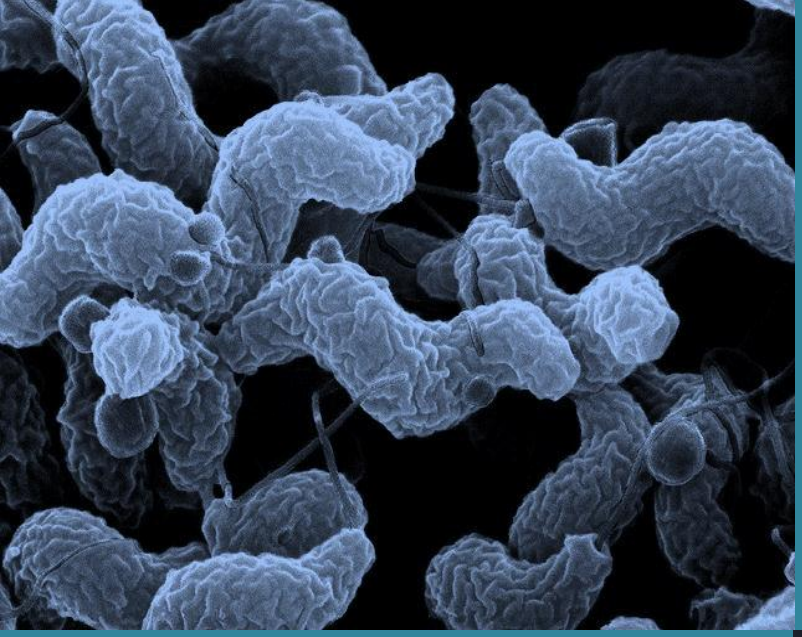
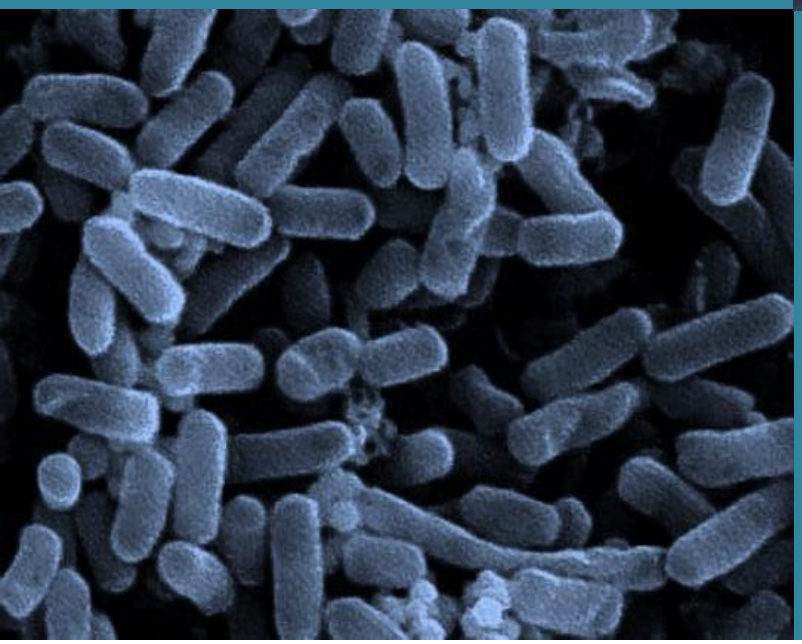


Gastrointestinal Infections in Northern Ireland



Annual Surveillance Report 2014

HSC Public Health Agency

Gastrointestinal Infections in Northern Ireland Annual Surveillance Report 2014

Contents

Key Points

- There was a decrease in most laboratory reports of gastrointestinal illness; however reports of campylobacter, giardia and listeria increased slightly in 2014 compared to the previous year. Shigella was the one exception, with a large increase compared to previous years.
- Notifications of food poisoning increased slightly in 2014 continuing the general upward trend since 2008. The total number of notifications has increased by 44% since 2008.
- *Campylobacter* infections rose again in 2014 to 1,414 detections, compared to 1,355 in 2013 (4% increase), an overall increase of 67% since 2008. However, some of the increase may be due to changes in testing procedures within one of the local laboratories.
- *Cryptosporidium* infections decreased by 11% in 2014, from 161 laboratory reports in 2013 to 143 in 2014 but still remain relatively high compared to previous years.
- There were 54 laboratory confirmed cases of *E. coli* O157 reported in 2014 representing a substantial drop from the previous year. Phage type 32 was the most commonly reported phage type (n=13). 35% of the cases reported in 2014 were admitted to hospital.
- None of the confirmed cases of *E. coli* O157 in 2014 were linked to outbreaks.
- Laboratory confirmed cases of giardiasis remained relatively stable with an increase to 48 from 47 in 2013 (2% increase).
- The number of *Salmonella* infections reported decreased substantially in 2014 with only 113 laboratory cases compared to 157 in 2013, representing a 28% decrease and the lowest number of cases in the past ten years. *Salmonella* definitive phage type (DT) 193 remains the most frequently reported phage type, although numbers dropped substantially from 20 in 2013 to 9 in 2014.
- Large increase in Shigella infections particularly Shigella flexneri although overall numbers remain low.
- Travel remains a significant risk factor for some gastrointestinal infections, with 43% of *Salmonella* infections being related to travel outside the UK in 2014.
- Similar to last year the number of outbreaks of gastrointestinal infection decreased substantially. As expected the majority were spread through person-to-person transmission and suspected or confirmed as due to norovirus.
- One of the Northern Ireland health service laboratories changed their testing procedures for several gastrointestinal organisms in 2014. Details of this can be found in the section entitled “Introduction of PCR testing in Northern Ireland”.

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. 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.

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.

This report presents the epidemiological data for selected gastrointestinal infections reported in Northern Ireland in the calendar year 2014.

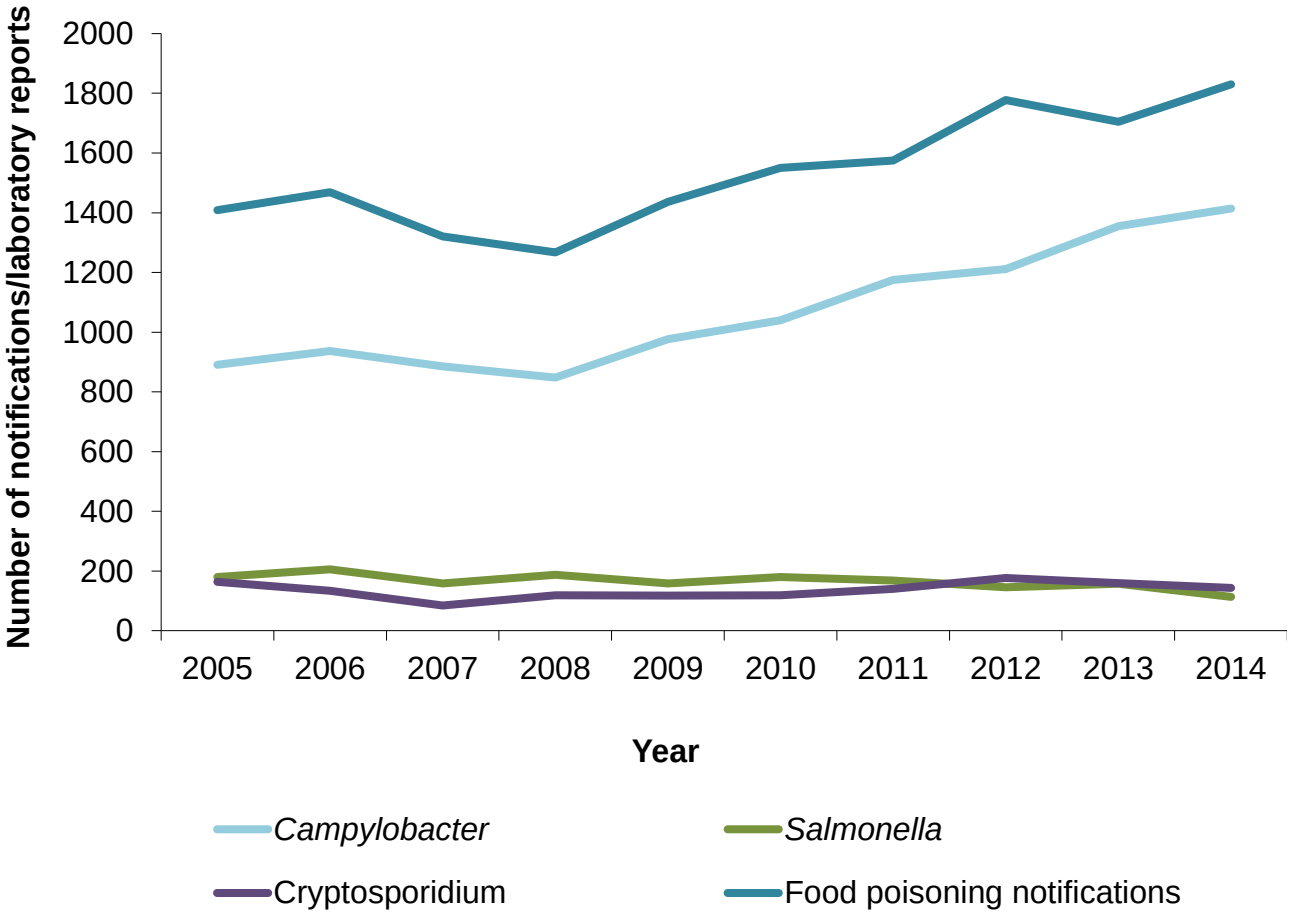
Food Poisoning

Following the small decrease in 2013 food poisoning notifications have increased in 2014 in line with the general trend since 2008.

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.

Cryptosporidium is a protozoa that is commonly acquired through the consumption of contaminated water. Cases of C*ryptosporidium* have been increasing since 2007 but peaked in 2012 and have subsequently been decreasing.

