

## Ireland

In 2006, 798 isolates were submitted to the National *Salmonella* Reference Laboratory. When non-*Salmonella*, QC contaminants and duplicate isolates were removed a total of 738 *Salmonella* isolates were typed. There were 430 human clinical isolates, including 17 blood (6 *S.Typhi*, 4 *S.Enteritidis* & 1 *S.Dublin*) and 4 other invasive isolates (2 *S.Typhimurium*). Among the faecal isolates (n = 409) *S.Enteritidis* (n = 154) and *S.Typhimurium* (n = 98) predominated. Where there are invasive and faecal isolates from the same patient, only the invasive isolate is recorded (Table 2). The average turnover time for testing was 5.3 days (range 0-21 days).

There was an increase in the number of *Salmonella* isolates from humans received in the NSRL on 2005 (Table 1).

**Table 1: Number of *Salmonella* isolates received in NSRL**

<b>Year</b>	<b>Human</b>	<b>Non-human</b>
2006	430	308
2005	357	494
2004	420	650
2003	486	634
2002	394	540
2001	508	574
2000	636	214

**Table 2: Top fifteen serotypes of Human Isolates (inc typhoidal)**

Serotype	Frequency	%
Enteritidis	158	37
Typhimurium	101	23
Hadar	11	3
Infantis	11	3
Virchow	10	2
Newport	9	2
Saintpaul	8	2
Typhi	7	2
Bredeney	6	1
Stanley	6	1
Agona	5	1
Kentucky	4	1
Mikawasima	4	1
Bareilly	4	1
Dublin	4	1
Others	82	19
Total	430	100

### **Salmonellosis non-typhoidal**

#### *S. Enteritidis*

*S. Enteritidis* accounted for 37% of all cases of *Salmonella*. The predominant phage types were PT4 (21%), PT1 (18%), PT21 (16%), PT14b (12%) and PT8 (11%). The increase in PT4 from 13% in 2005 to 21% in 2006 was particularly noticeable.

#### *S. Typhimurium*

*S. Typhimurium* accounted for 23% of all cases of *Salmonella*. Phage types DT104b and DT104b accounted for 30% and 25% respectively.

### **Other serotypes**

The incidence of *S. Infantis* increased from 1% in 2005 to 2% in 2006. Only one of the eleven patients had a history of recent foreign travel.

### **Salmonellosis typhoidal**

Seven isolates of *S. Typhi* and 1 isolate of *S. Paratyphi A* were received.

### **Antimicrobial resistance**

Fifty-seven percent of isolates were susceptible to all antimicrobial agents tested. Twenty-three percent of isolates were multi-drug resistant (four or more antibiotics). Of these, 47% had the resistance profile ACSSuT and were *S. Typhimurium* or closely related clonal groups. Two extended spectrum beta-lactamase (ESBL) producing isolates were detected, *S. Typhimurium* DT18 from a child from Hungary, and *S. Concord* from a child adopted from Ethiopia. A possible AmpC producing *S. Virchow* with intermediate susceptibility to cefotaxime was also detected. An isolate of *S. Kentucky* resistant to ciprofloxacin was also received.

**Travel related infection**

A history of recent foreign travel was noted in 92 cases (21%) (Table 3). However this is most likely an underestimate since the NSRL does not always receive a foreign travel history of patients. Spain was the most common destination. (17 cases)

**Table 3: Foreign travel history**

<b>Continent</b>	<b>Country</b>	<b>Number</b>
Europe (n = 49)		
	Spain	17
	Portugal	5
	Croatia	5
	Turkey	6
	Bulgaria	4
	Czech Republic	2
	Greece	2
	Mediterranean*	2
	Slovenia	1
	Italy	1
	France	1
	England	1
	Hungary	1
	Malta	1
Africa (n = 13)		
	Tunisia	4
	Nigeria	2
	Egypt	2
	Kenya	1
	Morocco	1
	Ethiopia	1
	North Africa*	1
	Africa *	1
Australasia (n = 20)		

	India	6
	Pakistan	3
	Bangladesh	2
	Philippines	2
	Thailand	2
	U.A.E	2
	Nepal	1
	China	1
	Australia	1
Americas	(n =5)	
	Mexico	2
	Jamaica	1
	Cuba	1
	South America*	1
Unknown*	(n =5)	

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\* Country not stated

### **Outbreaks**

Eighteen clusters involving 47 isolates were identified in 2006. *S.Typhimurium* was implicated in 9 clusters, and *S.Enteritidis* in six clusters. Eleven of these were family outbreaks while five outbreaks were associated with foreign travel.

