



## EPIDEMIOLOGICAL DATA FOR SHIGELLOSIS IN GREECE 2004-2023 MANDATORY NOTIFICATION SYSTEM

### Key Points

- The notification rate of shigellosis in Greece is low.
- Based on data for the 2004-2023 period:
  - The mean annual number of reported cases was low (62, SD=28.4).
  - The notification rate of the disease had a statistically significant seasonal trend; the mean monthly notification rate increased during summer months, reaching a peak in August ( $p<0.05$ ).
  - The disease was more frequently reported among children, especially in the age group of 0-4 years.
  - 8% of the cases were travel-related.
  - 48% of the notified cases were Roma.
  - The low notification rate of shigellosis during the period 2020-2021 may be attributed to the COVID-19 pandemic.

Shigellosis, also called bacillary dysentery, is a disease caused by the bacteria of the genus *Shigella*. *Shigella* comprises of four species or serogroups: *S. dysenteriae* (Group A), *S. flexneri* (Group B), *S. boydii* (Group C) and *S. sonnei* (Group D) [1].

The incubation period of the disease is usually 1-3 days, and may range from 12 to 96 hours; for *S. dysenteriae* it can be up to one week [1].

The pathogen can cause both sporadic cases and outbreaks [1,2]. In Greece, shigellosis is a mandatory notifiable disease.

### Time trend

The number of reported cases with the respective notification rate per year, for the period 2004-2023, are shown in **Table 1**. The temporal distribution of shigellosis notification rate for the same years is depicted in **Graph 1**. The annual notification rate ranged from 1.7 cases

in 2008 to 10.9 cases per 1,000,000 population in 2013. The mean annual notification rate for the period 2004-2023 was 5.7 cases per 1,000,000 population (standard deviation: 2.6) and the mean annual number of reported cases was 62 (standard deviation: 28.4). A statistically significant increasing or decreasing trend of the shigellosis notification rate was not observed during this period ( $p>0.05$ ).

#### Age and gender distribution

For the period 2004-2023, the disease had a higher mean annual notification rate in the age group 0-4 years (62.6 cases per 1,000,000 population), followed by the age group of 5-14 years (15.1 cases per 1,000,000 population) (**Graph 2**).

During the same period, the mean annual notification rate did not differ between males (5.9 cases/1,000,000 population) and females (5.4 cases/1,000,000 population).

#### Seasonality

There was a statistically significant seasonal trend of the notification rate of the disease ( $p<0.05$ ). The mean monthly notification rate for the period 2004-2023, increased during summer, reaching a peak in August, and remained high during autumn (**Graph 3**).

#### Geographical distribution

The geographical region of Western Greece had the highest mean annual notification rate (10.6 cases per 1,000,000 population), while the lowest rate was noted in the area of Southern Aegean (0.3 cases per 1,000,000 population). The mean annual notification rate of shigellosis by region for the period 2004-2023 is depicted in **Figure 1**.

#### Laboratory data

During 2004-2023, *S. flexneri* and *S. sonnei* were the most frequently identified *Shigella* species. Only five cases of *S. dysenteriae* were identified. A high percentage of strains were not further typed at the reference center for *Shigella* (**Table 2**).

It should be noted that the presented data in this report regard the cases notified via the Mandatory Notification System (MNS). For some of them the respective information from the reference center is available while for others it is not.

#### Characteristics of cases

For the period 2004-2022, 591 (48%) of the notified cases were Roma. Two hundred and four of the 1092 notified cases (19%), for which the respective information was available, reported the presence of another person with similar symptoms among their contacts, whereas 80 (8%) cases had recently travelled abroad (during the incubation period). Two outbreaks among refugees/migrants were reported; one in 2015 in Attica [3] and one in 2019 in the Reception and Identification Center of Samos island [4].

