3.6 Salmonella

Summary

Number of confirmed cases: 311
Number of probable cases: 0
Crude incidence rate: 6.8/100,000

Salmonellosis typically presents clinically as an acute enterocolitis, with sudden onset of, abdominal pain, diarrhoea, nausea, headache and occasionally vomiting. Fever is almost always present. Dehydration, especially amongst vulnerable populations such as infants, the immunocompromised and the elderly, may be severe. Invasive infection occurs in a proportion of cases. *S.* Typhi and *S.* Paratyphi can cause enteric fever, a severe systemic life threatening condition, but this is not common in Ireland and is almost invariably travel-associated.

Notification data (CIDR)

There were 311 cases of salmonellosis in reported in 2011, all of which were laboratory confirmed. The national crude incidence rate (CIR) for salmonellosis in 2011 was 6.8 per 100,000 population which was a slight decrease compared to 2010 (7.8/100,000) as shown in figure 1. Figure 2 illustrates the regional variation in CIR during 2011. The highest CIR occurred in HSE-MW (10.5/100,000), representing an increase of 3.2 per 100,000 population compared to 2010. This was the only region to experience an increase in the regional CIR during 2011. The lowest CIR occurred in HSE-S (4.1/100,000), which is a decrease compared to 6.0 per 100,000 population during 2010. The largest decrease in regional CIR during 2011 was observed in HSE-M, with a decrease of 8.1 per 100,000 population.

The female:male ratio for 2011 was 0.93:1.08. In terms of age distribution, 27.7% of cases occurred in children under five. This is likely to be, at least in part, a reflection of clinicians more readily seeking clinical samples in that age group. This is also reflected in the age specific incidence rate (ASIR) with the 0-4 age group having the highest ASIR nationally (28.1/100,000 in females and 19.8/100,000 in males) in both sexes (figure 3).

The seasonality of salmonellosis notifications in Ireland during 2011 is shown in figure 4, with the highest number of notifications occurring between June and

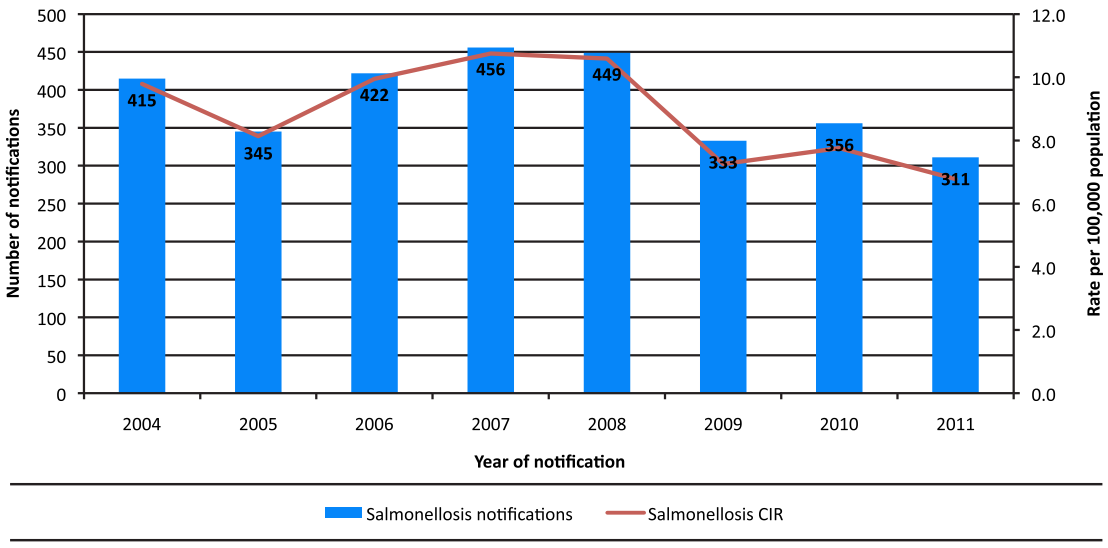

Figure 1: Salmonellosis notifications and crude incidence rate per 100,000 population by year of notification (CIDR)

October. During 2011, the peaks observed during July and August were largely due to travel associated salmonellosis notifications, which are anticipated seasonal increases that correlate with peak holiday periods and resultant increase of people travelling abroad. However, a peak in indigenous notifications was also observed during August due to a mixed strain outbreak of *S.* Newport and monophasic *S.* Typhimurium.

