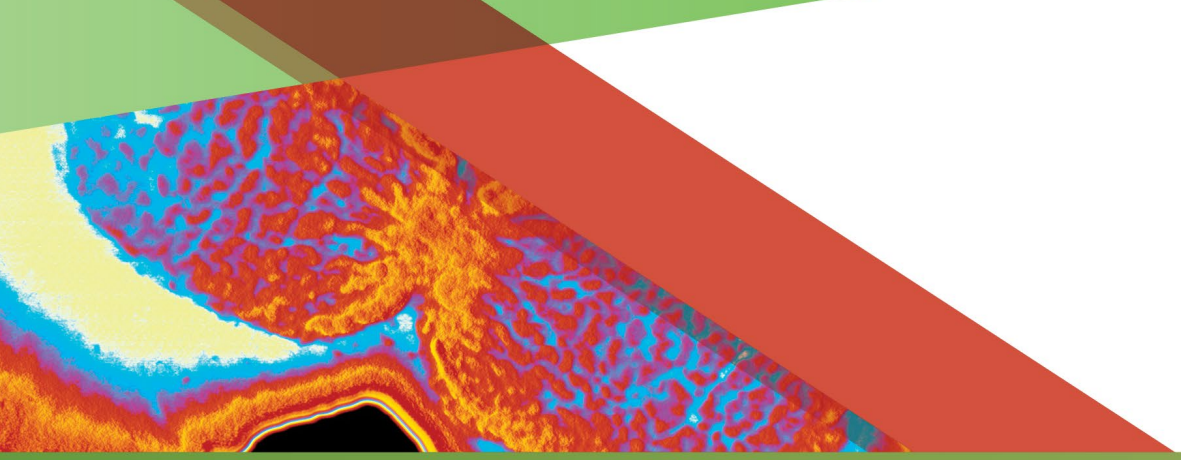

SURVEILLANCE REPORT

Shigellosis

Annual Epidemiological Report for 2019

Key facts

- Shigellosis is a relatively uncommon disease in the EU/EEA, but remains of concern in some countries and certain population groups.
- For 2019, 30 EU/EEA countries reported 8 448 confirmed shigellosis cases.
- The overall notification rate was 2.2 cases per 100 000 population, slightly higher than in 2018.
- The highest notification rate was observed in children below five years of age, followed by male adults aged 25–44 years. Sexual transmission of shigellosis among men who have sex with men (MSM) is thought to have contributed to the gender imbalance characterising the disease.

Introduction

Shigellosis is a gastrointestinal infection caused by one of the four species of the *Shigella* bacteria: *Shigella sonnei*, *S. flexneri*, *S. boydii* and *S. dysenteriae*. Humans are the only primary reservoir of the *Shigella* bacteria. Thus, shigellosis is caught by swallowing material contaminated by human faeces, either via the hands or objects which have been in contact with faeces.

Infection can also be caught from ingesting contaminated food and water. The disease primarily affects children, though within high-income settings, travellers and MSM are identified as the main risk groups. Increasing resistance of the bacteria to first- and second-line antimicrobials is of concern.

Methods

This report is based on data for 2019 retrieved from The European Surveillance System (TESSy) on 5 November 2021. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases.

For a detailed description of the methods used to produce this report, please refer to the 'Methods' chapter in the 'Introduction to the Annual Epidemiological Report' [1].

An overview of the national surveillance systems is available online [2].

A subset of the data used for this report is available through ECDC's online *Surveillance Atlas of Infectious Diseases* [3].

Thirty countries reported data for 2019. Twenty-six countries used various versions of the EU case definition for shigellosis (from 2002, 2008, 2012 or 2018).

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Stockholm, October 2022

Compared with previous EU case definitions, the 2018 EU case definition allows genotypic tests for laboratory confirmation of a probable case. Denmark, France, Germany and Italy used a case definition described as 'other', and Belgium did not specify which definition they used [2].

