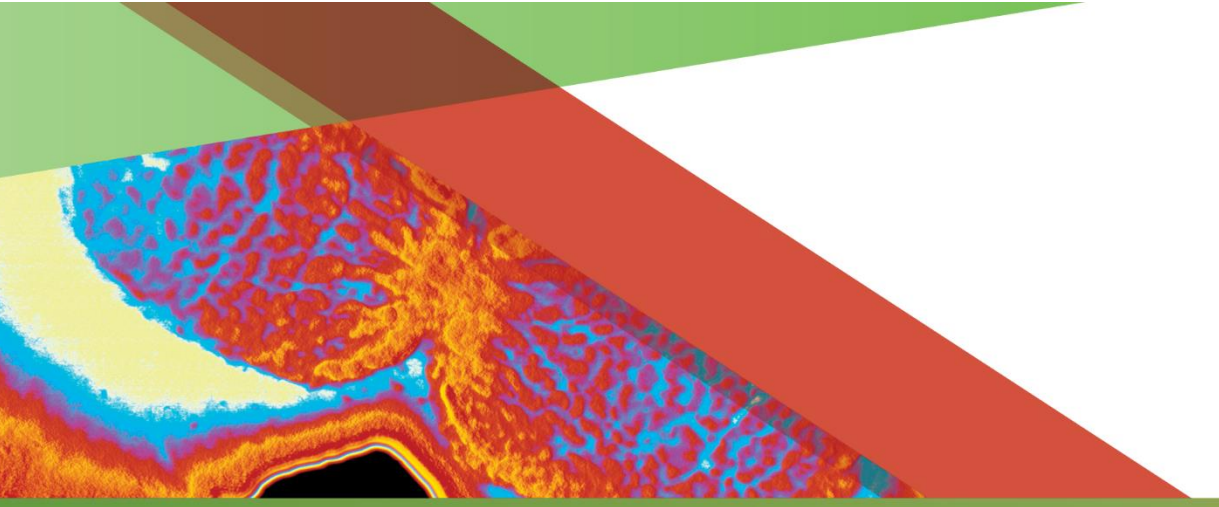


SURVEILLANCE REPORT

Annual Epidemiological Report for 2020

Shigellosis

Key facts

- Shigellosis is a relatively uncommon disease in the EU/EEA, but remains of concern in some countries and for some population groups.
- For 2020, 29 EU/EEA countries reported 1 806 confirmed shigellosis cases.
- The overall notification rate was 0.7 cases per 100 000 population. This is the lowest rate reported in the past five years, possibly due to a combined effect of the absence of UK data after exit from the EU and the COVID-19 pandemic.
- The highest notification rate was observed in children under 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 in the latter group.

Introduction

Shigellosis is a gastrointestinal infection caused by one of four species of Shigella bacteria: *Shigella sonnei*, *S. flexneri*, *S. boydii* and *S. dysenteriae*. Humans are the only primary reservoir and thus, shigellosis is caught by swallowing material contaminated by human faeces, either via the hands or on objects which have been in contact with faeces. Infection can also be caught from contaminated food and water. It is largely a disease of children in low-income settings, although within high-income settings, travellers and MSM are identified as the main risk groups. Increasing resistance to first- and second line antimicrobials is of concern.

Suggested citation: European Centre for Disease Prevention and Control. Shigellosis. In: ECDC. Annual epidemiological report for 2020. Stockholm: ECDC; 2022.

Stockholm, September 2022

Methods

This report is based on data for 2020 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 methods used to produce this report, please refer to the *Methods* chapter [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].

Twenty-nine countries reported data for 2020. No data for 2020 was reported by the United Kingdom due to the withdrawal of the UK from the EU on 31 January 2020. Twenty-four countries used various versions of the EU case definition for shigellosis (from 2002, 2008, 2012 or 2018). 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. France and Italy used a voluntary system and Belgium 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-one countries had surveillance systems that integrate 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 (EPIS-FWD).

Epidemiology

For 2020, 29 countries reported 1 930 cases of shigellosis (Table 1), of which 1 806 were confirmed. Three countries accounted for 50.6% of confirmed cases: France, the Netherlands and Germany, with France alone accounting for 32.1% of all confirmed cases.

The overall EU/EEA notification rate for shigellosis cases was 0.7 cases per 100 000 population for 2020. Luxembourg reported the highest notification rate of all EU/EEA countries with 2.1 cases per 100 000 population, followed by France and Slovakia who both have a notification rate of 1.9 cases per 100 000 population (Table 1, Figure 1).

