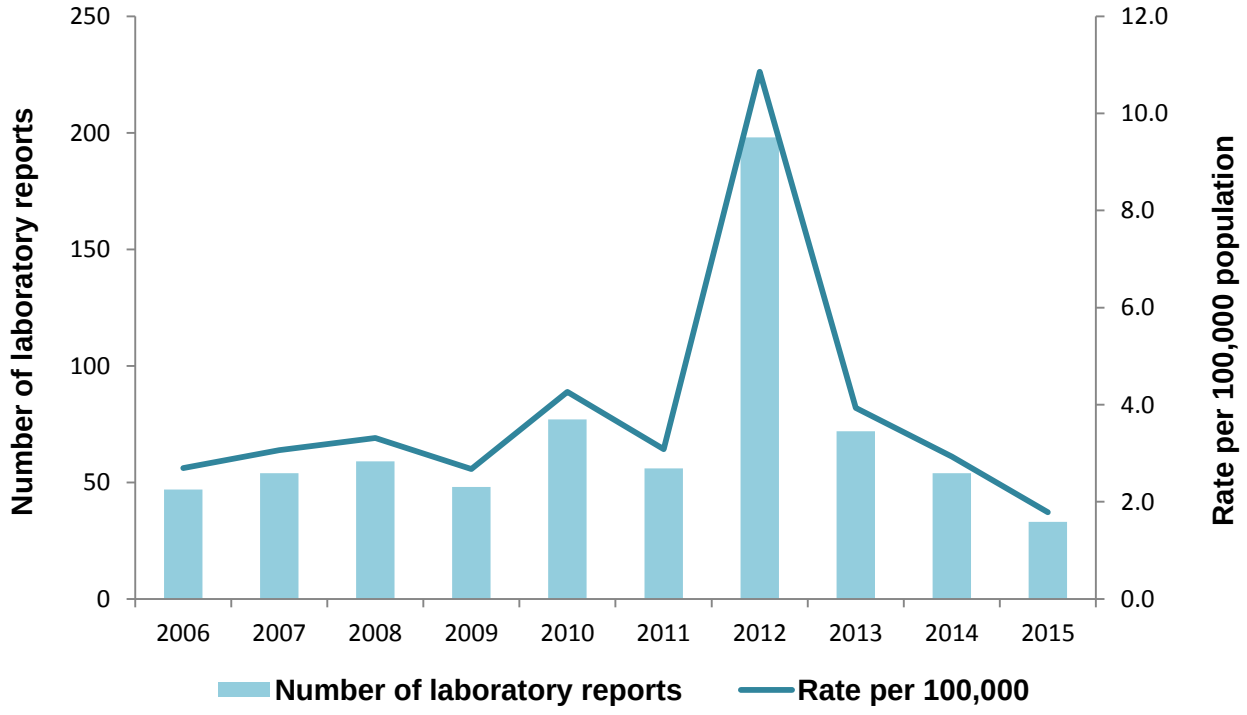
There were 33 laboratory culture confirmed cases of *E. coli* O157 reported in 2015, of which 32 (97%) tested positive as Vero cytotoxin-producing *E, coli* (VTEC). VTEC strains produce a toxin which can cause severe illness. There were no cases associated with outbreaks, and 7 cases (21%) were associated with travel outside the United Kingdom (Figure 8, Table 3).

Table 3. No of laboratory reports of *E. coli* O157, 2006- 2015

2006	2007	2008	2009	2010	2011	2012*	2013	2014	2015
47	54	59	48	77	56	198	72	54	33

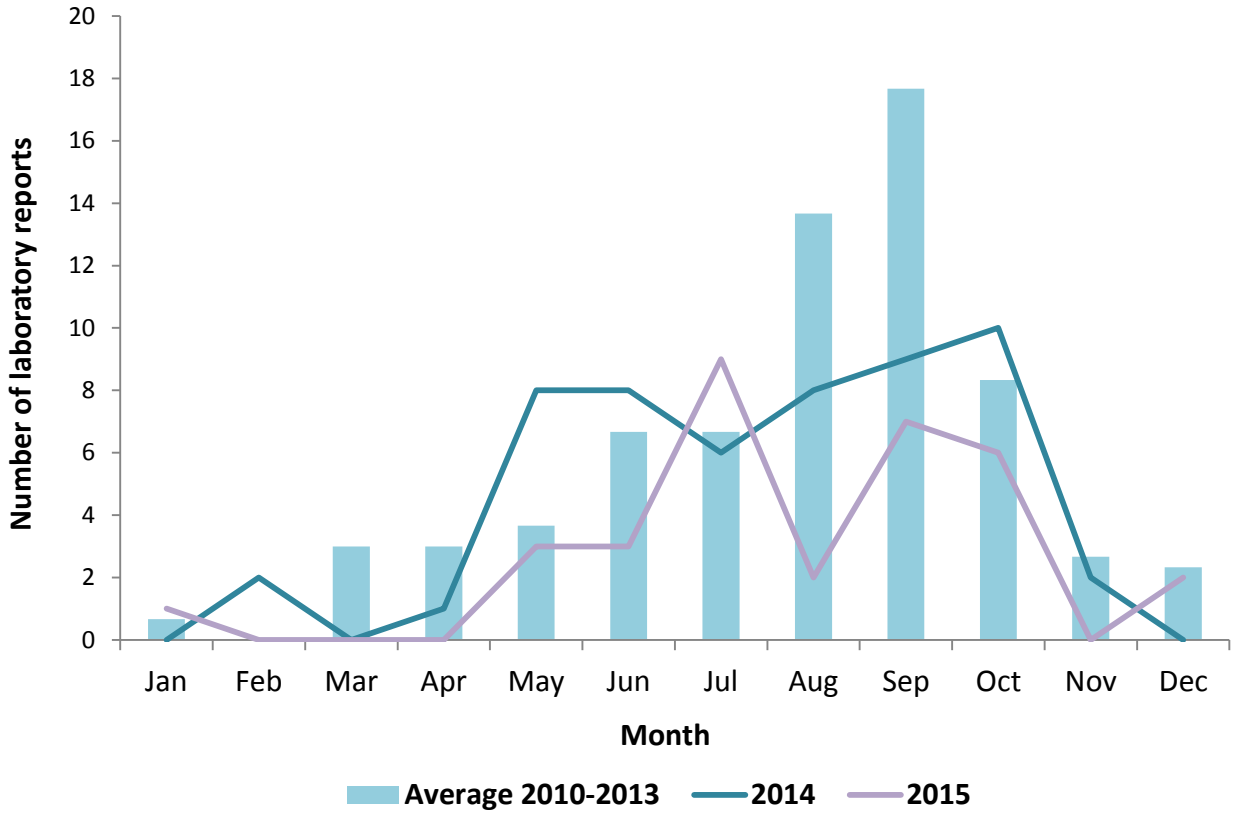
** increase due to largest recorded outbreak of E. coli in N. Ireland with 141 confirmed cases*

Fig 8: Laboratory reports of *E. coli* O157, 2006 - 2015



In 2015 the number of reports peaked in July, earlier than usual but with a secondary peak in September (Fig 9).

