Surveillance and outbreak reports

A QUARTERLY UPDATE ON FOOD- AND WATERBORNE DISEASES IN EUROPE - SUMMARY OF DATA FOR THE THIRD QUARTER OF 2007

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This paper highlights findings from the first quarterly report on food- and waterborne diseases produced by the European Centre for Disease Prevention and Control (ECDC). In the past such reports had been generated by Enter-net, a Europe-based international surveillance network for the enteric infections. The quarterly reports are an important surveillance tool for the network participants and other public health professionals to use in order to identify emerging trends and changes taking place in a shorter interval than one year.

Introduction

The report discussed here brings data from the third quarter of 2007 on cases of *Salmonella*, Verocytotoxin-producing *Escherichia coli* (VTEC) and *Campylobacter* in the European Union (EU) and European Free Trade Association (EFTA) countries. For this period, 25 countries provided data on *Salmonella*, 16 on VTEC, and 15 on *Campylobacter* (see the list of contributors). In 2006, respectively 27, 17 and 17 countries reported data for the third quarter of the year. As different countries reported in both years, direct comparisons and comments on trends in the data between these two years are avoided. At the time of writing this paper, ECDC does not yet have access to all historical data collected by Enter-net. Comparison across quarters from different years will be possible in future reports, once this data is available.

Methods

The former Enter-net surveillance hub collected data on *Salmonella*, VTEC and *Campylobacter* until 2 October, 2007. These data were collated in the Enter-net databases and included microbiological and epidemiological data on each laboratory case confirmed by the national reference laboratories. The *Salmonella* database has been in existence since 1995, the VTEC database since 2000 and the *Campylobacter* database since 2005 [1]. Data collected from the beginning of October 2006 were transferred to the ECDC on 2 October, 2007. Data for the third quarter of 2007 were submitted from countries directly to ECDC, where they were analysed and summarized before being returned to the network participants for approval.

Public domain versions of the quarterly reports are posted on the ECDC website [2]. When making comparisons between countries, one should take into account such factors as the variability of

case definitions, reporting requirements, surveillance systems and microbiological methods employed.

Results

Salmonella

The total number of human *Salmonella* isolates reported in the third quarter of 2007 was 29,294* by 25 countries. For comparison, 34,854 cases were reported in the same period of 2006. The majority of isolates were *S. Enteritidis* or *S. Typhimurium* (Table 1). With respect to emerging serotypes, 239 cases of *Salmonella* Java were reported in the third quarter of 2007, compared to 75 cases in the analogous period of 2006. This is believed to be related to an outbreak of 172 cases of *S. Java* occurring in Sweden, associated with a common exposure to imported spinach, although this has not been confirmed with microbiological evidence [3]. The majority of cases of *Salmonella* were reported in persons aged between 15

TABLE 1

Salmonella serotypes most frequently reported in Europe in the third quarter of 2007 (data from 25 countries) and 2006 (data from 27 countries)

Serotype	3 rd quarter of 2007		3 rd quarter of 2006	
	Number of cases	Percentage of the total	Number of cases	Percentage of the total
Enteritidis	17,722	64.4	23,531	67.5
Typhimurium	3,616	13.1	4,537	13.0
Infantis	351	1.3	314	0.9
Virchow	309	1.1	378	1.1
Java	239	0.9	77	0.2
Newport	193	0.7	242	0.7
Stanley	182	0.7	148	0.4
Typhi	162	0.6	213	0.7
Hadar	143	0.5	231	0.7
Agona	133	0.5	125	0.4
Other	4,455	16.2	5,058	14.5
Total	27,505*	100.0	34,854	100.0

* This sub-analysis was performed on cases received by February 2008 and therefore the total in this table (and the denominator used to calculate percentages) is lower than the total number of reported cases given in the text, due to later updates.

and 64 years (45%), which is also the largest age group. Cases younger than five years constituted approximately a quarter of all cases (25%).

Most frequently, *Salmonella* isolates were found to be resistant to sulphonamides (20% of all isolates tested), nalidixic acid (16%) and tetracyclines (16%) (Table 2). In the third quarter of 2006, the highest proportions of isolates were resistant to sulphonamides (24%), ampicillin (17%) and tetracyclines (16%).

Multi-drug resistance (MDR), defined as resistance to four or more unrelated antimicrobials, was found most frequently among *S. Group B* (48%) and *S. Haifa* (46%). Among the more common serotypes, MDR was highest in *S. Kentucky* (41%), *S. Virchow* (39%) and *S. Typhimurium* (38%).

Verocytotoxin-producing *Escherichia coli* (VTEC)

The total number of VTEC cases reported in the third quarter of 2007 was 594 from 16 countries. During the same period in 2006, 605 cases were reported from 17 countries. The most commonly identified serogroup was *E. coli* O157, which in the third quarter of 2007 represented the majority of all reported serogroups (56%) and of all known serogroups (65%) (Table 3). In the same period in 2006, *E. coli* O157 represented 42 % of all serogroups. Phage Types 8, 32 and 4 were reported most frequently in the third quarter of 2007, whereas phage type 21/28 was reported most frequently in the third quarter of 2006.

