

# 3.6 Salmonella

## Summary

Number of confirmed cases 2008 (CIDR): 449  
 Number of probable cases 2008 (CIDR): 1  
 Crude incidence rate: 10.6/100,000

Salmonellosis presents clinically as an acute enterocolitis, with sudden onset of headache, abdominal pain, diarrhoea, nausea and occasionally vomiting. Fever is almost always present. Dehydration, especially amongst vulnerable populations such as infants, the immunocompromised and the elderly, may be severe. *S. Typhi* and *S. Paratyphi* can cause enteric fever, a severe systemic life threatening condition, but this is very rare in Ireland and is almost invariably travel-associated.

There were 449 cases of salmonellosis species in 2008. Of these 448 were laboratory confirmed and there was one case classified as probable that was not laboratory confirmed. In addition to the cases of salmonellosis, there were five cases of *S. Typhi* and eight cases of *S. Paratyphi* notified on CIDR. The national salmonella

reference laboratory (NSRL) based in Galway has been providing reference testing nationally since 2000. In 2008 the NSRL analysed 447 human specimens.

The national crude incidence rate (CIR) of salmonellosis in 2008 was 10.8/100,000 (table 1). This is similar to the CIR calculated for 2007. CIR's varied regionally. The Midlands region experienced the highest CIR of 17.5/100,000 (an increase of 8.4 /100,000 on the 2007 CIR). The Northwest region had the lowest incidence of 8.0/100,000. Of note the Northeast experienced an increase in CIR of 7.8/100,000 while the South experienced a decrease in CIR of 12.2/100,000. In 2007 HSE-S notified a large salmonella outbreak which would account for the difference in annual CIR's. CIR's for all other regions remained similar to their previous annual CIR's.

The male to female ratio for the year was 1.00:0.98. In terms of age distribution 26% of cases occurred in children under five. This is likely to be a reflection of clinicians seeking clinical samples in children under five. This is reflected in the age specific incidence (ASIR). The 0-4 age group has the highest ASIR nationally (46.0/100,000) and in all regions with the exception

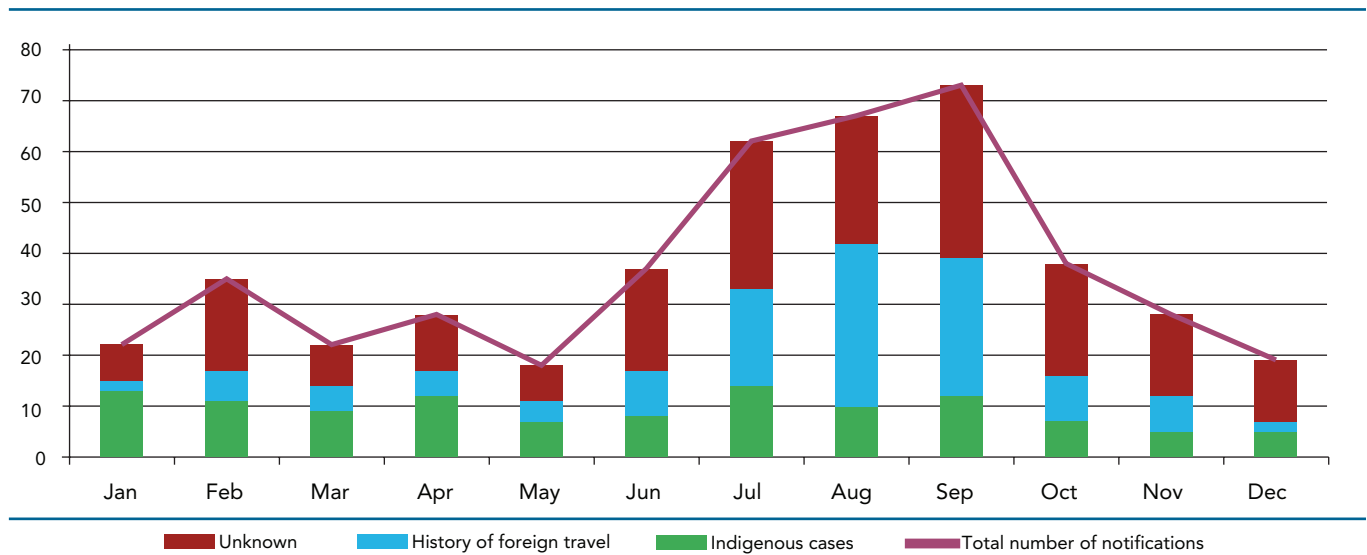


Figure 1: Seasonal Distribution of Salmonella Notifications by History of Foreign Travel, CIDR 2008