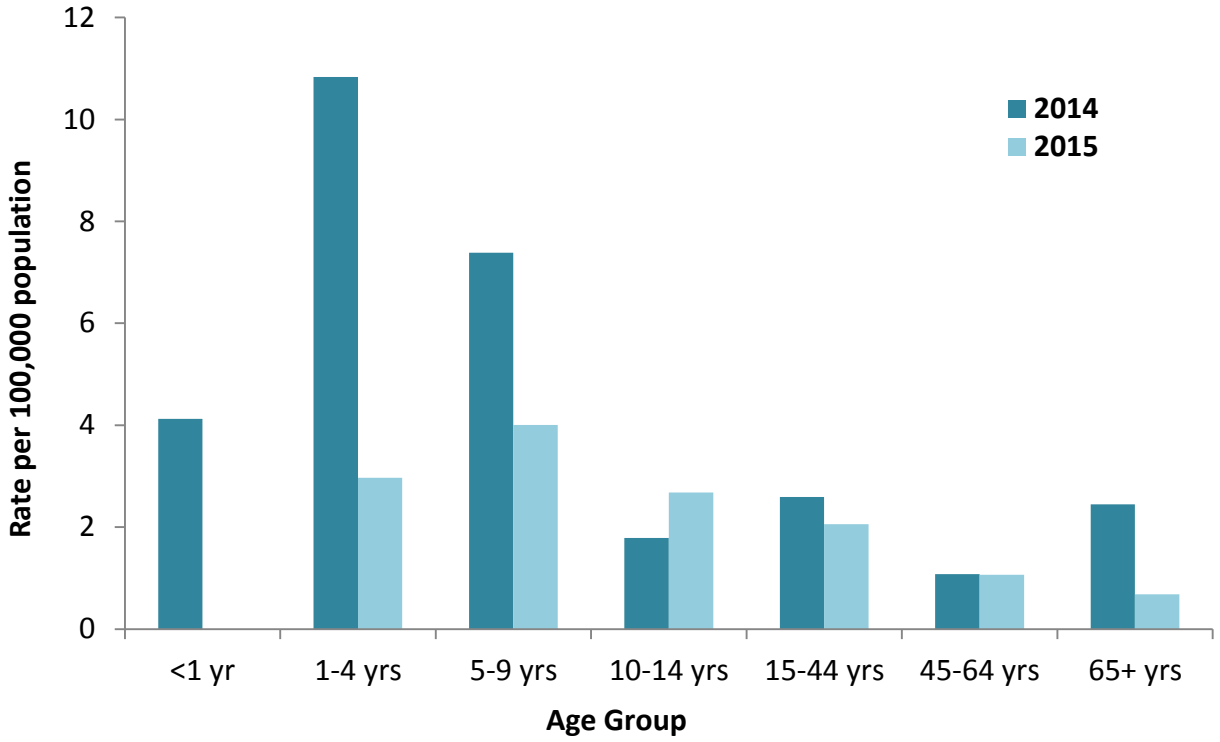
Fig 9: Monthly laboratory reports of *E. coli* O157, 2014 - 2015*



** 2012 not included due to the atypical nature of the large outbreak that occurred in this year.*

The reduction in overall rates was reflected in the majority of the age-specific rates, with the exception of those in the 10-14 year old age group; however this group only represents 3 cases. Unlike previous years when the 1-4 year age group had the highest rate, in 2015 the highest age specific rates were in the 5-9 year old age group. However, again this is likely due to small numbers as the 5-9 year age group only represents 4 cases (Figure 10).

Fig 10: Distribution of *E. coli* O157 cases by age group, 2014 - 2015



Phage type data were available for all but 2 cases in 2015 (Table 4). Phage type PT8 was the largest single phage type in 2015 (39%) with PT32 at similar levels (36%).

Verocytotoxin gene type was available for 32 of the 33 laboratory culture confirmed cases in 2015. Toxin type VT2 was the most common toxin profile with 45% of cases displaying this toxin type. The majority of the remaining cases were toxin type VT1 & 2 (30%) with the remaining reports not stating the toxin profile (Table 5).

Table 4: Distribution of phage types of laboratory confirmed cases of *E. coli* O157 by year, 2011-2015

Phage type	2011	2012	2013	2014	2015
1	0	1	0	0	0
2	0	1	1	2	1
4	1	0	0	0	0
8	19	14	10	12	13
14	0	1	2	1	0
21/28	6	3	2	0	5
31	3	14	2	2	0
32	11	20	42	13	12
33	0	1	0	0	0
34	0	0	1	0	0
51	4	0	0	1	0
54	1	135	1	3	0
89	0	1	0	0	0
Unknown	11	7	11	20	2
Total	**56**	**198**	**72**	**54**	**33**

Table 5: Verotoxin (VT) genes of laboratory confirmed cases of *E. coli* O157, 2006 - 2015

VT	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
VT1	0	0	0	0	2	0	0	0	0	0
VT2	33	45	39	25	42	24	34	50	18	16
VT1+2	8	4	11	11	22	20	153	9	13	10
VT+	1	0	6	8	1	5	2	2	12	6
Total	**42**	**49**	**56**	**44**	**67**	**49**	**189**	**61**	**43**	**32**

In 2015 the most common symptoms reported were diarrhoea (90%) and abdominal pain (83%) similar to 2014 (Table 6). Overall 80% of cases experienced bloody diarrhoea, a

slight increase compared to 2014. Cases in the over 65 year age group were the most likely to report bloody diarrhoea with 100% of cases reporting these symptoms, although this group contains only seven cases. Seven cases reported having all six symptoms listed.

Table 6: Symptoms experienced by *E. coli* O157 cases, 2015

Symptom	Number	Percentage*
Abdominal pain	25	83%
Blood in stools	21	70%
Diarrhoea	27	90%
Fever	8	27%
Nausea	14	47%
Vomiting	7	23%

** percentage of cases where a questionnaire has been received*

Similar to previous years, hospital admissions occurred in all age groups, with the exception of infants under 1 year old. There were 57% of cases admitted to hospital in 2015, an increase compared to 2014 (35%). There were substantial variations in the percentage hospitalised by age group but this may be due to the small numbers involved (Table 7).

Table 7: Hospitalisation of *E. coli* O157 cases by age group, 2015

Age group	Number of cases for whom questionnaire was received	Number of cases who visited GP	Number of cases who attended hospital	Number of cases hospitalised	% of age group hospitalised
<1	0	0	0	0	N/A
1-4	3	2	2	2	67%
5-9	4	2	3	1	25%
10-14	2	1	2	2	100%
15-44	14	9	10	8	57%
45-64	5	2	3	3	60%
65+	2	0	2	1	50%
Total	**30**	**16**	**22**	**17**	**57%**

Other Serotypes of E. coli

As mentioned previously the introduction of PCR testing in several of the Northern Ireland health service laboratories has allowed for the detection of non-O157 serotypes of verotoxin positive *E. coli*. However, only one laboratory in Northern Ireland is currently able to identify the particular serotype involved and this is limited to the eight most commonly found serotypes. The other laboratories do not routinely send non-O157 serotypes for further identification. This means that any data for these serotypes is likely to substantially underestimate the incidence of these case and be skewed due to geographical differences.