Fig 1: Food Poisoning: Notifications and Laboratory Reports 2005 – 2014



Campylobacter

Number of cases	**1,414**
Incidence rate	**76.8 per 100,000 population**

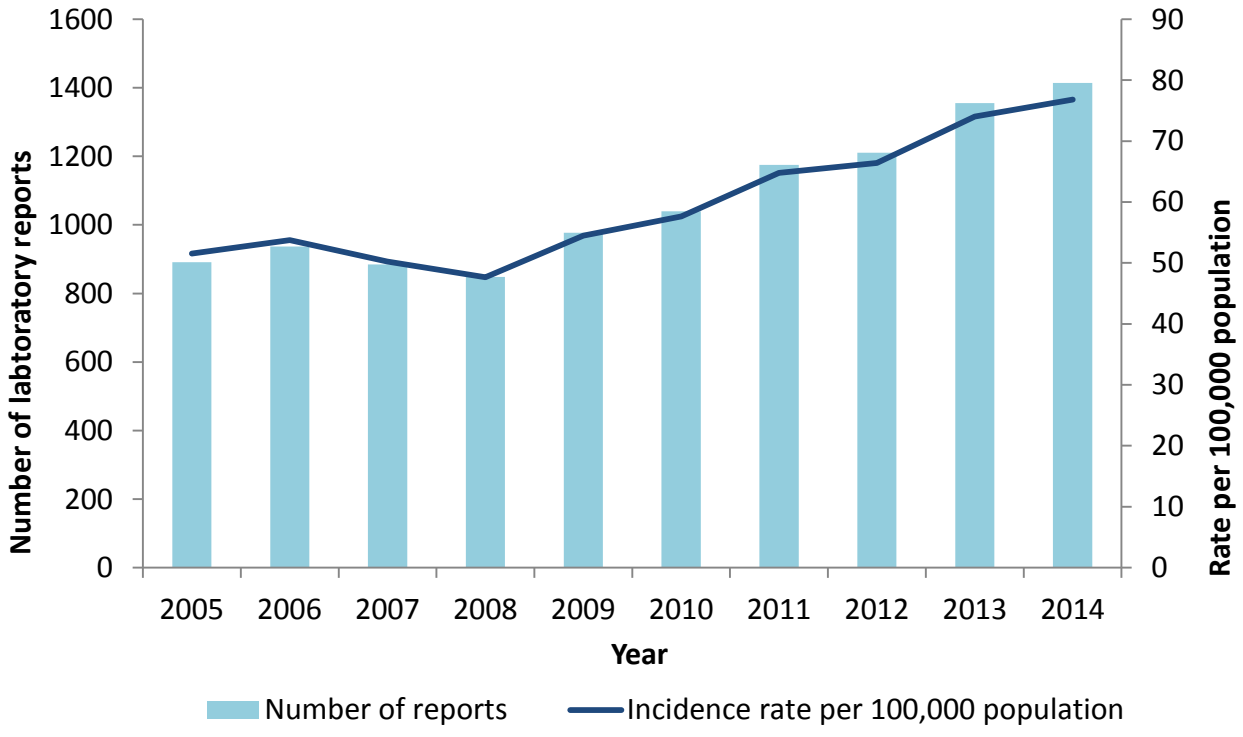
Campylobacter is the most common bacterial cause of gastrointestinal infection in the UK and Europe. Campylobacteriosis is characterised by diarrhoea, abdominal pain, malaise, fever, nausea and vomiting. Symptoms generally last for only a few days.

In 2014, C*ampylobacter* remained the most common bacterial gastrointestinal infection in Northern Ireland with 1,414 laboratory reported cases, an increase of 59 cases compared to 2013 (n=1,355 cases). However, it should be noted that this increase may be due, at least in part, to the introduction of PCR testing in one laboratory. The incidence of C*ampylobacter* infections was 76.8 per 100,000 population. Cases of C*ampylobacter* have been increasing since 2008 with an overall increase of 67% over this period (Table 1, Figure 2). Only 28 (2%) cases were reported as being associated with foreign travel; however, as reporting forms are completed for only a fraction of cases this figure is likely to be a large underestimate.

Table 1. No of laboratory reports of *Campylobacter*, 2005 - 2014

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
891	937	885	848	977	1040	1175	1211	1355	1414

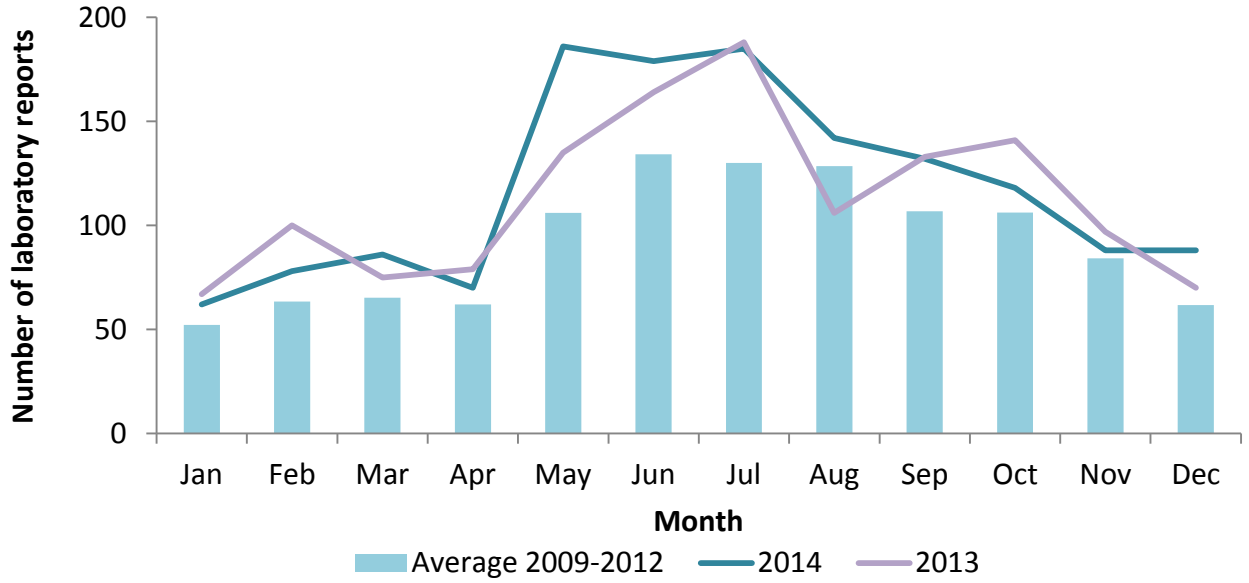
Fig 2: Laboratory reports and incidence rate of *Campylobacter*, 2005 - 2014



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

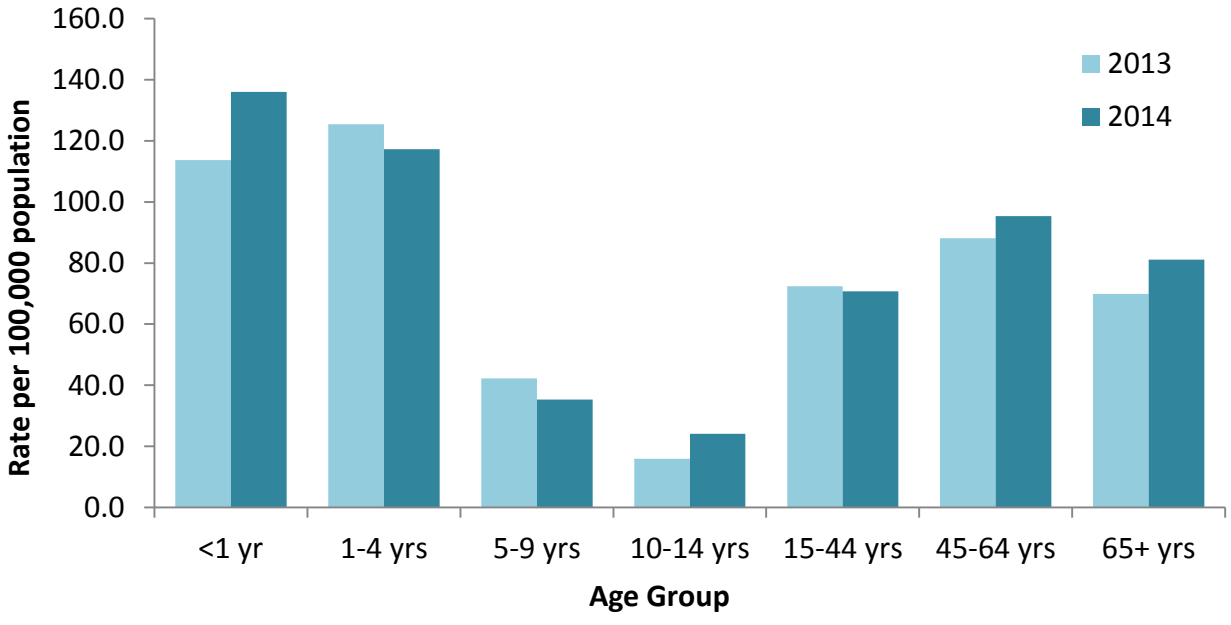
Number of reports peaked in May, two months earlier than the previous year with the peak number of cases being very similar. Cases remained high until July but then decreased steadily until November (Figure 3).

Fig 3: Monthly laboratory reports of *Campylobacter*, 2009 – 2014



The highest incidence rate of laboratory reported C*ampylobacter* infections in 2014 was in the under 1 year old age group (136.1 per 100,000 population); however, this represents a small number with only 33 cases in this age group (Figure 4). Rates in 2014 across most of the age groups were very similar to the previous year. The proportion of reported cases were 57% male (n=799), almost unchanged from 2013.

