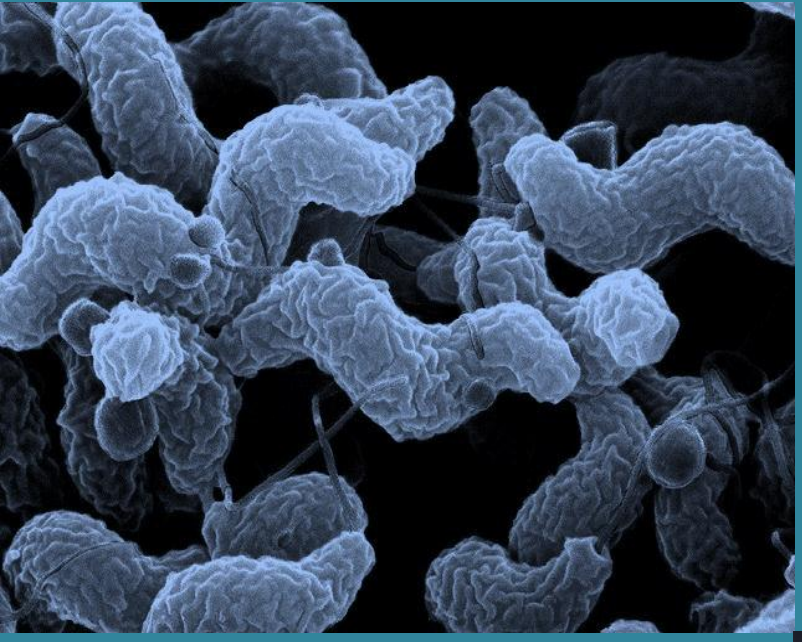
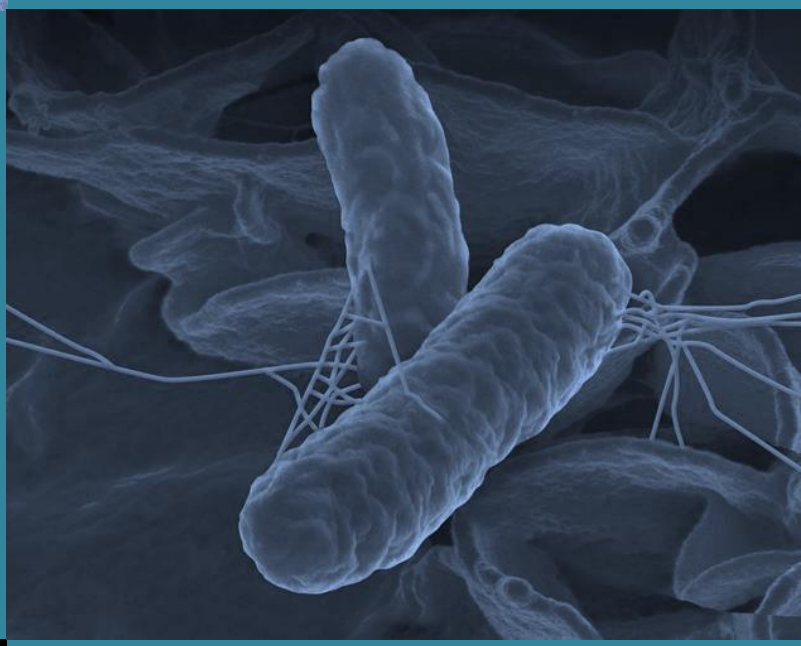
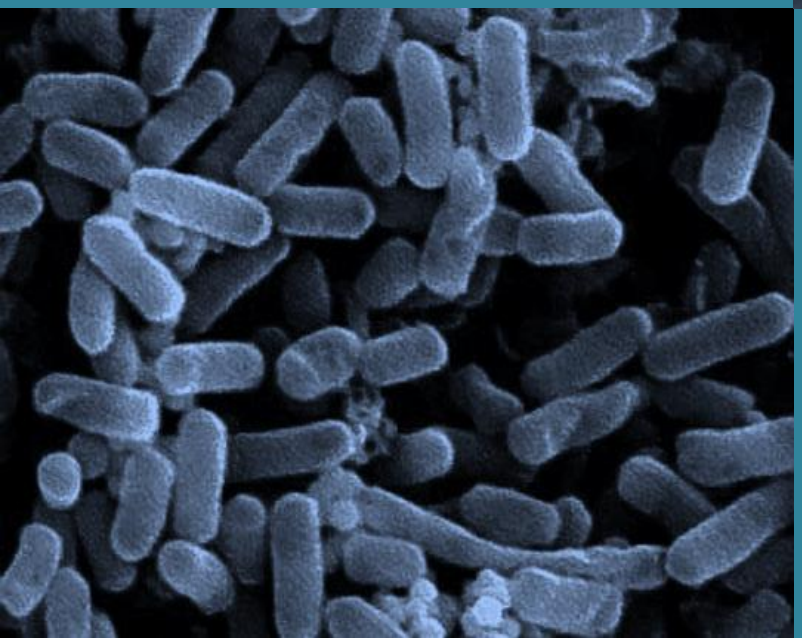


Gastrointestinal Infections in Northern Ireland





Annual Surveillance Report 2017

HSC Public Health Agency

Gastrointestinal Infections in Northern Ireland Annual Surveillance Report 2017

Contents

Key Points

- There was a mixed picture in 2017 with substantial increases seen in *Campylobacter* and *Giardia Lamblia* but reductions in several other gastrointestinal organisms.
- *Campylobacter* infections increased in 2017 (13%) particularly amongst children.
- *Cryptosporidium* infections reduced by 10% compared to 2016 but remains elevated compared to years prior to introduction of changes in testing procedures.
- There were 57 laboratory confirmed cases of *E. coli* O157 reported in 2017, a substantial reduction compared to 2016.
- There was a large increase in the reports of *Giardia Lamblia* compared to the previous year (34%). This represents the third year in a row that substantial increases have been seen in this organism. Whilst changes in testing protocol may account for much of this increase in the years 2015/16 there would also seem to be an underlying increase in 2017 the reason for which remains unknown.
- The number of *Salmonella* infections reported decreased by 9% with almost all of this decrease due to a large drop in reports of S. typhimurium.
- The number of *Shigella* reports increased compared to the previous year with a total of 24 culture confirmed cases compared to 21 in 2016. The number of reports of Shigella that could not be cultured and were positive on PCR test only increased much more substantially from 5 in 2016 to 25 in 2017.
- Travel remains a significant risk factor for some gastrointestinal infections, with 45% of *Salmonella* infections being related to travel outside the UK in 2017.
- There was a large decrease in the number of gastrointestinal related outbreaks particularly in hospital settings.
- Differences in testing policy and procedures between laboratories and their relatively recent introduction continue to make interpretation of surveillance data challenging.

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 2016.

It should be noted that most gastrointestinal illness samples which are sent for testing are not tested for every organism listed. What testing occurs may vary between laboratories and based on clinical criteria or age.

Campylobacter

Number of cases	**1,421**
Incidence rate	**76.0 per 100,000 population**

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

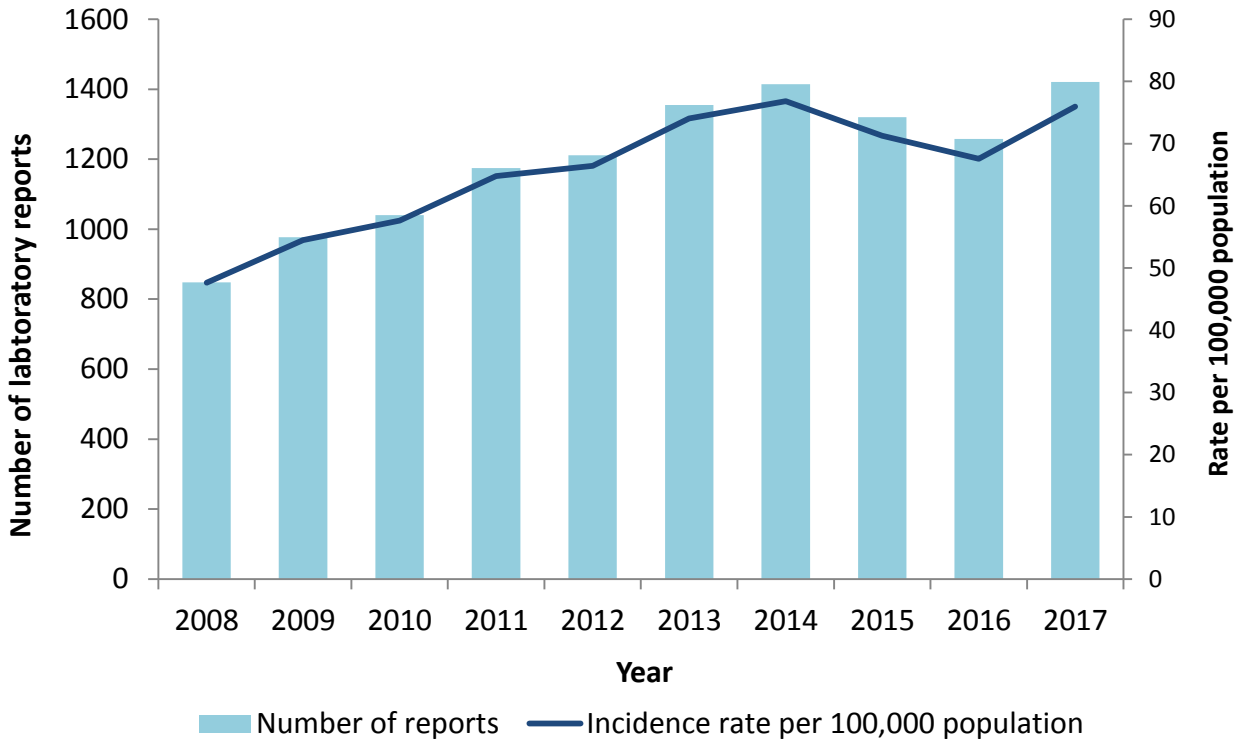
The number of cases of *Campylobacter* increased in 2017 following two years of decreases. C*ampylobacter* remains the most common bacterial gastrointestinal infection in Northern Ireland with 1,421 laboratory reported cases in 2017, an increase of 163 cases (13%) compared to 2015 (n=1,258 cases) (Table 1, Figure 1). This represents the highest rate of Campylobacter during the past ten years.

The incidence of C*ampylobacter* infections in 2017 was 76.0 per 100,000 population.