Below is a table detailing the non-O157 serotypes that were identified in 2015.

Table 8: Other serotypes of *E. coli*

Serotype	Number
O 103	1
O 010	1
O 026	17
O 091	2
O 145	4

Giardiasis

Number of cases	**92**
Incidence rate	**5.0 per 100,000 population**

Giardia lamblia is a protozoan parasite that causes giardiasis. The parasites are found in the gut of both humans and animals. Giardiasis can cause diarrhoea, abdominal cramps and flatulence; however up to a quarter of cases can be asymptomatic.

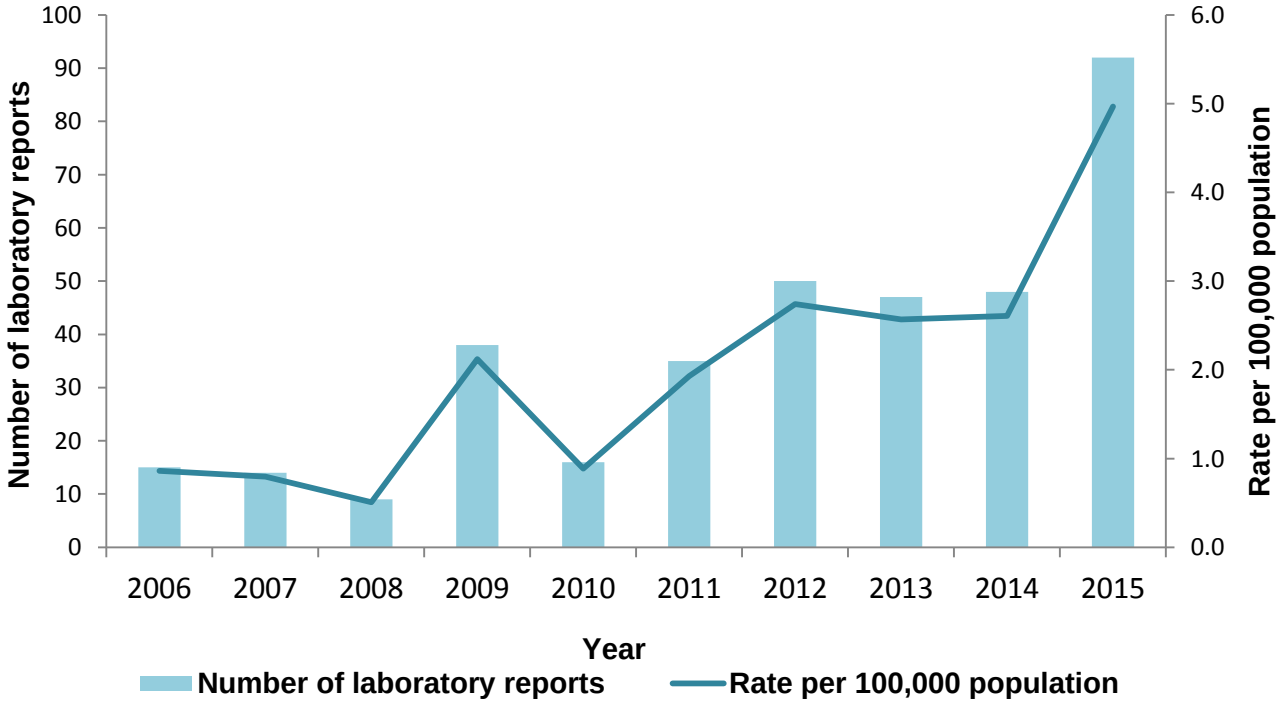
There was a large increase in the number of laboratory reports of *Giardia* in 2015. Similar to *Cryptosporidium* a number of laboratories introduced PCR testing for *Giardia* in 2015 and also started routinely testing for this organism. The increase in cases is likely to be due to increased ascertainment rather than a true increase.

Laboratory confirmed cases of giardiasis increase from 48 in 2014 to 92 in 2015 (92% increase). The incidence rate in 2015 was 5.0 per 100,000 population. There were 12 (13%) cases that were reported as being likely to be associated with foreign travel (Table 8, Figure 11). Approximately 65% of cases were male. There were no outbreaks of giardiasis reported in 2015.

Table 9. No of laboratory reports of *Giardia lamblia*, 2006 - 2015

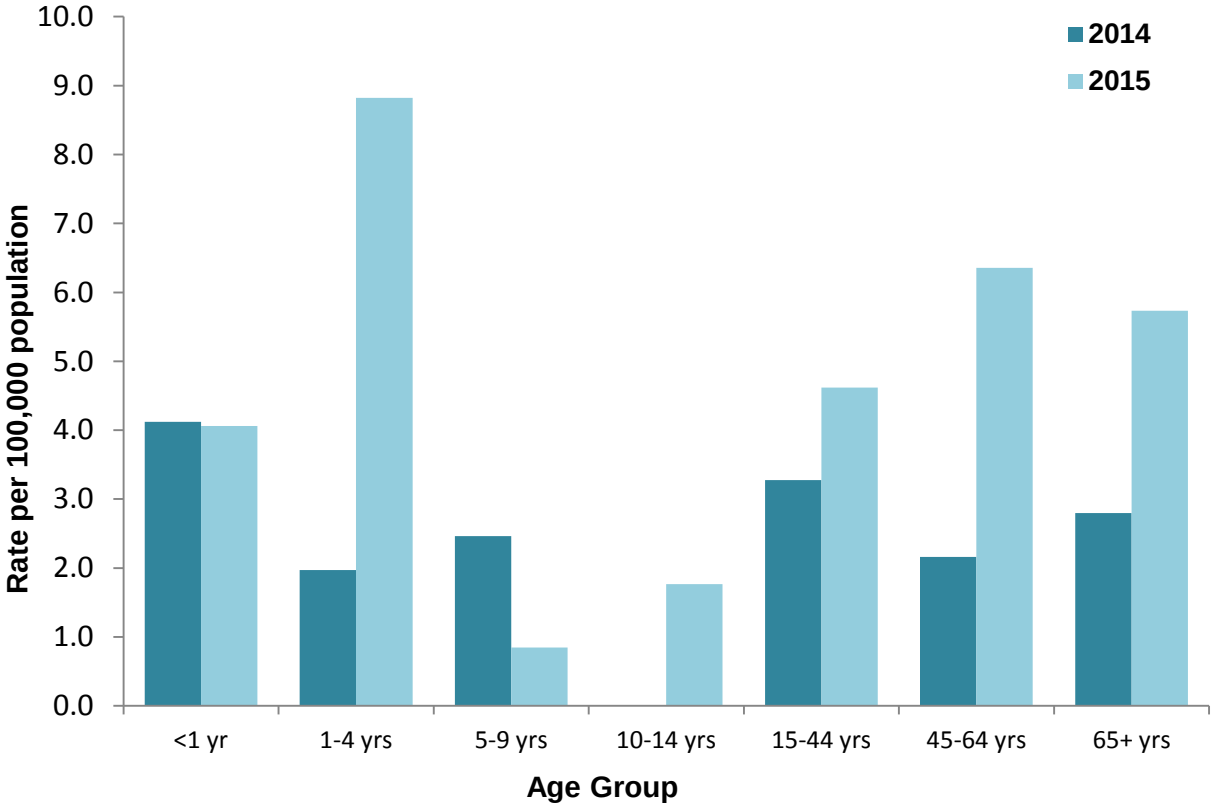
2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
15	14	9	38	16	35	50	47	48	92