In the third quarter of 2007, the highest proportion of VTEC isolates was resistant to sulphonamides (31%), streptomycin (24%) and tetracyclines (19%). The proportion of reported MDR isolates

TABLE 2

Antimicrobial susceptibility of *Salmonella*, third quarter of 2007 (14 countries reporting)

Antimicrobial agent	Total number of isolates tested	Number of resistant isolates (%)	Number of intermediate isolates (%)	Number of sensitive isolates (%)
Ampicillin	9,636	1,337(13.9)	19 (0.2)	8,280 (85.9)
Cefotaxime	8,337	28 (0.3)	8 (0.1)	8,301 (99.6)
Chloramphenicol	8,556	430 (5.0)	9 (0.1)	8,117 (94.9)
Ciprofloxacin	9,369	185 (2.0)	155 (1.7)	9,029 (96.4)
Gentamicin	8,529	198 (2.3)	24 (0.3)	8,307 (97.4)
Kanamycin	8,149	81 (1.0)	26 (0.3)	8,042 (98.7)
Nalidixic acid	7,857	1,285 (16.4)	7 (0.1)	6,565 (83.6)
Streptomycin	7,528	980 (13.0)	224 (3.0)	6,324 (84.0)
Sulphonamides	7,798	1,561 (20.0)	53 (0.7)	6,184 (79.3)
Tetracyclines	8,469	1,330 (15.7)	454 (5.4)	6,685 (78.9)
Trimethoprim	8,318	443 (5.3)	11 (0.1)	7,864 (94.5)

TABLE 3

Verotoxin-producing *Escherichia coli* (VTEC) serotypes most frequently reported in Europe in the third quarter of 2007 (data from 16 countries) and 2006 (data from 17 countries)

Serotyp	3 rd quarter of 2007		3 rd quarter of 2006	
	Number of cases	Percentage of the total	Number of cases	Percentage of the total
0157	334	56.2	253	41.8
026	48	8.1	61	10.1
0103	22	3.7	20	3.3
0145	17	2.9	30	5.0
0111	12	2.0	10	1.7
091	11	1.9	16	2.6
0121	7	1.2	13	2.1
0128	6	1.0	6	1.0
055	6	1.0	9	1.5
0113	4	0.7	3	0.5
Other	44	7.4	72	11.9
NT*	83	14.0	107	17.7
Total	594	100.0	605	100.0

*NT stands for untyped, untypable or not definitively typed

TABLE 4

Antimicrobial susceptibility of Verotoxin-producing *Escherichia coli* (VTEC), third quarter of 2007 (five countries reporting).

Anti-microbial agent	Resistant		Intermediate		Sensitive		Number of isolates tested
	Number of isolates	Percentage of all isolates tested	Number of isolates	Percentage of all isolates tested	Number of isolates	Percentage of all isolates tested	
Ampicillin	12	7.3	82	50.0	70	42.7	164
Cefotaxime	1	0.6	-	-	162	99.4	163
Chloramphenicol	2	1.2	-	-	162	98.8	164
Ciprofloxacin	1	0.6	-	-	163	99.4	164
Gentamicin	3	1.8	2	1.2	159	97.0	164
Kanamycin	5	3.0	2	1.2	157	95.7	164
Nalidixic acid	4	2.4	-	-	160	97.6	164
Streptomycin	40	24.4	2	1.2	122	74.4	164
Sulphonamides	50	30.5	53	32.3	61	37.2	164
Tetracyclines	31	18.9	60	36.6	73	44.5	164
Trimethoprim	8	5.2	1	0.6	145	94.2	154

TABLE 5

Multidrug-resistant (MDR) Verotoxin-producing *Escherichia coli* (VTEC), by serogroup, third quarter of 2007 (five countries reporting)

Serogroup	Number of MDR isolates	Total number of isolates tested	Percentage of the total
026	3	27	11.1
091	2	9	22.2
0111	2	8	25.0
018	1	1	100.0
055	1	6	16.7
092	1	1	100.0
NT*	2	6	33.3
Others	0	106	0.0
Total	12	164	7.3

MDR – resistant to ≥ 4 antimicrobial drugs

*NT stands for untyped, untypable or not definitively typed

TABLE 6

Clinical manifestations of Verotoxin-producing *Escherichia coli* (VTEC) infections, third quarter of 2007 (14 countries reporting)

Clinical manifestation	0157		non-0157		Unknown serogroup		All serogroups	
	Number of cases	Percentage of the total	Number of cases	Percentage of the total	Number of cases	Percentage of the total	Number of cases	Percentage of the total
Diarrhoea	61	38.9	73	75.3	23	62.2	157	54.0
Bloody diarrhoea	68	43.3	8	8.2	4	10.8	80	27.5
Hemolytic-uremic syndrome (HUS)	17	10.8	11	11.3	7	18.9	35	12.0
Asymptomatic	11	7.0	5	5.2	3	8.1	19	6.5
Total	157	100.0	97	100.0	37	100.0	291	100.0

was 7% (Tables 4 and 5). The proportion of MDR isolates reported in the third quarter of 2006 was 11%.