Table 1. No of laboratory reports of *Campylobacter*, 2008 - 2017

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
848	977	1040	1175	1211	1355	1414	1320	1258	1421

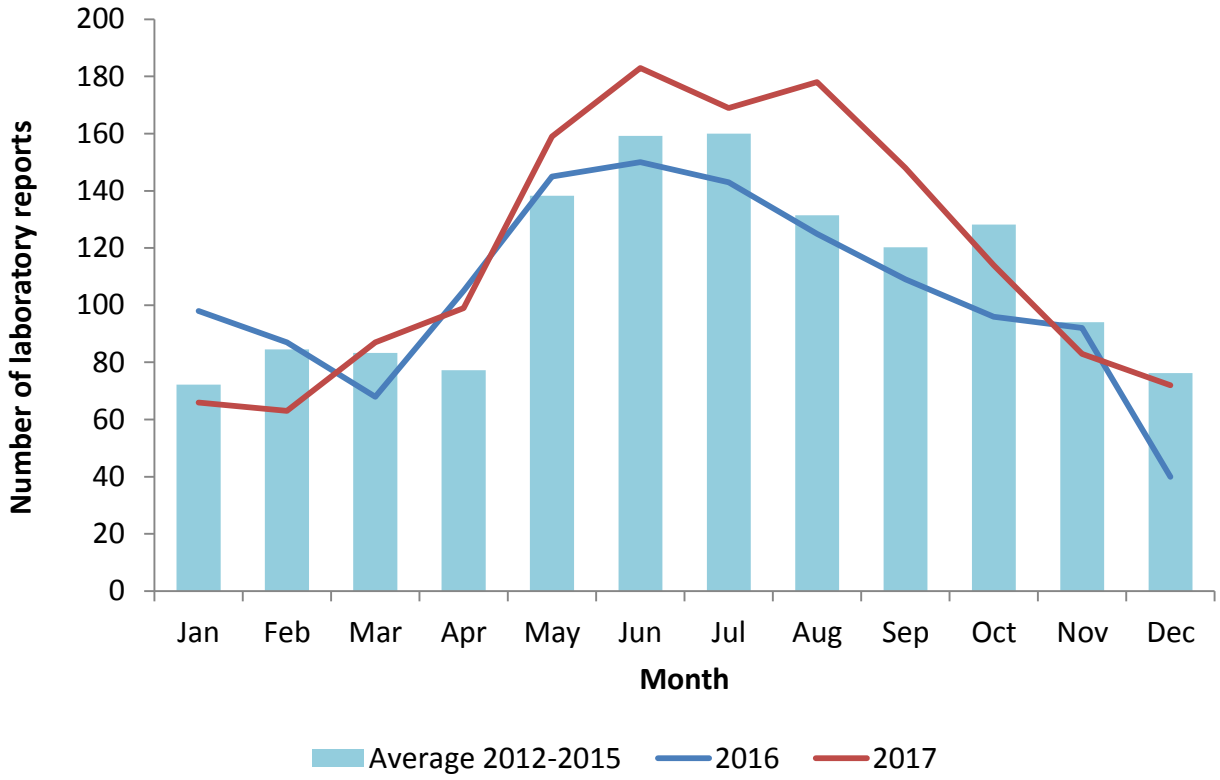
Fig 1: Laboratory reports and incidence rate of *Campylobacter*, 2008 - 2017



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.

Monthly reports in 2017 generally followed this pattern remaining elevated between May and August before starting to reduce in September (Figure 2).

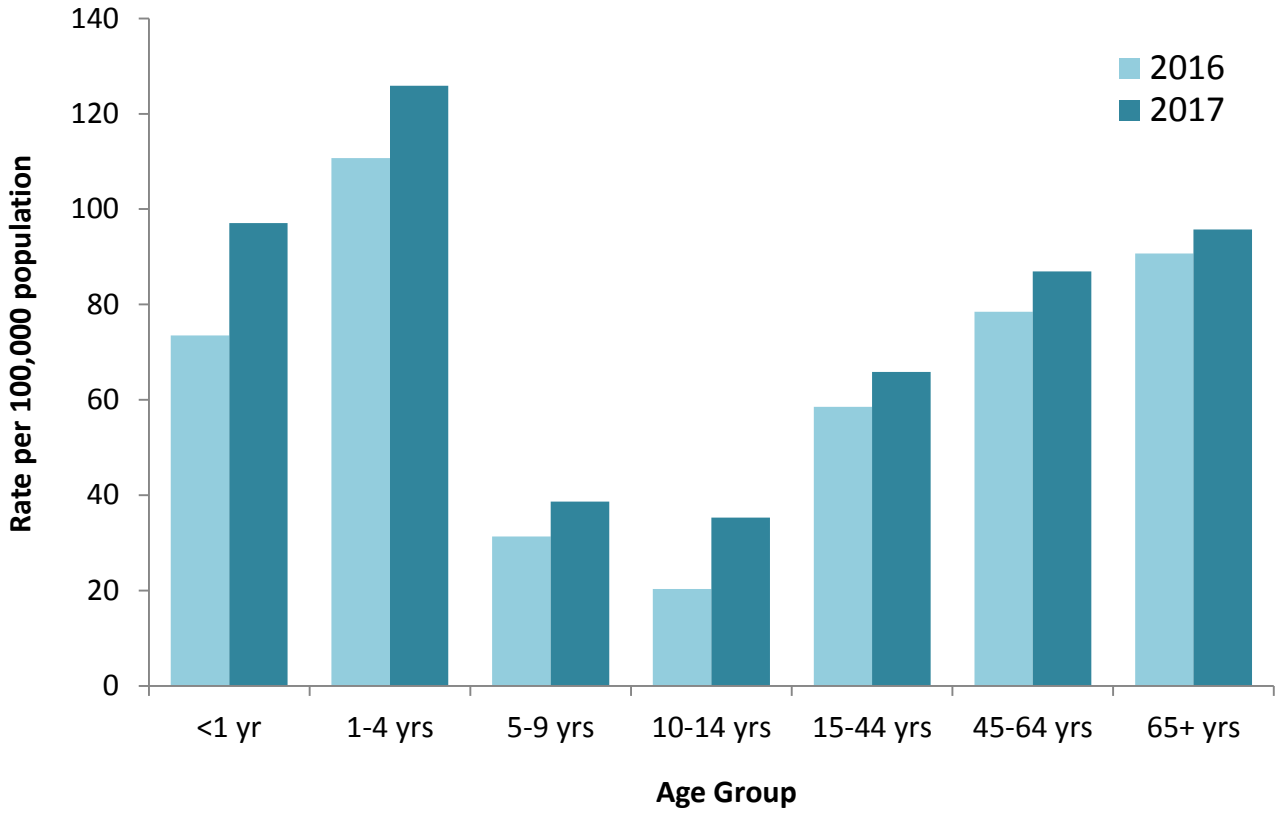
Fig 2: Monthly laboratory reports of *Campylobacter*, 2016 - 2017



All age groups in 2017 displayed an increase compared to 2016 with the largest increases generally seen in the younger age groups (Figure 3). The smallest increase was seen in the over 65 year age group with the highest in the 10-14 year age group, although this may be due to the relatively small numbers in the 10-14 year age group. The highest age specific rate was in the 1-4 year old age group which is similar to 2016.

In 2017 the proportion of reported cases that were male was 57% (n=811) similar to that in 2016 (58%).

Fig 3: Laboratory reports of *Campylobacter*, age-specific incidence rate, 2016 - 2017



Cryptosporidium

Number of cases	**253**
Incidence rate	**13.5 per 100,000 population**

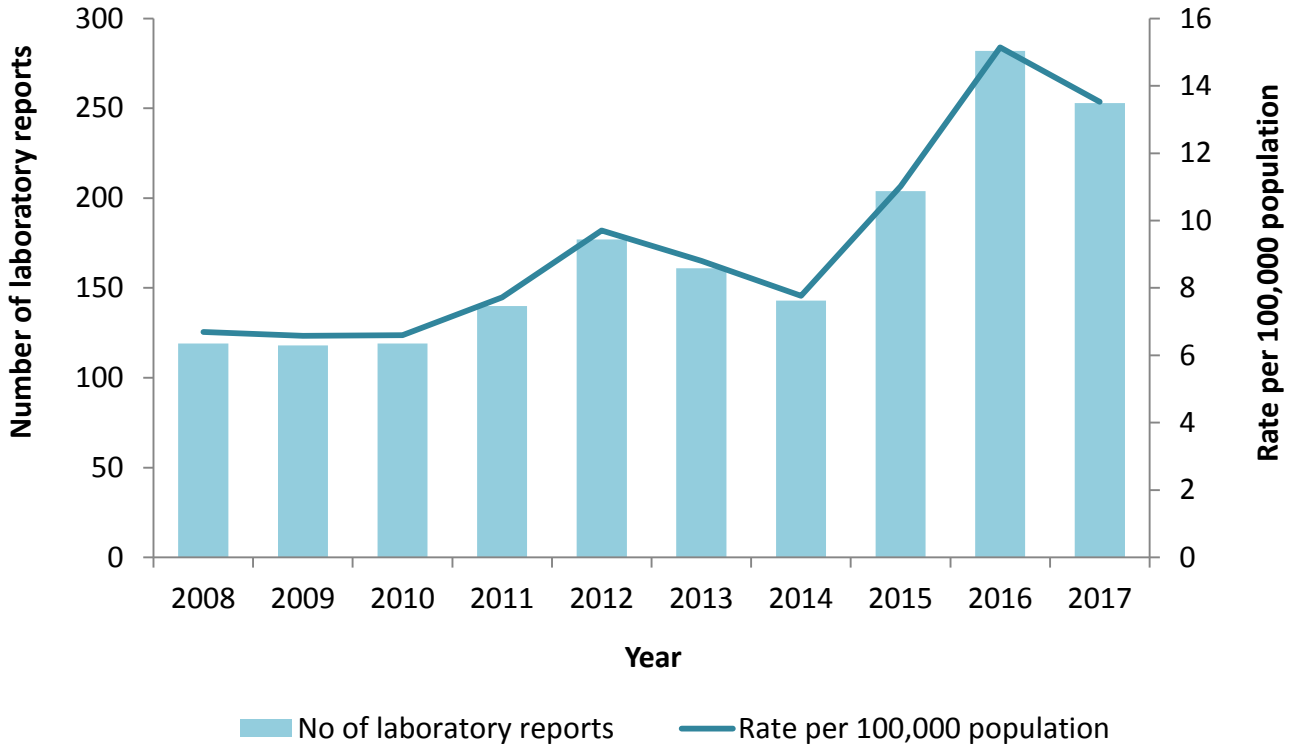
Cryptosporidium is a protozoal parasite that causes a diarrhoeal illness that can last between two days and four weeks. The infection can be more serious in people who are immunosuppressed. *Cryptosporidium* is found in lakes, streams, rivers, untreated water and occasionally in swimming pools.

Reports of Cryptosporidium decreased in 2017, falling from 282 in 2016 to 253. Whilst lower than in 2016 this is still substantially higher than data from years prior to the changes in testing policy and test type that occurred in 2015. (Table 2, Figure 4). The incidence rate of C*ryptosporidium* infection in 2017 was 13.5 per 100,000 population. One outbreak of C*ryptosporidium* was identified in 2017 and 31 cases (12%) were thought to be associated with travel outside the United Kingdom, a small increase compared to 2016 (10%).