Fig 11: Laboratory reports of *Giardia lamblia* (all specimen types), 2006 - 2015



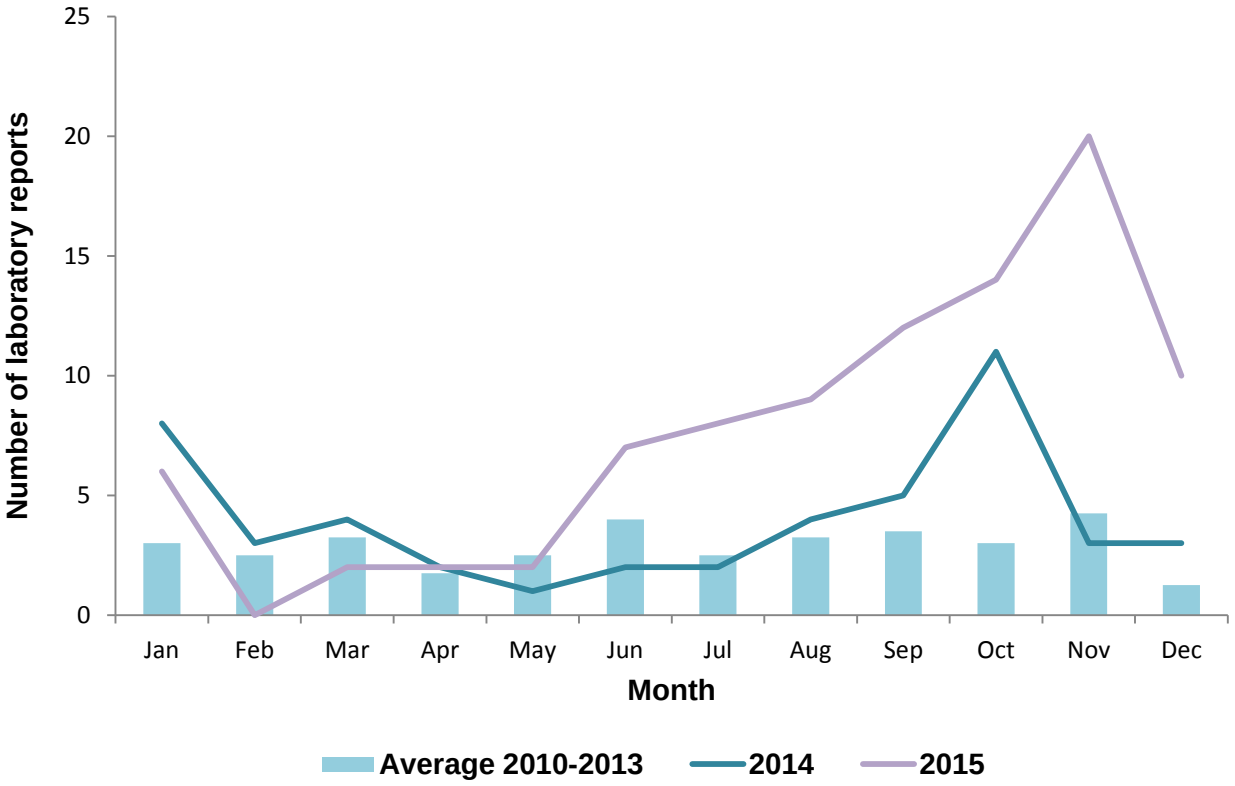
The highest incidence rate in 2015 was in the 1-4 year old age group (8.9 per 100,000 population) however this represents only 9 cases. The next highest age specific incidence rate was in the 45-64 year old group (n=29) with a rate of 6.2 per 100,000 population. Age specific rates have increased substantially for most age groups with the exception being the under 1 and 5-9 year age groups and this is likely due to the very small numbers involved (Figure 12).

Fig 12: Laboratory reports of *Giardia lamblia* (all age groups), 2014 - 2015



In both 2014 and 2015 the number of reported cases peaked late in the year with numbers increasing from May in 2015. This may represent the seasonality of *Giardia* within Northern Ireland; however, it may also be due in part to the phased introduction of the testing changes across different laboratories during 2015 and would require further data in subsequent years to establish a pattern.