Fig 4: Laboratory reports of *Campylobacter*, age-specific incidence rate, 2013 - 2014



Cryptosporidium

Number of cases	**142**
Incidence rate	**7.8 per 100,000 population**

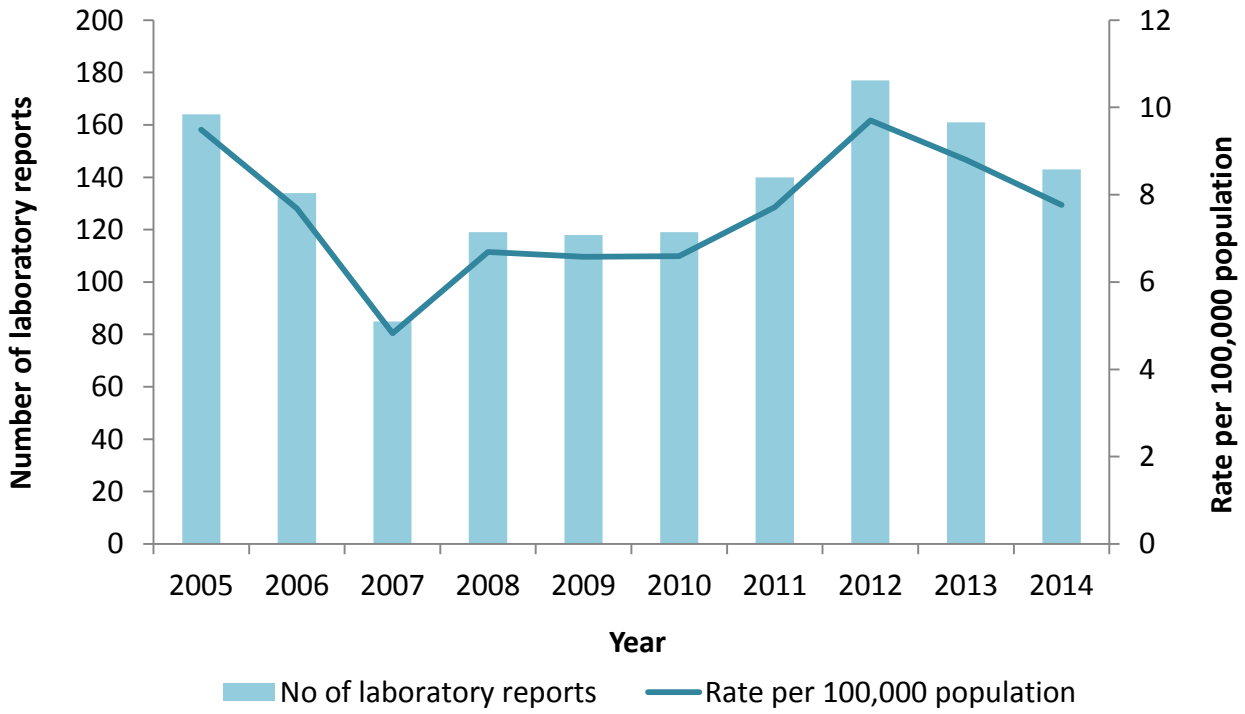
Cryptosporidium is a protozoal parasite that causes a diarrhoeal illness that can last between 2 days and 4 weeks. The infection can be a more serious illness in people who are immunosuppressed. *Cryptosporidium* is found in lakes, streams, rivers, untreated water and occasionally in swimming pools.

Laboratory reported cases of *Cryptosporidium* infection continued to decrease in 2014, with 143 cases compared to 161 in 2013, representing a 11% decrease (Table 2, Figure 5). The incidence rate of C*ryptosporidium* infection was 7.8 per 100,000 population. No outbreaks of C*ryptosporidium* were identified in 2014 and only 9 cases (6%) were thought to be associated with travel outside the United Kingdom.

Table 2. No of laboratory reports of *Cryptosporidium*, 2004 - 2013

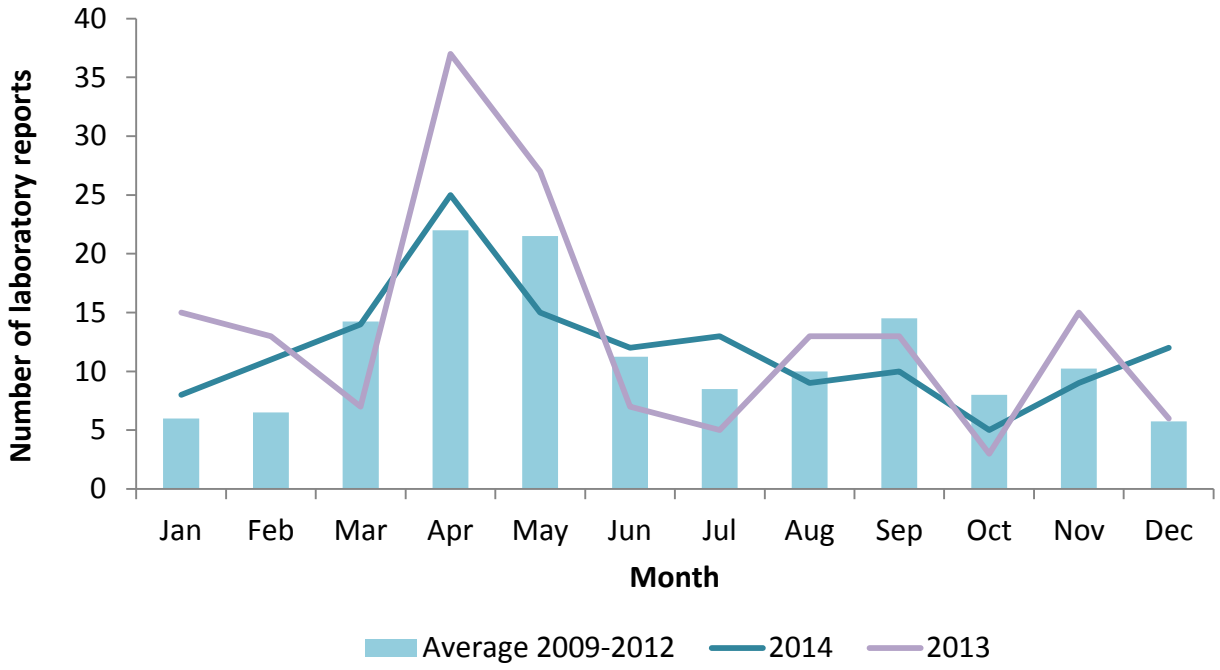
2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
164	134	85	119	118	119	140	177	161	143

Fig 5: Laboratory reports of *Cryptosporidium*, 2005 - 2014



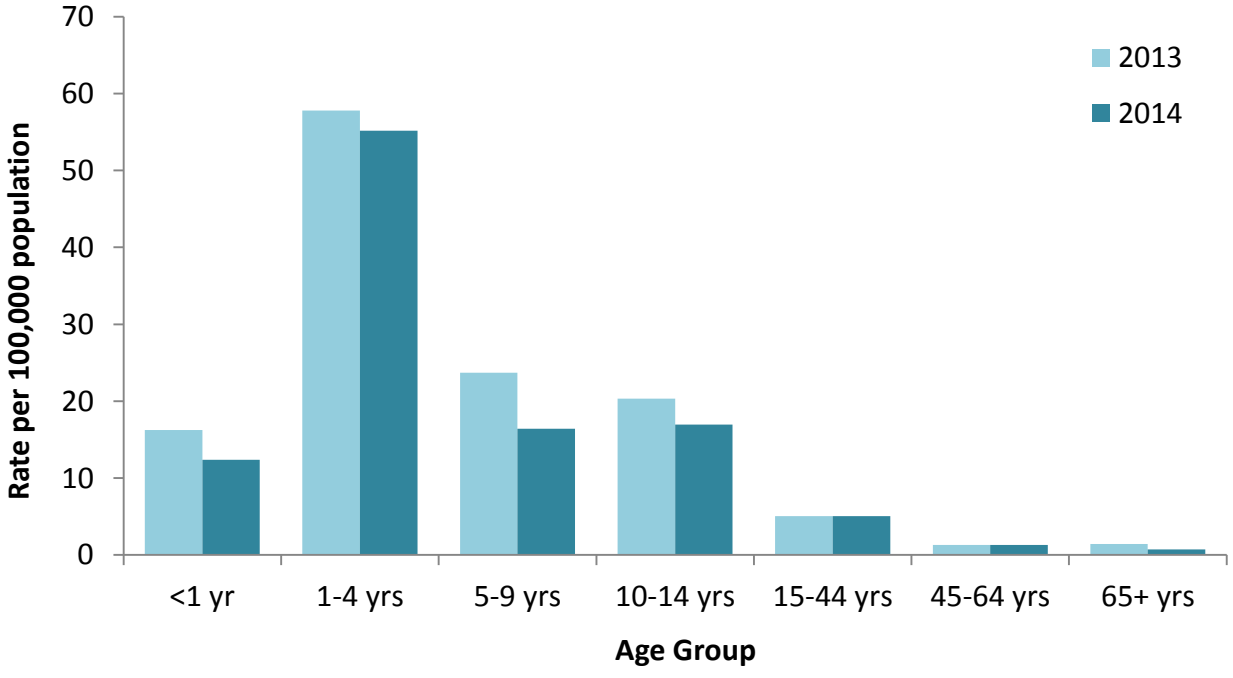
The spring peak in 2014 was much lower than in 2013 and more in line with the average for 2009-2012, with no second peak later in the year as would normally be the case (Figure 6).

Fig 6: Monthly laboratory reports of *Cryptosporidium*, 2009 - 2014



The highest incidence rate in 2013 was in the 1-4 years old age group (55.2 per 100,000 population) with 39% of cases occurring in this age group, almost unchanged from 2013 (Figure 7). The most pronounced change in rates occurred in the 5-9 year old age group; however the changes may be due to the small numbers involved in this age group. Overall 51% of cases were males in 2014; however, the proportion was generally slightly higher in the younger age groups, with 60% being male in the under 1 year olds.

Fig 7: Laboratory reports of *Cryptosporidium*, Age-Specific Rate (per 100,000 population), 2013 - 2014



E. coli O157

Number of cases	**54**
Incidence rate	**2.9 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 54 laboratory culture confirmed cases of *E. coli* O157 reported in 2014, of which 31 (57%) were positive for verocytotoxigenic (VTEC) genes. There were no cases associated with outbreaks, and 6 cases (11%) were associated with travel outside the United Kingdom.