Table 2. No of laboratory reports of *Cryptosporidium*, 2008 - 2017

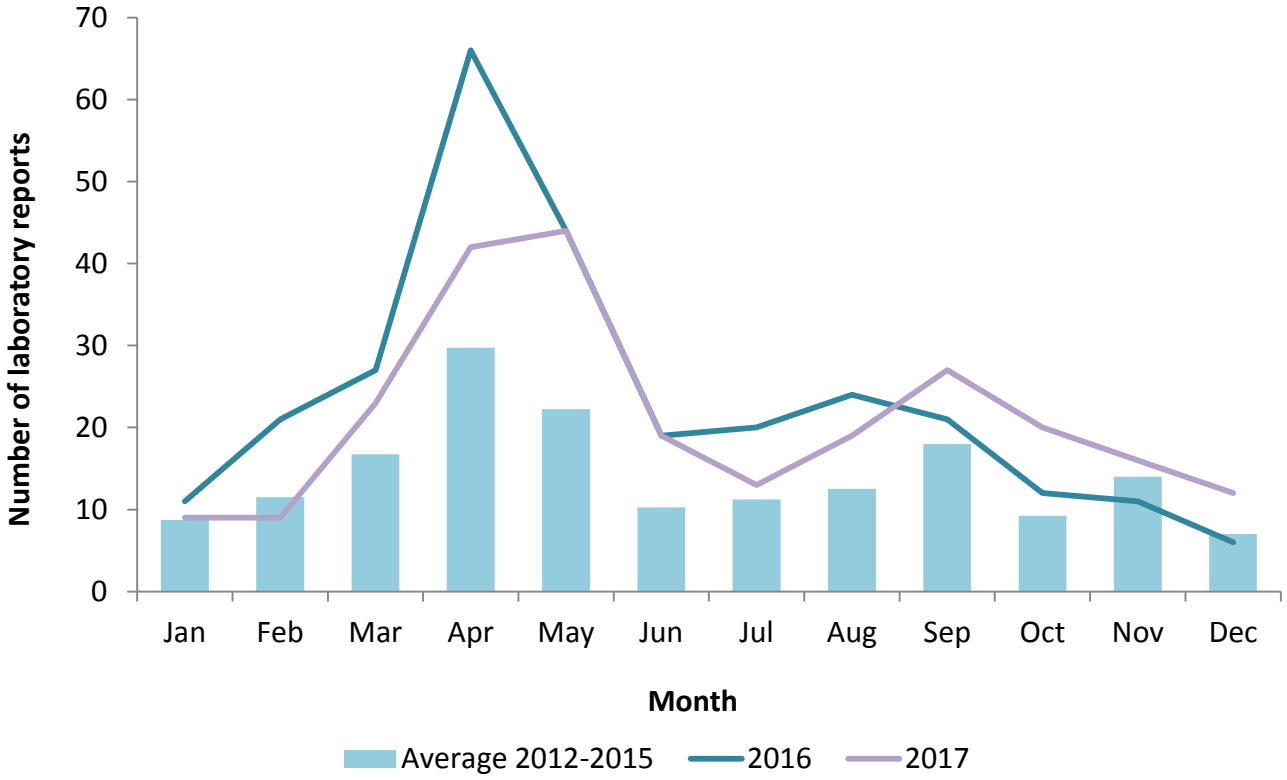
2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
119	118	119	140	177	161	143	204	282	253

Fig 4: Laboratory reports of *Cryptosporidium*, 2008 - 2017



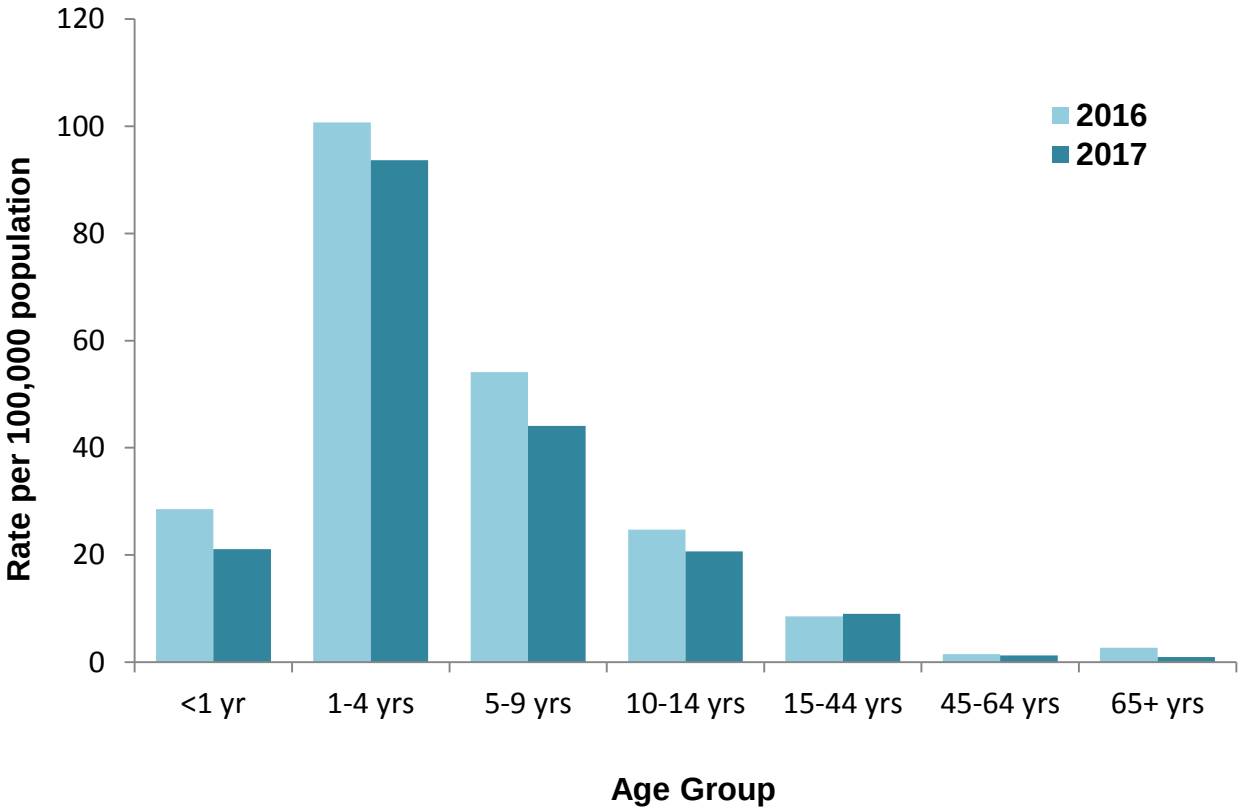
The spring peak in 2017 occurred slightly later than in the previous year and was substantially lower with the expected autumn peak being more pronounced and also later than in 2016 (Figure 5). With the exception of April, where the 2016 peak occurred, the monthly figures were fairly similar between 2016 and 2017.

Fig 5: Monthly laboratory reports of *Cryptosporidium*, 2011 - 2016



The highest age specific rate was in the 1-4 year age group (93.6 per 100,000 population) (Figure 6). Almost all age specific rates decreased in 2017 with the exception of the 15-44 year age group which increased slightly from 8.6 per 100,000 population in 2016 to 9.0 in 2017. The proportion of male cases was 54% in 2017, almost unchanged compared to 2016 (53%).

Fig 6: Laboratory reports of *Cryptosporidium*, Age-Specific Rate (per 100,000 population), 2016 - 2017



E. coli O157

Number of cases	**57**
Incidence rate	**3.0 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.

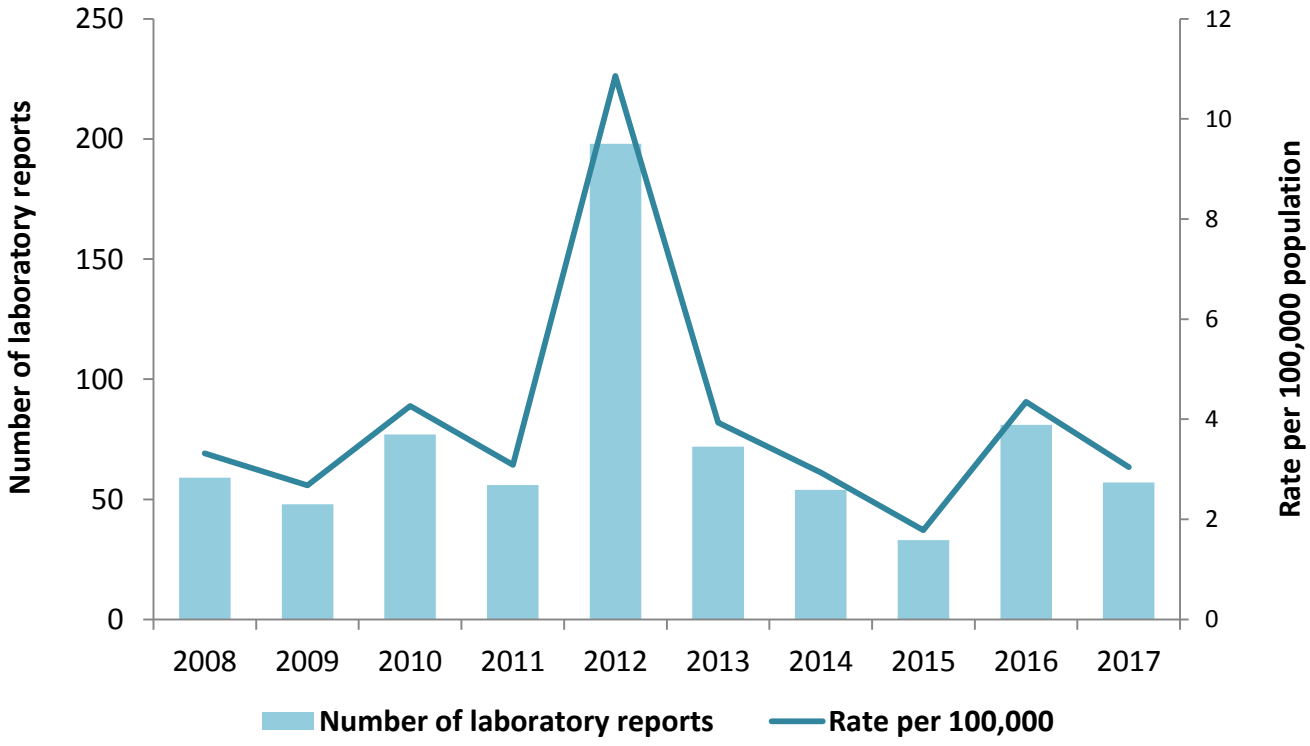
There were 57 laboratory culture confirmed cases of *E. coli* O157 reported in 2017, of which 45 (79%) tested positive as Vero cytotoxin-producing *E. coli* (VTEC). VTEC strains produce a toxin which can cause severe illness. Note that due to variations in testing across local laboratories not all O157 cultures have been tested for the existence of this toxin. There were no cases associated with outbreaks, and 13 cases (23%) were associated with travel outside the United Kingdom (Figure 7, Table 3).