Travel status was available for 1 028 confirmed cases (56.9%) and 290 of these (28.2%) were related to travel. Egypt, Indonesia, India and Madagascar were most frequently mentioned as probable country of infection among travel-related cases.

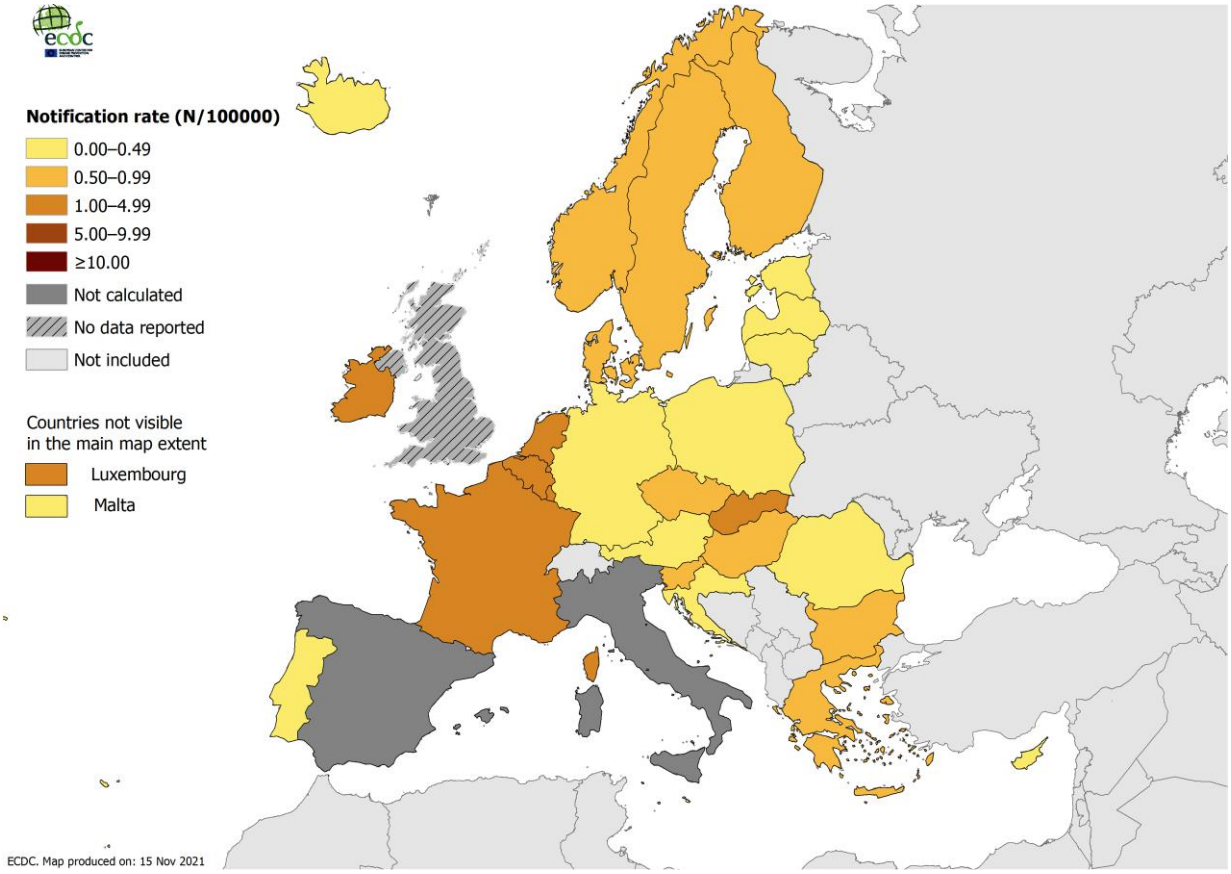
Out of 1 806 confirmed cases, only 236 had information on the suspected mode of transmission. Transmission via food was the most commonly reported (156), followed by sexual transmission (64), person-to-person (13; excluding mother-to-child and sexual transmission) or other (3).