## Discussion

The notification rate of shigellosis in Greece is low (6.4 cases per 1,000,000 population for the year 2022). The mean notification rate of shigellosis in the EU and the EEA/EFTA countries was 14.7 cases per 1,000,000 population for the year 2022 [5]. The seasonal and age distribution agrees with that reported by other European countries [5]. The high incidence among Roma and refugees/migrants indicates the need for public health measures targeting at these specific populations.

The low notification rate of shigellosis for the period 2020-2021 may be explained by the COVID-19 pandemic during which the frequency of travelling to other countries decreased. Moreover, quarantine, lockdown and other non-pharmaceutical mitigation measures may have reduced population exposure to risk factors associated with the occurrence of the disease [2]. Furthermore, the laboratory testing for the diagnosis of the disease may also decreased [2] and at the same time the under-reporting of the disease in the MNS increased [6].

## References

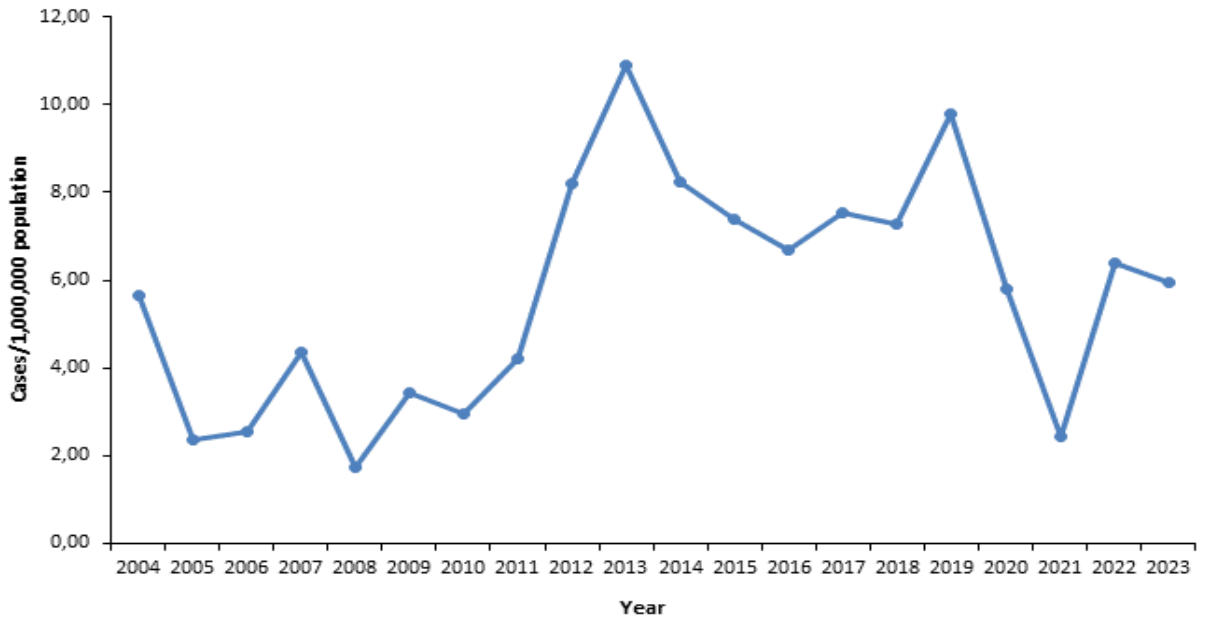
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2. EFSA and ECDC (European Food Safety Authority and European Centre for Disease Prevention and Control), 2023. European Union One Health 2023 Zoonoses Report. EFSA Journal 21(12). <https://doi.org/10.2903/j.efsa.2023.8442>
3. Georgakopoulou T, Mandilara G, Mellou K et al. Resistant Shigella strains in refugees, August-October 2015, Greece. Epidemiol Infect. 2016, 16:1-5.