of the northwest. In this region the ASIR of the 20-24 age group was 31.2/100,000, compared to an ASIR of 23.5/100,000 in the 0-4 age group.

The seasonality of salmonellosis notifications in Ireland is shown in figure 1. It can be seen that the highest number of notifications occurred in the summer months (mid June to the start of October). These are expected seasonal increases that correlate with peak holiday periods and an increase of people travelling abroad.

Serotyping analysis is conducted at the NSRL. Review of information provided by the NSRL show serotyping was conducted on 435 isolates identifying 63 serotypes in 2008. Table 2 presents the most dominant serotypes recorded for the year. In 2008 *S. Typhimurium* (n=139) was the dominant serotype, followed by *S. Enteritidis* (n=122), *S. Agona* (n=13, please see outbreaks paragraph) and *S. Virchow* (n=10). There are 20 CIDR events which could not be definitively linked to a serotype result and are not present on the CIDR system. The 415 events which were updated with serotyping information are presented by age group in figure 2.

The NSRL conducted phage typing analysis on all *S. Typhimurium* and *S. Enteritidis* isolates. Of the 139 *S. Typhimurium* isolates phage types were assigned to 138 specimens. DT104 (20%), DT104b (20%) and DT193 (13%) were the commonest phage types observed.

All 122 *S. Enteritidis* isolated were typed. PT1 (19%), PT21 (18%), PT4 (18%) and PT8 (12%) were the dominant types.

Two hundred and fifty of the 447 human isolates analysed by the NSRL were fully sensitive to all antibiotics tested. The remaining 197 isolates exhibited some degree of antibiotic resistance. The commonest resistance pattern seen was of type Ampicillin, Chloramphenicol, Streptomycin, Sulphonamide and Tetracyclin (ACSSuT) (n=54). All isolates with this pattern were *S. Typhimurium*.

Table 1: Number of cases and CIR of human salmonellosis in Ireland, 2008 (CIDR)

HSE Area	No Cases (2008)	CIR incl. 95% CI 2008
HSE - E	149	9.9 [8.3-11.5]
HSE - M	44	17.5 [12.3-22.6]
HSE - MW	35	9.7 [6.5-12.9]
HSE - NE	60	15.2 [11.4-19.1]
HSE - NW	19	8 [4.4-11.6]
HSE - SE	43	9.3 [6.5-12.1]
HSE - S	55	8.9 [6.5-11.2]
HSE - W	44	10.6 [7.5-13.8]
<b>Total</b>	<b>449</b>	<b>10.6 [9.6-11.6]</b>

Twenty-nine *S. Enteritidis* isolates exhibited some degree of antibiotic resistance, which was mostly mild (79% were resistant to only one type of antibiotic tested). There was one *S. Enteritidis* isolate that was resistant to eight antibiotics tested. This case had a travel history to the Maldives and was PT1.

Please refer to the NSRLs Annual Report 2008 for more detailed analysis of results<sup>1</sup>.

Travel history was provided on CIDR in 53% of cases in 2008. Future improvement in this data will be reflected in these analysis.

Using information provided via CIDR it is known that 25% of salmonellosis cases were indigenous to Ireland, 28% of cases had a recent history of travel and in 47% of cases the travel history was either unknown or not specified.

Figure 1 also illustrates the number of cases where a comprehensive answer to recent travel was entered on CIDR (base on event date). As expected the number of cases associated with foreign travel increases during the summer months. Where travel history was documented, people with a recent history of travel to Spain (n=21) had the greatest occurrence of salmonellosis. Portugal (n=11), Thailand (n=10) and Turkey (n=10) were countries with high rates of recent travel and subsequent development of salmonellosis (table 3). These results are likely to reflect the popularity of these countries as travel destinations.

