SURVEILLANCE OF INFECTIOUS INTESTINAL (IID), ZOONOTIC AND VECTORBORNE DISEASE, AND OUTBREAKS of INFECTIOUS DISEASE IN IRELAND

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

A quarterly report by the Health Protection Surveillance Centre in collaboration with the Departments of Public Health

Quarter 3–2017 **December 2017**

This is the third quarterly report for 2017 produced by the Gastroenteric Unit of the Health Protection Surveillance Centre.

The production of this quarterly report would not be possible without the valuable input and commitment from the Directors of Public Health, Specialists in Public Health Medicine, Surveillance Scientists, Clinical Microbiologists, General Practitioners, Hospital Clinicians, Infection Control, Environmental Health and laboratory personnel, and other professionals who provide the data for the HPSC's surveillance systems.

Note: Data are collected and analysed using the Computerised Infectious Disease Reporting (CIDR) system. The data in this report are provisional and will not be regarded as final until all returns are received and data have been validated.

OUTBREAK SURVEILLANCE

Table 1. General outbreaks of infectious intestinal disease (IID) in Q3, 2017

Month	HSE area	Location	No. ill *	No. Hosp.	Date Onset	Suspect mode of transmission	Disease
Jul	NW	Comm. Hosp/Long-stay unit	3	-	02/07/2017	Not Specified	AIG
Jul	S	Comm. Hosp/Long-stay unit	26	-	01/07/2017	P-P	AIG
Jul	S	Comm. Hosp/Long-stay unit	9	0	27/06/2017	P-P	AIG
Jul	W	Unknown	30	-	03/07/2017	Unknown	AIG
Jul	S	Childcare facility	3		30/06/2017	P-P	Rotavirus infection
Jul	W	Hospital	2	2	-	P-P	Clostridium difficile infection
Jul	S	Residential institution	12	0	22/07/2017	P-P	AIG
Aug	W	Childcare facility	2	0	01/07/2017	P-P	VTEC
Aug	S	Community outbreak	5	1	02/07/2017	P-P & WB	VTEC
Aug	W	Nursing home	13	0	30/07/2017	P-P	AIG
Aug	NW	Comm. Hosp/Long-stay unit	5	0	04/08/2017	P-P	AIG
Aug	S	Hospital	3	-	31/07/2017	Not Specified	Clostridium difficile infection
Aug	E	Nursing home	11	0	04/08/2017	P-P & AB	Noroviral infection
Aug	M	Community outbreak	4	-	27/07/2017	Unknown	Rotavirus infection
Aug	E	Private house	2	2	06/07/2017	P-P	Hepatitis A (acute)
Aug	SE	Nursing home	20	-	16/08/2017	P-P	AIG
Aug	NE	Hospital	5	-	13/08/2017	P-P	AIG
Aug	NE	Nursing home	6	0	18/08/2017	P-P & AB	AIG
Aug	NW	Residential institution	3	0	13/08/2017	P-P	AIG
Aug	W	Hospital	11	10	-	P-P	Noroviral infection
Sep	M	Hotel	20	0	28/08/2017	Unknown	AIG
Sep	W	Nursing home	7	0	-	P-P	AIG
Sep	M	Nursing home	4	0	-	Unknown	AIG
Sep	W	Other	40		02/09/2017	Unknown	AIG
Sep	W	Hospital	13	10		P-P	Noroviral infection
Sep	E	Hospital	3	-	23/08/2017	P-P	Clostridium difficile infection
Sep	S	Restaurant / Cafe	5	-	03/09/2017	FB	AIG
Sep	MW	Other	2	-	01/09/2017	P-P	VTEC
Sep	E	Childcare facility		-	23/08/2017	P-P	VTEC
Sep	E	Childcare facility	44	0	31/08/2017	Unknown	VTEC
Sep	S	Comm. Hosp/Long-stay unit	5	0	11/09/2017	Not Specified	AIG
Sep	S	Comm. Hosp/Long-stay unit	8	-	-	Not Specified	AIG
Sep	HPSC	Travel related	11	-	28/08/2017	Unknown	Cryptosporidiosis
Sep	SE	Nursing home	10	-	14/09/2017	P-P	Noroviral infection
Sep	E	Hospital	3	3	15/09/2017	P-P	Noroviral infection
Sep	NW	Residential institution	3	-	27/09/2017	Not Specified	AIG
Sep	S	Restaurant / Cafe	22	-	18/09/2017	Unknown	AIG

P-P denotes Person-to-Person transmission, FB denotes foodborne, WB denotes waterborne; AB denotes airborne; AIG denotes Acute Infectious Gastroenteritis (unspecified); VTEC denotes infection with Verotoxigenic *E. coli;* NK=unknown