Table 3. No of laboratory reports of *E. coli* O157, 2008 - 2017

2008	2009	2010	2011	2012*	2013	2014	2015	2016	2017
59	48	77	56	198	72	54	33	81	57

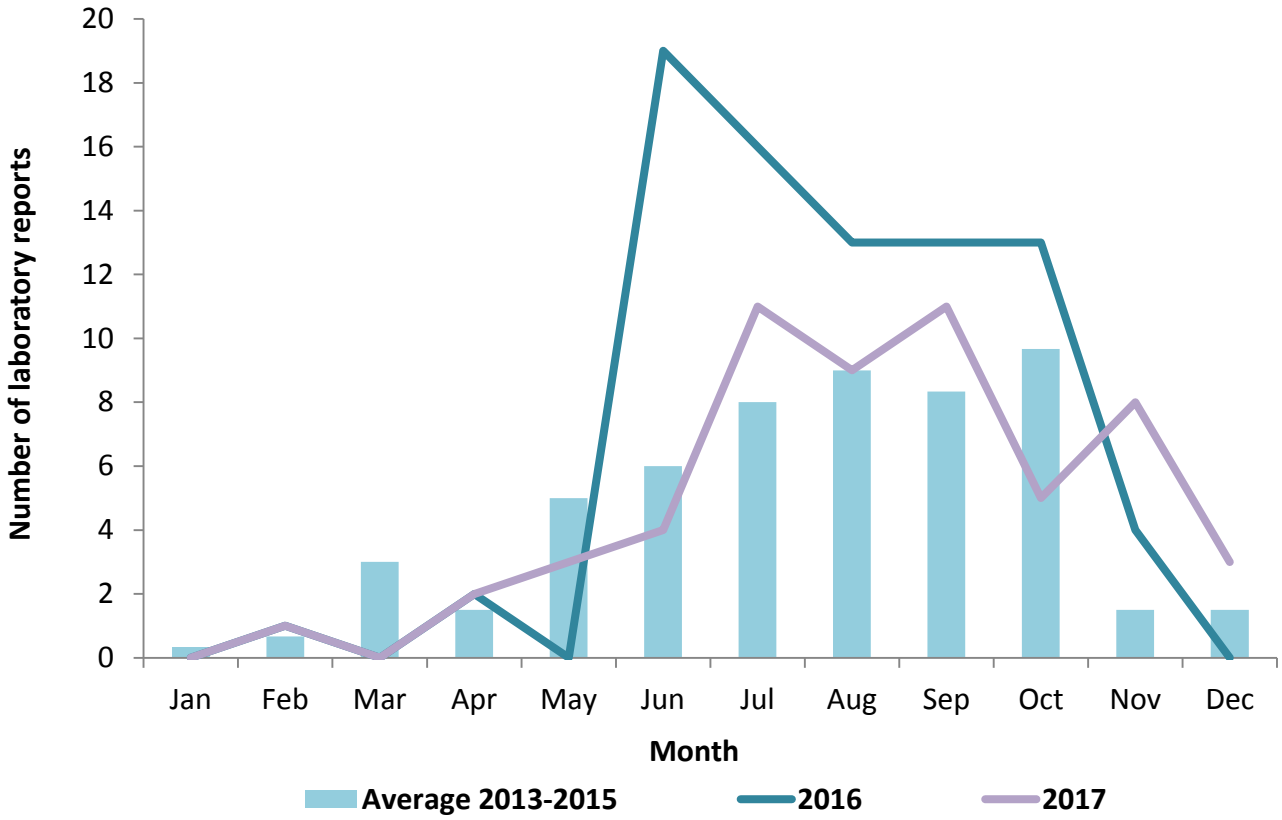
** increase due to largest recorded outbreak of E. coli in N. Ireland with 141 confirmed cases*

Fig 7: Laboratory reports of *E. coli* O157, 2008 - 2017



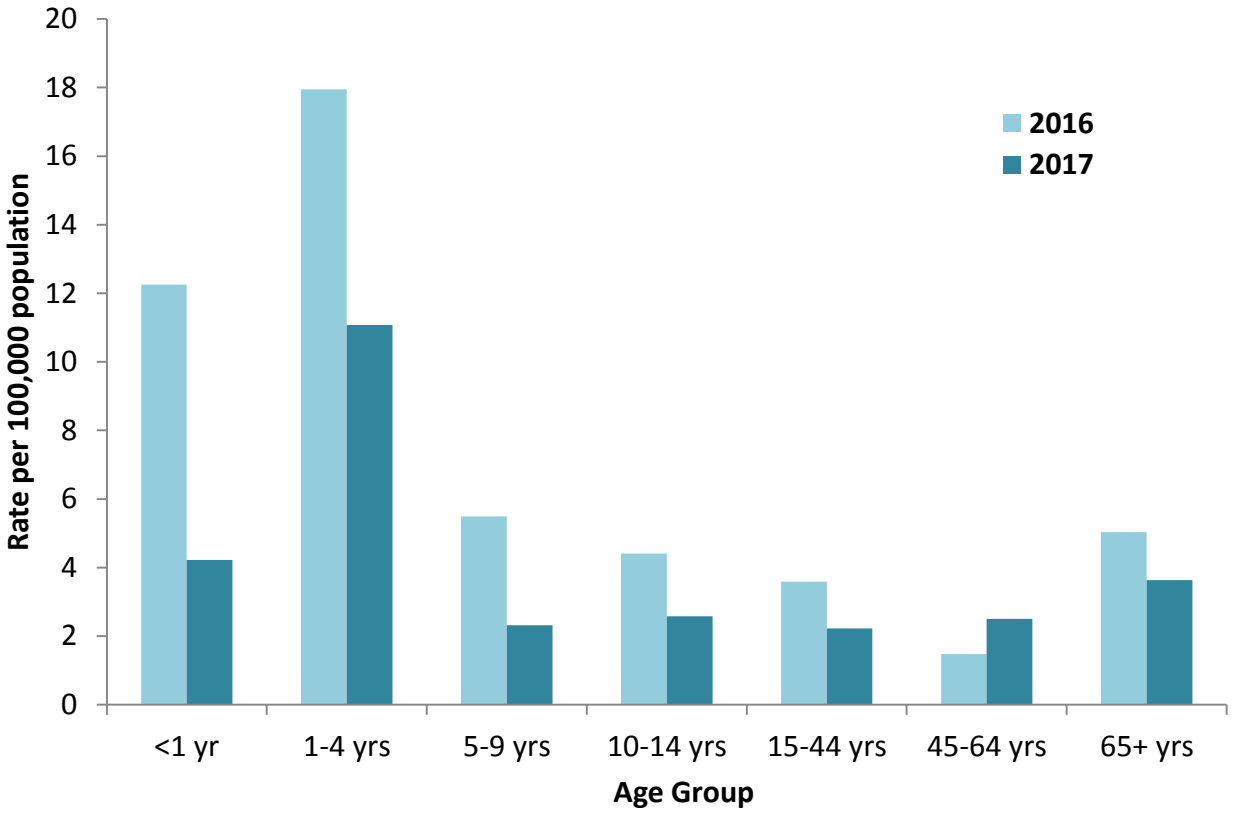
In 2017 the number of reports peaked slightly later than in 2016 in July and September with reports in October much lower than in recent years.

Fig 8: Monthly laboratory reports of *E. coli* O157, 2013 - 2017*



With the exception of the 45-64 year age group all age-specific rates in 2017 were lower than the previous year. Similar to 2016 the highest incidence rate was in the 1-4 year age group. Whilst the reductions in the younger age groups appear large this is due to the relatively small numbers in these age groups (Figure 9).

Fig 9: Distribution of *E. coli* O157 cases by age group, 2016 - 2017



Phage type data were only available for 30 cases (53%) in 2017. This is due to a lower number of O157 cultures being sent for phage and toxin typing to the reference laboratory. Phage type 32 was the largest single phage type identified in 2017 (47% of those typed).

Vero cytotoxin gene type was available for 45 of the 57 laboratory culture confirmed cases in 2017. Toxin type VT2 was the most common toxin profile with 33% of cases (where toxin typing took place) displaying this toxin type. The majority of the remaining cases were toxin type VT1 & 2 (31%) with the remaining reports not stating the toxin profile (Table 4).

Table 4: Verotoxin (VT) genes of laboratory confirmed cases of *E. coli* O157, 2008 - 2017

VT	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
VT1	0	0	2	0	0	0	0	0	0	0
VT2	39	25	42	24	34	50	18	16	32	15
VT1+2	11	11	22	20	153	9	13	10	17	14
VT+	6	8	1	5	2	2	12	6	15	16
Total	**56**	**44**	**67**	**49**	**189**	**61**	**43**	**32**	**63**	**45**

Questionnaires were received for 56 of the 57 O157 cases (98%) with 52 reporting symptoms. Those not reporting symptoms are contacts of symptomatic cases who have tested positive for *E. coli* O157. The most common symptoms reported were diarrhoea (91%) and abdominal pain (73%) similar to previous years (Table 5). Overall 63% of cases experienced bloody diarrhoea with substantial variation in the age specific proportion although some of this variation is likely to be due to small numbers in some age groups.

Table 5: Symptoms experienced by *E. coli* O157 cases, 2017

Symptom	Number	Percentage*
Abdominal pain	41	73%
Blood in stools	35	63%
Diarrhoea	51	91%
Fever	24	43%
Nausea	32	57%
Vomiting	21	38%

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

Hospital admissions occurred in all but one of the age groups. There were 46% of cases admitted to hospital in 2017, a slight decrease compared to 2016 (53%). There were substantial variations in the percentage hospitalised by age group but this may be due to the small numbers involved (Table 6).

Table 6: Hospitalisation of *E. coli* O157 cases by age group, 2017

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	1	1	0	0	0%
1-4	10	7	4	3	30%
5-9	3	2	3	3	100%
10-14	3	2	3	2	67%
15-44	16	12	9	4	25%
45-64	12	3	9	9	75%
65+	11	7	7	5	45%
Total	**56**	**34**	**42**	**33**	**46%**

E. coli – serotypes other than O157

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* where previously only *E. coli* O157 could be identified. 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, resulting in an underestimate of the incidence of non-O157 serotypes and variation due to geographical differences.

In addition some specimens that test positive using PCR techniques cannot be subsequently cultured or identified. In some cases this would likely be due to the serotype being one the laboratory cannot identify but it can also include cases of O157 where it simply has not been possible to culture the organism. Depending on the severity of the symptoms or links to existing cases, a questionnaire may not be obtained for cases only identified through PCR testing. These changes mean that data prior to 2015 is not directly comparable to current data, as well as making interpretation of more recent data difficult.

There was a substantial reduction in the number of O026 serotypes reported in 2017; however the large number in 2016 was partly due to two outbreaks (Table 7). There was also a smaller decrease in PCR only reports of toxin positive *E. coli* where serotype cannot be identified (Table 8).

Table 7: Culture positive VTEC samples where a serotype was established

Serotype	2014	2015	2016	2017
O026	18	17	33	19
O145	1	4	3	1
O091	1	2	0	0
O110	1	1	0	0
O5	0	0	1	1
Others*	4	1	1	0

* Others includes serotypes where only one positive has been identified in the past 4 years

There were also three cases where *E. coli* was cultured but it was not possible to identify the serotype. Samples positive for non-O157 are not routinely sent for toxin or phage typing so this information is not available for the majority of non-O157 cases.