Table 1. Distribution of confirmed shigellosis cases and rates per 100 000 population by country and year, EU/EEA, 2016–2020

Country	2016		2017		2018		2019		2020		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	62	0.7	54	0.6	69	0.8	72	0.8	25	0.3	0.3
Belgium	353	3.1	353	3.1	427	3.7	423	3.7	115	1.0	1.0
Bulgaria	291	4.1	308	4.3	235	3.3	219	3.1	47	0.7	0.7
Croatia	6	0.1	1	0.0	29	0.7	17	0.4	1	0.0	0.0
Cyprus	1	0.1	0	0.0	4	0.5	2	0.2	0	0.0	0.0
Czechia	68	0.6	166	1.6	142	1.3	127	1.2	72	0.7	0.7
Denmark	212	3.7	137	2.4	146	2.5	192	3.3	51	0.9	0.9
Estonia	17	1.3	16	1.2	17	1.3	29	2.2	4	0.3	0.3
Finland	59	1.1	85	1.5	111	2.0	154	2.8	41	0.7	0.8
France	828	2.8	997	3.4	1 132	3.8	1 167	3.9	564	1.9	2.0
Germany	419	0.5	438	0.5	655	0.8	614	0.7	139	0.2	0.2
Greece	72	0.7	81	0.8	78	0.7	104	1.0	61	0.6	0.7
Hungary	23	0.2	18	0.2	13	0.1	45	0.5	61	0.6	0.7
Iceland	0	0.0	6	1.8	4	1.1	4	1.1	1	0.3	0.3
Ireland	84	1.8	97	2.0	101	2.1	121	2.5	66	1.3	1.3
Italy	20	-	17	-	32	-	40	-	14	-	-
Latvia	3	0.2	3	0.2	17	0.9	14	0.7	3	0.2	0.2
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.
Lithuania	13	0.5	9	0.3	21	0.7	17	0.6	2	0.1	-
Luxembourg	1	0.2	9	1.5	11	1.8	13	2.1	13	2.1	2.1
Malta	2	0.4	2	0.4	4	0.8	9	1.8	0	0.0	0.0
Netherlands	428	2.5	410	2.4	484	2.8	516	3.0	187	1.1	1.1
Norway	83	1.6	115	2.2	102	1.9	133	2.5	37	0.7	0.7
Poland	15	0.0	31	0.1	89	0.2	34	0.1	12	0.0	0.0
Portugal	13	0.1	12	0.1	24	0.2	8	0.1	5	0.0	0.1
Romania	129	0.7	122	0.6	147	0.8	117	0.6	15	0.1	0.1
Slovakia	145	2.7	257	4.7	195	3.6	146	2.7	103	1.9	1.9
Slovenia	17	0.8	16	0.8	26	1.3	24	1.2	14	0.7	0.7
Spain	180	0.4	325	0.7	455	1.0	512	1.1	72	-	-
Sweden	232	2.4	213	2.1	259	2.6	305	3.0	81	0.8	0.8
United Kingdom	1 856	2.8	2 040	3.1	2 617	3.9	3 270	4.9	-	-	-
EU-EEA	**5 632**	**1.5**	**6 338**	**1.7**	**7 646**	**2.0**	**8 448**	**2.2**	**1 806**	**0.7**	**0.7**

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

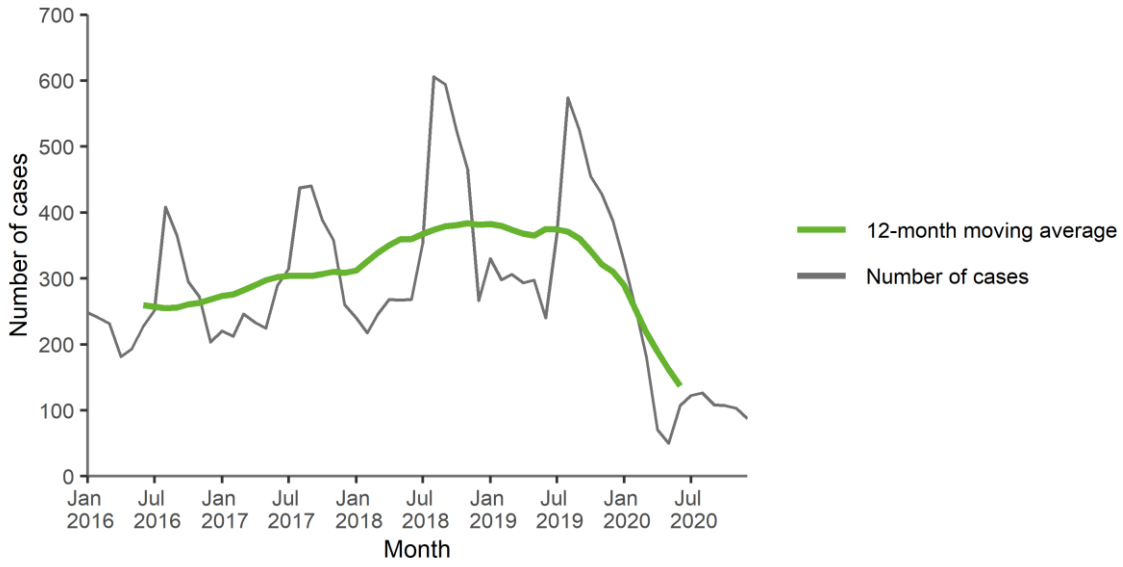
Figure 1. Distribution of confirmed shigellosis cases per 100 000 population by country, EU/EEA, 2020