Of the 311 cases notified on CIDR during 2011, travel history was provided for 241 cases (77.5%). Of the 241 cases where travel history was reported, 124 (51.5%) of salmonellosis cases were indigenous to Ireland and 117 cases (48.5%) reported a recent history of travel. Where travel history was documented, the three countries with highest occurrence of recent travel and subsequent development of salmonellosis were; Spain (n=13), Turkey (n=13) and Thailand (n=12). When serotyping data were analysed by travel history, 31.6% of all travel associated cases were *S.* Enteritidis whereas 40.3% of cases indigenous to Ireland are *S.* Typhimurium (table 1).

There is a considerable degree of underreporting of salmonellosis. A study undertaken in Sweden in which reviewers ascertained the degree of underreporting of salmonellosis cases amongst Swedish holidaymakers returning to Sweden from a range of European countries indicated that when compared with national statistics, salmonellosis cases were underreported by a factor of four. Given the high degree of sensitivity and specificity of the Swedish national surveillance system, this is probably an reasonable accurate estimation signifying that for every sporadic case of salmonellosis that is notified nationally in Ireland, there are a further four cases that go un recognised in the community.[2]

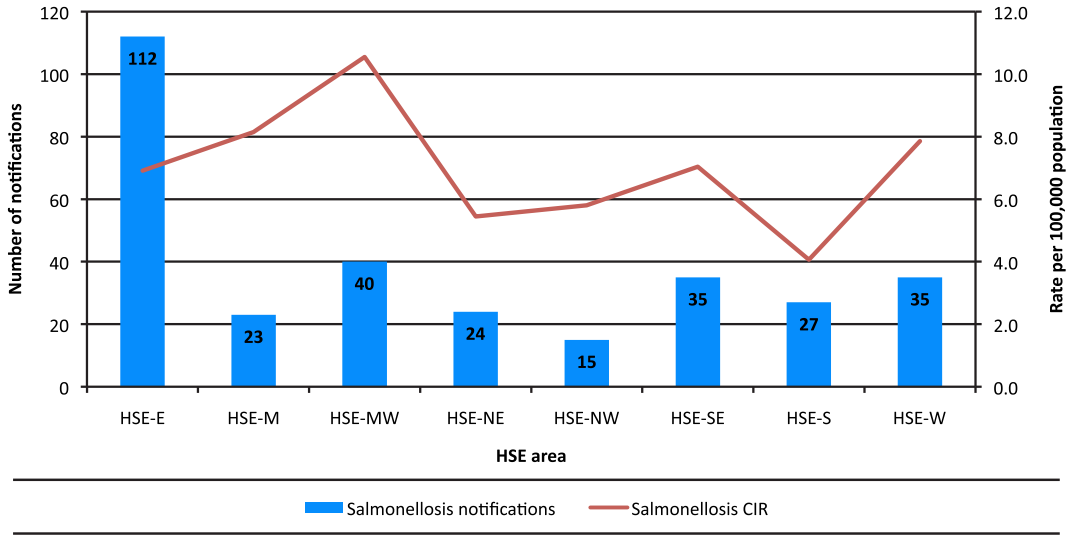

Figure 2: Salmonellosis notifications and crude incidence rate per 100,000 population by HSE area, 2011 (CIDR)