**Non-Human isolates**

In 2006, 307 isolates of *Salmonella* of non-human origin were submitted to the NSRL. The majority of isolates were from poultry (n = 163) while there were also isolates from swine (n = 84) and bovine (n = 33) sources.

*S.*Typhimurium and *S.*Indiana were the most prevalent serovars.

**Table Top seventeen serotypes among non-human isolates**

Serotype	Frequency	%
Typhimurium	99	32
Indiana	50	16
Derby	29	9
Agona	28	9
Orion	18	6
Dublin	13	4
Kentucky	9	3
Livingstone	7	2
Mbandaka	6	2
Bredeney	6	2
Bovismorbificans	5	2
Kottbus	5	2
Java	4	1
Kedougou	3	1
Tennessee	3	1
Senftenberg	3	1
Bareilly	3	1
Others	16	5
Total	430	100

### ***Salmonella* serotypes**

Despite being the most common serotype from human infections no *S. Enteritidis* isolates were received in the NSRL from non-human samples in 2006.

#### ***S. Typhimurium***

*S. Typhimurium* accounted for 32% of all non-human isolates and were isolated from a variety of sources including swine (n = 61), bovine (n = 19) and poultry (n = 8). Phage types DT104b (n = 23), U310 (n = 22) and DT193 (n = 10) were the most common phage types from swine while DT104 was rare (n = 2). In contrast DT104 was the most common phage type among bovine (n = 11) and poultry (n = 6) isolates. Phage type DT193 was present in swine (n = 10), bovine (n = 1) and poultry (n = 1) isolates.

### **Sources of Isolates**

#### **Poultry**

A total of 18 serovars were received from poultry sources. *S. Indiana* was the most common serovar (n = 49) and most were from the same laboratory. All the isolates had the same resistance profile, SuTMn. In contrast 2 human isolates of *S. Indiana* referred to the NSRL had different resistance profiles, i.e. TMn. Other common serovars from poultry sources include *S. Agona* (n = 25), *S. Orion* (n = 18) and *S. Derby* (n = 14).

#### **Swine**

A total of 10 serovars accounted for the 86 isolates received from swine. *S. Typhimurium* (n = 61) accounted for the majority of isolates while *S. Derby* (n = 15) was also common.

#### **Bovine**

A total of 34 isolates were received from bovine sources. *S. Typhimurium* accounted for the majority of isolates (n = 19) while *S. Dublin* (n = 9) was also common.

### **Antimicrobial Resistance**

Forty-four percent of isolates were susceptible to all antimicrobial agents tested. Twenty-nine percent were multi-drug resistant (four or more antibiotics). Fourteen percent of isolates had the resistance profile ACSSuT and were *S.Typhimurium* DT104 or closely related clonal groups. There were no ESBL producers and none of the isolates were resistant to ciprofloxacin. However 5 isolates exhibited resistance to nalidixic acid.

### **Other Testing:**

The NSRL received 17 *Listeria* isolates in 2006. A single blood culture isolate was serotype 1/2. Pulsed field gel electrophoresis (PFGE) is to be performed on these isolates.

A total of 22 *Shigella* isolates were referred to the NSRL in 2006 of which 20 grew *Shigella*. These included 7 *S.sonnei*, 5 *S.flexneri* 2a, 4 *S.flexneri* 6, 2 *S.flexneri* 1b and 1 *S.flexneri* 1a isolates. Twelve of these patients had a history of recent foreign travel. The NSRL offered a reference service for antimicrobial susceptibility testing of ciprofloxacin resistant or suspect ESBL-producing *E.coli* isolates from blood cultures or CSFs in the latter part of 2006. A total of 30 isolates were received, mainly from one laboratory.