Fig 13: Monthly laboratory reports of *Giardia lamblia*, 2014 – 2015



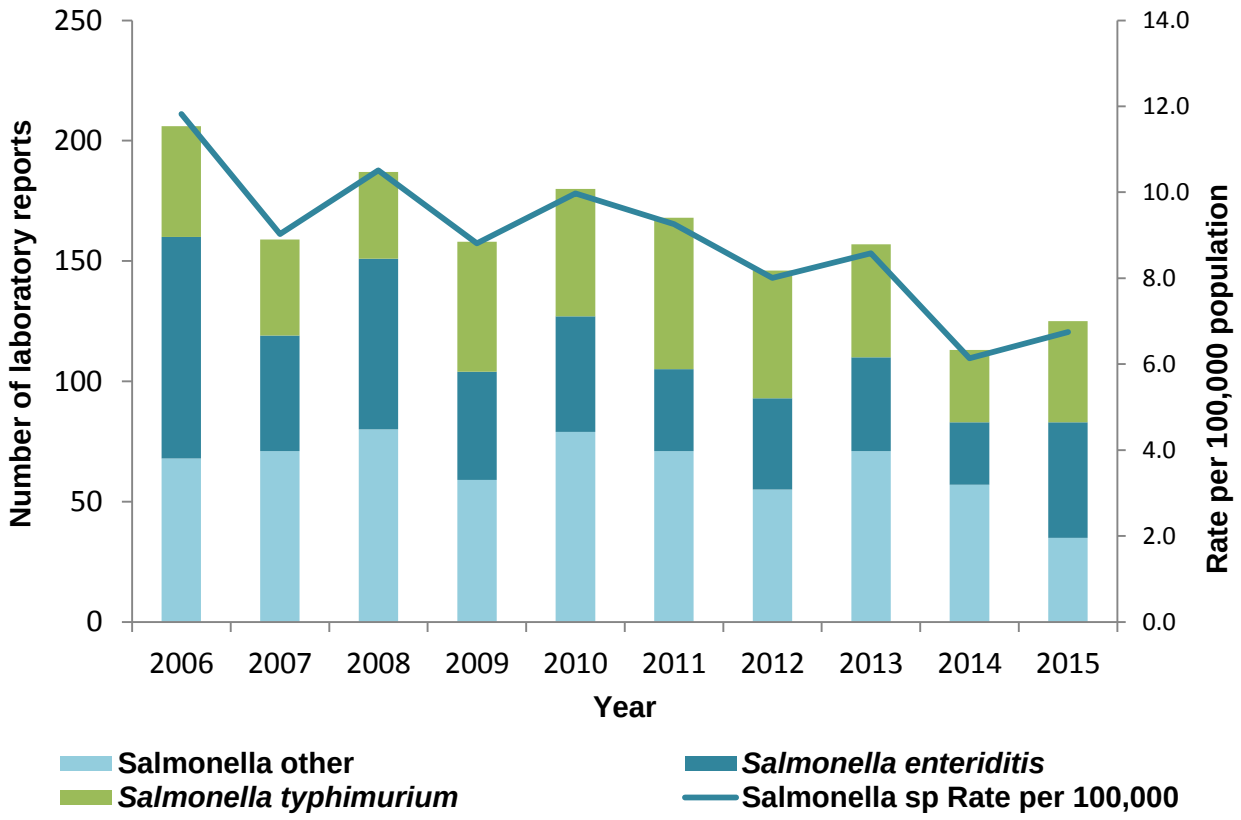
Salmonella

Number of cases	**125**
Incidence rate	**6.8 per 100,000 population**

Salmonella infections are one of the most commonly reported causes of bacterial gastrointestinal infections across Europe. *Salmonella* infection is characterised by abdominal pain, diarrhoea, fever, nausea, headache and occasionally vomiting. Dehydration amongst vulnerable populations such as infants, the immunocompromised and the elderly can be severe.

Laboratory reports increased in 2015 compared with the previous year but remain relatively low compared to years prior to 2014. A total of 125 reports were received representing a 11% increase compared to 2014. The incidence of *salmonella* infections was 6.8 per 100,000 population. Similar to 2014, the number of reported cases that were likely to be associated with foreign travel made up a substantial proportion of the reports at 34% (n=42). Consistent with previous years there were significant differences in the proportion due to travel between serotypes, with 42% of *S.* enteriditis due to travel and only 21% in the case of *S*. typhimurium. The sole *S.* typhi case was also associated with travel.

Fig 14: Laboratory Reports of *Salmonella*, 2006 - 2015



In 2015 *S.* enteritidis and *S*. typhimurium remained the two most frequently reported serotypes in Northern Ireland, accounting for 38% and 34% of cases respectively. Since 2009 *S*. typhimurium cases have been the most common serovar of *Salmonella* in Northern Ireland; however, in 2015 *S.* enteriditis reports overtook those of *S.* typhimurium (Table 9). There was a substantial drop in the reports of *Salmonella* classified as 'other'.

Table 10. No of laboratory reports of *Salmonella*, 2006 - 2015

Serovar	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Enteriditis	92	48	71	45	48	34	38	39	26	48
Typhimurium	46	40	37	54	53	63	53	47	30	43
Paratyphi	0	2	1	0	2	1	1	1	1	0
Typhi	0	2	1	0	0	1	0	1	1	1
Other	68	67	77	59	77	69	54	69	55	33
Total	**206**	**159**	**187**	**158**	**180**	**168**	**146**	**157**	**113**	**125**

Similar to many gastrointestinal illnesses, S*almonella* cases also followed a seasonal pattern. The number of cases peaked much later than usual in November (Figure 15). Cases of the most common serotypes *S.* enteriditis and *S.* typhimurium peaked in different months, with *S. e*nteriditis peaking in September and *S.* typhimurium peaking in November (Figure 16). The reason for the large shift in peak month for *S.* typhimurium is unknown.