* Total numbers ill does not include asymptomatic cases

Table 2. Family outbreaks of infectious intestinal disease (IID) in Q3, 2017

Month	HSE area	Location	No. ill *	No. Hosp.	Date Onset	Suspect mode of transmission	Disease
Jul	M	Private house	2	0	25/06/2017	Unknown	VTEC
Jul	W	Private house	2	1	-	P-P	Rotavirus infection
Jul	E	Private house	3	0	19/06/2017	Unknown	VTEC
Jul	M	Private house	1	1	02/07/2017	Unknown	VTEC
Jul	W	Private house	1	-	22/06/2017	P-P & Animal	VTEC
Jul	M	Private house	0	0	-	Unknown	VTEC
Jul	NW	Private house	1	0	14/06/2017	Unknown	VTEC
Jul	S	Private house	3	-	-	P-P	Rotavirus infection
Jul	M	Private house	1	0	14/06/2017	Unknown	VTEC
Jul	S	Private house	2	0	09/06/2017	P-P	VTEC
Jul	W	Private house	2	-	20/06/2017	P-P	VTEC
Jul	S	Extended family	30	0	07/07/2017	Unknown	Shigellosis
Jul	E	Restaurant / Cafe	8	0	15/07/2017	Unknown	AIG
Jul	M	Private house	1	-	11/07/2017	Unknown	VTEC
Jul	M	Private house	2	-	05/07/2017	Unknown	VTEC
Jul	E	Private house	2	2	25/06/2017	Unknown	Salmonellosis
Jul	M	Private house	1	1	22/07/2017	Unknown	VTEC
Jul	W	Extended family	2	0	28/06/2017	P-P	Cryptosporidiosis
Aug	W	Private house	2	1	-	Unknown	Rotavirus infection
Aug	E	Travel related	2	-	05/07/2017	Unknown	Salmonellosis
Aug	W	Private house	1	0	10/06/2017	WB	VTEC
Aug	S	Private house	2	-	27/07/2017	P-P & Animal	VTEC
Aug	E	Private house	3	-	08/07/2017	Unknown	Typhoid
Aug	MW	Private house	2	-	20/03/2017	P-P	VTEC
Aug	MW	Private house	1	0	20/07/2017	P-P	VTEC
Aug	M	Private house	1	1	05/08/2017	Unknown	VTEC
Aug	NE	Private house	1	-	22/07/2017	Environmental / Fomite	VTEC
Aug	M	Private house	1	0	18/07/2017	Unknown	VTEC
Aug	SE	Private house	1	0	08/08/2017	Unknown	VTEC
Aug	M	Private house	1	1	22/08/2017	Not Specified	VTEC
Aug	M	Private house	1	1	21/08/2017	Not Specified	VTEC
Aug	M	Private house	-	-	21/08/2017	Not Specified	VTEC
Aug	SE	Private house	4	0	15/08/2017	P-P	Campylobacter infection
Aug	S	Private house	2		31/07/2017	P-P	VTEC
Aug	MW	Private house	1	0	16/08/2017	P-P	VTEC
Aug	MW	Private house	2	2	09/08/2017	P-P	Salmonellosis
Aug	S	Private house	2		15/08/2017	P-P & Animal	VTEC
Aug	MW	Hotel	2	1	17/06/2017	P-P	Salmonellosis
Sep	MW	Private house	1	1	15/08/2017	P-P	VTEC
Sep	M	Private house	1	-	31/08/2017	Unknown	VTEC
Sep	NW	Private house	5	-	23/08/2017	WB	Campylobacter infection
Sep	M	Private house	2	0	16/08/2017	FB	Salmonellosis
Sep	M	Private house	1	0	05/09/2017	Unknown	VTEC
Sep	MW	Private house	2	0	03/08/2017	P-P	VTEC
Sep	SE	Private house	3	0	28/08/2017	Unknown	VTEC
Sep	W	Private house	2	-	14/07/2017	Unknown	Giardiasis

Sep	NE	Private house	1	-	29/07/2017	P-P & WB	VTEC
Sep	M	Private house	1	1	11/09/2017	Unknown	VTEC
Sep	M	Private house	3	-	21/08/2017	Unknown	VTEC
Sep	S	Not Specified	2	-	24/08/2017	Not Specified	VTEC
Sep	M	Private house	1	1	10/09/2017	Unknown	VTEC
Sep	S	Private house	2	0	-	FB & WB	Giardiasis
Sep	M	Private house	2	1	12/09/2017	Unknown	VTEC
Sep	MW	Private house	2	-	07/09/2017	P-P	VTEC
Sep	M	Private house	1	0	15/09/2017	Unknown	VTEC
Sep	M	Not Specified	1	0	-	Unknown	VTEC
Sep	M	Private house	1	0	19/09/2017	Unknown	VTEC
Sep	S	Private house	1	-	12/09/2017	P-P	VTEC
Sep	M	Private house	1	1	-	Unknown	VTEC
Sep	M	Private house	2	1	21/09/2017	Unknown	VTEC
Sep	NW	Private house	3	2	12/09/2017	Unknown	VTEC
Sep	S	Private house	2	0	25/08/2017	P-P	VTEC
Sep	W	Private house	3	-	13/09/2017	Unknown	VTEC
Sep	M	Private house	-	-	24/09/2017	Not Specified	VTEC

P-P denotes Person-to-Person transmission, FB denotes foodborne, WB denotes waterborne; AB denotes airborne; AIG denotes Acute Infectious Gastroenteritis; VTEC denotes infection with Verotoxigenic *E. coli* NK denotes unknown