When serotyping data are analysed by history of foreign travel, the most common serotype among indigenous cases was *S. Typhimurium* (table 4). The 2008 annual report published by the National Reference Laboratory *Salmonella* – Food, Feed and Animal Health, which is part of the Central Veterinary Research Laboratory (CVRL), show that of the 1251 *Salmonella* isolates received resulting from checks on food business operators, *S. Kentucky* (n=476) and *S. Typhimurium* (n=229) were the prevalent strains. *S. Kentucky* was

Table 2: Serotyping Information, NSRL2008.

Serotype	No. of Isolates
<i>S. Typhimurium</i>	139
<i>S. Enteritidis</i>	122
<i>S. Agona</i>	13
<i>S. Virchow</i>	10
<i>S. Java</i>	7
<i>S. Worthington</i>	7
<i>S. Panama</i>	7
<i>S. Bredeney</i>	6
<i>S. Newport</i>	6
<i>S. Hadar</i>	6
<i>S. Kentucky</i>	6
Other	87

found in 263 environmental poultry samples. *S. Typhimurium* was found in 139 porcine and 46 bovine raw meat samples/carcass swabs. These findings may account for the high indigenous rates of *S. Typhimurium* human isolates during 2008. Please refer to the CVRLs annual report for more detailed analysis<sup>2</sup>.

Like 2007, the number of *S. Typhi* and *S. Paratyphi*'s diagnosed in Ireland in 2008 remains elevated when compared to previous years. In 2008 there were five reported cases of *S. Typhi*, seven cases of *Paratyphi A* and one case of *S. Paratyphi B*. Three of the *S. Typhi* had known recent travel history to India, one had a recent travel history to Nigeria, and in the final case the travel history of the patient was unknown. In the *S. Paratyphi A* cases three had recent travel history to India, one case had travel history to Indonesia, one case had travel history to Pakistan and in the remaining two cases the travel history was not specified. Finally, the case of *S. Paratyphi B* had recent travel to South America

There were 22 outbreaks of *Salmonella* during the year resulting in 79 persons ill and an associated hospitalisation rate of 25%. This is an increase of 120%

on the number of salmonellosis outbreaks reported in the previous year. Three of these outbreaks were travel related. Associated countries included Egypt, Barbados and Greece. Ten outbreaks were family outbreaks in private houses and the remaining 12 outbreaks occurred in a variety of locations. The general outbreaks, included the three travel related outbreaks (all foodborne), three were community based (all foodborne), four occurred in hospitals (n=3 person to person transmission, n=1 foodborne), one in a residential institution (person to person transmission) and one was unknown. Foodborne general outbreaks accounted for 53 persons ill.

In two of these general, foodborne, travel related outbreaks specialists at the HPSC liaised with international agencies and aided them with their investigations. As the three general community outbreaks occurred across several HSE areas, the HPSC acted as the co-ordinating body for the associated investigations.

The most significant outbreak during 2008 was that of serotype of *S. Agona*. In July 2008 the National Surveillance Reference Laboratory (NSRL) alerted the