Source: country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, and Sweden. No rate calculated for Italy and Spain.

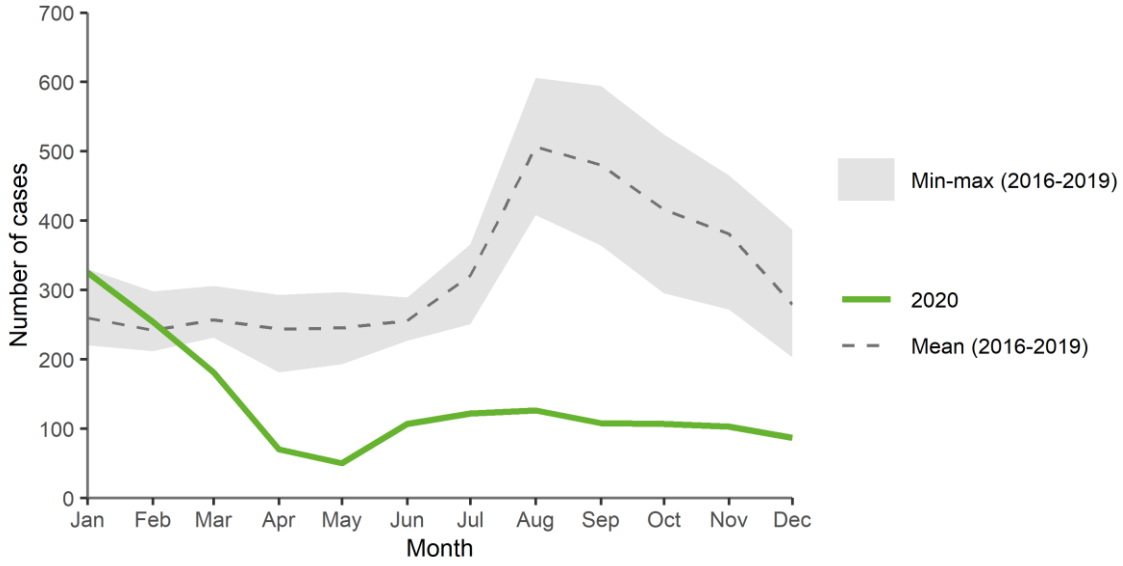
In contrast to previous years, there was a marked decrease in confirmed cases reported for the period February–May 2020 (Figure 2 and Figure 3). During the summer and autumn months, there was a slight increase of reported cases corresponding to the seasonal trend of previous years (Figure 2). However, the number of cases reported for this period also remained far below the minimum of the period 2016-2019 (Figure 3.)

Figure 2. Distribution of confirmed shigellosis cases by month, EU/EEA, 2016–2020