Table 8: PCR positive only VTEC samples			
2014	**2015**	**2016**	**2017**
0	93	129	120

There were a total of 144 cases where *E. coli* was detected but the serotype was either not O157 or not typed, this includes both culture and PCR only samples. Of these 144 cases questionnaires were obtained for 61 (42%) with 54 being symptomatic (88% of questionnaires).

In general the percentage of cases suffering from each of the symptoms is lower than for *E. coli* O157. Similar to O157, abdominal pain and diarrhoea are the primary symptoms reported (Table 9).

Table 9: Symptoms experienced by *VTEC non-O157** cases, 2017		
Symptom	**Number**	**Percentage***
Abdominal pain	43	70%
Blood in stools	35	57%
Diarrhoea	53	87%
Fever	22	36%
Nausea	29	48%
Vomiting	19	31%

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

The proportion admitted to hospital was 41% compared to 19% last year (Table 10). There is substantial variation by age group which may be due, at least in part, to the small numbers involved rather than any significant underlying differences.

Table 10: Hospitalisation of *VTEC non-O157* * cases by age group, 2017

Age group	Nor 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	3	2	3	2	67%
1-4	17	13	8	4	24%
5-9	3	1	1	1	33%
10-14	3	3	2	2	67%
15-44	16	9	8	7	44%
45-64	9	7	3	4	44%
65+	10	5	2	5	50%
Total	**61**	**40**	**27**	**25**	**41%**

* Table includes culture confirmed non-O157 VTEC cases as well as untyped and unknown serotypes identified through PCR testing.

Giardiasis

Number of cases	**163**
Incidence rate	**8.7 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.

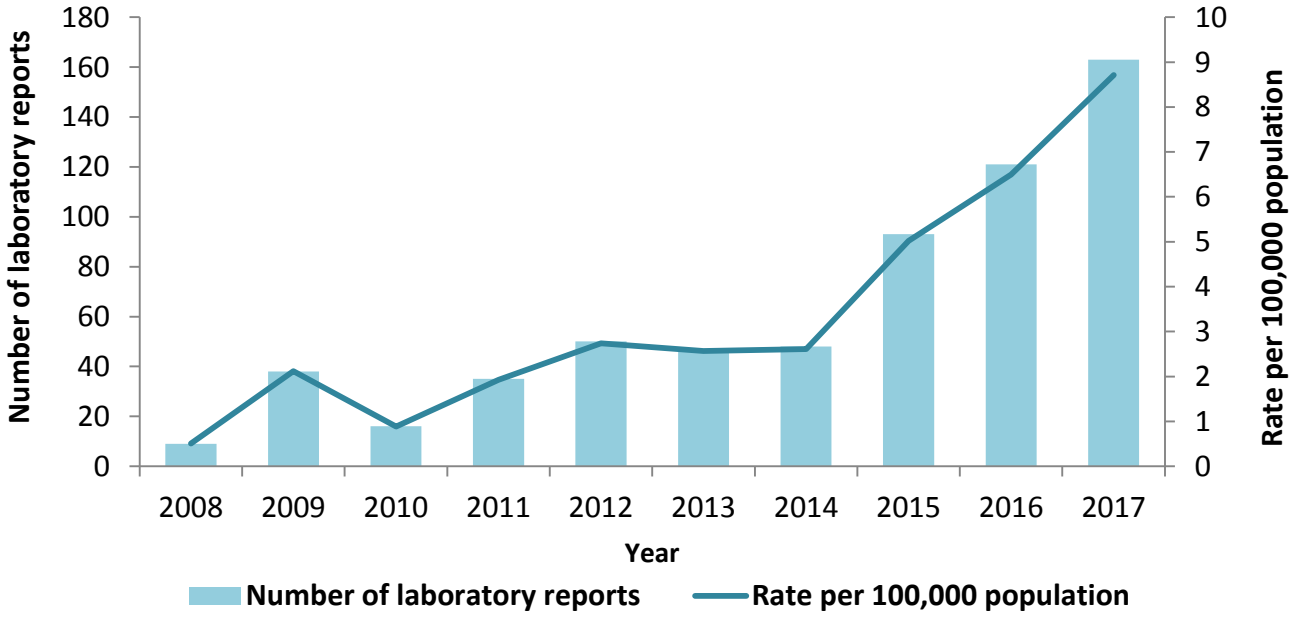
For the third year in a row there has been a large increase in the number of reported cases of giardiasis. While the increase seen in the years 2015/2016 was likely due to changes in both testing policy and test type that of 2017 would appear to be a genuine increase although the cause for this is currently unknown.

Laboratory confirmed cases of giardiasis increased from 121 in 2016 to 163 in 2016 (35% increase). The incidence rate in 2016 was 8.7 per 100,000 population. There were 32 (20%) cases that were reported as being likely to be associated with foreign travel (Table 11, Figure 10). The proportion of male cases was 63% which is higher than for most gastrointestinal infectious diseases. There were no outbreaks of giardiasis reported in 2017.

Table 11. No of laboratory reports of *Giardia lamblia*, 2008 - 2017

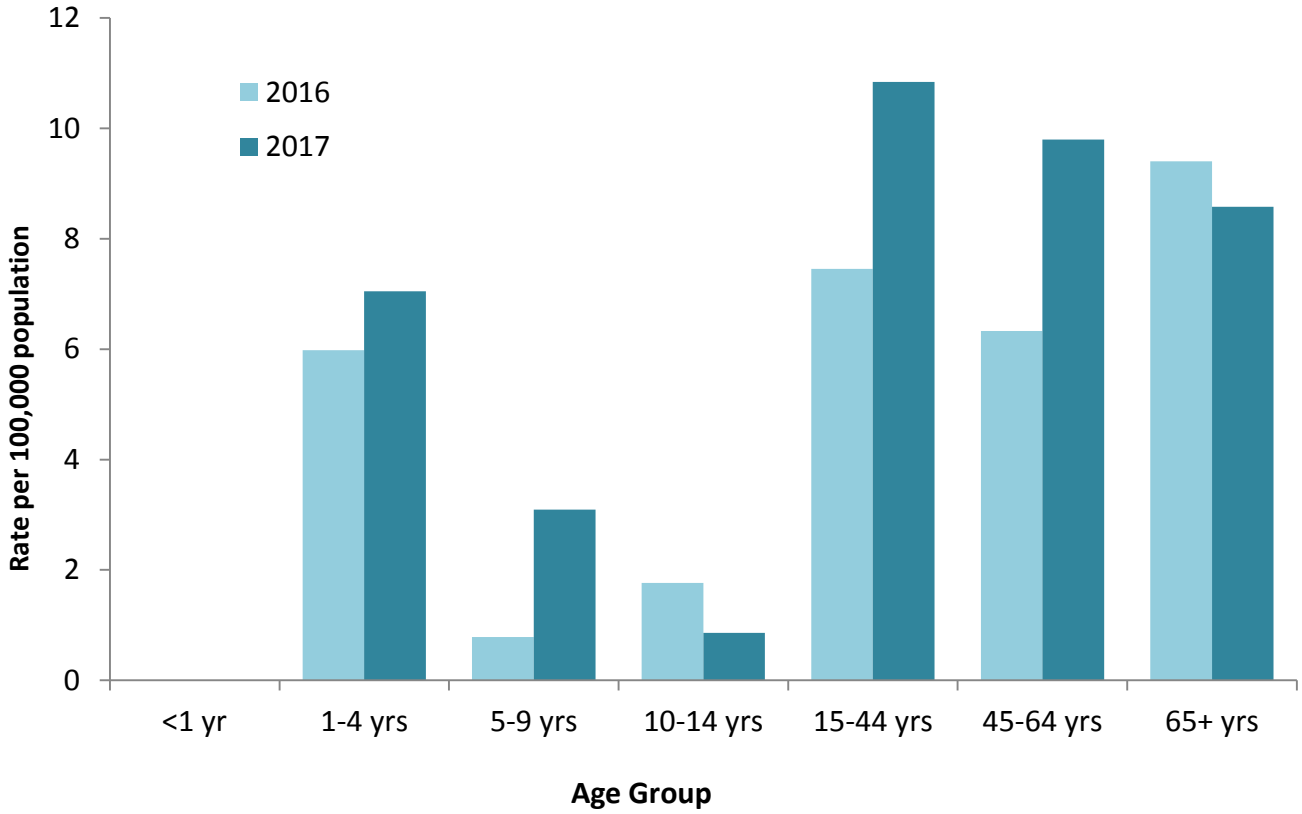
2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
9	38	16	35	50	47	48	93	121	163

Fig 10: Laboratory reports of *Giardia lamblia* (all specimen types), 2008 - 2017



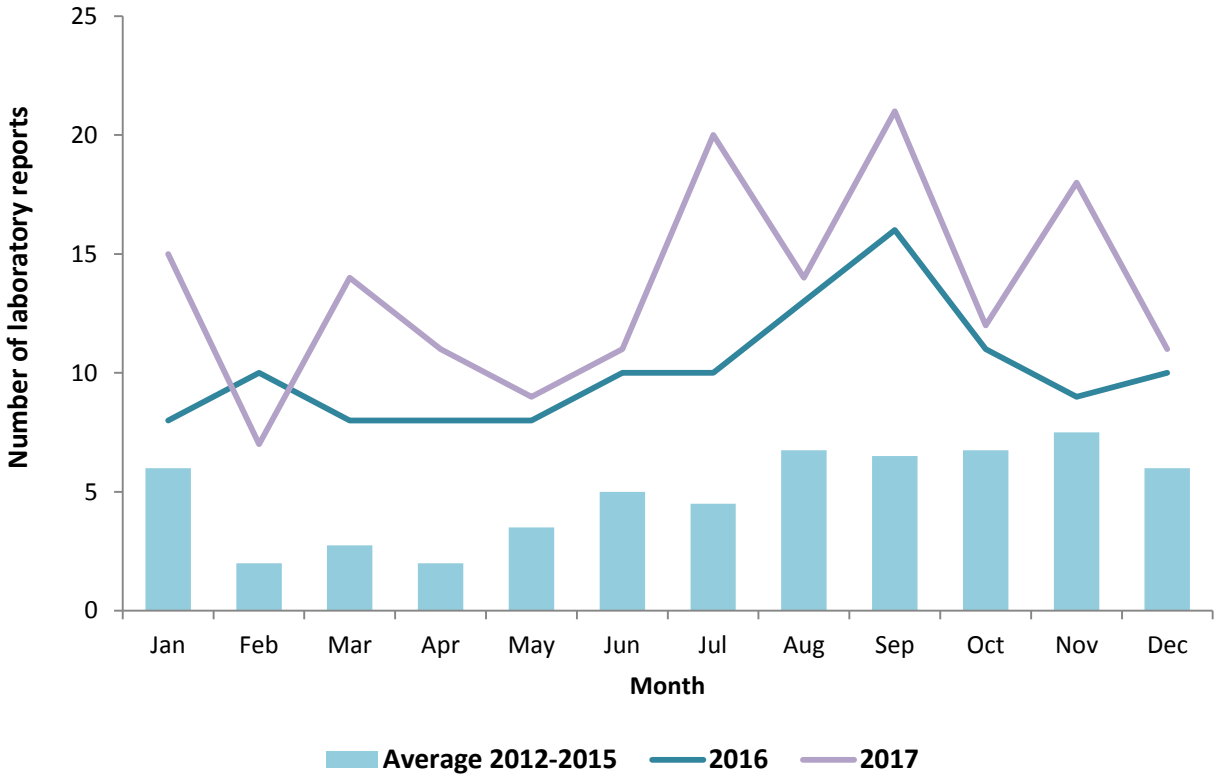
The highest incidence rate in 2017 was in the 15-44 year age group (10.8 per 100,000 population). Overall a large majority of the cases are in adults with 91.4% in those 18 or over, similarly the incidence rates are also highest in the adult population unlike many other common gastrointestinal diseases where rates tend to be highest in young children. Excluding the 10-14 year age group, which has very small numbers, only the over 65 year age group decreased with the 15-44 and 45-64 year age groups showing substantial increases (Figure 11).