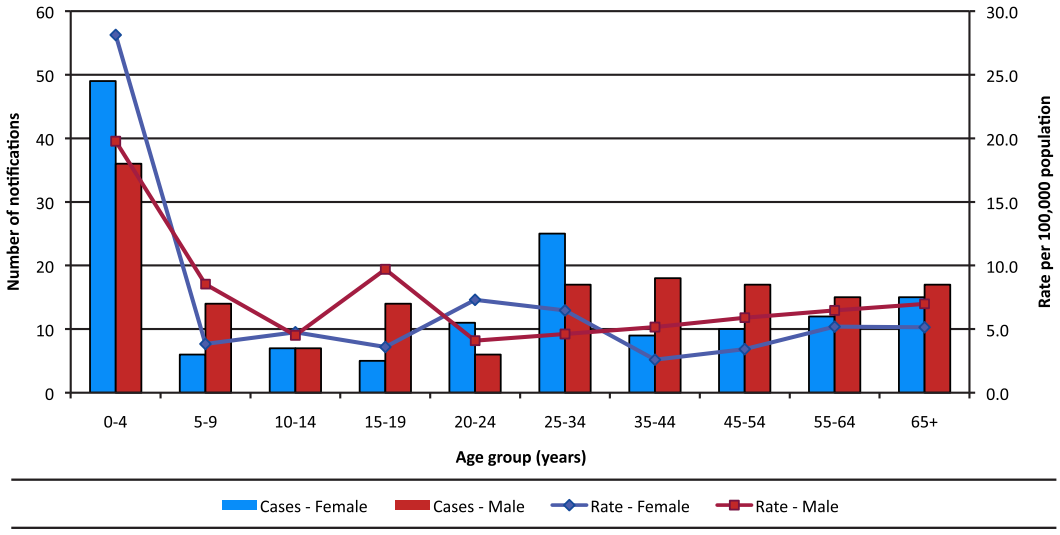

Figure 3: Salmonellosis notifications and age specific incidence rate per 100,000 population by age group (years) and sex, 2011 (CIDR)

NSSLRL data:
The National Salmonella, Shigella and Listeria Reference Laboratory (NSSLRL) based in Galway has been providing reference services nationally since 2000. In 2011, the NSSLRL analysed 321 human *Salmonella* isolates referred for further typing, identifying 54 serotypes. Table 2 presents the most dominant serotypes detected during 2011. *S.* Typhimurium* (n=116) was the most common serotype, followed by *S.* Enteritidis (n=58).

The NSSLRL conducted phage typing analysis on all 116 *S.* Typhimurium and all 58 *S.* Enteritidis isolates. Phage types DT104 (23.3%) and DT193 (19.8%) were the commonest phage types observed among *S.* Typhimurium isolates while phage types PT1 (17.2%), RDNC (17.2%) and PT21(10.3%) were the dominant types observed among *S.* Enteritidis isolates.[1]Of the 321 human isolates analysed by the NSSLRL, 168 (52.3%) were fully susceptible to all antimicrobials tested. The remaining 153 isolates exhibited some degree of antimicrobial resistance. The three commonest resistance patterns§ seen were resistance to ampicillin, chloramphenicol, streptomycin, sulphadiazine and tetracycline (ACSSuT, n=30, 9.3% of total and 19.6% of resistant isolates), resistance to nalidixic acid (Na, n=29, 9.0% of total and 19.0% of resistant isolates), followed by resistance to ampicillin, streptomycin, sulphadiazine and tetracycline (ASSuT, n=24, 7.5% of total and 15.7% of resistant isolates). Over 98% of human isolates with a resistance profile of ACSSuT or ASSuT were *S.* Typhimurium (including 19 monophasic isolates) while 51.7% of human isolates with a resistance profile of Na were *S.* Enteritidis.

Four isolates of *S.* Concord and one *S.* Stanley were resistant to nine antibiotics tested; two *S.* Concord and one *S.* Typhimurium isolates were resistant to eight antibiotics tested while one isolate each of *S.* Kentucky and *S.* Worthington were resistant to seven antibiotics tested. Please refer to the NSSLRL's Annual Report 2011 for more detailed analysis of results[1]. The pattern of antimicrobial resistance observed is broadly similar to previous years. To date carbapenemase production in salmonella has not been detected in Ireland.