Twenty-six countries had a compulsory notification system for shigellosis. France and Italy used a voluntary system, while Belgium and the United Kingdom (UK) used another type of surveillance system. All countries had comprehensive surveillance of shigellosis except Italy, which used a sentinel system. Czechia and Slovakia used active surveillance systems, while all other countries used passive systems. Twenty-two countries had surveillance systems that integrated laboratory and epidemiological data from physicians or hospitals.

In addition to TESSy records, information from event-based surveillance for shigellosis clusters and outbreaks with a potential EU/EEA dimension was collected through the Epidemic Intelligence Information System for Food- and Waterborne Diseases and Zoonoses (EPIS-FWD).

Epidemiology

For 2019, 30 countries reported 8 798 cases of shigellosis, 8 448 of which were confirmed (Table 1). Two countries (France and the UK) accounted for 52.5% of the confirmed cases, with the UK alone accounting for 38.7% of the confirmed cases.

The overall EU/EEA notification rate for shigellosis cases was 2.2 cases per 100 000 population in 2019. The UK reported the highest notification rate of all EU/EEA countries with 4.9 cases per 100 000 population, followed by France with 3.9 cases and Belgium with 3.7 cases per 100 000 population (Table 1, Figure 1).

Travel status was available for 4 340 confirmed cases (51.4 %), and 2 092 of these (48.2%) were related to travel. Egypt, India, Morocco and Pakistan were the most frequently mentioned probable countries of infection among travel-related cases. A total of 155 cases were imported with a probable country of infection within the EU/EEA.

Out of 8 448 confirmed cases, only 806 had information regarding the suspected mode of transmission. Transmission via food was the most commonly reported (572), followed by sex (142), person-to-person transmission (87; excluding mother-to-child and sexual transmission), other (4), or recreational water activities (1).

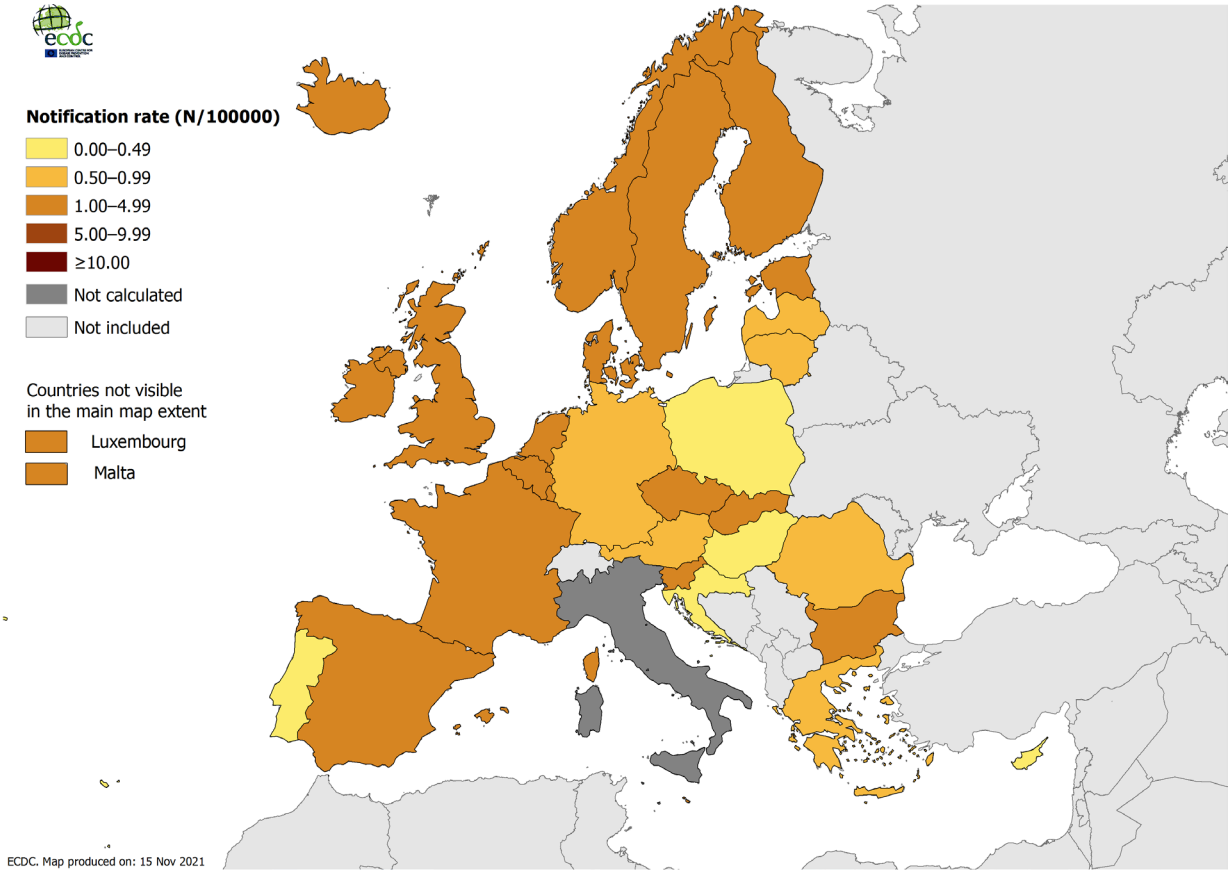
Table 1. Distribution of confirmed shigellosis cases and rates per 100 000 population by country and year, EU/EEA, 2015–2019