Fig 11: Laboratory reports of *Giardia lamblia* (all age groups), 2016 – 2017



While the number of cases in 2017 increased in the autumn period there were several peaks from July to November, unlike 2016 which showed a pronounced single peak in September. Prior to 2015 the low numbers for this organism meant that seasonality was unclear but the data in 2016 and 2017 would indicate that Giardia tends to peak in the autumn which corresponds with data from England and Wales (Figure 12).

Fig 12: Monthly laboratory reports of *Giardia lamblia*, 2012 - 2017



Salmonella

Number of cases	**128 (non-typhoidal)**
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.

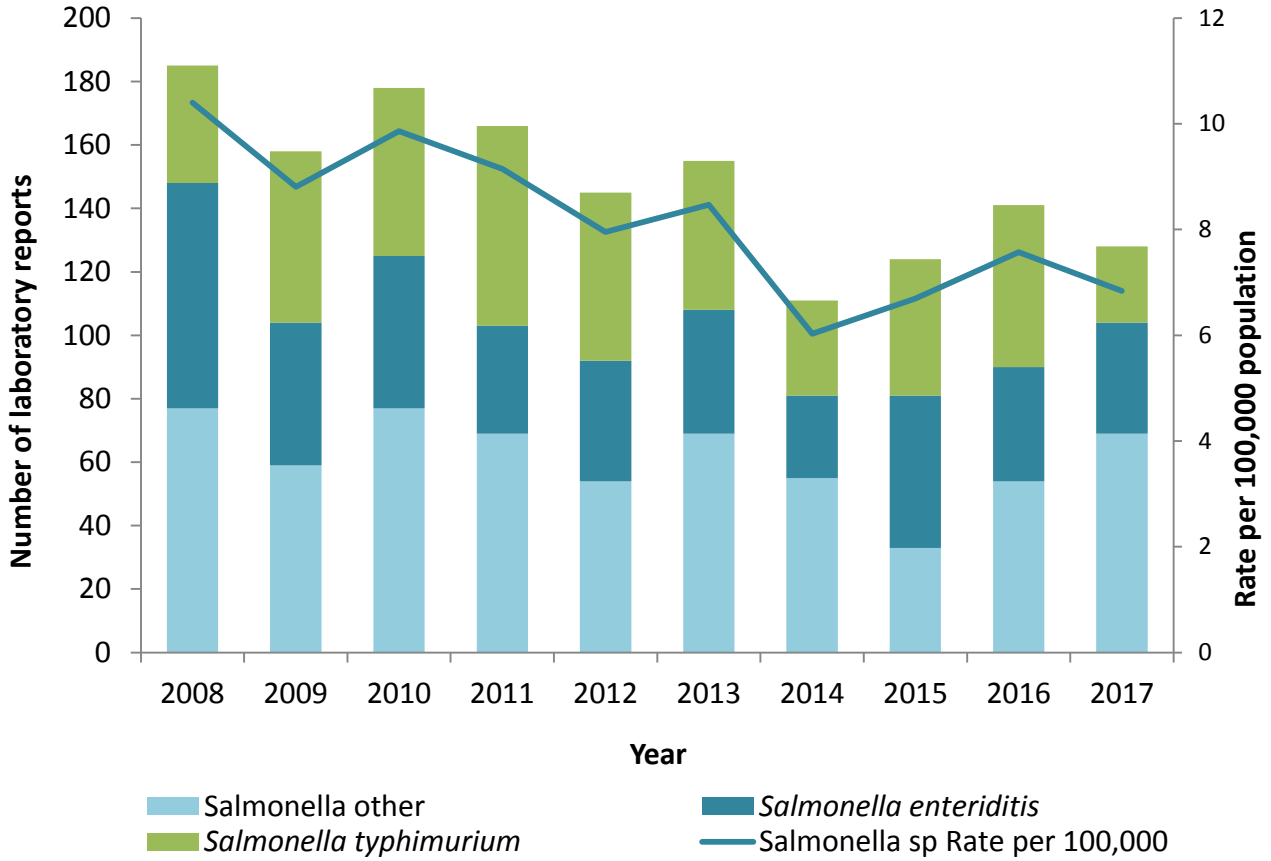
Laboratory reports of *Salmonella* fell in 2017 with the decrease almost entirely due to a large reduction in *S.* typhimurium cases. Total non-typhoidal *Salmonella* cases fell from 141 in 2016 to 128 in 2017 (9%) with S. typhimurium falling from 51 cases to 24 (53%). There is no apparent reason for the fall in this specific serovar at this time. The number of cases due to S. enteritidis showed only a minor decrease from 36 cases in 2016 to 35 in 2017 with those for other serovars of Salmonella increasing from 54 to 69. The incidence of *salmonella* infections in 2017 was 6.8 per 100,000 population.

The number of reported cases that were associated with foreign travel made up a substantial proportion of the reports at 45% (n=57). Consistent with previous years there were differences in the proportion due to travel between serotypes, with 57% of *S.* enteriditis due to travel but only 46% in the case of *S*. typhimurium. Examining the S. typhimurium data it would appear that the reduction in cases is mainly in those considered to be acquired locally which has led to the increase in proportion due to travel compared to 2016 (25%).

There was one case each of *S.* typhi and S. paratyphi and both were associated with travel.

In 2017 the proportion of cases in males was 47%, a small reduction compared to the previous years but within the normal range for *Salmonella*.

Fig 13: Laboratory Reports of *Salmonella*, 2008 - 2017



In 2017 *S.* enteritidis and *S.* typhimurium remain the two most frequently reported serotypes in Northern Ireland, accounting for 27% and 35% of cases respectively (Table 12).

Table 12. No of laboratory reports of *Salmonella*, 2008 - 2017

Serovar	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Enteriditis	71	45	48	34	38	39	26	48	36	35
Typhimurium	37	54	53	63	53	47	30	43	51	24
Paratyphi	1	0	2	1	1	1	1	0	2	1
Typhi	1	0	0	1	0	1	1	1	2	1
Other	77	59	77	69	54	69	55	33	54	69
Total	**187**	**158**	**180**	**168**	**146**	**157**	**113**	**125**	**145**	**130**

Similar to many gastrointestinal illnesses, S*almonella* cases follow a seasonal pattern. Reports of salmonella peaked earlier in 2017 than would normally be expected, with reports peaking in July this year compared to September in 2016. (Figure 14). Peaks for cases of the most common serotypes *S.* enteriditis and *S.* typhimurium also peaked earlier than the

previous year in July and June respectively (Figure 15). The difference in peak months may be partially due to the differing proportions due to travel for each of these serovars.