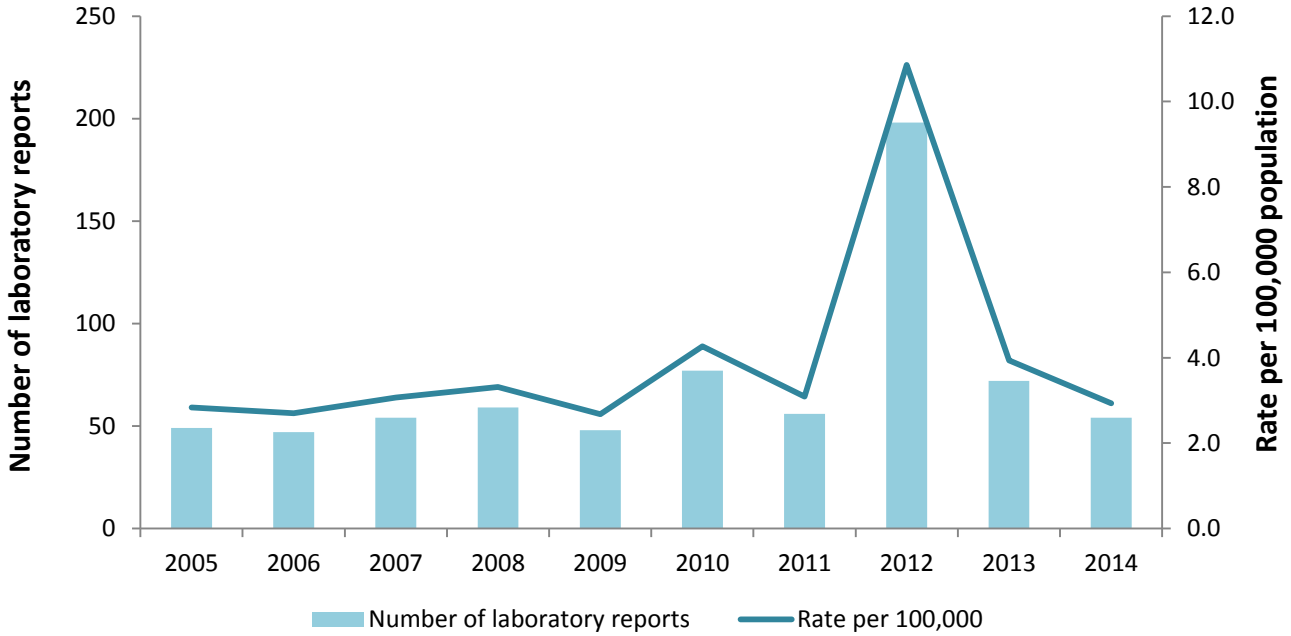
There was a substantial reduction in 2014 with only 54 cases compared to 72 cases in 2013. (Figure 8, Table 3).

Table 3. No of laboratory reports of *E. coli* O157, 2005 - 2014

2005	2006	2007	2008	2009	2010	2011	2012*	2013	2014
49	47	54	59	48	77	56	198	72	54

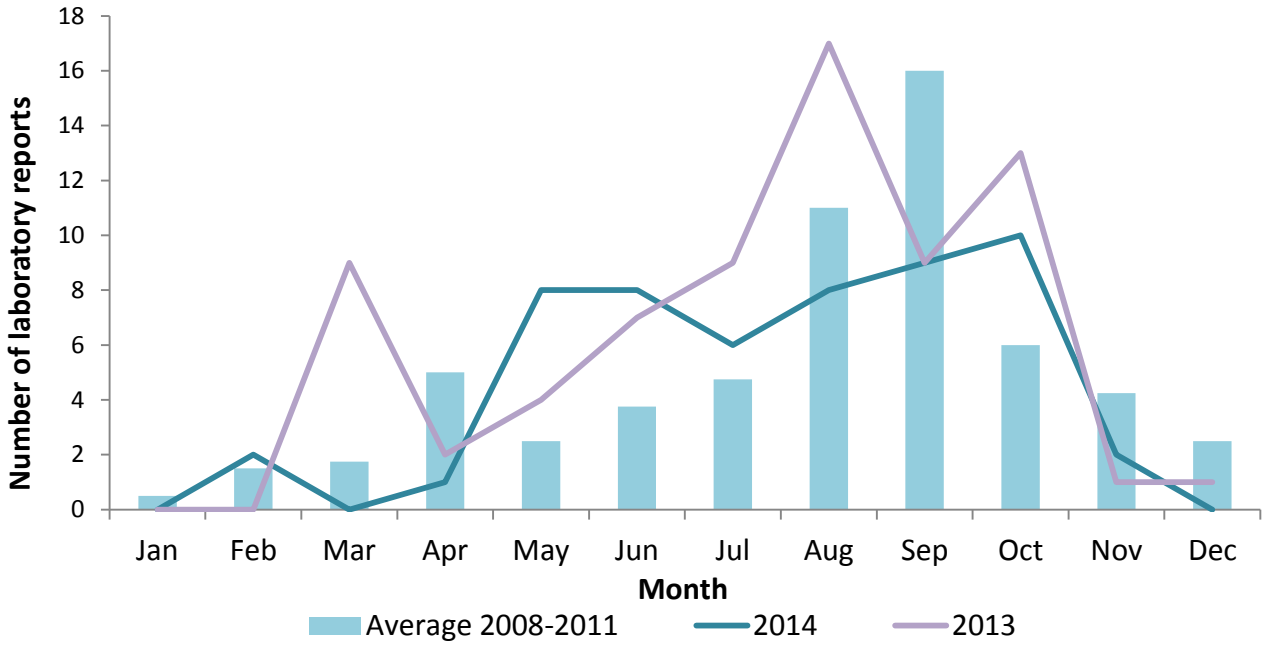
** increase due to largest recorded outbreak of E coli in N. Ireland with 141 confirmed cases*

Fig 8: Laboratory reports of *E. coli* O157, 2005 - 2014



Seasonality in 2014 was less pronounced than in 2013 with a period of increased activity from May until October, and the peak in October slightly later than usual (Fig 9).

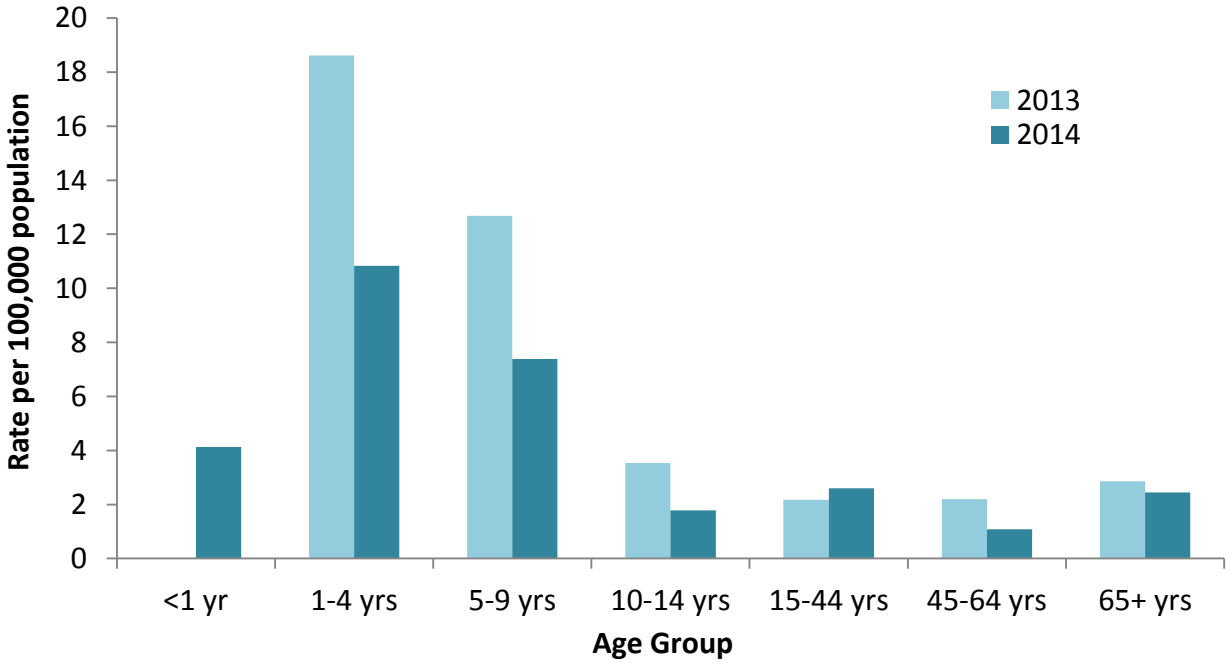
Fig 9: Monthly laboratory reports of *E. coli* O157, 2008 – 2014*



** 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 15-44 year old age group. There was also an increase in those aged under 1; however this represents only one case. Similar to last year the age-specific rates were highest in the 1-4 year age category (10.8 per 100,000 population) with rates generally declining with age until the over 65 year age group. (Figure 10).

Fig 10: Distribution of *E. coli* O157 cases by age group, 2013-14



Phage type data were available for 24 of the 54 laboratory culture confirmed cases in 2014 (Table 4). Similar to 2013 the most commonly reported phage type was PT32, making up 54% (n=13) of the typed E coli O157 cases. PT8 was the only other phage type contributing substantial numbers with only 6 cases (25%) being reported.

Verocytotoxigenic gene type was available for 31 of the 54 laboratory culture confirmed cases in 2013. Similar to 2013 no samples of E Coli O157 were positive for VT1 only genes. With the exception of 2012, VT2 only has been the dominant verotoxin pattern reported in the past ten years (Table 5).

Table 4: Distribution of phage types of laboratory confirmed cases of *E. coli* O157 by year, 2010-2014

Phage type	2010	2011	2012	2013	2014
1	1	0	1	0	0
2	0	0	1	1	2
4	0	1	0	0	0
8	34	19	14	10	6
14	0	0	1	2	1
21/28	2	6	3	2	0
31	2	3	14	2	0
32	14	11	20	42	13
33	0	0	1	0	0
34	6	0	0	1	0
51	0	4	0	0	0
54	0	1	135	1	2
89	0	0	1	0	0
Unknown	18	11	7	11	30
Total	**77**	**56**	**198**	**72**	**54**

Table 5: Verotoxin (VT) genes of laboratory confirmed cases of *E. coli* O157, 2005-2014

VT	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
VT1	0	0	0	0	0	2	0	0	0	0
VT2	31	33	45	39	25	42	24	34	50	17
VT1+2	10	8	4	11	11	22	20	153	9	13
VT+	6	1	0	6	8	1	5	2	2	1
Total	**47**	**42**	**49**	**56**	**44**	**67**	**49**	**189**	**61**	**31**

Barring minor differences, the distribution of symptoms experienced by cases in 2014 is similar to that in 2013. The most common symptoms reported were diarrhoea (89%) and abdominal pain (83%) (Table 6). Overall 67% of cases experienced bloody diarrhoea. 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. Only seven cases reported having all six symptoms listed.