Country	2015		2016		2017		2018		2019		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	96	1.1	62	0.7	54	0.6	69	0.8	72	0.8	0.8
Belgium	391	3.5	353	3.1	353	3.1	427	3.7	423	3.7	3.6
Bulgaria	410	5.7	291	4.1	308	4.3	235	3.3	219	3.1	3.4
Croatia	12	0.3	6	0.1	1	0.0	29	0.7	17	0.4	0.5
Cyprus	0	0.0	1	0.1	0	0.0	4	0.5	2	0.2	0.2
Czechia	88	0.8	68	0.6	166	1.6	142	1.3	127	1.2	1.2
Denmark	170	3.0	212	3.7	137	2.4	146	2.5	192	3.3	3.4
Estonia	12	0.9	17	1.3	16	1.2	17	1.3	29	2.2	2.2
Finland	86	1.6	59	1.1	85	1.5	111	2.0	154	2.8	3.0
France	822	2.8	828	2.8	997	3.4	1 132	3.8	1 167	3.9	4.1
Germany	555	0.7	419	0.5	438	0.5	655	0.8	614	0.7	0.8
Greece	78	0.7	72	0.7	81	0.8	78	0.7	104	1.0	1.1
Hungary	65	0.7	23	0.2	18	0.2	13	0.1	45	0.5	0.5
Iceland	1	0.3	0	0.0	6	1.8	4	1.1	4	1.1	1.1
Ireland	88	1.9	84	1.8	97	2.0	101	2.1	121	2.5	2.5
Italy	26	-	20	-	17	-	32	-	40	-	-

Country	2015		2016		2017		2018		2019		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Latvia	12	0.6	3	0.2	3	0.2	17	0.9	14	0.7	0.8
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.
Lithuania	24	0.8	13	0.5	9	0.3	21	0.7	17	0.6	0.7
Luxembourg	3	0.5	1	0.2	9	1.5	11	1.8	13	2.1	2.0
Malta	1	0.2	2	0.4	2	0.4	4	0.8	9	1.8	1.8
Netherlands	444	2.6	428	2.5	410	2.4	484	2.8	516	3.0	3.1
Norway	85	1.6	83	1.6	115	2.2	102	1.9	133	2.5	2.5
Poland	18	0.0	15	0.0	31	0.1	89	0.2	34	0.1	0.1
Portugal	33	0.3	13	0.1	12	0.1	24	0.2	8	0.1	0.1
Romania	168	0.8	129	0.7	122	0.6	147	0.8	117	0.6	0.6
Slovakia	191	3.5	145	2.7	257	4.7	195	3.6	146	2.7	2.7
Slovenia	34	1.6	17	0.8	16	0.8	26	1.3	24	1.2	1.3
Spain	293	0.6	180	0.4	325	0.7	455	1.0	512	1.1	1.1
Sweden	311	3.2	232	2.4	213	2.1	259	2.6	305	3.0	3.0
United Kingdom	2 208	3.4	1 856	2.8	2 040	3.1	2 617	3.9	3 270	4.9	5.0
EU-EEA	**6 725**	**1.7**	**5 632**	**1.5**	**6 338**	**1.7**	**7 646**	**2.0**	**8 448**	**2.2**	**2.2**