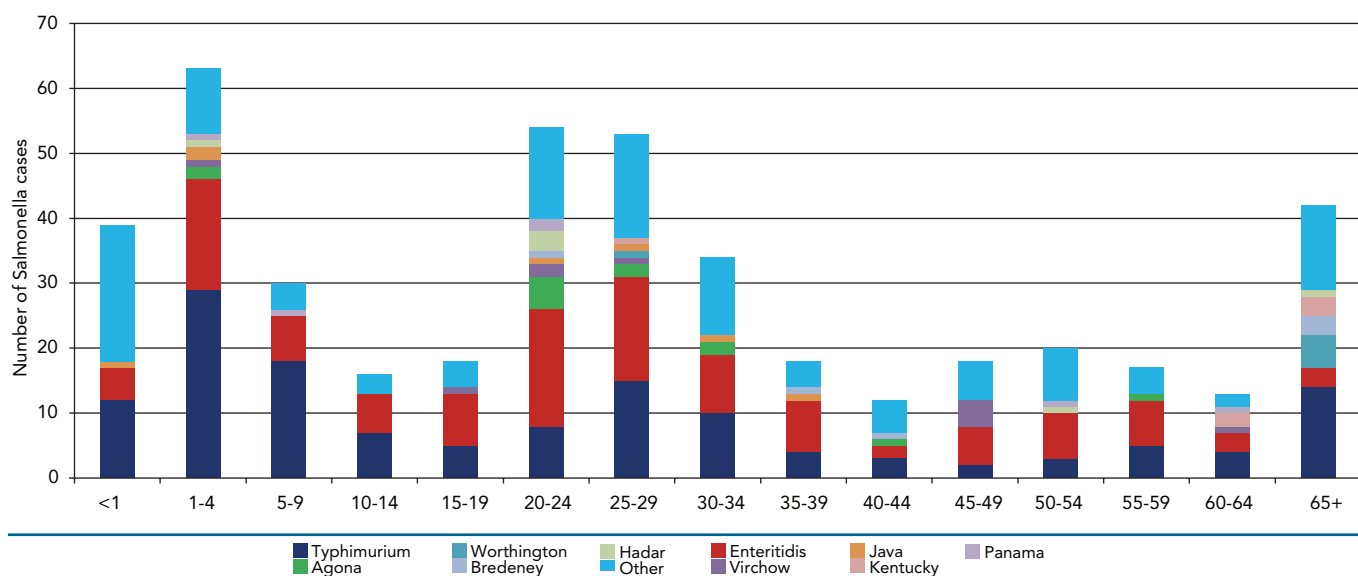


Figure 2: Salmonella Serotypes Reported on CIDR by Age Group, 2008

Table 3: Travel Associated Salmonellosis by Country, CIDR 2008

Country of Infection	% of Travel Associated Salmonella Cases
Spain	16.5% (n=21)
Portugal	8.7% (n=11)
Thailand	7.9% (n=10)
Turkey	7.9% (n=10)
Egypt	6.6% (n=8)
Greece	5.5% (n=7)
Italy	4.7% (n=6)
United states	3.9% (n=5)
Barbados	3.9% (n=5)
Tunisia	3.1% (n=4)
Other	31.5% (n=40)

Table 4: Median Age, and, Percent of *S. Enteritidis*, *S. Typhimurium* and All other *Salmonella* Serotypes by History of Foreign Travel Status, CIDR 2008.

	History of Foreign Travel (n=127)	Indigenous (n=113)	Not known (n=208)
Median Age (All serotypes)	27	22	25
% <i>S. Enteritidis</i>	41.31%	18.58%	22.12%
% <i>S. Typhimurium</i>	19.69%	39.82%	33.17%
% Other	37.01%	41.59%	44.71%

HPSC of a cluster of five *S. Agona* cases. Following contact with UK colleagues, a much larger cluster involving the UK was identified. Epidemiological investigations were conducted and alerts sent using the Food and Waterborne Diseases (FWD) network, the European Union's Early Warning and Response System (EWRS), and the European Unions' Rapid Alert System for Food and Feed (RASFF). These ultimately resulted in the identification of 11 Irish cases and 152 cases throughout England, Scotland, Wales and five other European countries. The outbreak strain was associated with two deaths. Epidemiological investigations, supported by microbiological evidence, identified meat product produced at an Irish food plant as the source of the outbreak. The company voluntarily temporarily closed the implicated section of the plant and recalled affected product.

In April four cases of *S. Typhimurium* (PTU320) were linked to a larger outbreak in the UK. Epidemiological information provided by public health departments and the HPSC contributed to a case control study conducted by the Health Protection Agency (HPA) in the UK. This study identified pre-packed egg sandwiches as the most likely source of the outbreak.

**References:**

1. National *Salmonella* Reference Laboratory of Ireland, Annual Report for 2008.
2. National Reference Laboratory *Salmonella* (Food, Feed and Animal Health), Annual Report 2008.