* Total numbers ill does not include asymptomatic cases

Table 3. Non-IID outbreaks in Q3, 2017

Month	HSE area	Type of outbreak	Location	No. ill *	No. Hosp.	Date Onset	Suspect mode of transmission	Organism
Jul	E	Family	Private house	3	0	13/06/2017	P-P	Pertussis
Jul	S	Family	Private house	2	-	-	P-P	Viral meningitis
Jul	SE	General	Hospital	14	-	-	P-P	Suspected scabies
Jul	S	General	Residential institution	7	0	-	P-P	Respiratory illness
Jul	E	General	Hotel	30	-	08/07/2017	P-P	Acute respiratory infection
Aug	E	Family	Private house	2	0	15/05/2017	P-P	Pertussis
Aug	E	General	Childcare facility	30	-	01/07/2017	P-P & AB	Varicella Zoster
Aug	S	General	Nursing home	15	0	25/07/2017	P-P & AB	Influenza
Aug	E	General	Hospital	2 pts colonised	2	-	Other	CPE
Aug	E	Family	Private house	2	0	20/06/2017	P-P & AB	Pertussis
Aug	E	General	Hospital	3 pts colonised	3	30/06/2017	P-P	CPE
Aug	SE	Family	Private house	3	0	16/07/2017	P-P	Pertussis
Aug	SE	Family	Private house	2	0	01/04/2017	P-P & AB	Pertussis
Aug	SE	General	Hospital	2 pts colonised	2	-	Unknown	CPE
Aug	M	General	Community outbreak	5	-	10/05/2017	P-P	Pertussis
Sep	E	General	Nursing home	3	0	26/08/2017	P-P	Varicella Zoster
Sep	S	General	Comm. Hosp/Long-stay unit	9	1	07/09/2017	Not Specified	Acute respiratory infection
Sep	MW	Family	Private house	3	1	26/07/2017	P-P	Pertussis
Sep	NE	Family	Private house	2		24/08/2017	P-P & AB	Tuberculosis
Sep	NE	General	Community outbreak	2	-	-	P-P	Tuberculosis
Sep	E	General	Hospital	5 pts colonised	5	29/08/2017	Unknown	Pseudomonas Aeuroginosa
Sep	E	General	Hospital	8	-	-	P-P & AB	RSV

P-P denotes Person-to-Person transmission, WB denotes waterborne; AB denotes airborne; NK denotes unknown; CPE denotes Carbapenemresistant Enterobacteriaceae; Pts denotes patients; RSV denotes Respiratory syncytial virus.
* Total numbers ill does not include asymptomatic cases.

Since July 2001, outbreaks have been reported to HPSC. Preliminary information is provided by a public health professional when the outbreak is first notified. Further information is provided by the lead investigator once more complete data are available. The data requested includes information on the source of reporting of the outbreak, the extent of the outbreak, mode of transmission, location, pathogen involved, laboratory investigation, morbidity and mortality data, suspect vehicle and factors contributing to the outbreak. The data provided are crucial in providing information on the reasons why the outbreak occurred, the factors that lead to the spread of disease and the lessons that can be learnt to prevent further such outbreaks.

Since the 1st January 2004, with the amendment to the Infectious Diseases Regulations (2003), there is a statutory requirement for medical practitioners and clinical directors of a diagnostic laboratory to notify to the medical officer of health 'any unusual clusters or changing patterns of any illness, and individual cases thereof, that may be of public health concern'.

Tables 1 and 2 present a line listing of all general and family outbreaks of IID reported to HPSC in the third quarter of 2017. There were 37 general and 64 family IID outbreaks reported during this period, resulting in at least 517 people being ill.

Acute infectious gastroenteritis (n=20) was responsible for the most general outbreaks of IID (54%), followed by Norovirus (n=5) and VTEC (n=5). All three general VTEC outbreaks this quarter occurred in childcare facilities.

The most common cause of family outbreaks of IID was VTEC (n=48) [75%]. Other pathogens responsible for family outbreaks in Q3 2017 were AIG, campylobacteriosis, cryptosporidiosis, giardiasis, rotavirus, salmonellosis shigellosis and typyhoid. (Table 2).

Twenty-two general IID outbreaks were transmitted person-to-person/person-to-person & airborne (59%). Twenty-three general IID outbreaks (62%) were reported to have occurred in healthcare settings, i.e. hospitals or residential institutions, during this period.

There were twenty-two non-IID outbreaks reported during Q3 2017 (Table 3). The most common causes of non IID outbreaks was during this period were influenza, acute respiratory infection and pertussis, with six outbreaks of each reported.

Table 4 outlines the outbreak rate per HSE-area for outbreaks notified during Q3 2017.

Table 4. Number of infectious disease outbreaks by HSE Area, Q3 2017

HSE Area	No. of outbreaks	Rate per 100,000 population
E	21	1.2
M	29	10.0
MW	10	2.7
NE	6	1.3
NW	7	3.0
SE	9	1.8
S	24	3.5
W	16	3.5
Total	**122**	**2.6**

NOTIFICATIONS OF INFECTIOUS INTESTINAL, ZOONOTIC AND VECTORBORNE DISEASE

The number of notifications of infectious intestinal, zoonotic and vectorborne disease by HSE-Area for the third quarter of 2017 is shown in Table 5.