Source: Country reports
ASR: age-standardised rate
.: no data reported
-: no rate calculated

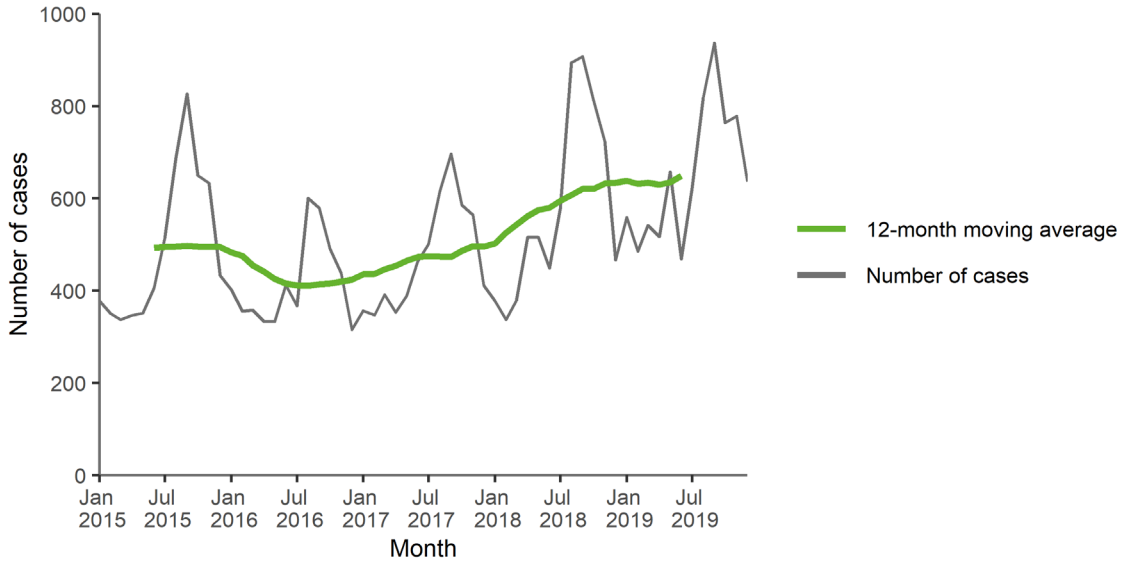
Figure 1. Distribution of confirmed shigellosis cases per 100 000 population by country, EU/EEA, 2019



Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom. Notification rates for Italy were not calculated.