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5. European Centre for Disease Prevention and Control. Surveillance Atlas of Infectious Diseases. Shigellosis – Data by Country and Year. Current time period: 2022. Available from: <https://atlas.ecdc.europa.eu/public/index.aspx>
6. National Public Health Organization. Evaluation of underreporting in the Mandatory Notification System of laboratory confirmed salmonellosis, shigellosis, listeriosis, Hepatitis A Virus infection, typhoid/paratyphoid fever cases by Public General Hospitals in Greece, 2022. Available from: <https://eody.gov.gr/disease/sigkellosi/>

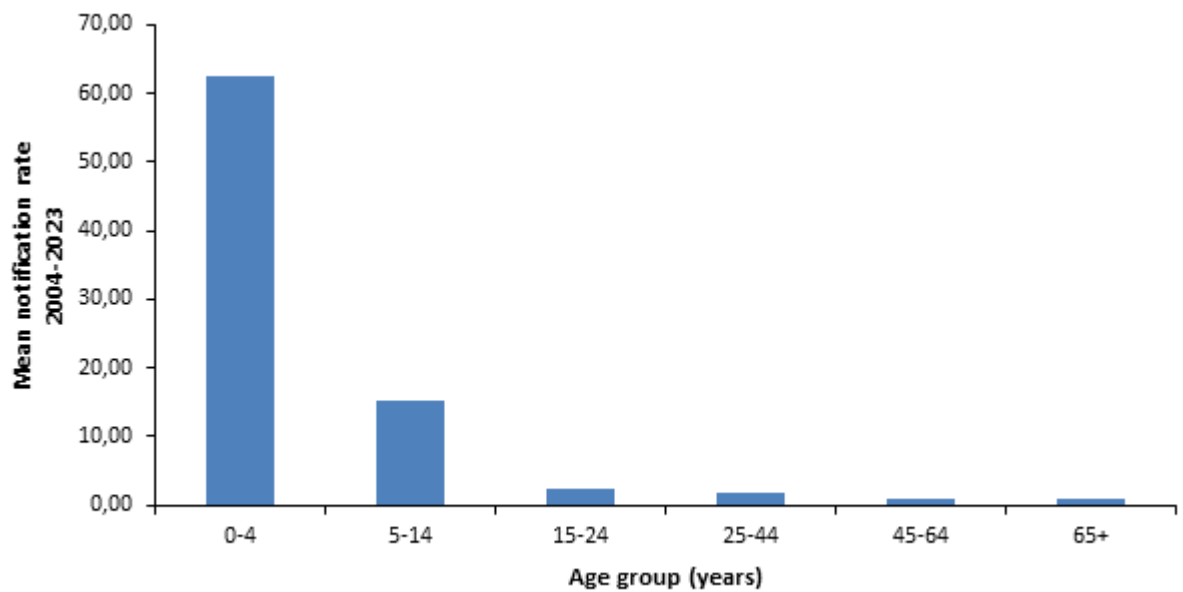
**Table 1.** Annual number of notified cases and notification rate of shigellosis, Mandatory Notification System, Greece, 2004-2023.

<b>Year</b>	<b>Number of cases</b>	<b>Annual notification rate (per 1,000,000 population)</b>
2004	62	5.6
2005	26	2.4
2006	28	2.5
2007	48	4.3
2008	19	1.7
2009	38	3.4
2010	33	3.0
2011	47	4.2
2012	91	8.2
2013	120	10.9
2014	90	8.2
2015	80	7.3
2016	72	6.9
2017	81	7.4
2018	78	7.2
2019	105	9.8
2020	62	5.8
2021	26	2.4
2022	67	6.3
2023	62	6.0
<b>Total</b>	<b>1,235</b>	<b>5.7*</b>