Table 5. Infectious intestinal, zoonotic and vectorborne disease notifications Q3, 2017 by HSE-Area

Infectious Intestinal Disease	E	M	MW	NE	NW	SE	S	W	Total
Bacillus cereus foodborne infection/intoxication	0	0	0	0	0	0	0	0	**0**
Botulism	0	0	0	0	0	0	0	0	**0**
Campylobacter infection	338	34	52	56	30	99	109	81	**799**
Cholera	0	0	0	0	0	0	0	0	**0**
Clostridium perfringens (type A) food-borne disease	0	0	0	0	0	0	0	0	**0**
Cryptosporidiosis	20	5	9	12	7	15	20	20	**108**
Giardiasis	24	2	2	1	0	17	14	10	**70**
Listeriosis	~	~	~	~	~	~	~	~	**2**
Noroviral infection [a1]	93	4	11	14	1	3	17	16	**159**
Paratyphoid	~	~	~	~	~	~	~	~	**2**
Rotavirus infection[b1]	77	26	6	14	12	11	63	35	**244**
Salmonellosis	43	15	16	14	7	13	18	13	**139**
Shigellosis	21	0	0	2	0	5	6	4	**38**
Staphylococcal food poisoning	0	0	0	0	0	0	0	0	**0**
Typhoid	~	~	~	~	~	~	~	~	**6**
Verotoxigenic *Escherichia coli* infection	81	39	61	23	10	37	59	43	**353**
Yersiniosis	0	0	0	0	0	0	0	0	**0**
Zoonotic Disease									
Anthrax	0	0	0	0	0	0	0	0	**0**
Brucellosis	0	0	0	0	0	0	0	0	**0**
Echinococcosis	0	0	0	0	0	0	0	0	**0**
Leptospirosis	2	0	1	0	0	1	4	1	**9**
Plague	0	0	0	0	0	0	0	0	**0**
Q Fever	0	0	0	0	0	0	1	1	**2**
Rabies	0	0	0	0	0	0	0	0	**0**
Toxoplasmosis	5	1	0	0	0	0	1	1	**8**
Trichinosis	0	0	0	0	0	0	0	0	**0**
Vectorborne Disease									
Chikungunya disease	0	0	0	0	0	0	0	0	**0**
Dengue	1	0	0	0	0	2	1	0	**4**
Lyme disease (neuroborreliosis)	0	0	0	1	0	1	0	2	**4**
Malaria	12	5	1	5	1	1	4	0	**29**
Typhus	0	0	0	0	0	0	0	0	**0**
West Nile fever	0	0	0	0	0	0	0	0	**0**
Zika Virus Infection	~	~	~	~	~	~	~	~	**1**

[1] Since March 2013, norovirus and rotavirus notifications from HSE-East are based on laboratory testing results rather than patient episodes. Notifications from HSE-E may also refer to area of laboratory testing rather than area of patient residence.

Human salmonellosis (*S. enterica*) is a notifiable disease. The National *Salmonella*, *Shigella* and *Listeria* Reference Laboratory (NSSLRL) in Ireland was established in 2000 in the Dept. of Medical Microbiology, University College Hospital, Galway. This laboratory accepts *S. enterica* isolates from all clinical and food laboratories in Ireland for serotyping, phage typing and antimicrobial sensitivity testing. Table 6 shows the number of salmonellosis notifications by HSE-Area and month for the third quarter of 2017. Comparison of trends with previous years is shown in Figure 1.

Table 6. Salmonellosis notifications by HSE-Area and month, Q3 2017

Month	E	M	MW	NE	NW	SE	S	W	Total
Jul	14	4	6	4	2	4	6	3	**43**
Aug	22	7	8	6	5	3	6	5	**62**
Sep	7	4	2	4		6	6	5	**34**
Total	**43**	**15**	**16**	**14**	**7**	**13**	**18**	**13**	**139**

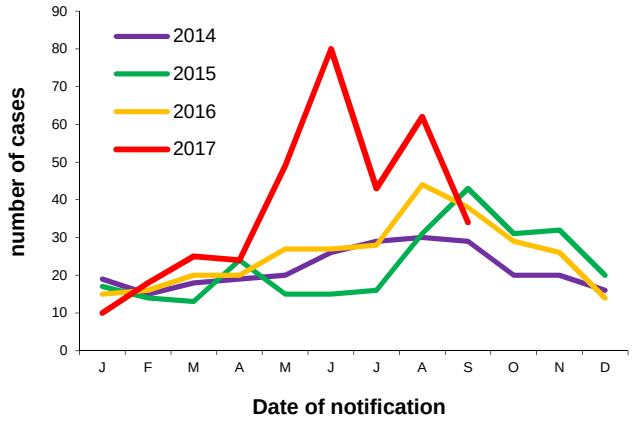

Figure 1. Seasonal distribution of human salmonellosis notifications, 2014 to end Q3 2017

Table 7 shows the serotypes for the *Salmonella* isolates typed by the NSSLRL in the third quarter of 2017 by HSE area (n=142). The commonest human serotypes reported this quarter were *S.* Typhimurium[†] (n=44, 31%) and *S.* Enteritidis (n=36).

Table 8 shows the serotype distribution of confirmed *Salmonella* notifications by travel status this quarter among salmonellosis notifications on CIDR. 52% (n=72) were travel-associated, 26% (n=36) were indigenous and for 31 cases, the country of infection was unknown/not specified.

Outbreaks of salmonellosis

There were five family outbreak sof salmonellosis notified in Q3 2017, one of which was part of a larger general outbreak in a hotel in a Spanish holiday resort. (Tables 1 &2).