VTEC infections manifested most commonly as bloody diarrhoea and haemolytic-uremic syndrome (HUS). Bloody diarrhoea was reported more frequently in cases with VTEC O157 infections, compared to non-O157 infections, while HUS was as common in O157 cases as among non-O157 cases.

The majority of VTEC O157 cases were reported in females (58%), whereas non-O157 cases were evenly divided between males and females. VTEC O157 cases were typically older and aged between 16 and 64 years (42%), whereas non-O157 cases were more frequently reported in children aged between one and five years (47%).

Campylobacter

The incidence rate of *Campylobacter* infections among 15 reporting European Union countries was 6.9 per 100,000 population in the third quarter of 2007. In the same period in 2006 the rate was 7.3 per 100,000 population. *C. jejuni* was the predominant species identified (representing 62% of the total and 93% of all known species) (Table 7). In the third quarter of 2007, most cases were reported in persons aged between 15 and 64 years (59%) and of male gender (53%). Data on 90% of travel-associated cases included a source country. The top three reported source countries were Spain (371 cases and 25% of all sources identified), Turkey (315, 21%) and Bulgaria (259, 17%).

In the third quarter of 2007, a total of 1,096 isolates were tested for antimicrobial resistance. In contrast, only 207 were reported to have been tested in the third quarter of 2006. The highest proportion of *C. jejuni* and *C. coli* isolates were resistant to

tetracyclines, nalidixic acid and tetracyclines, with the proportion of resistant *C. coli* isolates nearly triple that of *C. jejuni*. Multidrug-resistance was identified in 10% of all isolates tested in the third quarter of 2007, and was most frequent among *C. coli* species (23%) (Table 8). In the third quarter of 2006, 18% of all isolates tested were reported to be MDR.

Conclusion

The first quarterly report by ECDC on cases of *Salmonella*, VTEC and *Campylobacter* is limited by its inability to compare data with prior reports due to a lack of consistency in reporting countries and systems. For the purpose of interpretation, however, we compared the findings from this report with those from the Community Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents, Antimicrobial resistance and Foodborne outbreaks in the European Union in 2006 (Zoonoses Report) [4]. We found that the proportions of *S. Enteritidis* and *S. Typhimurium* to other serotypes were similar, as was the breakdown of the ages of the reported cases. *S. Java* stands out for being reported more frequently than expected due to an outbreak occurring in Sweden briefly described in the report. *Salmonella* drug-resistance data is consistent with the findings from the 2006 third quarterly report, concerning levels of resistance to commonly used antibiotics, particularly sulphonamides and tetracyclines.

Other noteworthy findings in the present report are that VTEC O157 cases constitute a larger proportion of all reported serotypes in the third quarter of 2007 when compared with findings of the 2006 Zoonoses Report [4] where 47% were VTEC O157, and with the third quarterly report of 2006 in which 42% were reported as VTEC O157. To see more bloody diarrhoea among VTEC O157 cases than among non O157 cases is something to be expected. Finding as many HUS cases among both VTEC O157 and non-O157 cases,

TABLE 7

Cases of *Campylobacter*, by species, third quarter of 2007 (11 countries reporting)

Species	Number of cases	Percentage of total	Percentage of isolates typed
<i>C. jejuni</i>	12,494	61.7	92.9
<i>C. coli</i>	445	2.2	3.3
Other	510	2.5	3.8
Not typed	6,816	33.6	-
Total	20,265	100.0	100.0

TABLE 8

Multidrug-resistant (MDR) *Campylobacter*, by species, third quarter of 2007 (three countries reporting)

Species	Number of MDR isolates	Total number of isolates tested	Percentage of the total
<i>C. jejuni</i>	70	898	7.8
<i>C. coli</i>	36	159	22.6
Others	1	39	2.6
Total	107	1,096	9.8

MDR – resistant to ≥ 4 antimicrobial drugs

however, is unusual, as typically there are many more HUS cases associated with VTEC O157 than with non-O157. This finding may be explained partly by the fact that some countries have not been testing for non-O157 isolates and only now are beginning to do so [4]. The proportion of *C. jejuni* to *C. coli* cases reported, and their respective resistance patterns offer no deviations from findings over 2006 [4]. Yet the fact that few VTEC and *Campylobacter* specimens submitted in the third quarter of 2007 demonstrated multi drug-resistance is difficult to interpret, due to a small number of countries reporting this information and a need for many more samples to be analyzed before trends can be interpreted.

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