Table 6: Symptoms experienced by *E. coli* O157 cases, 2014

Symptom	Number	Percentage*
Abdominal pain	45	83
Blood in stools	37	67
Diarrhoea	48	89
Fever	18	33
Nausea	24	44
Vomiting	26	48

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

Similar to 2013 hospital admissions occurred in all age groups in 2014, with the exception of infants under 1 year old. There were 35% of cases admitted to hospital in 2014, a slight reduction compared to 2013 (42%). Similar to 2013 cases in the over 65 year old age group were most likely to be hospitalised (57% of age group hospitalised) but this represents a large reduction in percentage terms compared to 2013 (88%) (Table 7).

Table 7: Hospitalisation of *E. coli* O157 cases by age group, 2014					
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	11	9	4	2	18
5-9	8	3	2	2	25
10-14	3	3	1	1	33
15-44	19	15	9	8	42
45-64	5	3	2	2	40
65+	7	6	4	4	57
Total	**54**	**40**	**22**	**19**	**35**

Other Serotypes of E coli

As mentioned previously the introduction of PCR testing has allow for the detection of non-O157 serotypes of verotoxin positive E coli. Further identification is only possible by sending specimens to the Public Health England reference laboratory.

Below is a table detailing the serotype of those cases where serotyping took place. Note that these serotypes do not represent a full year's data as PCR testing was not introduced until April.

Serotype	Number
O 026	19
O 084	1
O 091	1
O 105	1
O 110	1
O 142	1
O 145	1
O 182	1

As detection of these serotype was only possible locally from 2014 it is not possible at this stage to indicate whether these figures are typical and this will require further work.

Giardiasis

Number of cases	**48**
Incidence rate	**2.6 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. Up to a quarter of cases can be asymptomatic.

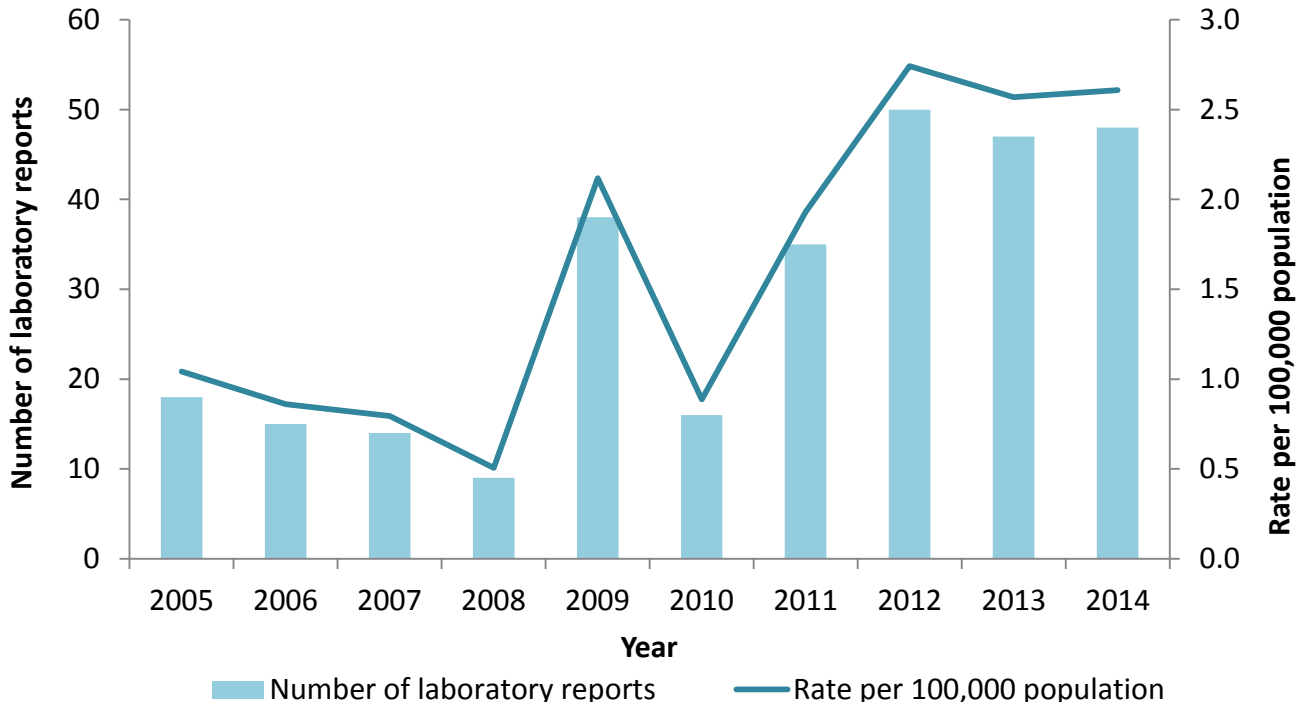
Laboratory confirmed cases of giardiasis in 2014 remained almost unchanged at 48 cases compared to 47 in 2013. The incidence rate was similar at 2.6 per 100,000 population. There were 8 (17%) cases that were reported as being likely to be associated with foreign travel.

Rates of Giardia have generally been raised since 2009 compared to previous years; however compared to other organisms the actual number of cases remains small, (Table 8, Figure 11). Similar patterns have been described in England and Wales. There were no outbreaks of giardiasis reported in 2013.

Table 8. No of laboratory reports of *Giardia lamblia*, 2005 - 2014

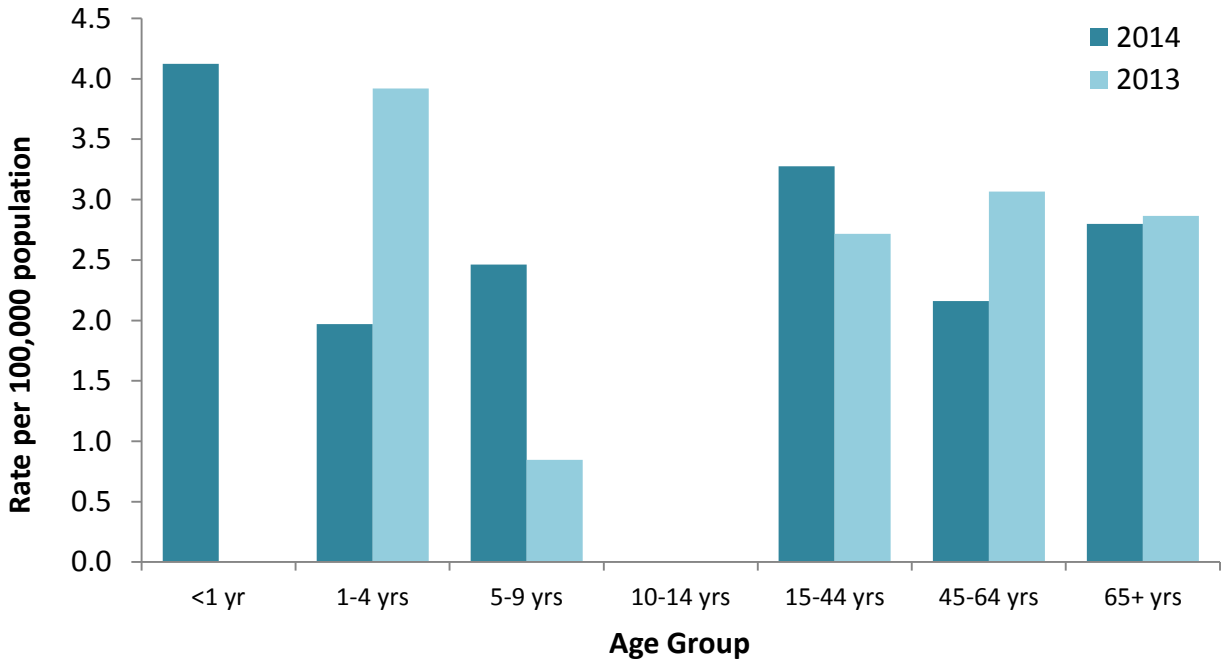
2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
18	15	14	9	38	16	35	50	47	48

Fig 11: Laboratory reports of *Giardia lamblia* (all specimen types), 2005 - 2014