Table 7. Serotypes of human *S. enterica* isolates referred to NSSLRL Q3 2017

Serotype	E	M	MW	NE	NW	SE	S	W	Total
4,[5],12:i:-	11	5	5	2	1	3	4	2	33
Agama	0	0	0	0	1	0	0	0	1
Agona	2	0	0	1	1	0	1	1	6
Bareilly	0	0	2	0	0	0	0	0	2
Bovismorbificans	0	0	0	1	0	0	0	0	1
Bredeney	0	0	0	0	0	0	1	0	1
Coeln	0	1	0	0	0	0	0	0	1
Diguel	1	0	0	0	0	0	0	0	1
Dublin	0	0	0	0	0	0	0	1	1
Durban	1	0	0	0	0	0	0	0	1
Enteritidis	7	3	4	4	2	5	4	7	36
Give	0	0	0	0	0	1	0	0	1
Infantis	0	2	0	1	0	1	0	0	4
Javiana	2	0	0	0	0	0	0	0	2
Kentucky	1	0	0	0	0	1	1	0	3
Lehrte	0	1	0	0	0	0	0	0	1
Mbandaka	1	0	0	0	0	0	0	0	1
Muenchen	1	0	0	0	0	0	1	0	2
Napoli	0	0	0	0	0	0	1	0	1
Newport	5	0	1	0	0	0	0	0	6
Paratyphi A	1	0	0	0	0	0	1	0	2
Sandiego	0	0	0	1	0	0	0	0	1
Stanley	0	0	0	1	1	1	0	0	3
Typhi	4	0	1	0	0	0	1	1	7
Typhimurium	3	2	1	1	0	1	2	1	11
Umbilo	0	0	0	0	1	0	0	1	2
Unnamed	1	1	2	1	0	0	0	0	5
Virchow	0	0	2	0	0	0	0	0	2
Virginia	1	0	0	0	0	0	0	0	1
Weltevreden	1	1	0	0	0	0	0	0	2
Yaba	1	0	0	0	0	0	0	0	1
Total	**44**	**16**	**18**	**13**	**7**	**13**	**17**	**14**	**142**

Data Source: NSSLRL

Table 8. Confirmed *Salmonella* notifications by serotype and travel status, Q3 2017 [n(%)]

Serotype	Indigenous	Travel-associated	Unk/not specified	Total
***S.* Enteritidis**	3 (9%)	27 (37%)	9 (29%)	**39 (28%)**
S.* Typhimurium	16 (44%)	20 (28%)	8 (25%)	**44 (32%)**
Other	16 (44%)	23 (32%)	13 (41%)	**51 (37%)**
***Salmonella* spp**	1 (3%)	2 (3%)	2 (5%)	**5 (3%)**
Total	**36 (100%)**	**72 (100%)**	**31 (100%)**	**139 (100%)**

[†]includes 33 cases of monophasic *S.*Typhimurium 4,5,12:i:-

Note: Data source CIDR. Travel status is inferred from *Country of Infection* variable on CIDR. Note excludes probable notifications
* Includes monophasic S.Typhimurium 4,5,12:i:-

S. Typhi and S. Paratyphi

There were six cases of typhoid reported to CIDR in Q3 2017. Three were associated with travel to the Indian Sub-Continent and the country of infection is unknown for the three remaining cases.

There were two cases of paratyphoid reported this quarter, both of which were associated with travel to the Indian Sub-Continent.

Outbreaks of S. Typhi and S. Paratyphi

There was one family outbreak of typhoid notified in Q3 2017.

VEROTOXIGENIC *E. COLI* (VTEC)

Verotoxigenic *E. coli* (VTEC) became a notifiable disease on January 1st 2012. Previously, VTEC were notified under the category of Enterohaemorrhagic *E. coli* between 2004 and 2011.

Three hundred and fifty-three cases of VTEC were notified this quarter, the regional distribution of which is shown in Table 9. This compares with 318 VTEC cases notified in Q3 2016 and 260 in Q3 2015 (figure 2).

Table 9 shows the number of VTEC cases reported by case classification and HSE-area and Table 10 shows the number of VTEC cases by serogroup and month, Q3 2017.

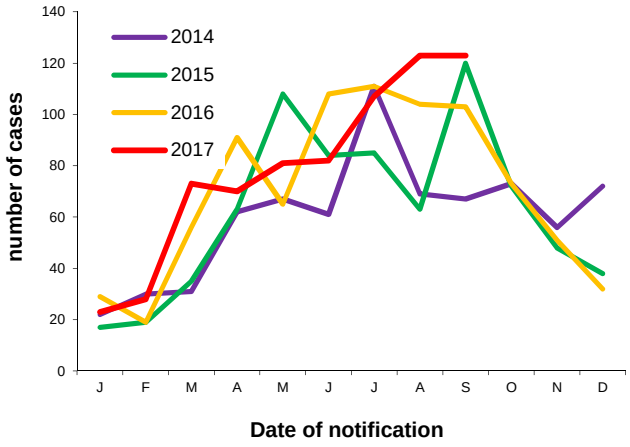

Figure 2. Seasonal distribution of VTEC cases notified 2014 to end Q3 2017

The HSE-DML Public Health Laboratory at Cherry Orchard Hospital, Dublin provides a national *E. coli* O157 and non-O157 diagnostic service for clinical samples, including *E. coli* serotyping, verotoxin detection and VTEC molecular typing. Table 11 shows the *vt* types of VTEC cases notified in Q3 2017.