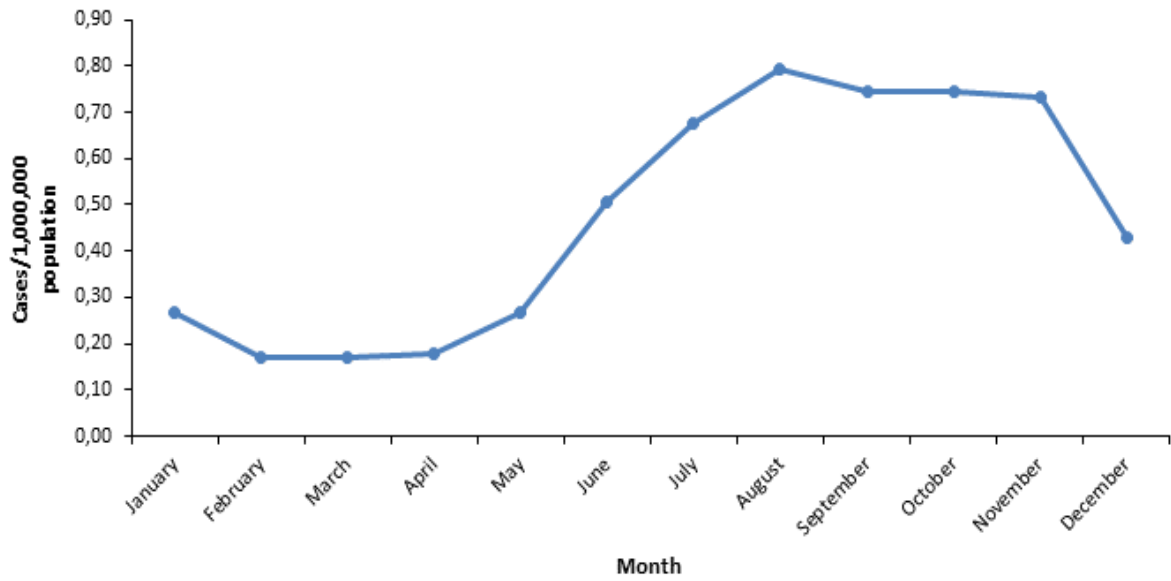
\*Mean annual notification rate for the period 2004-2023



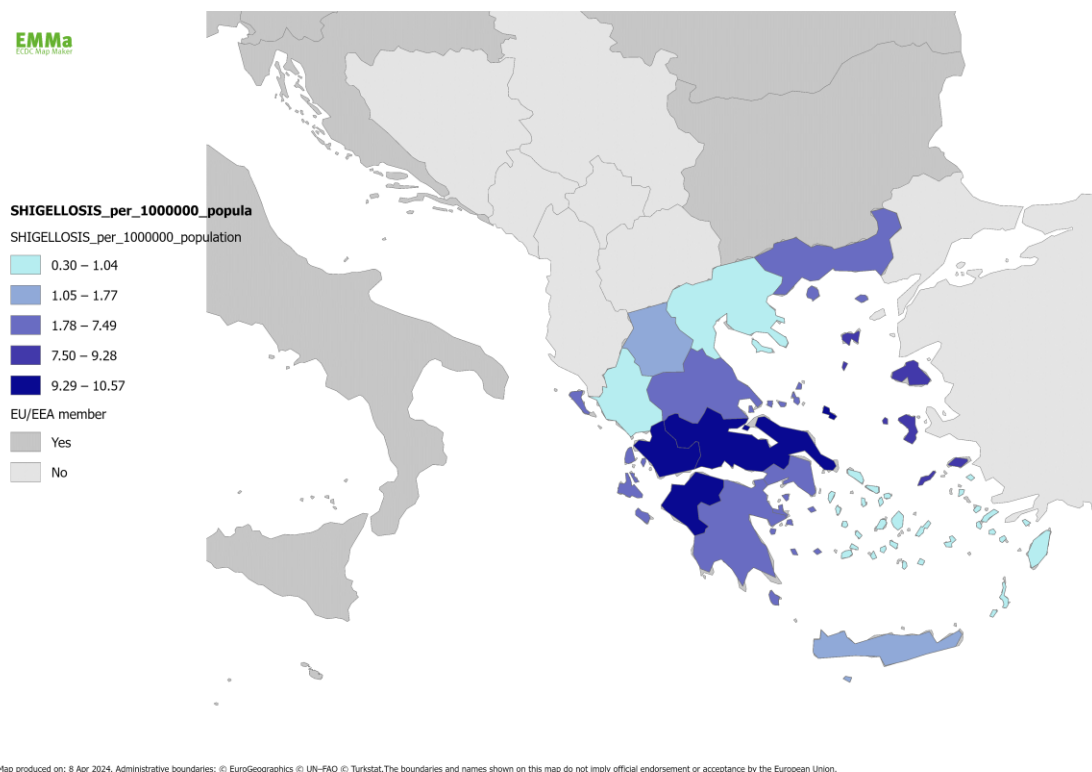
**Graph 1.** Shigellosis notification rate (cases/1,000,000 population) by year, Mandatory Notification System, Greece, 2004-2023.