Outbreaks:
There were 13 outbreaks of *Salmonella* during 2011 which is similar to the number of salmonellosis outbreaks reported in 2010. These outbreaks resulted in 49 cases of illness and an associated hospitalisation rate of 20.4% (n=10 cases). Table 3 outlines the number of salmonellosis outbreaks and number ill by outbreak location and outbreak transmission mode during 2011.

There were eight family outbreaks during 2011, six of which were in private houses and two were

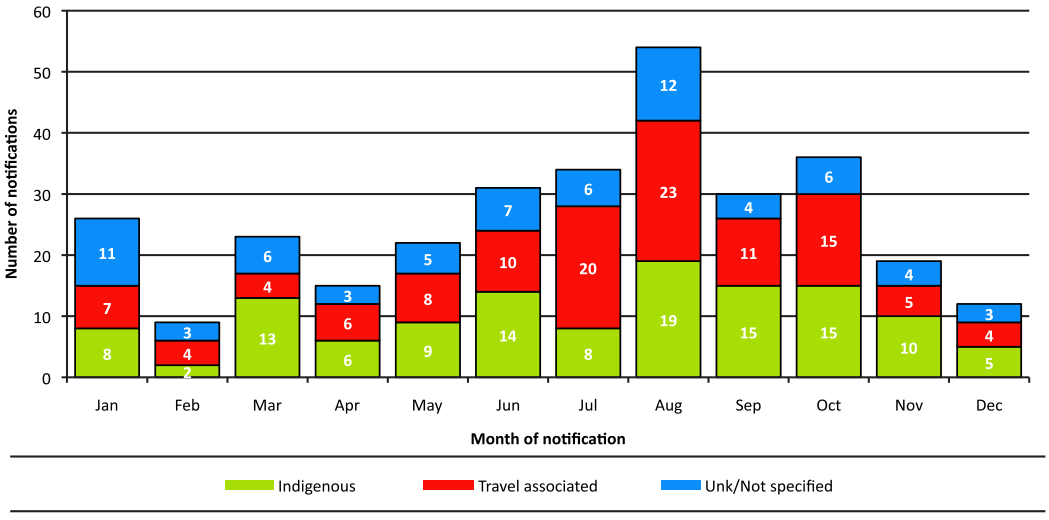

Figure 4: Salmonellosis notifications by month of notification and travel history, 2011 (CIDR)

Table 1: Percentage of Salmonellosis notifications by serotype and travel history, 2011 (CIDR)

Salmonella serotype	Travel associated	Indigenous	Travel history unknown	Total
***S.* Enteritidis (%)**	31.6	9.7	12.9	18.6
***S.* Typhimurium (%)**	11.1	40.3	27.1	26.4
Other serotypes (%)	47.9	32.3	47.1	41.5
Serotype not specified (%)	9.4	17.7	12.9	13.5
All serotypes (n)	**117**	**124**	**70**	**311**
All serotypes (%)	**37.6**	**39.9**	**22.5**	**100.0**

* This includes 28 *S.* Typhimurium isolates with serotype 4,5,12:1
§ Where A= Ampicillin, C= Chloramphenicol, Na = Naladixic acid, S= Streptomycin, Su= Sulphonamide and T= Tetracycline

travel associated. Of the two travel associated family outbreaks, one reported exposure in Turkey and the other reported exposure in the UK. Three family outbreaks were reported as person to person transmission while two were reported as food-borne transmission. Transmission was unknown for the remaining three outbreaks. Of the two food-borne outbreaks, suspected food items reported included a buffet meal.

There were five general outbreaks during 2011, two were national travel related outbreaks, one was a national outbreak in a community setting and the remaining two were local outbreaks occurring in a hotel and a community setting.