Table 9. Number VTEC notified by case classification and HSE-area, Q3 2017

Case classification	E	M	MW	NE	NW	SE	S	W	Total
Confirmed	79	29	54	21	9	35	56	42	325
Probable	2	10	7	1	1	1	3	1	26
Possible	0	0	0	1	0	1	0	0	2
Total	81	39	61	23	10	37	59	43	353

Table 10. VTEC notified by serogroup and month, Q3 2017

Month	O157	O26	Other	Total
Jul	14	37	56	**107**
Aug	19	34	70	**123**
Sep	34	18	71	**123**
Total	**67**	**89**	**197**	**353**

Twelve VTEC cases notified this quarter were reported as having developed HUS – five O26, one O111, one O145, one O157 and an ungroupable strain.

Table 11. Verotoxin typing profiles of *E. coli* referred to the HSE DML Public Health Laboratory, Cherry Orchard Hospital in Q3 2017

Serogroup	*vt1*	*vt2*	*vt1+vt2*	Not spec.	Total
O157	0	44	21	2	**67**
O26	29	6	49	5	**89**
Other	47	76	38	36	**197**
Total	**76**	**126**	**108**	**43**	**353**

Data Source: PHL Cherry Orchard

Outbreaks of VTEC infection

During this quarter, five general and forty-eight family outbreaks of VTEC infection were reported (Tables 1 & 2).

CAMPYLOBACTER

Human campylobacteriosis became a notifiable disease on January 1st 2004. Prior to this, human campylobacter infection was notified under the category of 'Food Poisoning (bacterial other than Salmonella)'. The notifications for the third quarter of 2017 are shown in Table 12. There were 799 cases of campylobacteriosis notified in Q3 2017 compared to 761 in the same period in 2016 and 766 in Q3 2015 (Figure 3).

From August 2017, campylobacter notifications from HSE-East are based on laboratory testing results rather than patient episodes. Notifications from HSE-E may also refer to area of laboratory testing rather than area of patient residence.

Table 12. *Campylobacter* notifications by HSE-Area and month, Q3 2017

Month	E	M	MW	NE	NW	SE	S	W	Total
Jul	64	6	15	19	8	35	44	27	**218**
Aug	184	12	21	20	10	38	39	32	**356**
Sep	90	16	16	17	12	26	26	22	**225**
Total	**338**	**34**	**52**	**56**	**30**	**99**	**109**	**81**	**799**

Outbreaks of *Campylobacter* infection

There were two family outbreaks of campylobacteriosis reported in Q3 2017 (Tables 1 and 2).

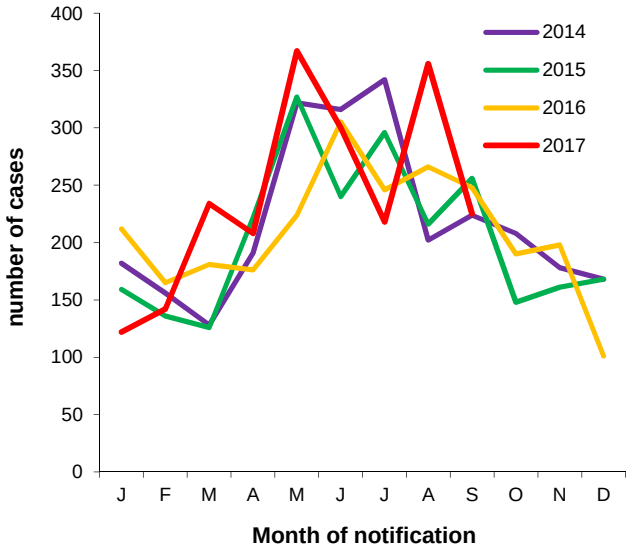

Figure 3. Seasonal distribution of *Campylobacter* notifications 2014 to end Q3 2017

CRYPTOSPORIDIUM

Human cryptosporidiosis became a notifiable disease on January 1st 2004. Prior to this, cryptosporidiosis was notifiable in Ireland only in young children under the category 'Gastroenteritis in Children Under 2'. In Q3 2017, 108 cases of cryptosporidiosis were notified (Table 13), compared to 73 in the same period in 2016 and 108 in Q3 2015 (Figure 4).

Table 13. Cryptosporidiosis notifications by HSE-Area and month, Q3 2017

Month	E	M	MW	NE	NW	SE	S	W	Total
Jul	5	4	4	4	1	4	8	11	**41**
Aug	2	1	2	3	1	3	5	4	**21**
Sep	13		3	5	5	8	7	5	**46**
Total	**20**	**5**	**9**	**12**	**7**	**15**	**20**	**20**	**108**

Outbreaks of cryptosporidiosis

There was one general and one family outbreaks of cryptosporidiosis reported in quarter 3 2017 – both were associated with foreign travel. (Tables 1 and 2).