**Graph 2.** Mean annual notification rate (cases/1,000,000 population) of shigellosis by age group, Mandatory Notification System, Greece, 2004-2023.



**Graph 3.** Mean monthly notification rate (cases/1,000,000 population) of shigellosis, Mandatory Notification System, Greece, 2004-2023.



**Figure 1.** Mean annual notification rate (cases/1,000,000 population) of shigellosis by region, Mandatory Notification System, Greece, 2004-2023.

**Table 2.** Frequency distribution of *Shigella* species, Mandatory Notification System & National Reference Laboratory for Salmonella-Shigella, Greece, 2004-2023.

	<i>S. flexneri</i>	<i>S. sonnei</i>	<i>S. boydii</i>	<i>S. dysenteriae</i>	Unknown	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
<b>2004</b>	19 (31)	13 (21)	1 (2)	0 (0)	28 (46)	61 (100)
<b>2005</b>	8 (30)	11 (42)	1 (4)	0 (0)	6 (24)	26 (100)
<b>2006</b>	4 (15)	2 (7)	1 (4)	0 (0)	20 (74)	27 (100)
<b>2007</b>	4 (8)	23 (49)	0 (0)	0 (0)	20 (43)	47 (100)
<b>2008</b>	7 (50)	1 (7)	0 (0)	0 (0)	6 (43)	14 (100)
<b>2009</b>	17 (50)	1 (3)	1 (3)	0 (0)	15 (44)	34 (100)
<b>2010</b>	17 (63)	2 (8)	0 (0)	2 (7)	6 (22)	27 (100)
<b>2011</b>	16 (37)	1 (2)	1 (2)	0 (0)	26 (59)	44 (100)
<b>2012</b>	27 (30)	1 (1)	0 (0)	0 (0)	63 (69)	91 (100)
<b>2013</b>	54 (49)	27 (25)	0 (0)	1 (1)	28 (25)	110 (100)
<b>2014</b>	37 (43)	19 (22)	1 (1)	0 (0)	30 (34)	87 (100)
<b>2015</b>	45 (61)	18 (24)	4 (5)	2 (3)	5 (7)	74 (100)
<b>2016</b>	29 (41)	12 (17)	4 (6)	0 (0)	25 (36)	70 (100)
<b>2017</b>	25 (33)	31 (41)	1 (1)	0 (0)	18 (24)	75 (100)
<b>2018</b>	25 (39)	21 (32)	2 (3)	0 (0)	17 (26)	65 (100)
<b>2019</b>	28 (27)	31 (30)	2 (2)	0 (0)	44 (42)	105 (100)
<b>2020</b>	14 (23)	11 (18)	11 (18)	0 (0)	26 (42)	62 (100)
<b>2021</b>	9 (35)	1 (4)	3 (11)	0 (0)	13 (50)	26 (100)
<b>2022</b>	28 (42)	2 (3)	4 (6)	1 (1)	32 (48)	67 (100)
<b>2023</b>	16 (26)	4 (7)	0 (0)	0 (0)	42 (68)	62 (100)

*Last updated: April 2024*