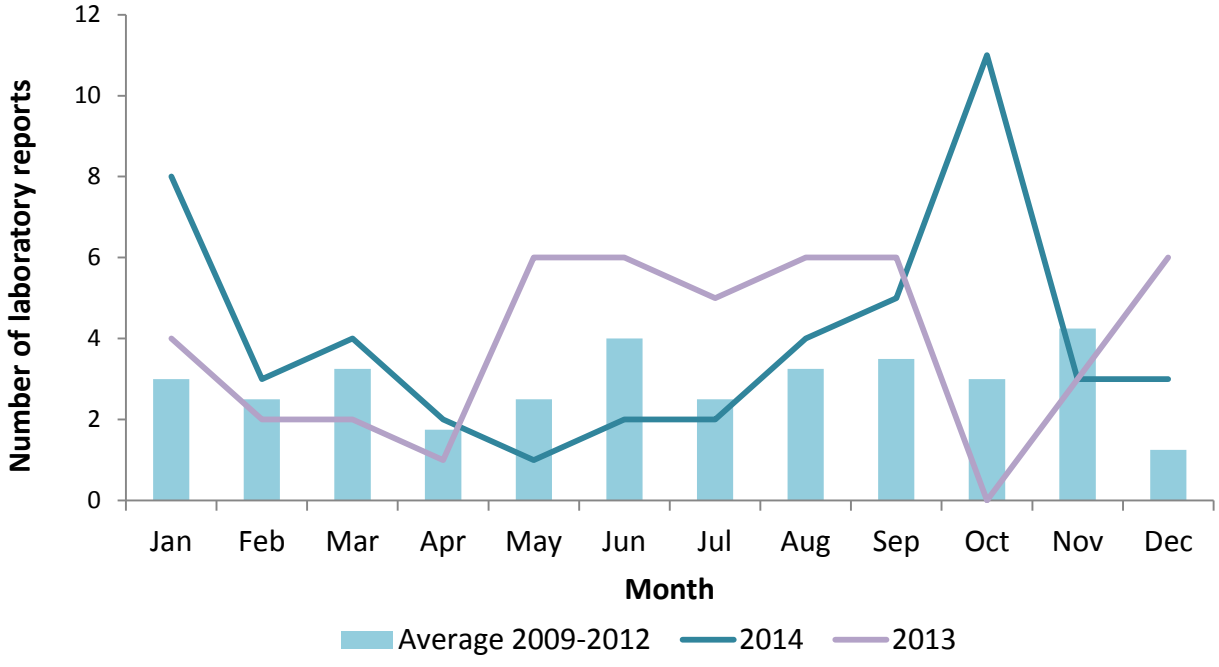
The highest incidence rate in 2014 was in the under 1 year old age group (4.1 per 100,000 population) however this represents only one case. The next highest age specific incidence rate was in the 15-44 year old group (n=24) with a rate of 3.3 per 100,000 population. Due to small numbers the age-specific rates can vary substantially over time (Figure 12).

Fig 12: Laboratory reports of *Giardia lamblia* (all age groups), 2013 - 2014



There is little evidence to suggest seasonality for G*iardia* in Northern Ireland (Fig 13); however this may be due, in part, to the relatively small numbers reported in Northern Ireland as other countries in Europe have reported seasonality, with increased numbers during summer/autumn.

Fig 13: Monthly laboratory reports of *Giardia lamblia*, 2009 – 2014



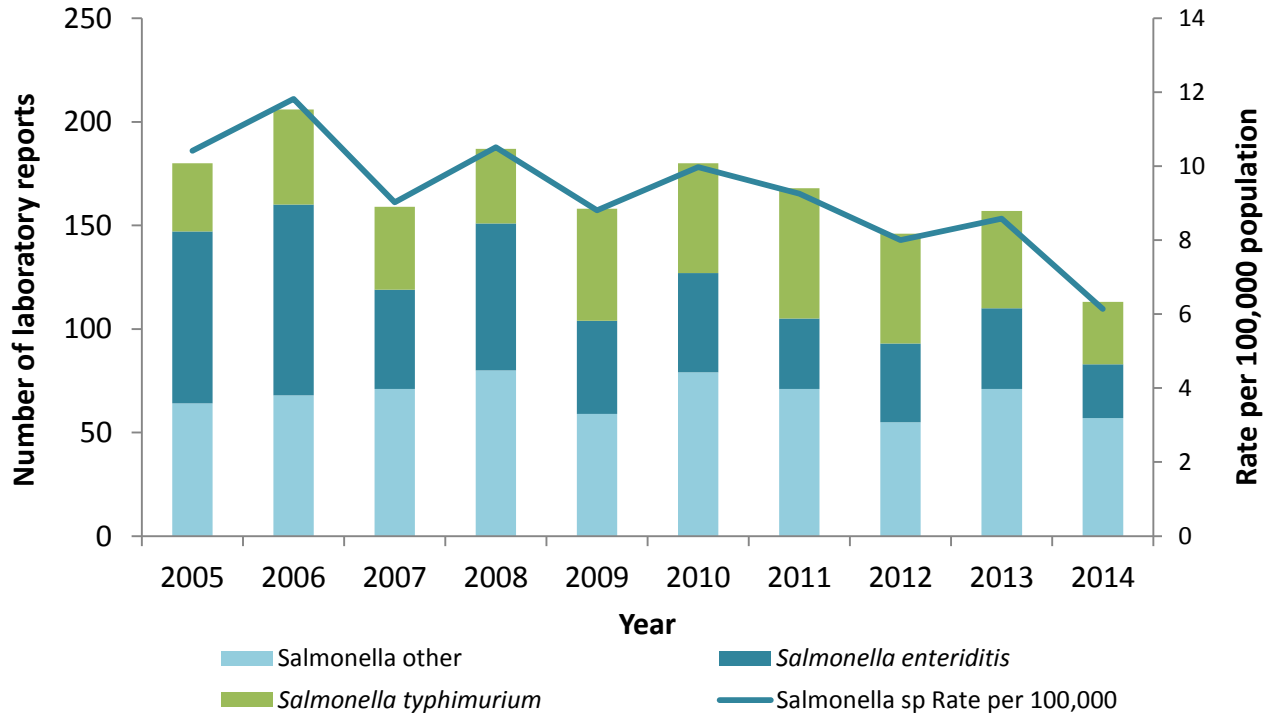
Salmonella

Number of cases	**113**
Incidence rate	**6.1 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.

The number of laboratory reports has decreased substantially in 2014 with only 113 reports compared to 157 in 2013. This represents a 28% decrease compared to 2013. The incidence of *salmonella* infections was 6.1 per 100,000 population. Similar to the previous year the number of reported cases that were likely to be associated with foreign travel made up a substantial proportion of the reports with 43% (n=49) being travel associated. Similar to 2013 there were differences in association with foreign travel between the two most common serovars, with 69% of *S.* Enteriditis cases associated with travel, but only 33% of *S*. Typhimurium associated with travel. Both cases of *S.* Typhi and *S*. Paratyphi were associated with travel.

Fig 14: Laboratory Reports of *Salmonella*, 2005- 2014



Over the ten year period there has been a general trend of decreasing *S*. Enteriditis and increasing *S*. Typhimurium, whilst other serovars have remained relatively steady (Table 9).

Table 9. No of laboratory reports of *Salmonella*, 2004 - 2013

Serovar	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Enteriditis	83	92	48	71	45	48	34	38	39	26
Typhimurium	33	46	40	37	54	53	63	53	47	30
Paratyphi	2	0	2	1	0	2	1	1	1	1
Typhi	1	0	2	1	0	0	1	0	1	1
Other	61	68	67	77	59	77	69	54	69	55
Total	**180**	**206**	**159**	**187**	**158**	**180**	**168**	**146**	**157**	**113**

Similar to many gastrointestinal illness cases of S*almonella* also follow a seasonal pattern. Similar to 2013 cases peaked in September with 18 cases reported (Figure 15). This increase is in line with previous years; however, cases of the most common serotypes *S.* Enteriditis and *S.* Typhimurium peaked in different months, with *S.* Enteriditis peaking in October and *S.* Typhimurium peaking in September (Figure 16).