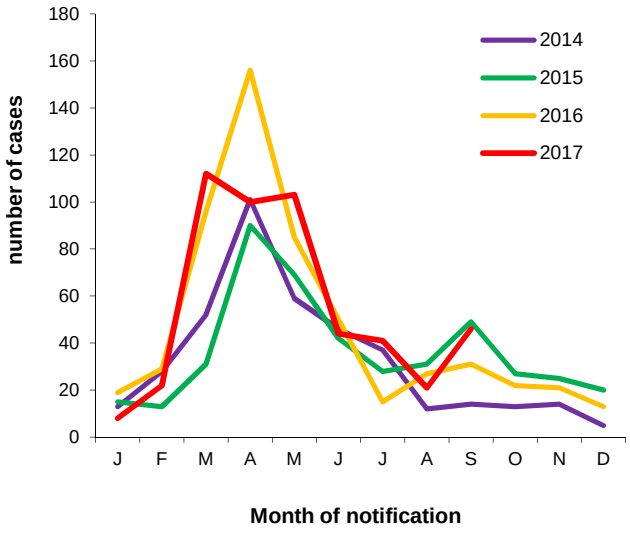

Figure 4. Seasonal distribution of cryptosporidiosis notifications 2014 to end Q3 2017

NOROVIRUS

Human noroviral infection became a notifiable disease on January 1st 2004. Since March 2013, norovirus notifications from HSE-East are based on laboratory testing results rather than patient episodes. Notifications from HSE-E may also refer to area of laboratory testing rather than area of patient residence.

There were 159 cases notified in the third quarter of 2017 (Table 14). These data are certainly an under-ascertainment of the true burden of disease due to this pathogen.

Table 14. Norovirus notifications by HSE-Area and month, Q3 2017

Month	E	M	MW	NE	NW	SE	S	W	Total
Jul	24	3	4	5	1	2	10	2	**51**
Aug	42	0	4	7	0	0	4	1	**58**
Sep	27	1	3	2	0	1	3	13	**50**
Total	**93**	**4**	**11**	**14**	**1**	**3**	**17**	**16**	**159**

Norovirus outbreaks

Norovirus or suspect viral aetiology is the commonest cause of outbreaks of acute gastroenteritis in Ireland. In the third quarter of 2017, there were fourteen outbreaks confirmed as being caused by this virus, involving at least 206 people becoming ill, as outlined in tables 1 & 2. The seasonal trend is outlined in figure 5.

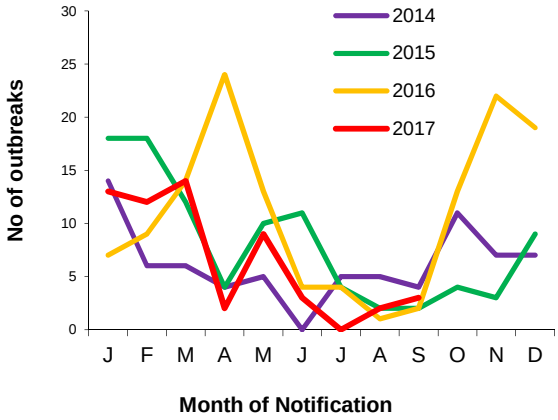

Figure 5. Seasonal distribution of confirmed norovirus outbreaks, 2014 to end Q3 2017

SHIGELLA

On January 1st 2004, infection with *Shigella* spp. became notifiable as 'Shigellosis'. Prior to this, it was notifiable as 'Bacillary Dysentery'.

During Q3 2017, thirty-eight cases of shigellosis were notified (Table 5). This compares with twenty-one cases notified in Q3 2016 and twenty-seven in Q3 2015.

Eleven cases were travel related and the country of infection was reported as Ireland for a futher seventeen cases. The country of infection was reported as unknown/not specified for the remaining ten cases.

Six notified cases for whom country of infection was reported as Ireland were associated with a foodborne outbreak.

Table 15: Species and serotype distribution of Q3 2017 human *Shigella* isolates referred to the NSSLRL.

Serotype	Number of isolates
Shigella boydii	1
Shigella dysenteriae	3
Shigella flexneri 2a	4
Shigella flexneri 3b	1
Shigella flexneri 6	1
Shigella sonnei	20
Shigella spp	1
Total	**31**

Data Source: NSSLRL

Outbreaks of shigellosis

There was one outbreak of shigellosis notified in Q3 2017 (Table 2).

GIARDIA

Human giardiasis became a notifiable disease on January 1st 2004. Prior to this, giardiasis was notifiable in Ireland only in young children under the category 'gastroenteritis in children under 2 years'.

During Quarter 3, 2017, seventy cases of giardiasis were notified (Table 5); this compares with 44 cases notified in Q3 2016 and 50 in Q3 2015.

Fourteen cases were reported to have acquired their illness abroad. Country of infection was reported as Ireland for sixteen cases and 'not specified' or 'unknown' for the remaining forty cases.

Outbreaks of giardiasis

There were two family outbreaks of giardiasis notified in Q3 2017. (Table 2).

LISTERIA

Human listeriosis became a notifiable disease on January 1st 2004. Prior to this, listeriosis was notified under the category of 'Food Poisoning (bacterial other than Salmonella)' or 'Bacterial Meningitis' as appropriate.

There were two (one adult and one neonatal) cases of listeriosis notified in Q3 2017, compared to four cases in quarter 3 2016 and two in quarter 3 2015.

Outbreaks of listeriosis

There were no outbreaks of listeriosis notified in Q3 2017. (Table 2).

Two isolates were referred for typing to NSSLRL this quarter (Table 16).