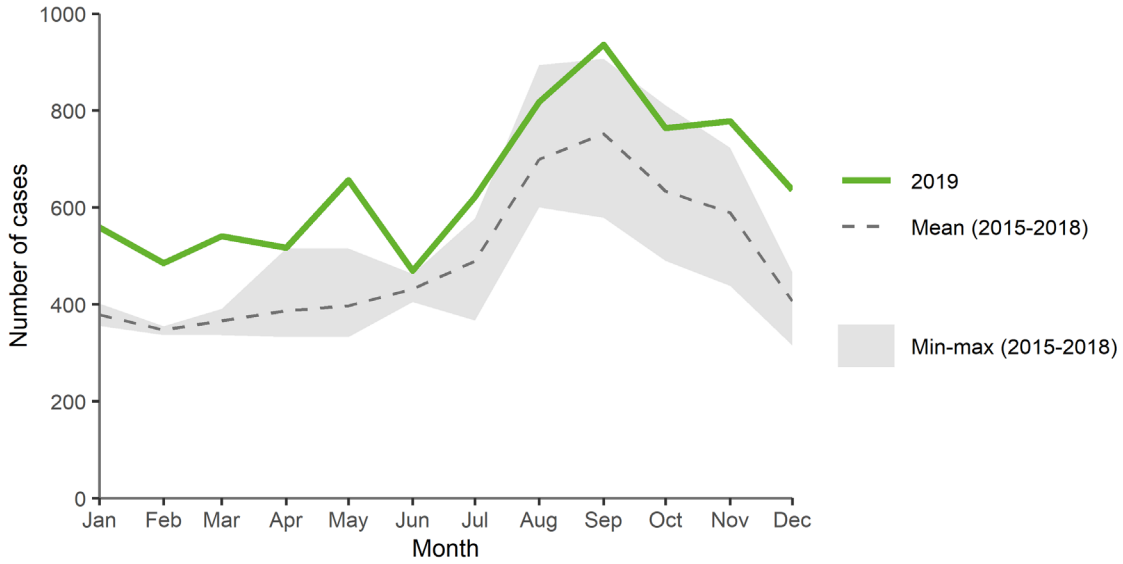
As in previous years, confirmed shigellosis cases reported for 2019 followed a characteristic seasonal trend, with peaks in late summer/autumn (Figure 3). Throughout the whole year, case numbers were similar to or higher than the maxima of the past four years. There has been a gradual increase in case numbers per year since 2016 (Figure 2).

Figure 2. Distribution of confirmed shigellosis cases by month, EU/EEA, 2015–2019



Source: Country reports from Austria, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

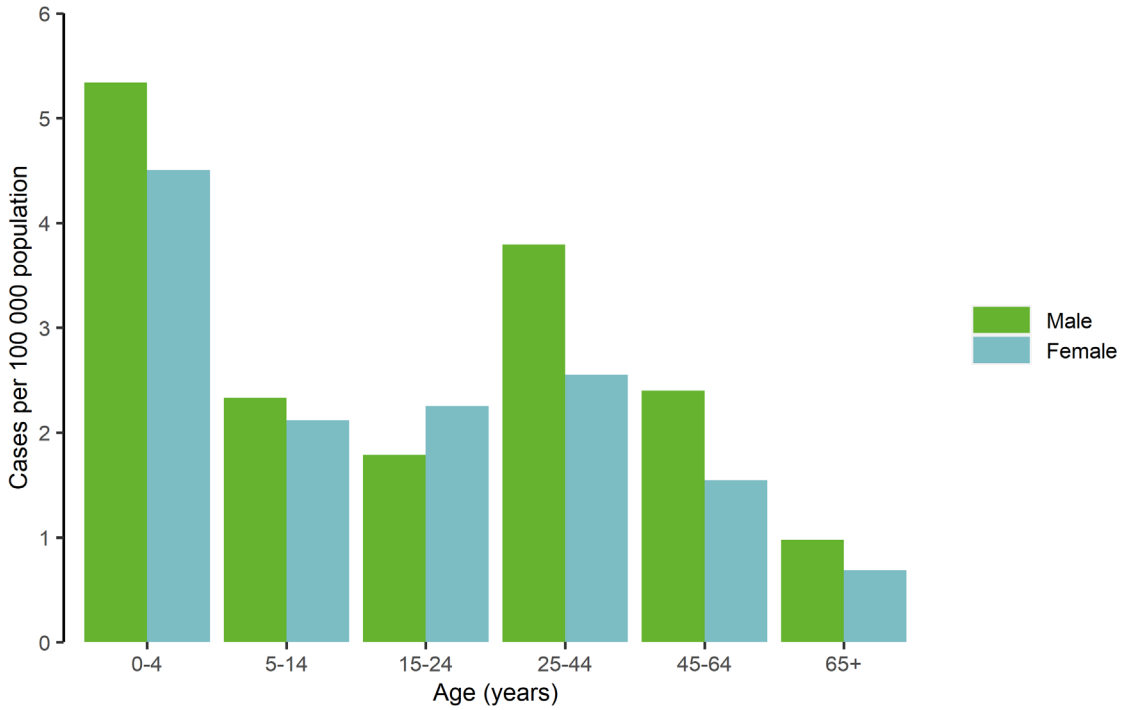
Figure 3. Distribution of confirmed shigellosis cases by month, EU/EEA, 2019 and 2015–2018