Fig 15: Monthly laboratory reports of *Salmonella*, 2014 - 2015

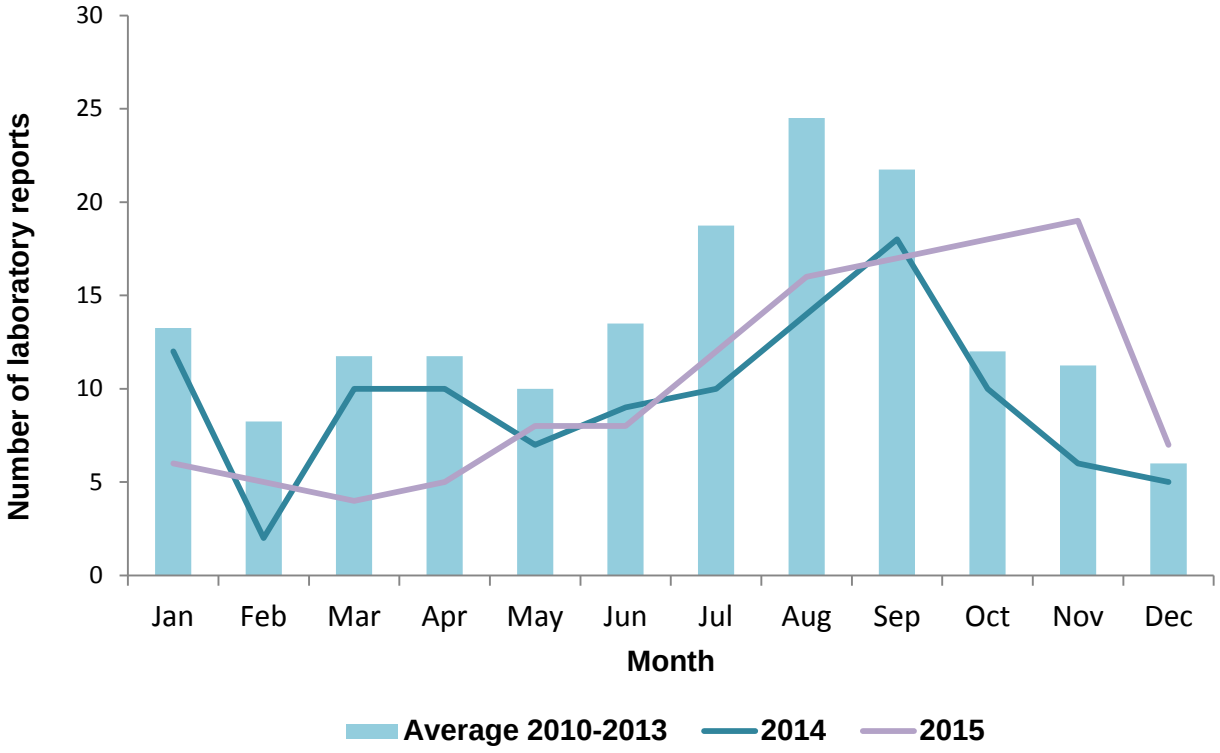
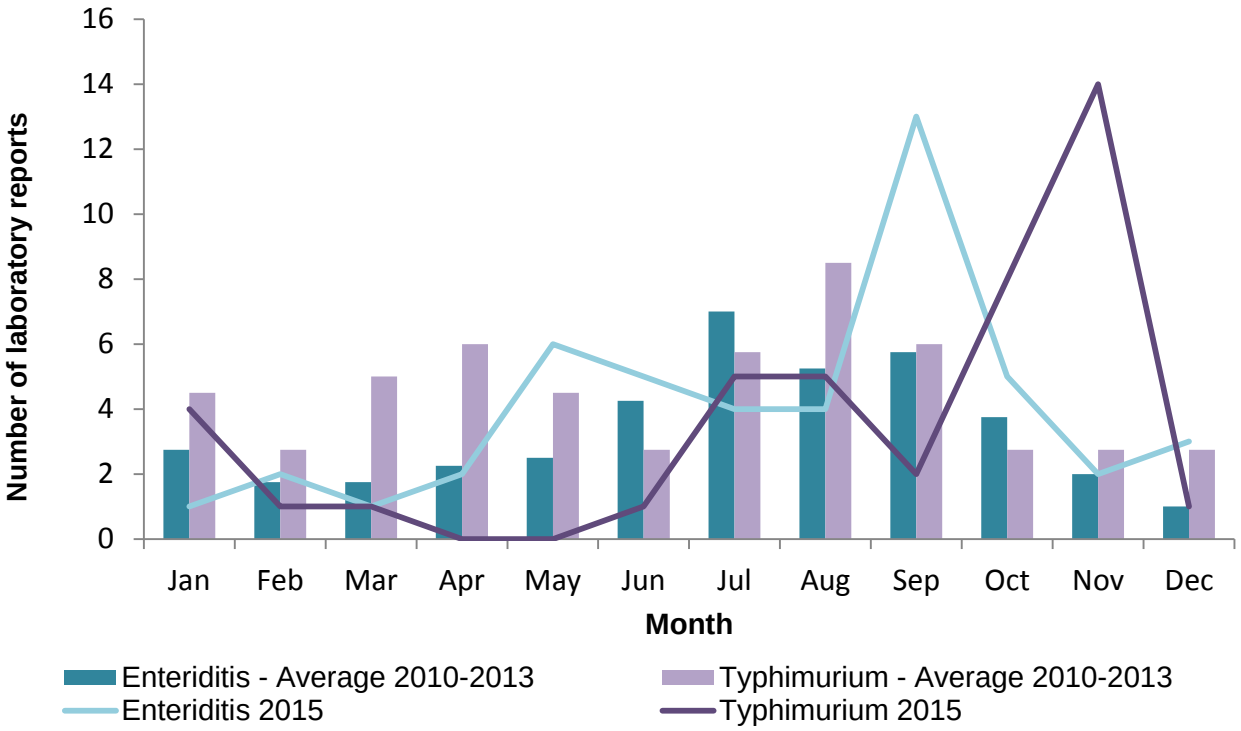
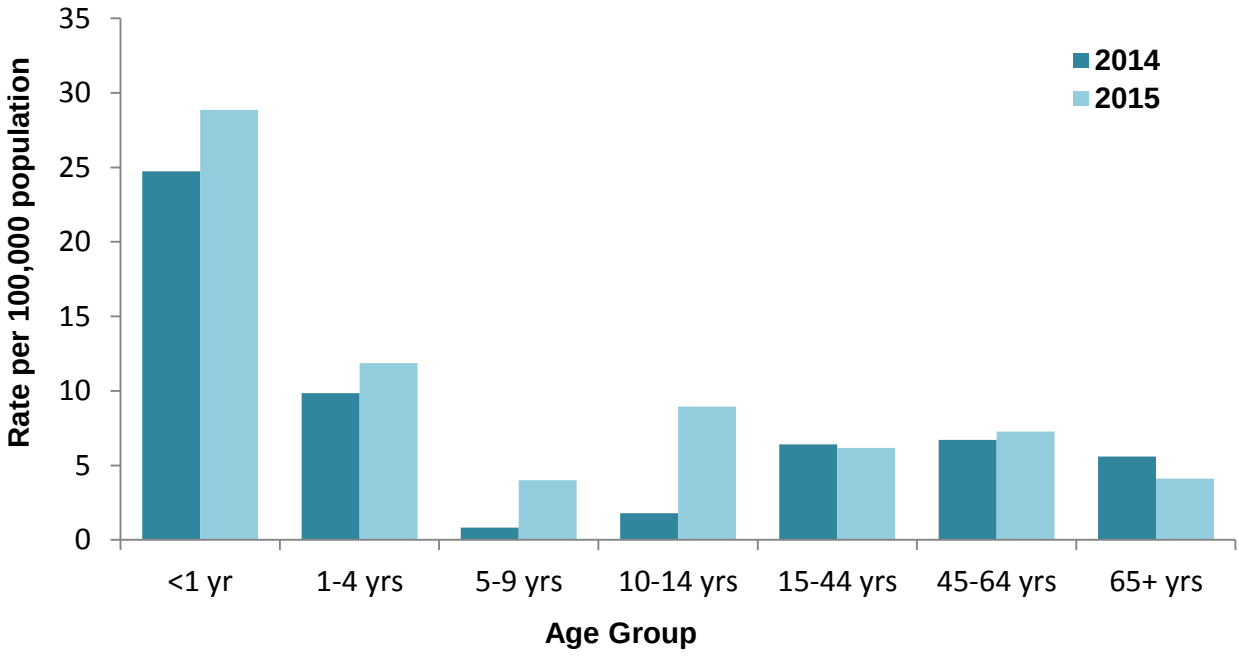


Fig 16: Monthly laboratory reports of *S.* Enteriditis and *S.* Typhimurium, 2015



In 2015 58% of the cases were male, a slight increase from 2014. The highest incidence rate in 2015 was in the under 1 year old age group (28.9) per 100,000 population although this represents only 7 cases (Figure 17). Both *S.* Enteritidis and *S.* Typhimurium peaked in the 1-4 year old age group; though it should be noted that there are very small numbers in both these age groups when examining these serovars in isolation.

Fig 17: Laboratory reports of *Salmonella*, age specific rates (per 100,000 population), 2014 – 2015



Other serotypes for which more than one report was received since 2012 are presented in Table 10 along with data from the previous 3 years; however, other than S. enteriditis and S. typhimurium numbers of individual serovars remain very low. There were an additional 14 serovars reported in 2015 where only one case was reported, including one *Salmonella* typhi.

Table 11. *Salmonella* serovars 2012 -2015

2012		2013		2014		2015	
Serovar	No	Serovar	No	Serovar	No	Serovar	No
Mikawasima	5	*Infantis*	7	*Java*	4	*Infantis*	3
Newport	5	*Senftenberg*	4	*Agona*	3	*Stanley*	3
Infantis	4	*Bareilly*	3	*Heidelberg*	3	*Agona*	2
Stanley	4	*Java*	3	*Infantis*	3	*Heidelberg*	2
Bredeney	3	*Kentucky*	3	*Newport*	3	*Saint-Paul*	2
Agona	2	*Stanley*	3	*Saint-Paul*	3	Nachshonim	2
Bareilly	2	*Abony*	2	*Stanley*	3	Muenchen	2
Dublin	2	*Agama*	2	*Virchow*	3		
Kentucky	2	*Agona*	2	*Braenderup*	2		
Montevideo	2	*Dublin*	2	*Corvallis*	2		
Oranienburg	2	*Hadar*	2				
		Haifa	2				
		Kottbus	2				
		Mikawasima	2				
		Panama	2				
		Saint-Paul	2				

During 2015 full genome sequencing was introduced by Public Health England for *Salmonella* testing. As part of this change in testing routine phage typing of Salmonella isolates was stopped.