Table 16: Serotypes of Q3 2017 human *Listeria* isolates referred to the NSSLRL

Serotype	Number of isolates
1/2a	2

Data Source: NSSLRL

ROTAVIRUS INFECTION

Prior to 2004, rotavirus cases were notified under the "Gastroenteritis in children under two years" disease category. From 2004 to 2010, rotavirus was notifiable in all age groups under the "Acute Infectious Gastroenteritis" (AIG) disease category, until it became notifiable as a disease in its own right under the Infectious Diseases (Amendment) Regulations 2011 (S.I. No. 452 of 2011). From March 2013 to July 2017, rotavirus notifications from HSE-East are based on laboratory testing results rather than patient episodes. Notifications from HSE-E may also refer to area of laboratory testing rather than area of patient residence.

Rotavirus notifications for the third quarter of 2017 are shown in Table 17 and Figure 6.

Table 17. Rotavirus infection by HSE-Area and month, Q3 2017

Month	E	M	MW	NE	NW	SE	S	W	Total
Jul	35	11	3	7	7	3	49	21	**136**
Aug	25	15	3	4	4	2	11	8	**72**
Sep	17	0	0	3	1	6	3	6	**36**
Total	**77**	**26**	**6**	**14**	**12**	**11**	**63**	**35**	**244**

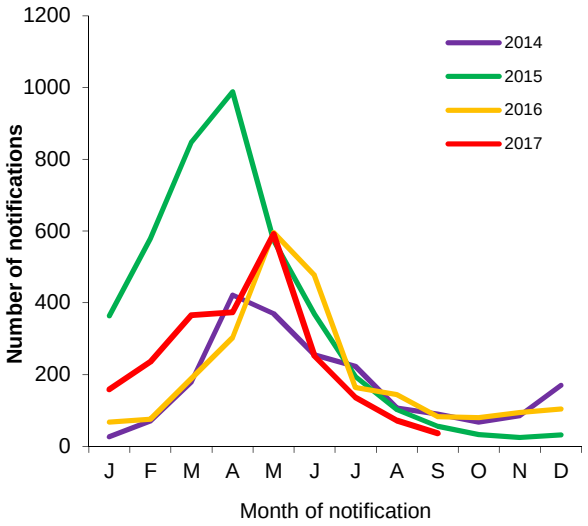

Figure 6. Seasonal distribution of rotavirus notifications, 2014 to end Q3 2017

Outbreaks of rotavirus

There were three family and two general outbreaks of rotavirus notified this quarter (Table 2).

FOODBORNE INTOXICATIONS

Bacillus cereus foodborne infection/intoxication, botulism, *Clostridium perfringens* (type A) food-borne disease and staphylococcal food poisoning became notifiable diseases on January 1st 2004. Prior to this, these diseases were notified under the category of 'Food Poisoning (bacterial other than Salmonella)'.

There were no cases of foodborne intoxication reported in Q3 2017.

NON-IID ZOONOTIC DISEASES

Non-IID zoonoses now notifiable include: anthrax, brucellosis, echinococcosis, leptospirosis, plague, Q fever, toxoplasmosis, trichinosis and rabies. The Q3 2017 notifications of these zoonotic diseases are reported by HSE-Area in Table 5.

Eigth cases of toxoplasmosis were notified in this quarter. This compares with eight cases notified in the same period in 2016 and five cases in Q3 2015.

There were nine cases of leptospirosis notified in Q3 2017. This compares with seven cases in Q3 2016 and seven cases in Q3 2015.

Four leptospirosis cases this quarter are believed to have acquired their infection occupationally, four are believed to have been exposed during recreational/leisure activitity and the source of infection for one case is not known.

There were two cases of Q Fever notified in Q3 2017.

There were no cases of brucellosis, echinococcosis or trichinosis notified this quarter.

MALARIA

Malaria has been a notifiable disease for many years. The Q3 2017 notifications are reported in Table 5 by HSE-Area.

Twenty-nine cases of malaria were notified in Q3 2017. This compares with forty-five cases reported in Q3 2016 and thirty in Q3 2015.

Twenty-six cases this quarter were reported as *P. falciparum* and one as *P. vivax*. There was no species identified for the remaining two cases.
Eight cases were exposed in Sub-Saharan Africa and one in the Indian Sub-Continent. Country of infection is unknown/not specified for the remaining twenty cases this quarter.

Nine cases cited 'visiting family in country of origin' as their reason for travel and one case reported business/professional travel. One case this quarter was identified in a new entrant to Ireland and one case was reported in a foreign visitor who became ill whilst in Ireland. Travel information was not specified/unknown for the remaining seventeen cases this quarter.

OTHER NOTIFIABLE VECTORBORNE DISEASES

Under Infectious Diseases (Amendment) Regulations 2011 (S.I. No. 452 of 2011) (Sept 2011), Chikungunya disease, Dengue, Lyme disease (neuroborreliosis) and West Nile fever were made notifiable.

Zika virus infection is a notifiable disease in Ireland under the Infectious Diseases (Amendment) Regulations 2016 (S.I. No. 276 of 2016).
The Q3 2017 notifications are reported in Table 5 by HSE-Area.

There were four cases of Lyme disease (neuroborreliosis) reported in Q3 2017.

There was one case of Zika virus infection this quarter, associated with travel to an affected area.

There were four cases of Dengue fever notified in Q3 2017. Country of infection was not specified for any of these cases.

There were no notifications of Chikungunya disease or West Nile fever this quarter.

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