Source: Country reports from Austria, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

For 2019, the highest notification rate of shigellosis was observed in children below five years of age: 4.8 cases per 100 000 population (Figure 4). Male cases aged 25–44 years had the second-highest overall notification rate at 3.7 cases per 100 000 population. Notification rates in the age group 0–4 years were the highest in Bulgaria and Slovakia, with 26.7 and 20.2 cases per 100 000 population, respectively. The overall male-to-female ratio was 1.4:1 and in the age group 25–44 years, 1.5:1.

Figure 4. Distribution of confirmed shigellosis cases per 100 000 population, by age and gender, EU/EEA, 2019



Species information was available for 6 306 confirmed cases. Among those, *Shigella sonnei* was the most frequent species identified, followed by *Shigella flexneri* (Table 2). Together they accounted for 94.8% of the cases. *S. sonnei* was the most frequently identified species in both autochthonous and travel-related cases. *S. flexneri* 2a was the most common serotype (241 cases) reported for *S. flexneri* (*S. sonnei* is not divided by serotype).

Table 2. Distribution of confirmed shigellosis cases by species, EU/EEA, 2019

Pathogen	Number of cases	Percentage
Shigella sonnei	3 745	59.4 %
Shigella flexneri	2 234	35.4 %
Shigella boydii	204	3.2 %
Shigella dysenteriae	123	2.0 %
Total	**6 306**	**100 %**

Source: TESSy data extracted on 21 February 2022

Table 3 provides an overview of antimicrobial resistance in isolates from confirmed shigellosis cases, stratified by species (only *S. sonnei* and *S. flexneri*). Among the antimicrobials that can be reported for *Shigella* to TESSy, isolates were predominantly tested for ampicillin, cefotaxime and ciprofloxacin resistance. In both species, resistance to ampicillin and trimethoprim-sulfamethoxazole is high (45.6–88.2%). While ampicillin resistance is higher in *S. sonnei*, trimethoprim-sulfamethoxazole resistance is higher in *S. flexneri.* In addition, a considerable proportion of isolates from both species are resistant to ciprofloxacin (25.5–36.9%). Even though overall resistance to third-generation cephalosporins is relatively low, 16.2% of the *S. sonnei* isolates were resistant to cefotaxime compared to only 1.2% among *S. flexneri.* Azithromycin susceptibility was less frequently investigated. Nine out of 65 *S. sonnei* isolates had the non-wild type phenotype, compared to only one out of 15 *S. flexneri* isolates.

Table 3. Antimicrobial resistance in isolates from confirmed shigellosis cases by pathogen, 2019

		Ampicillin		Azithromycin		Cefotaxime		Ceftazidime		Ciprofloxacin		SXT	
	Susceptibility	N	%	N	%	N	%	N	%	N	%	N	%
S. sonnei	R	684	45.6	NA	NA	192	16.2	22	4.8	339	36.9	285	88.2
	I/NWT	0	0.0	9	13.8	1	0.1	25	5.4	15	1.6	0	0.0
	S/WT	816	54.4	56	86.2	994	83.7	415	89.8	564	61.4	38	11.8
	Total	1500	-	65	-	1187	-	462	-	918	-	323	-
S. flexneri	R	739	80.0	NA	NA	8	1.2	7	3.7	133	25.5	121	47.1
	I/NWT	0	0.0	1	6.7	1	0.2	2	1.1	8	1.5	0	0.0
	S/WT	185	20.0	14	93.3	657	98.6	181	95.3	380	72.9	136	52.9
	Total	924	-	15	-	666	-	190	-	521	-	257	-