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

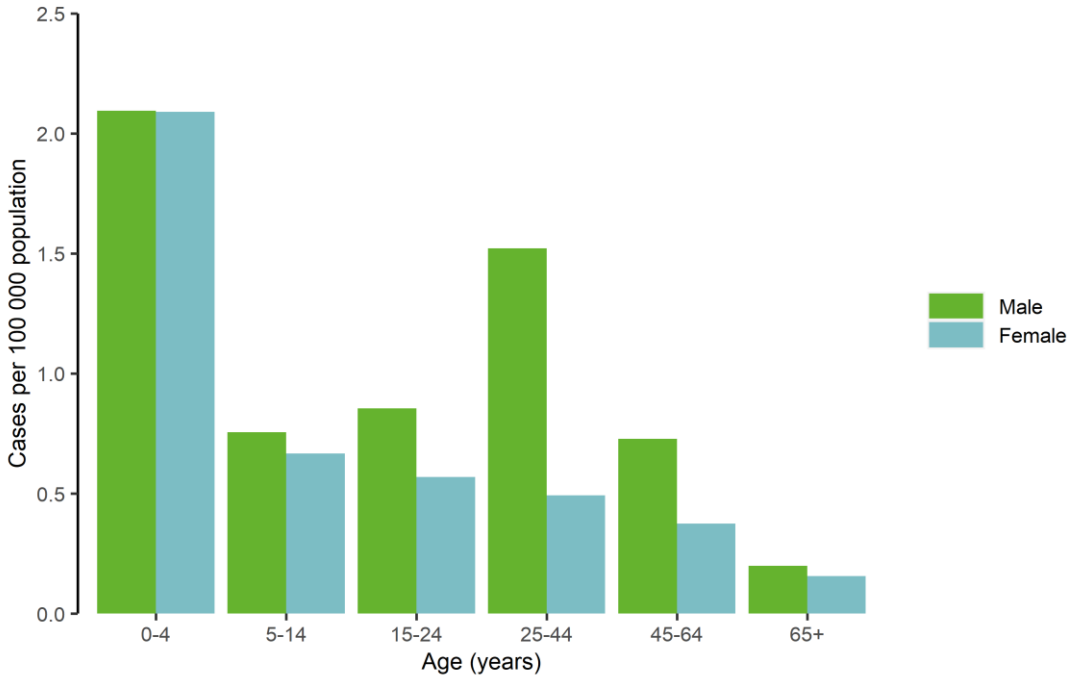
Figure 3. Distribution of confirmed shigellosis cases by month, EU/EEA, 2020 and 2016–2019



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

For 2020, the highest notification rate of shigellosis was observed in children under five years: 2.1 cases per 100 000 population (Figure 4). Male cases aged 25–44 years had the second-highest overall notification rate at 1.5 cases per 100 000 population. Notification rates in the age group 0–4 years were highest in Slovakia and Bulgaria, with 21.1 and 7.2 cases per 100 000 population, respectively. The overall male-to-female ratio was 1.8:1 and in the age group 25–44 years, 3:1.

Figure 4. Distribution of confirmed shigellosis cases per 100 000 population, by age and sex, EU/EEA, 2020



Species information was available for 1 591 confirmed cases. Among those, *Shigella sonnei* was the most frequent species identified, followed by *Shigella flexneri* (Table 2). Together, they accounted for 95.8% 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 (136 cases) reported for *S. flexneri* (*S. sonnei* is not divided by serotype).

Table 2. Distribution of confirmed shigellosis cases by species, EU/EEA, 2020

Pathogen	Number of cases	Percentage
Shigella sonnei	779	49.0 %
Shigella flexneri	745	46.8 %
Shigella boydii	47	3.0 %
Shigella dysenteriae	20	1.3 %
Total	**1 591**	**100 %**

Source: TESSy data extracted 8 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*). Isolates were predominantly tested for ampicillin and cefotaxime resistance. In both species, more than 50% was resistant to ampicillin while resistance against third-generation cephalosporins was low. Resistance against ciprofloxacin, however, was notable with 18.0% and 30.9% in *S. flexneri* and *S. sonnei* respectively. Few isolates were tested for susceptibility to trimethoprim-sulfamethoxazole or azithromycin. Fourteen out of 15 *S. sonnei* isolates were resistant to trimethoprim-sulfamethoxazole, compared to two out of nine *S. flexneri* isolates. Three out of 16 *S. sonnei* isolates were classified as the azithromycin non-wild type phenotype, compared to one out of six *S. flexneri* isolates.

Table 3. Antimicrobial resistance in isolates from confirmed shigellosis cases by pathogen, 2020

		Ampicillin		Azithromycin		Cefotaxime		Ceftazidime		Ciprofloxacin		SXT	
	Susceptibility	N	%	N	%	N	%	N	%	N	%	N	%
S. sonnei	R	181	54.8	NA	NA	13	3.9	2	2.9	21	30.9	14	93.3
	I/NWT	0	0.0	3	18.8	0	0.0	10	14.7	0	0.0	1	6.7
	S/WT	149	45.2	13	81.2	317	96.1	56	82.4	47	69.1	0	0
	Total	330	-	16	-	330	-	68	-	68	-	15	-
S. flexneri	R	324	90.0	NA	NA	1	0.3	0	0	11	18.0	2	22.2
	I/NWT	0	0.0	1	16.7	0	0.0	0	0.0	0	0.0	0	0.0
	S/WT	36	10.0	5	83.3	359	99.7	66	100.0	50	82.0	7	77.8
	Total	360	-	6	-	360	-	66	-	61	-	9	-

Source: TESSy data extracted 8 February 2022

N – Number of isolates; % - percent 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

Five foodborne shigellosis outbreaks were reported by four Member States (Denmark, France, the Netherlands and Slovakia) in the European Union One Health 2020 Zoonoses report [4]. In addition, Hungary identified three shigellosis outbreaks in 2020: two small family outbreaks and one outbreak in a long-term care facility where 58 people became ill (personal communication E. Mezei, National Public Health Centre, Budapest, Hungary, 26 July 2021).