One national general outbreak involving 25 cases associated with a flight from Tanzania was reported in 2011. Cases were identified from Ireland, Netherlands, Norway, US and Canada. All cases had travelled to Tanzania at the beginning of July 2011. A descriptive study strongly suggested that the flight was the location of this outbreak with 98% of total cases and 100% of confirmed cases are explained by the flight. In two analytical studies two food items served on board the flight were significantly associated with illness.
One national general outbreak of *S.* Napoli, consisting of two associated cases in a community setting , was detected by NSSLRL during 2011. No history of recent travel was reported by the cases and the route of transmission remains unknown for this outbreak.

One national general outbreak was caused by *S.* Enteritidis RDNC was detected by NSSLRL during 2011. This outbreak resulted in six cases of illness, three of whom were hospitalised. All cases reported a history of recent travel to Turkey. Route of transmission remains unknown for this outbreak.

One local general outbreak in HSE-MW was caused by *S.* Umbilo with three confirmed cases, one of whom was hospitalised. Mode of transmission was reported as unknown for this outbreak.

One local general outbreak in HSE-E was caused by *S.* Newport and monophasic *S.* Typhimurium. This outbreak resulted in 13 cases of illness and was reported as food-borne transmission associated with a meal eaten in a hotel.

Table 2: Number and percentage of human Salmonella isolates by serotype, NSSLRL 2011

Salmonella serotype	Number of isolates	*% Isolates*
Typhimurium†	116	*36.1*
Enteritidis	58	*18.1*
Typhi	13	*4.0*
Unnamed‡	12	*3.7*
Newport	10	*3.1*
Heidelberg	9	*2.8*
Stanley	9	*2.8*
Braenderup	7	*2.2*
Concord	7	*2.2*
Infantis	6	*1.9*
Agona	5	*1.6*
Other	*69*	*21.5*
Total	**321**	*100.0*

Table 3: Number of salmonellosis outbreaks and number ill by outbreak location and outbreak transmission mode, 2011 (CIDR)

Location	Food-borne**		Person-to-person††		Unknown		Total	
	No. outbreaks	No. ill	No. outbreaks	No. ill	No. outbreaks	No. ill	No. outbreaks	No. ill
Community outbreak	0	0	0	0	2	5	2	5
Hotel	1	13	0	0	0	0	1	13
Private house	1	1	3	10	2	4	6	15
Travel related	2	6	0	0	2	10	4	16
Total	**4**	**20**	**3**	**10**	**6**	**19**	**13**	**49**

†This includes 28 (8.7%) S. Typhimurium isolates with serotype 4,5,12:1
‡ Unnamed is not a serotype. The term refers to a very diverse group of isolates where the complete antigenic formula cannot be determined and which therefore can not be formally designated as belonging to any specific serovar
**Includes 1 outbreak reported as person to person and foodborne
††Includes 1 outbreak reported as person to person and animal contact

Typhoid/Paratyphoid:
The number of *S.* Typhi and *S.* Paratyphi cases diagnosed in Ireland remains elevated when compared to previous years. In 2011 there were 14 cases of *S.* Typhi reported and two cases of *S.* Paratyphi.
Ten of the *S.* Typhi reported a recent history of travel, with three travelling to Bangladesh, two to Pakistan, two to India and one each to Philippines, Ghana and Cameroon. Two cases reported country of infection as Ireland, following secondary transmission from a recently returned traveller to an endemic area. The remaining two cases did not report country of infection, however one was born in an endemic area and identified on contact tracing. In the *S.* Paratyphi cases one had known recent travel history to Bangladesh and one to Pakistan.

References:

1. National *Salmonella* Reference Laboratory of Ireland, Annual Report for 2011. Available at: http://www.nuigalway.ie/research/salmonella_lab/reports.html
2. De Jong B and Ekdahl K. *The comparative burden of salmonellosis in the European Union member states, associated and candidate countries.* BMC Public Health 2006, 6:4. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1352352/pdf/1471-2458-6-4.pdf