Source: TESSy data extracted on 22 February 2022

N: number of isolates; %: percentage of tested isolates; R: resistant; I/NWT: susceptible, increased exposure or non-wild type; S/WT: susceptible, standard dosing regimen or wild type; SXT – trimethoprim-sulfamethoxazole

** Azithromycin classification is based on epidemiological cut-off values and therefore the terminology, wild type and non-wild type is used.*

Outbreaks and other threats

A total of 22 foodborne outbreaks in EU Member States have been reported in the European Union One Health 2019 Zoonoses Report, with a total of 106 associated cases [4]. In addition, the report mentions three additional outbreaks in Norway and Serbia with a total of 38 cases [4].

One outbreak associated with *S. sonnei* in two youth camps in Belgium has been published in scientific literature. The strain was believed to be introduced from Central America after a recent travel [5].

Discussion

For 2019, 8 448 confirmed cases of shigellosis have been reported by 30 countries. This corresponds to a notification rate of 2.2 cases per 100 000 population, which represents a further increase compared to 2018. Even though the UK is not the only country reporting a rise in cases, it has contributed the most to the overall increase observed between 2017 and 2019. In addition, cases reported by the UK alone accounted for 38.7% of all cases in the EU/EEA. Public Health England has ascribed this increase to increased transmission of shigellosis among presumed MSM [6]. While the total number of diagnoses for women and the number of travel-associated diagnoses for men were relatively stable throughout the years, the number of non-travel-associated cases among men has increased [6]. Even though data on the sexual behaviour of these men is lacking, it is presumed that these are MSM.

Similar to previous years, the highest notification rates of shigellosis can be found among children below five years of age and men in the age group 25–44 years. A similar pattern in the latter age group was notified in England and it has been hypothesised that this could be due to sexual transmission in MSM [7]. Of particular concern is the high prevalence of antimicrobial resistance among this group [6, 8, 9].

Globally, the burden of shigellosis is the highest in low- and middle-income settings [9]. Within high-income settings, travellers and MSM are identified as the main risk groups for shigellosis [8, 9]. About half of the reported cases for 2019 were associated with travel, mainly to destinations outside the EU/EEA. Information on sexual preference is not available in the data. However, 17.6% of those with known transmission modes, were classified as sexually transmitted.

A substantial proportion of isolates tested for antimicrobial susceptibility were resistant to ampicillin, ciprofloxacin and trimethoprim-sulfamethoxazole. In addition, several non-wild type azithromycin phenotypes have been identified. Resistance against third-generation cephalosporins was relatively low, except for 192 *S. sonnei* isolates which were resistant against cefotaxime. The discrepancy in resistance against cefotaxime and ceftazidime could possibly be explained by the presence of CTX-M extended spectrum beta-lactamases with a higher activity against cefotaxime [10]. However, it should be noted that 65.1% of these were not tested for ceftazidime susceptibility. Given that several of these drugs are recommended as first or second-line therapy, concerns have been raised about the risk of therapy failure [9]. In 2017, the World Health Organization had listed a fluoroquinolone-resistant *Shigella* species as a priority pathogen for antibiotic development [11].

Public health implications

Humans are the only primary reservoir for the *Shigella* species, with transmission occurring either through person-to-person contact or ingestion of contaminated food or water [9]. In the past few decades, sexually transmitted *Shigella* has been reported [9]. Within high-income settings, travellers and MSM are identified as the main risk groups for shigellosis [8, 9].

In general, prevention of infection and control of outbreaks relies on good personal and environmental hygiene practices to prevent faecal-oral transmission, particularly during sexual activities. Travellers to endemic areas benefit from adhering to common advice on how to avoid food- and waterborne infections when travelling. Targeted information campaigns to increase awareness of shigellosis could help reduce the spread of infection among risk groups.

Even though the main therapy for shigellosis is conservative, antibiotics can be used in case of dysentery to shorten the duration of symptoms and pathogen shedding [9]. However, prescribing clinicians should be aware of the increasing resistance of the *Shigella* bacteria among commonly prescribed therapy regimens, especially among high-risk groups.

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