Discussion

For 2020, 1 806 confirmed cases of shigellosis were reported by 29 countries. This corresponds to a notification rate of 0.7 per 100 000 population, which is the lowest notification rate of the past five years This is the first annual epidemiological report without data from the UK since the country exited from the EU on 31 January 2020. As can be observed in Table 1, the UK was responsible for more than 30% of all shigellosis cases reported in the period between 2016-2019 and had the highest notification rate for 2019. The absence of UK data has therefore likely substantially contributed to the decrease in total case numbers and the notification rate. However, the total case numbers for 2020 are also far below the case numbers of previous years after subtracting UK cases.

It can be hypothesised that the COVID-19 pandemic has significantly contributed to a decrease in cases, even though it is not possible to confirm this with the data available. Several factors have been suggested by countries which could possibly explain the decrease in cases. There could be a true reduction in transmission due to reduced travel because of travel restrictions, fewer social interactions, and increased hygiene measures. On the other hand, there is a potential risk for underdiagnosis due to reduced care seeking behaviour for mild symptoms or reduced capacity for diagnosis of mild diseases for example. Interestingly, the decrease in cases and notification rates compared to 2019 occurred in all countries except for Luxembourg and Hungary. The increase observed in Hungary could be explained by an outbreak in a long-term care facility between January and February 2020 where a total of 58 residents out of 116 fell ill.

The suspected transmission mode was person-to-person (personal communication E. Mezei, National Public Health Centre, Budapest, Hungary, 26 July 2021). No information could be found to explain the steady level of cases in Luxembourg. However, it should be noted that in absolute numbers they are still low.

Despite the lower notification rates in 2020, the age and sex distribution remained similar. We note a much higher notification rate among children under five years old and among men in the age group 25-44 years old. 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 [5]. However, the difference between men and women in this age group is more pronounced compared to previous years. For 2020, there is a male-to-female ratio of 3:1 in the age group 25-44 years old, compared to ratios between 1.3:1 and 1.5:1 in the period 2016-2019. This could possibly be explained by a differential effect of COVID-19 restrictions, where travel-associated cases were more drastically reduced than sexually-transmitted cases [6]. Of particular concern is the high prevalence of antimicrobial resistance among this group [6-8].

Globally, the burden of shigellosis is the highest in low- and middle-income settings [8]. Within high-income settings, travellers and MSM are identified as the main risk groups for shigellosis [7,8]. Twenty-eight percent of the reported cases for 2020 were associated with travel, which is lower than in previous years. A possible explanation could be travel restrictions during the COVID-19 pandemic. Information on sexual preference is not available in the data. However, 27.1 % of those with known transmission mode were classified as sexually-transmitted.

The data does not allow us to make inference on the presence of antimicrobial resistance in the EU/EEA. However, of the isolates tested, a substantial proportion were resistant to ampicillin and ciprofloxacin. In addition, several non-wild type azithromycin phenotypes and isolates resistant to trimethoprim-sulfamethoxazole were identified. Given that these drugs are recommended as first or second-line therapy, concerns have been raised about the risk of therapy failure [8]. Fluoroquinolone-resistant *Shigella* spp. was already listed as a priority pathogen for antibiotic development by the World Health Organization in 2017 [9].

Public health implications

Humans are the only primary reservoir for *Shigella* species, with transmission occurring either through person-to-person contact or ingestion of contaminated food or water [8]. In the past few decades, sexually-transmitted *Shigella* has been reported [8]. Within high-income settings, travellers and MSM are identified as the main risk groups for shigellosis [7,8]. 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 water-borne 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 shigella infection is conservative, antibiotics can be used in case of dysentery to shorten the duration of symptoms and pathogen shedding [8]. However, prescribing clinicians should be aware of the increasing resistance among commonly prescribed therapy regimens, especially among high-risk groups.

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