Other Gastrointestinal Infections

Clostridium perfringens

Clostridium perfringens is widely distributed in the environment and foods, and forms part of the normal gut flora in humans and animals. Food poisoning most often occurs when food (usually meat) is prepared in advance and kept warm for several hours before serving. Illness generally lasts no more than 24 hours although elderly people may be more seriously affected. In 2015 there were 34 cases of clostridium perfringens reported in NI (Table 13).

Table 12. No of laboratory reports of Clostridium perfringens, 2006-2015

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
29	20	36	18	36	16	28	24	23	34

Listeria

Listeria is a rare but potentially life-threatening disease. Healthy adults are likely to experience only mild infection, causing flu-like symptoms or gastroenteritis. However, listeria infection can occasionally lead to severe blood poisoning or meningitis. Pregnant women, the elderly and people with weakened immune systems are more susceptible to listeria. It is particularly dangerous in pregnancy as although the illness is unlikely to be serious for the mother, it can cause miscarriage, premature delivery or severe illness in a newborn child. In 2015 there were six cases of listeria reported in NI (Table 14).

Table 13. No of laboratory reports of *Listeria*, 2006-2015

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
6	5	11	4	2	3	7	2	4	6

Norovirus

Norovirus is the most common known cause of gastrointestinal infections in the UK. Within closed settings such as hospitals, the virus can cause widespread disruption because it is able to survive for long periods in the environment, it has a low infectious dose and any immunity to infection is short-lived. Norovirus infection rates peak in winter months; however, it is present in the community all year round.

Numbers of laboratory reports of norovirus do not necessarily reflect the level of norovirus present in the community as many reports are associated with outbreaks. However, in outbreak situations only a small number of patients are usually tested and once norovirus is identified there is usually no further testing done for patients associated with that outbreak; this means that relatively few cases are identified for testing.

In 2015 there were 335 laboratory reports of Norovirus reported in NI (Table 15).

Table 14. No of laboratory reports of norovirus, 2006-2015

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
385	439	439	424	643	445	592	386	272	335

Rotavirus

Rotavirus is the most common cause of gastroenteritis in infants and very young children, with most children suffering an infection by the age of five. Rotavirus can cause severe vomiting, severe diarrhoea, and stomach cramps. These symptoms usually last from 3-8 days. Adults may become infected; however, repeat infections are generally less severe than infections during childhood. The majority of infections tend to occur during the spring (Table 16).

A vaccine for rotavirus for children was introduced in Northern Ireland in July 2013, and a high uptake rate has been reported so far (estimated at 94% of eligible children receiving two doses of the vaccine in the first year of the programme). The decrease in the number of laboratory reports in 2014 is likely due to this introduction. For further information on the rotavirus immunisation programme please see http://www.publichealth.hscni.net/news/pha-launches-rotavirus-vaccine-protect-babies-under-4-months.

The number of cases of rotavirus in 2015 (n=404) rose substantially compared to 2014 (n=210); however, they were still lower than prior to the introduction of the vaccine. The Republic of Ireland also saw a very large increase in reported cases in 2015 with their highest ever recorded number of cases.

Table 15. No of laboratory reports of rotavirus, 2006 - 2015

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
432	363	724	594	599	630	543	599	210	404

Shigellosis

Shigellosis, also called bacillary dysentery, is caused by four species; *Shigella dysenteriae*, *Shigella flexneri*, *Shigella boydii* and *Shigella sonnei*. The two most commonly seen in Northern Ireland are *Shigella sonnei* and *Shigella flexneri* with the latter generally being more severe. The illness is characterised by diarrhoea, sometimes with blood and mucus and is common amongst young children although infection can occur in all ages after travel to areas where hygiene is poor. Invasive disease is rare but extra-intestinal complications such as Haemolytic Uraemic Syndrome can occur (Tables 17 & 18).

The rise in reported cases of *Shigella* noted in 2014 continued in 2015 with a total of 30 culture confirmed cases. Whilst *Shigella flexneri* cases remained virtually unchanged compared to the previous year the number of *sonnei* reports more than doubled, although compared to other gastrointestinal organisms there are relatively few cases of *Shigella* in

total. Similar to 2014, the bulk of the cases were males (81%) with a substantial proportion of these (56%) self-reporting as men who have sex with men (MSM). This would tend to support findings from the previous year indicating that at least some of the increase in *Shigella* cases is at least partially related to sexual transmission between MSM..

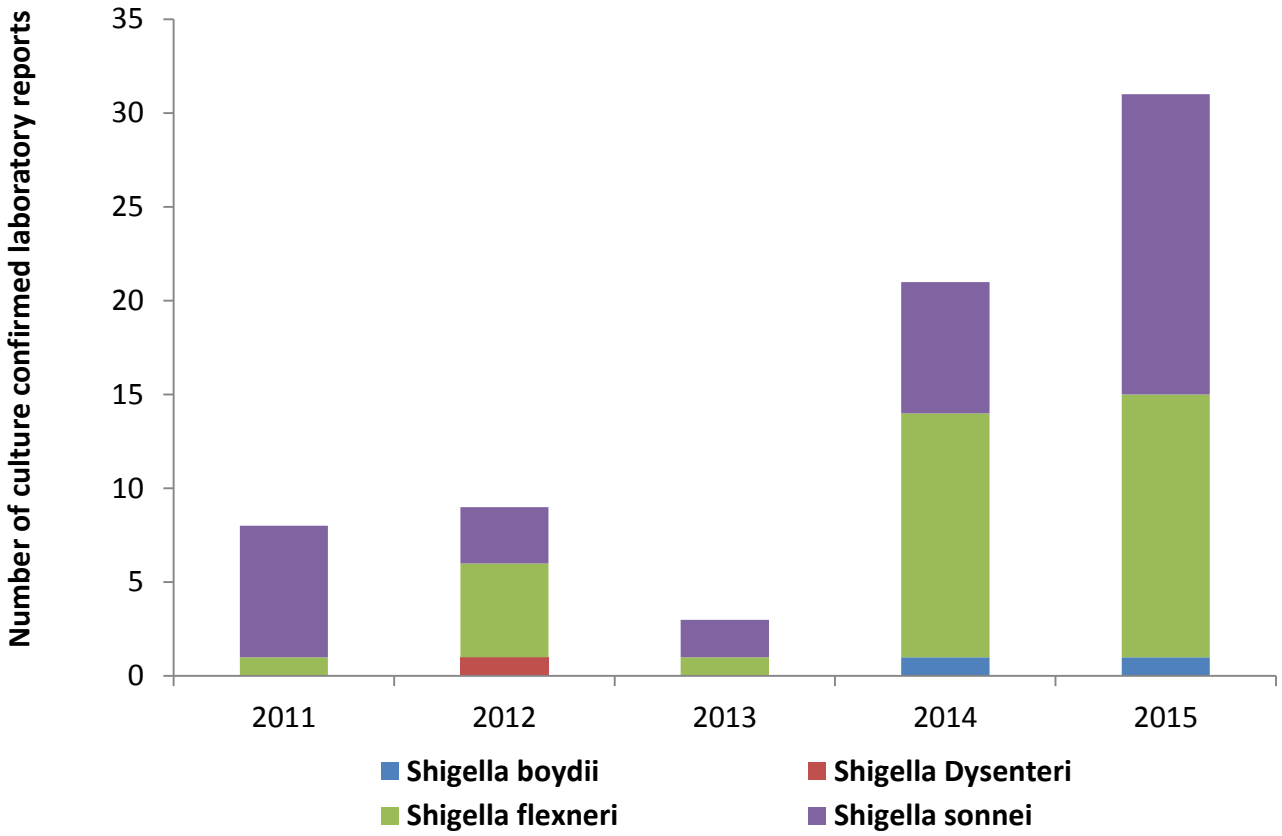
Table 16. No of culture confirmed laboratory reports of Shigellosis, 2006 - 2015