Fig 15: Monthly laboratory reports of *Salmonella*, 2013 & 2014

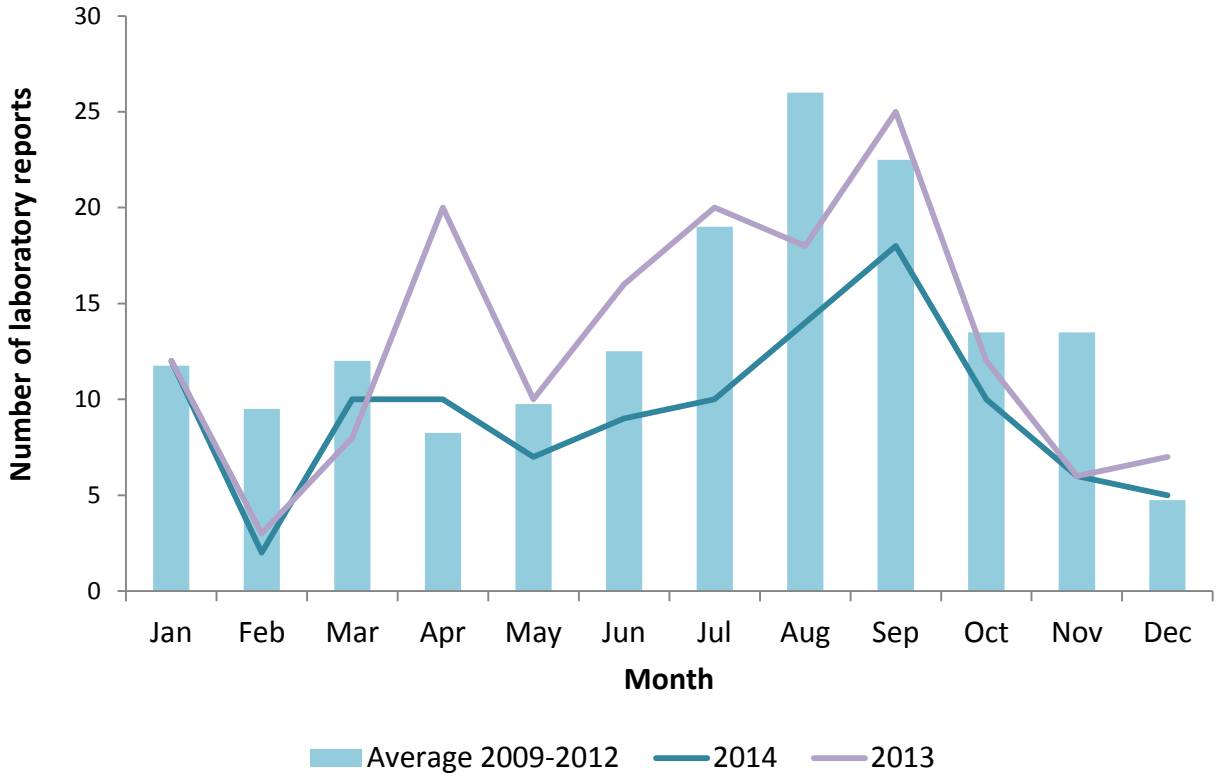
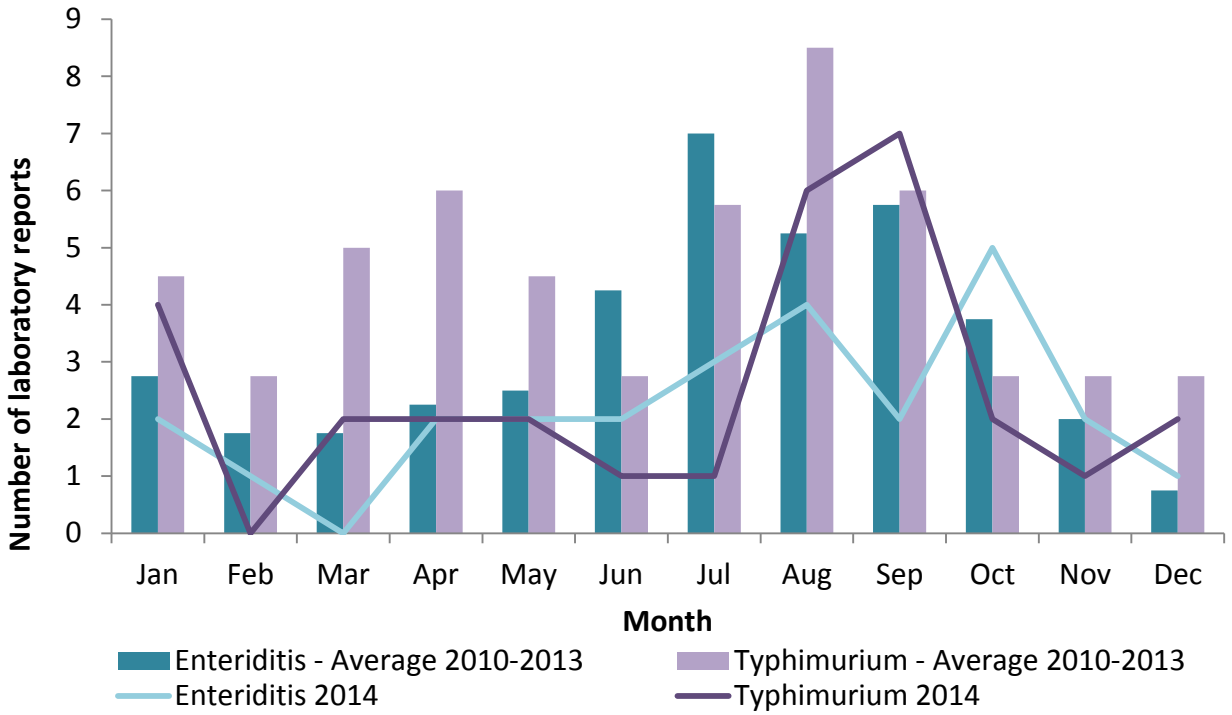
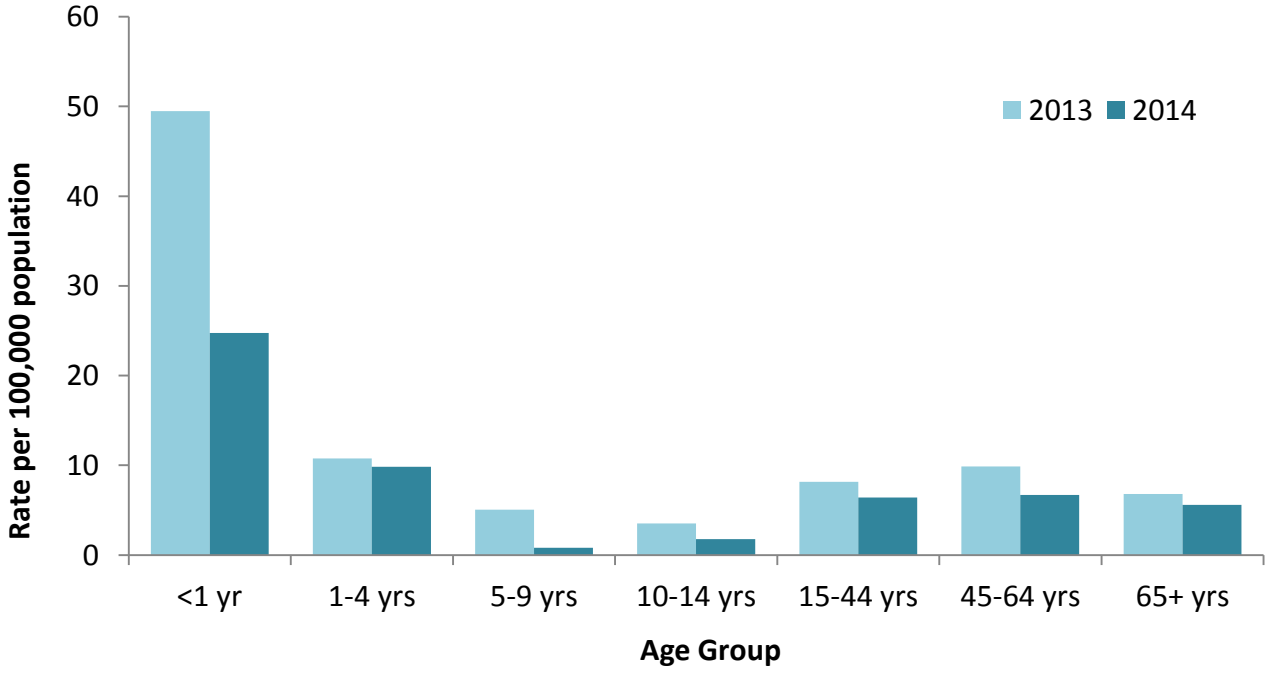


Fig 16: Monthly laboratory reports of *S.* Enteriditis and *S.* Typhimurium, 2014



In 2014 54% of the cases were male. Similar to 2013 the highest incidence rate in 2014 was in the under 1 year old age group (24.7 per 100,000 population); this represents a reduction of almost half although small numbers in this age group may contribute to large variations (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), 2013 - 2014



In 2014 *S.* Enteritidis and *S*. Typhimurium remained the two most frequently reported serotypes in Northern Ireland, accounting for 23% and 27% of cases respectively.. *S*. Enteriditis cases have been comparatively low over the past 3 years with cases of *S*. Typhimurium exceeding those of *S.* Enteritidis since 2009.

Other serotypes for which more than one report was received in 2013 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 19 serovars reported in 2014 where only one case was reported, including one *Salmonella* Paratyphi A and one *Salmonella* Typhi.

Table 10. *Salmonella* serovars 2010 -2013

2011		2012		2013		2014	
Serovar	**No**	**Serovar**	**No**	**Serovar**	**No**	**Serovar**	**No**
Dublin	4	Mikawasima	5	Infantis	7	Java	4
Infantis	4	Newport	5	Senftenberg	4	Agona	3
Tokoin	4	Infantis	4	Bareilly	3	Heidelberg	3
Montevideo	3	Stanley	4	Java	3	Infantis	3
Newport	3	Bredeney	3	Kentucky	3	Newport	3
Stanley	3	Agona	2	Stanley	3	Saint-Paul	3
Braenderup	2	Bareilly	2	Abony	2	Stanley	3
Glostrup	2	Dublin	2	Agama	2	Virchow	3
Lagos	2	Kentucky	2	Agona	2	Braenderup	2
Oranienburg	2	Montevideo	2	Dublin	2	Corvallis	2
Saint-Paul	2	Oranienburg	2	Hadar	2		
Virchow	2			Haifa	2		
				Kottbus	2		
				Mikawasima	2		
				Panama	2		
				Saint-Paul	2		

Almost all of the phage types of enteriditis have decreased or remained stable in 2014 with the exception of PT21 which increased slightly and was the predominant phage type reported accounting for 19% of *S.* Enteritidis cases. The number of salmonella enteriditis cases with no phage type available increased substantially (Table 11).

Table 11. Common phage types of *S.* Enteriditis										
Phage type	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
PT 1	24	34	2	7	5	10	6	3	3	3
PT 4	13	13	3	10	4	5	2	2	2	1
PT 6	0	6	4	5	2	3	0	0	1	0
PT 6A	2	3	2	2	3	0	0	3	0	0
PT 8	3	2	5	10	3	12	10	16	6	3
PT 14B	6	13	8	9	5	0	4	3	7	3
PT 21	9	8	4	11	3	3	3	4	3	5
Other	6	10	5	12	15	12	7	6	14	1
Untyped	20	3	15	5	5	3	2	1	3	9
Total	**83**	**92**	**48**	**71**	**45**	**48**	**34**	**38**	**39**	**26**

S. Typhimurium definitive phage type (DT) 193 remains the largest single phage type of *S*. Typhimurium although it has decreased again in 2014. *S*. Typhimurium DT 120 is the only phage type to have increased (Table 12).

Table 12. Common phage types of *S.* Typhimurium										
Phage type	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
DT 1	1	0	2	1	0	0	1	1	4	1
DT 8	2	1	0	1	13	10	5	2	5	1
DT 104	4	11	0	5	5	5	14	10	4	0
DT 104B	2	12	5	11	0	2	7	1	0	0
DT 193	3	6	6	5	6	10	13	20	11	9
DT 120	1	0	1	0	2	6	5	11	7	8
Other	6	13	12	9	20	13	17	7	13	9
Untyped	14	3	14	5	8	7	1	1	3	2
Total	**33**	**46**	**40**	**37**	**54**	**53**	**63**	**53**	**47**	**30**

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 2014 there were 23 cases of clostridium perfringens reported in NI (Table 13).

Table 13. No of laboratory reports of Clostridium perfringens

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
22	29	20	36	18	36	16	28	24	23

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 2014 there were four cases of listeria reported in NI (Table 14).

Table 14. No of laboratory reports of *Listeria*

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
3	6	5	11	4	2	3	7	2	4

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. In 2014 there were 272 laboratory reports of Norovirus reported in NI (Table 15).

Table 15. No of laboratory reports of norovirus

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
209	385	439	439	424	643	445	592	386	272

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). In 2014 there were 209 cases of rotavirus in NI, a substantial reduction from 599 cases in 2013.

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; however, as only one year of data is currently available surveillance systems will continue to monitor and assess the impact the vaccine has had both in terms of laboratory reports but also attendance at hospital. 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.