Fig 14: Monthly laboratory reports of *Salmonella*, 2012 – 2017

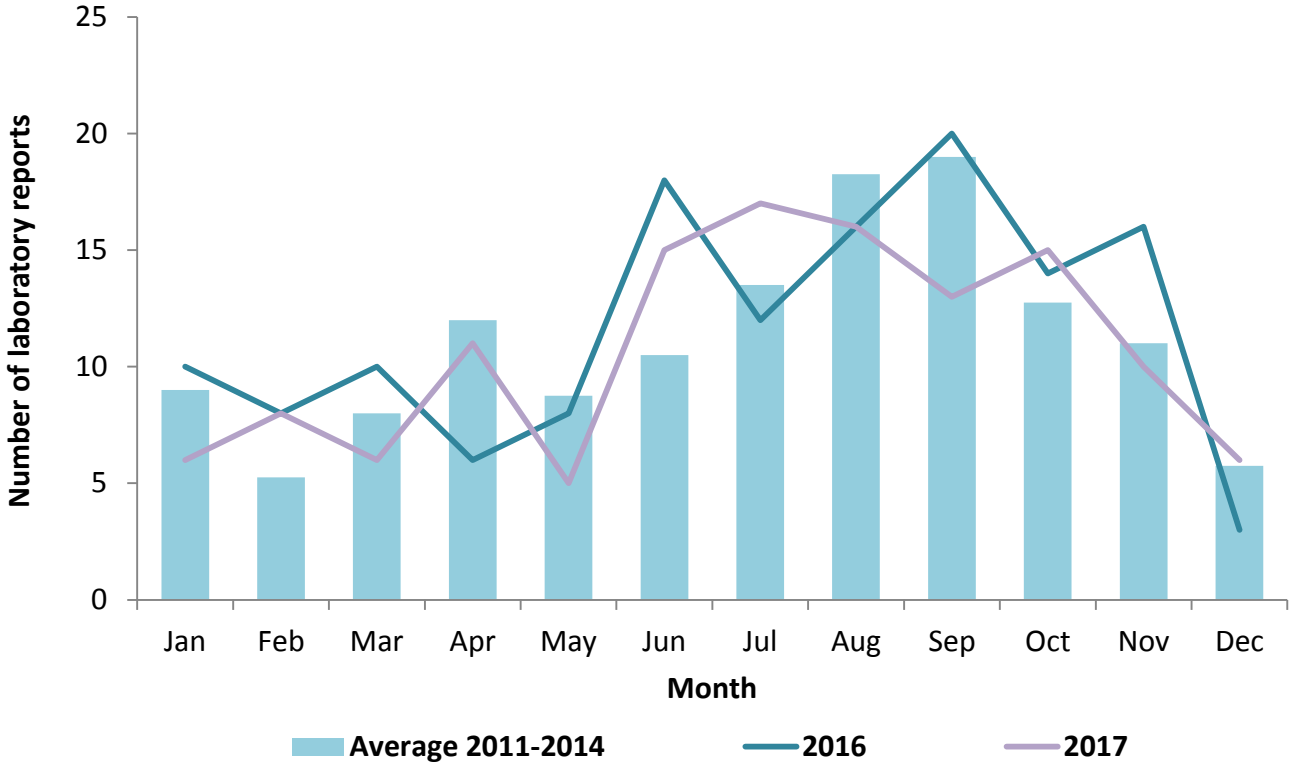
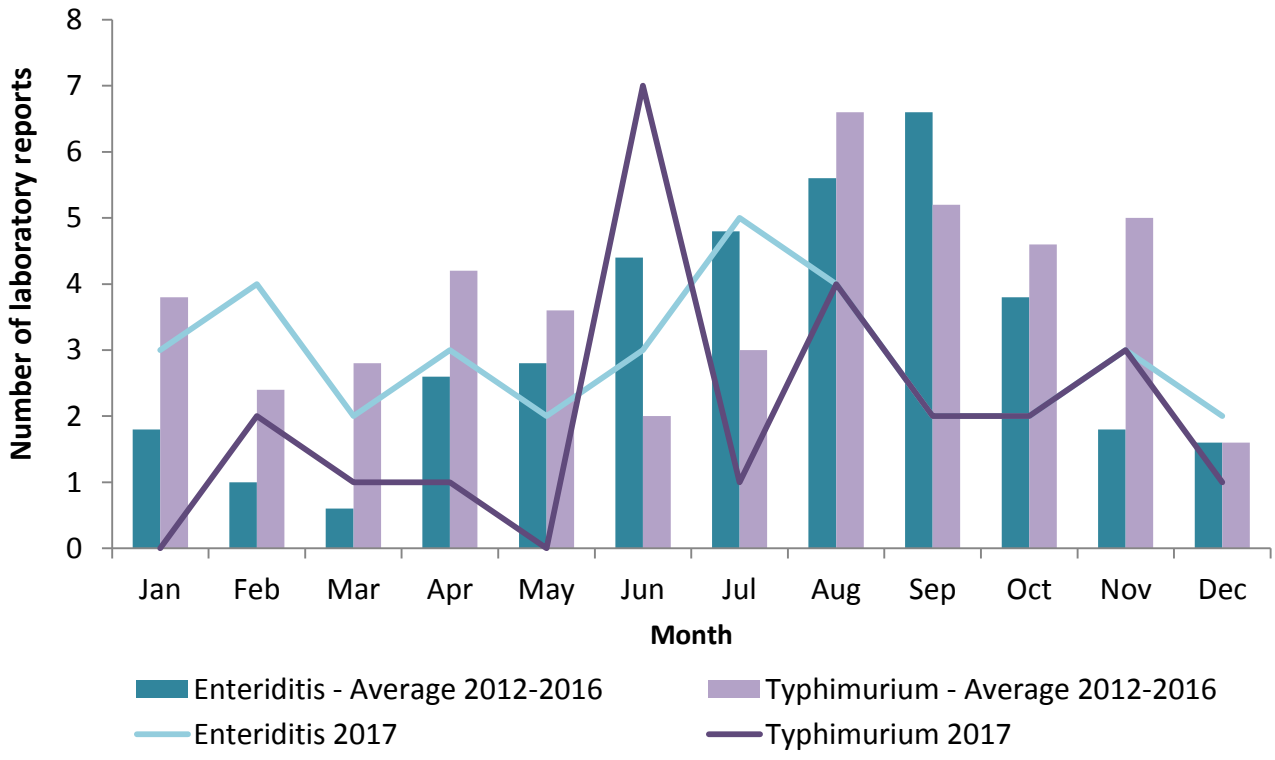
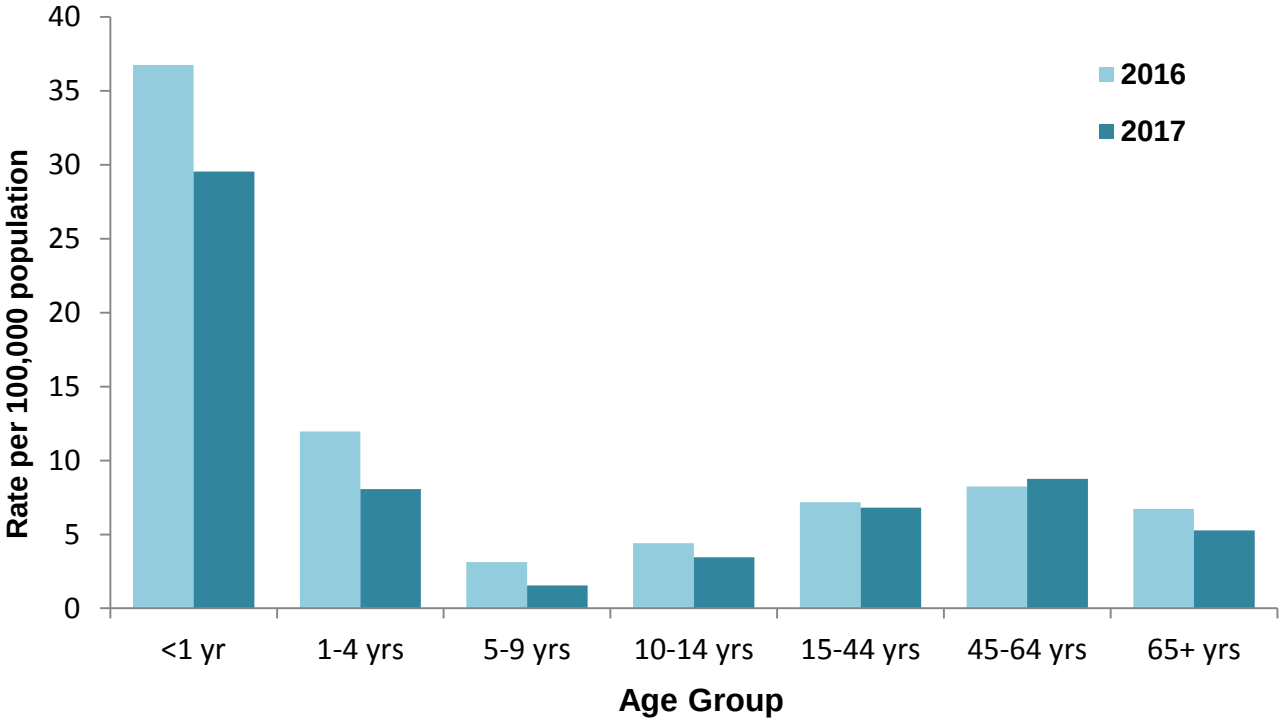


Fig 15: Monthly laboratory reports of *S.* Enteriditis and *S.* Typhimurium, 2017



Similar to 2016, the highest incidence rate in 2017 was in the under 1 year old age group (29.6) per 100,000 population although this represents only seven cases (Figure 16). All but one age specific rate decreased with those in the 15-44 year age group increasing slightly.

Fig 16: Laboratory reports of *Salmonella*, age specific rates (per 100,000 population), 2016 – 2017



Other serotypes for which more than one report was received in 2017 are presented in Table 13 along with data from the previous 3 years. However, other than S. enteriditis and S. typhimurium the numbers of individual serovars remain very low. There were an additional 25 serovars reported in 2017 where only one case was reported, five of which were seen for the first time in Northern Ireland.

Table 13. *Salmonella* serovars 2014 – 2017

2014		2015		2016		2017	
Serovar	**No**	**Serovar**	**No**	**Serovar**	**No**	**Serovar**	**No**
Java	4	Infantis	3	Infantis	7	Infantis	8
Agona	3	Stanley	3	Oranienburg	3	Mikawasima	7
Heidelberg	3	Agona	2	Agona	3	Stanley	4
Infantis	3	Heidelberg	2	Bredeney	2	Newport	4
Newport	3	Saint-Paul	2	Stanley	2	Agona	3
Saint-Paul	3	Nachshonim	2	Newport	2	Saint-Paul	3
Stanley	3	Muenchen	2	Hadar	2	Java	3
Virchow	3			Typhi	2	Montevideo	2
Braenderup	2			Paratyphi	2	Agama	2
Corvallis	*2*					Indiana	2

Shigella

Number of cases	**24**
Incidence rate	**1.3 per 100,000 population**

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 (HUS) can occur.

The total number of culture confirmed laboratory reports of Shigella species increased in 2016; however, both *S. flexneri* and *S. sonnei cases* decreased with the overall increase due to reports of *S. boydii* and *S. dysenteriae* (Tables 14 & 15). The number of cases that were identified solely by PCR testing methods increased substantially from 5 in 2016 to 25 in 2017.

Table 14. No of culture confirmed laboratory reports of Shigellosis, 2008 - 2017

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
16	13	5	8	9	4	21	31	21	24

Table 15. No of culture confirmed reports of Shigellosis by serogroup, 2013 - 2017

Serogroup	2013	2014	2015	2016	2017
S. boydii	0	1	1	0	2
S. dysenteriae	0	0	0	0	2
S. flexneri	1	13	14	8	6
S. sonnei	2	7	16	12	9
Untyped	1	0	0	1	1
Total	**4**	**21**	**31**	**21**	**24**