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
9	16	16	13	5	8	9	4	21	31

Table 17. No of culture confirmed reports of Shigellosis by serogroup, 2011 - 2015

Serogroup	2011	2012	2013	2014	2015
S. boydii	0	0	0	1	1
S. dysenteriae	0	1	0	0	0
S. flexneri	1	5	1	13	14
S. sonnei	7	3	2	7	16
Untyped	0	0	1	0	0

Fig 18: Culture confirmed laboratory reports of *Shigella sp* 2011 - 2015



Gastrointestinal Outbreaks

A total of 161 gastrointestinal outbreaks were reported in 2015 with the suspected mode of transmission for these outbreaks being either person-to-person spread or unknown in all but one case. Whilst this is a substantial increase in the number of outbreaks compared to 2014 it is comparable to earlier years.

There was a single outbreak suspected as food poisoning. Similar to previous years the most commonly identified causative agent of the gastrointestinal outbreaks was norovirus, which accounted for 47 (29%) outbreaks, a small increase compared to 2014 (25%). Only two other outbreaks had an organism identified, one rotavirus and the other a suspected food related outbreak due to *Salmonella typhimurium*.

The causative organism was not determined in 112 of the gastrointestinal outbreaks.

During 2015 there were a total of 19 hospital outbreaks affecting at least 176 people; 134 residential institution outbreaks affecting at least 2207 people; and a further 8 outbreaks linked to other sites (e.g. nursery, conference facilities) although the total number ill was only available for one of these outbreaks (Table 19).

Table 18: Total distribution and location of gastrointestinal outbreaks 2015 (based on date of report to PHA)

Location	Identified Organism(s)	No of outbreaks	Number of symptomatic individuals
Hospital	Norovirus	10	122
	Not identified	9	54
Residential institution	Norovirus	35	851
	Rotavirus	1	26
	Not identified	98	1330
Other	*Salmonella typhimurium*	1	2
	Norovirus	2	unknown
	Not identified	5	unknown

* In gastrointestinal outbreaks it is not normal practice for all symptomatic individuals to be tested once the causative organism has been identified. Therefore the number of symptomatic individuals is often in excess of the number of laboratory confirmed cases.

Summary

In contrast to the previous year the overall laboratory reports and notifications of gastrointestinal disease increased in 2015. The only exceptions were *E coli* and *campylobacter*.

Campylobacter decreased in 2015 (7%) representing the first such decrease since 2008. This is in spite of additional laboratories testing for this organism by PCR which might have been expected to cause an increase in ascertainment. However, there has been a recent focus on campylobacter by the Food Standards Agency and the media particularly with regards to the production of chicken which has led to supermarket chains attempting to reduce the level of campylobacter in store bought chickens which may have had some impact on the level of campylobacter infections in humans but at this point there is no evidence in Northern Ireland to support this.

Cryptosporidium reports increased significantly in 2015 (43%), the highest number of reports in the past ten years. Reports of *giardiasis* showed an even larger increase rising from 48 cases in 2014 to 92 in 2015 (92% increase). In both cases the increase would appear to be down to a change in testing method and also these organisms being routinely tested for in two laboratories where previously tested was on demand.

E. coli O157 cases continued to decrease with a ten year low of only 33 cases reported (39% reduction). However, with laboratories now being able to detect non-O157 toxin positive cases we are seeing an increasing number of these cases although in many of these cases the exact serotype cannot be identified due to testing limitations.

Salmonella increased for the first time since 2010 rising by 11% Similar to previous years a large proportion (34%) of reported cases were thought to be travel related and similar variations were found between different serotypes in terms of the proportion due to travel.

Shigella reports remained high in 2015 compared to reports prior to 2014. The 2014 increase was mainly due to increases in *S*. flexneri; however, in 2015 whilst *S*. flexneri reports remained stable those of *S*. sonnei more than doubled. Similar to last year it would appear that at least some of the increase may be due to sexual transmission.

Outbreak activity also increased with 161 gastrointestinal outbreaks being reported. This compares to 122 in 2013 and 172 in 2013. Similar to previous years the majority of outbreaks are related to either Norovirus or suspected viral gastroenteritis, with only one outbreak related to bacterial causes in 2014 and one to rotavirus. The majority of the viral outbreaks took place in residential facilities, particularly those for the elderly population.

The number of reports of rotavirus data increased substantially in 2015 (92% increase) but remains below the figures reported for years prior to the introduction of the rotavirus vaccine. The Republic of Ireland reported an extremely high level of rotavirus activity in 2015, the highest since this disease became notifiable in Ireland.

Changes in both tests used and which organisms are routinely tested for have made interpretation of this year's gastrointestinal data more difficult than usual. Until testing has been standardised and/or we have sufficient data this difficulty is likely to continue.

Appendix 1

Changes in gastrointestinal illness testing

Following the introduction of polymerase chain reaction testing (PCR) in one of the Northern Ireland laboratories in 2014, a further two laboratories have introduced this testing technique in 2015. This means that three of the five health trusts are currently using PCR testing for their standard gastrointestinal disease faecal panel.

It was introduced for the main gastrointestinal bacterial organisms initially – *Salmonella*, *E. coli* (VTEC), *Shigella* and *Campylobacter*. It has now been extended to detect both *Cryptosporidium* and *Giardia Lamblia*. Prior to the introduction of PCR testing two of the laboratories did not routinely test all faecal samples for these two organisms, and this change in testing has led to an increase in testing and likely ascertainment in the diseases covered by these laboratories.

PCR testing is both faster and more sensitive than the current method of culturing specimens. Currently PCR testing is generally being used as a complement to existing methods, with specimens being initially identified using PCR but being followed up by culture for most of the organisms, or microscopy in the case of *Cryptosporidium* and *Giardia*. However, there is some variation in testing procedures between those laboratories who have introduced PCR. This early identification can aid clinicians in deciding on treatment regimens and allows for earlier public health measures to be taken in some cases, it also allowed for local identification of non-O157 *E. coli* with VT genes for the first time.

This new form of testing for gastrointestinal disease is a useful aid to clinical decisions and public health actions. It continues, however, to present challenges to the interpretation of the surveillance of these diseases especially as it is not currently available in all the Northern Ireland laboratories. This has been complicated by additional changes in terms of what is routinely tested for, and some variations in testing procedures between those laboratories who have introduced PCR testing.

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