Table 16. No of laboratory reports of rotavirus, 2005 - 2014

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
438	432	363	724	594	599	630	543	599	209

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).

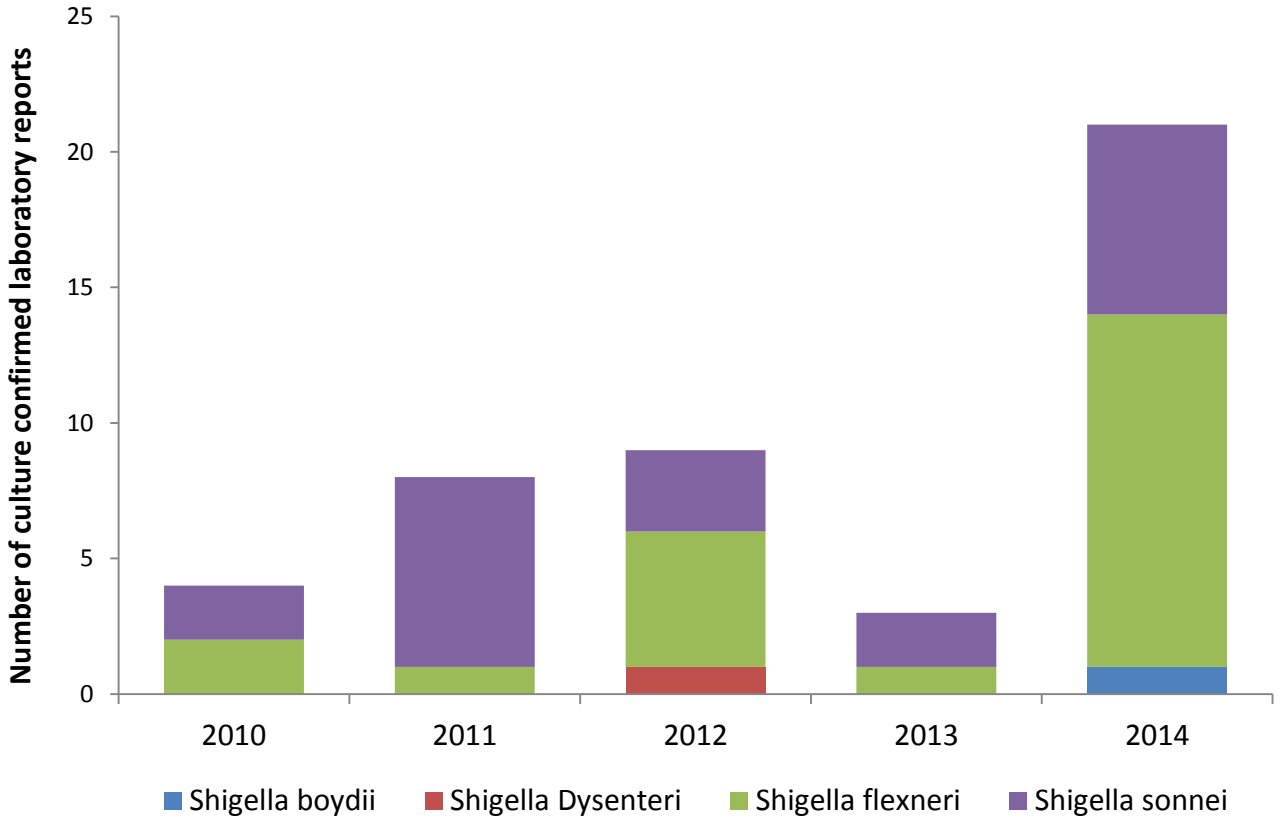
During 2014 there was a large increase in the number of cases compared to recent years. Much of this increase was related to cases of *Shigella flexneri*. This rise was investigated and would appear to be related, at least partially, to sexual transmission between men who have sex with men (MSM).This is line with similar trends in England where there have been a number of outbreaks of sexually transmitted *Shigella flexneri* in recent years. As a result targeted control measures were undertaken with relevant stakeholders. However, it should be noted that although there has been a large increase in relative terms the numbers of cases still remain small in comparison to other gastrointestinal illnesses.

Further details on the rise of *Shigella flexneri* in 2014 can be found in the December 2014 Transmit article:
http://www.publichealth.hscni.net/publications/transmit-health-protection-service-bulletin

Table 17. No of laboratory reports of Shigellosis, 2005 - 2014									
2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
7	9	16	16	13	5	8	9	4	21

Table 18. No of laboratory reports of Shigellosis by serogroup, 2010 - 2014					
Serogroup	**2010**	**2011**	**2012**	**2013**	**2014**
S. boydii	0	0	0	0	1
S. dysenteriae	0	0	1	0	0
S. flexneri	3	1	5	1	13
S. sonnei	2	7	3	2	7
Untyped	0	0	0	1	0

Fig 17: Culture confirmed laboratory reports of *Shigella sp* 2010 - 2014



Gastrointestinal Outbreaks

A total of 122 gastrointestinal outbreaks were reported in 2014 with the suspected mode of transmission for these outbreaks being either person-to-person spread or unknown in all but one case. There was a single outbreak suspected as food poisoning.

The number of gastrointestinal outbreaks reported decreased again in 2014 with a reduction from 172 outbreaks in 2013.

Similar to previous years the most commonly identified causative agent of the gastrointestinal outbreaks was norovirus, which accounted for 31 (25%) outbreaks, which represents a substantial reduction in the rate of detection compared to 2013 where 41% were identified as norovirus. Only two other outbreaks had an organism identified, one rotavirus and the other a suspected food related outbreak due to Clostridium perfringens.

The causative organism was not determined in 89 of the gastrointestinal outbreaks.

During 2014 there were a total of 17 hospital outbreaks affecting at least 102 people; 97 residential institution outbreaks affecting at least 1,372 people; and a further 8 outbreaks linked to other sites (e.g. nursery, conference facilities) affecting at least 13 people (Table 19).

Table 19: Total distribution and location of gastrointestinal outbreaks 2014 (based on date of report to PHA)

Location	Identified Organism(s)*	No of outbreaks	Number ill**
Hospital	Norovirus	8	50
	Not identified	9	52
Residential institution	Norovirus	21	403
	Rotavirus	1	13
	Not identified	75	956
Other	*Clostridium perfringens*	1	9
	Norovirus	2	4
	Not identified	5	Not known

* Note that Clostridium difficile is no longer included in the gastrointestinal outbreak report and is reported separately as part of the Healthcare Associated Infections report

** 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

Overall laboratory reports and notifications of gastrointestinal disease decreased in 2014 compared to 2013, with the exception of *Campylobacter* (4% increase), Giardia (2% increase), *Listeria* (100% increase but numbers were still low at 4 cases in 2014) and *Shigella.*

Campylobacter has been steadily increasing since 2008 in line with other areas within the United Kingdom and at present the reason for this continuing increase has not been determined. However, the increase in 2014 may be at least partially due to changes in testing in one of the Northern Ireland laboratories.

Cryptosporidium reports decreased again in 2014, and are now more in line with the average over the preceding 10 years. *E. coli O157* cases also decreased for a second year to 54 cases with a reduction of 25% overall, and the number of cases are now more in line with those seen before 2012. Reports of giardiasis were virtually unchanged with 48 cases reported compared to 47 in 2013 (2% increase).

Salmonella decreased substantially in 2014 with a 28% reduction compared to 2013. Similar to previous years a large proportion (43%) of reported case 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 significantly, rising from 4 reports in 2013 to 21 in 2014. The majority of this rise was due to an increase in *Shigella flexneri* which would traditionally have been associated with foreign travel. However, after investigation it would appear that at least some of the increase in flexneri cases may be due to sexual transmission. In light of the changing epidemiology surveillance of this organism has increased; however, it should be borne in mind that numbers still remain very small compared to other gastrointestinal diseases.

Outbreak activity reduced with only 122 being reported. This compares to 172 in 2013 and 248 in 2012. 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.

Rotavirus data for 2014 has shown a substantial decrease compared to the previous year. The introduction of a vaccine in July of 2013 is the likely cause of this reduction; however, other countries, including the Republic of Ireland, which did not institute a vaccine programme also witnessed a reduction in 2014. Work is continuing to analyse the effectiveness of the vaccine but early indications in 2015 are that levels of rotavirus continue to remain much lower than the pre-vaccine years.

Appendix 1

Introduction of PCR testing in Northern Ireland

During 2014, polymerase chain reaction testing (PCR) was introduced for certain gastrointestinal bacterial infections for the first time in Northern in one Northern Ireland health service laboratory, with other laboratories introducing the service in 2015.

PCR testing is both faster and more sensitive than the current method of culturing specimens. It was introduced for the main gastrointestinal bacterial organisms initially – *Salmonella*, *E. coli* (VTEC), *Shigella* and *Campylobacter*. Currently it is 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. 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.

It has the disadvantage that it can detect genetic material from dead organisms or from living organisms that are present in such small numbers that they may not be clinically relevant. It can also present challenges in terms of surveillance as any change in testing may impact on the numbers of laboratory reports.

Data for *Campylobacter* and *Salmonella* were compared by laboratory to investigate if the percentage change in laboratory reports in 2014 differed based on whether PCR testing was used; data for both Shigella and E coli O157 was atypical and not considered suitable for comparison. For Salmonella the proportional decrease in 2014 for the laboratory using PCR methods was similar to other laboratories in Northern Ireland; however, for campylobacter there was a significant rise in laboratory reports compared to other labs. In the case of campylobacter only some of the specimens are followed up by culture, with the majority identified by PCR only. However for salmonella, all specimens are sent for culture, with cases only considered to be confirmed for surveillance purposes if a positive culture is obtained. This would tend to suggest that in those organisms where confirmation by culture is still undertaken, the surveillance data should be directly comparable to previous years, but for those that may only be identified by PCR an increase due to the change in testing methods would be expected.

This new form of testing for gastrointestinal disease is a useful aid to clinical decisions and public health actions. It does, however, present challenges to the interpretation of the surveillance of these diseases especially as it is not currently available in all the Northern Ireland laboratories. Additional work will need to be done to investigate the impact of this revised testing.

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