Table 16. No of PCR only reports of Shigellosis, 2014 - 2017

	2014	2015	2016	2017
Number of reports	4	16	5	25

Fig 17: Culture confirmed laboratory reports of *Shigella*, 2008 - 2017

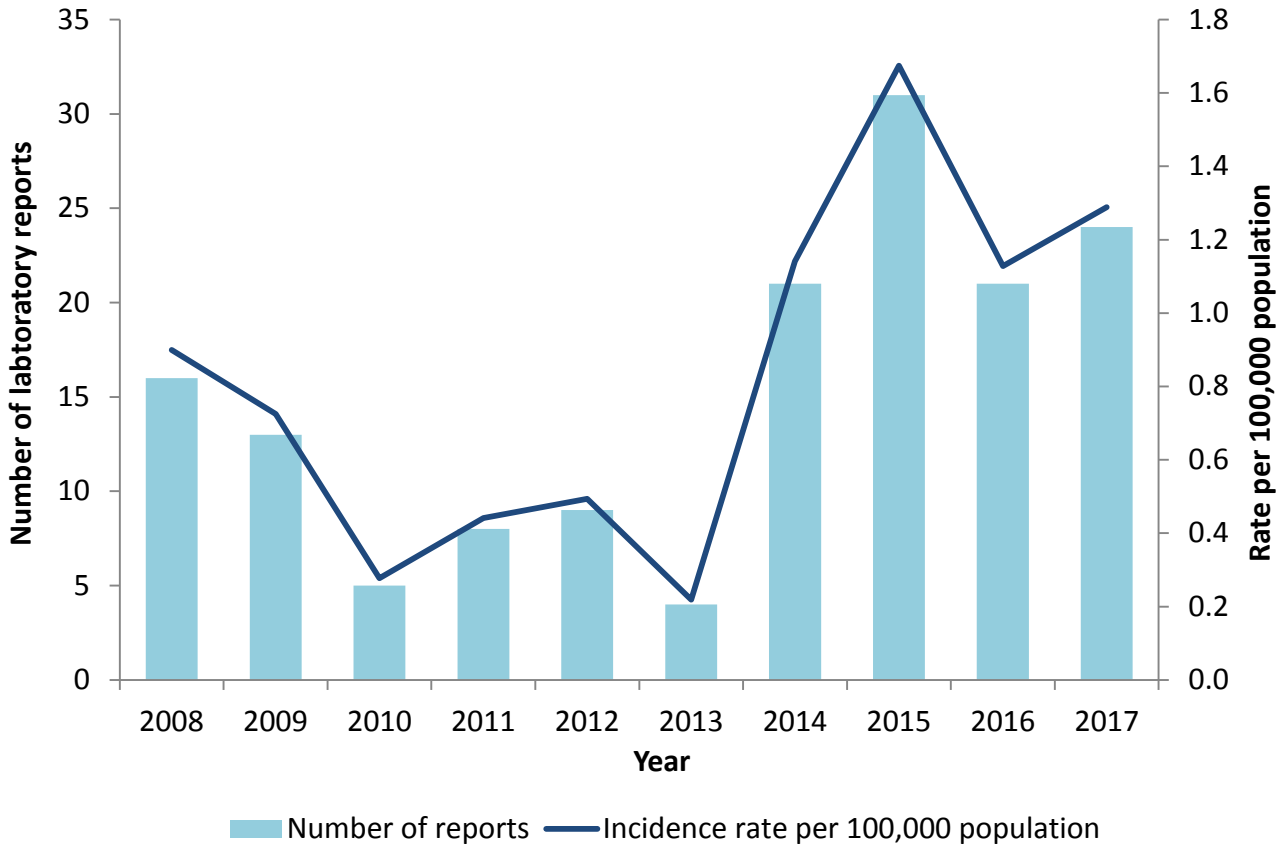
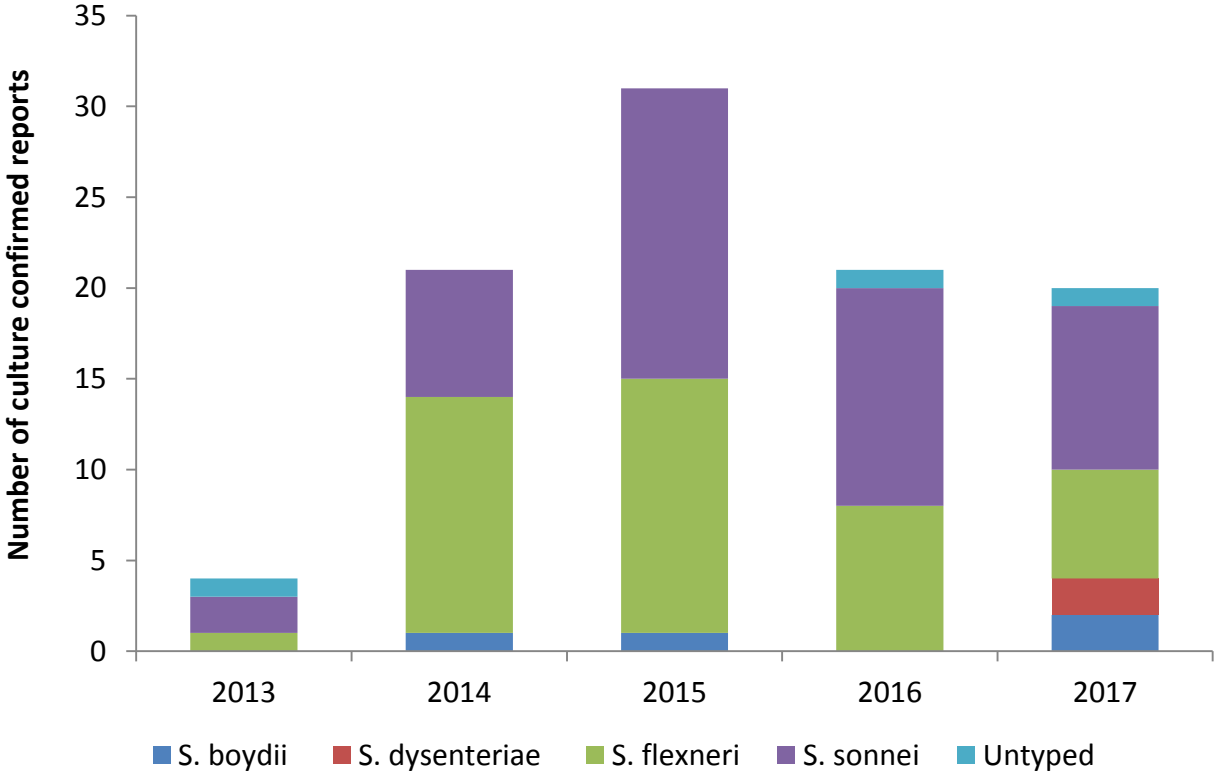


Fig 18: Culture confirmed laboratory reports of *Shigella sp* 2013 - 2017



Whilst a number of gastrointestinal infections show a larger proportion of male cases *Shigella sp* displays a larger proportion of males than any other, particularly in those infections considered to be community acquired (i.e. not travel related). Overall 83% of culture confirmed cases are male in 2017.

Shigella sp has been involved in a number of ongoing outbreaks within the MSM (males who have sex with males) community in England. Enhanced surveillance of cases in Northern Ireland have also indicated that at least some are likely related to sexual transmission within the MSM community. This may also partially explain the high proportion of males with the infection.

Other Gastrointestinal Infections

Adenovirus (gastroenteritis)

Adenovirus causes a variety of diseases but certain serotypes can cause gastroenteritis, particularly in young children. It is estimated that it is the second most common virus causing gastroenteritis in young children. Symptoms generally include diarrhoea and vomiting but tend to be relatively mild and short-lived although dehydration can sometimes be an issue.

Table 17. No of laboratory reports of Adenovirus (faecal), 2007 - 2016

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
270	222	127	209	207	102	125	115	104	85

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. This organism is not routinely tested for in cases of gastroenteritis. In 2017 there were 26 cases of clostridium perfringens reported in Northern Ireland (Table 18).

Table 18. No of laboratory reports of Clostridium perfringens, 2007 - 2016

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
36	18	36	16	28	24	23	34	24	25

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. This organism is not routinely tested for in cases of gastroenteritis. In 2017 there was only one case of listeria reported in Northern Ireland (Table 19).

Table 19. No of laboratory reports of *Listeria*, 2007 - 2016

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
11	4	2	3	7	2	4	6	4	1

Norovirus

Norovirus is the most common known cause of gastrointestinal infections in the United Kingdom. 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.

The number 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 2017 there were 299 laboratory reports of Norovirus reported in Northern Ireland (Table 20).

Table 20. No of laboratory reports of norovirus, 2008 - 2017

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
439	424	643	445	592	386	272	335	618	299

Rotavirus

Rotavirus is a common cause of gastroenteritis in infants and very young children, with many children suffering an infection by the age of five. Rotavirus can cause severe vomiting, severe diarrhoea, and stomach cramps. Symptoms usually last from three to eight days. Adults may become infected; however, repeat infections are generally less severe than infections during childhood. The majority of infections tend to occur in the spring (Table 21).

A rotavirus vaccine 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). 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.

Rotavirus reports increased substantially in 2017 compared to the previous year but remained lower than was seen prior to the introduction of the vaccine.

Table 21. No of laboratory reports of rotavirus, 2007 - 2016

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
724	594	599	630	543	599	210	404	101	234

Gastrointestinal Outbreaks

A total of 142 gastrointestinal outbreaks were reported in 2017 with the suspected mode of transmission for these outbreaks being either person-to-person spread or unknown in all cases.

Similar to previous years the most commonly identified causative agent of the gastrointestinal outbreaks was norovirus, which accounted for 44 (31%) of outbreaks, a reduction in the proportion that could identified. Three other outbreaks had an organism identified, one as rotavirus one Astrovirus and one as *Cryptosporidium*.

The causative organism was not determined in 95 of the gastrointestinal outbreaks, although it is likely these were viral in origin.

During 2017 there were a total of 30 hospital outbreaks, 108 residential institution outbreaks and a further 4 outbreaks linked to other sites (e.g. nursery, conference facilities) (Table 22).

Table 22: Total distribution and location of gastrointestinal outbreaks 2017 (based on date of report to PHA)

Location	Identified Organism(s)	No of outbreaks
Hospital	Norovirus	7
	Not identified	22
	Astrovirus	1
Residential institution	Norovirus	35
	Rotavirus	1
	Not identified	72
Other	*Cryptosporidium*	1
	Norovirus	2
	Not identified	1

* 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

Several organisms showed an increase in the number reported including *Campylobacter, Giardia lamblia* and rotavirus.

Campylobacter reports rose (13% increase) to their highest level in the past ten years following a two year period when the number of reported cases were dropping. Some of this increase may be due to more sensitive methods of testing introduced in 2015.

Reports of *Cryptosporidium* reports decreased (10% reduction) but still remain much higher than in the years prior to testing changes in 2015. However, reports of giardiasis showed a large increase for the third year in a row. Some of the increase seen in recent years is likely due to increased ascertainment due to the same testing changes seen in other organisms but the year on year rise would suggest that there has also been an increase in the underlying incidence of giardiasis.

E. coli O157 cases displayed a reduction in 2017 (30% decrease). However, whilst elevated this figure is similar to those seen in earlier years. We are continuing to see relatively large numbers of other serotypes and PCR positive only specimens, although these data are difficult to interpret due to the lack of comparable data.

Reports of *Salmonella* fell in 2017 (9% decrease) with the reduction mainly due to a large decrease in *S.* Typhimuirum cases. Similar to previous years a large proportion (45%) 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 increased from 21 culture confirmed cases in 2016 to 24 in 2017 despite a fall in the number of cases of both *S. sonnei* and *S. flexneri*. The increase seen was due to cases of *S. boydii* and *S. dysenteriae* which are rarely reported in Northern Ireland. Reports remain relatively high compared to the years prior to 2014. PCR only results increased substantially compared to 2016.

Outbreak activity fell in 2017 particularly in hospital settings. However, the majority of outbreaks were related to either Norovirus or suspected viral gastroenteritis as would normally be expected. Only one outbreak was reported as being from a non-viral source (*Cryptosporidium*).

The number of reports of rotavirus data increased by 75% compared to 2015 and represents the lowest number of reports in the past 10 years by far. This is likely due to the effect of the ongoing vaccination programme.

Summary table of laboratory reports

Table 23. No of laboratory reports of selected gastrointestinal infections, 2008 - 2017

Organism	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Adenovirus (faecal)	270	222	127	209	207	102	125	115	104	85
Campylobacter sp	848	977	1040	1175	1211	1355	1414	1320	1258	1421
Clostridium perfringens	36	18	36	16	28	24	23	34	24	25
Cryptosporidium sp	119	118	119	140	177	161	143	204	282	253
E coli O157	59	48	77	56	198	72	54	33	81	57
Giardia sp	9	38	16	35	50	47	48	93	120	163
Listeria sp	11	4	2	3	7	2	4	6	4	1
Norovirus	439	424	643	445	592	386	272	335	618	299
Rotavirus	724	594	599	630	543	599	210	404	101	234
Salmonella sp*	185	158	178	166	145	155	111	124	141	128
Shigella sp**	16	13	5	8	9	4	21	31	21	24

* non-typhoidal
** culture confirmed

See individual sections for more information.

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