



NATIONAL PUBLIC  
HEALTH ORGANIZATION

## EPIDEMIOLOGICAL DATA FOR TYPHOID/PARATYPHOID FEVER IN GREECE

2004-2021

### MANDATORY NOTIFICATION SYSTEM

#### Main points

- The notification rate of typhoid/paratyphoid fever in Greece is low.
- Based on the data for the 2004-2021 period:
  - Seventy-four (44.1%) of the confirmed cases had traveled abroad during the incubation period
  - Travel-related cases were mainly foreigners who had traveled to their home country (VFRs, Visiting Friends or Relatives)
  - A seasonal pattern was apparent; the mean monthly notification rate reached a peak in August

Typhoid fever is a systematic disease, caused by *Salmonella* Typhi. The incubation period of the disease is 3-40 days. Paratyphoid fever is also a systematic disease, with an incubation period of 7-10 days. It is caused by *Salmonella* Paratyphi, for which three types have been identified; A, B and C [1]. Humans get infected after consuming contaminated food or water. Two to 5% of the cases become chronic carriers. Chronic carriage is more frequent among *S.* Typhi cases than it is among *S.* Paratyphi B cases. Paratyphi A and C have only short-term carriers.

#### Time trend

The number of notified cases for the period 2004-2021 is shown in **Table 1**. Out of the 182 reported cases, 107 (58.8%) were typhoid and 75 (41.2%) were paratyphoid cases. Time trend of the typhoid/paratyphoid fever notification rate is depicted in **Graph 1**.

The annual notification rate for typhoid/paratyphoid fever for the period 2004-2021, ranged from 0.2 cases in 2021 to 1.8 cases per 1,000,000 population in 2004 and 2005, respectively. The mean annual notification rate for typhoid/paratyphoid fever for the same period was 1.0 (standard deviation:  $\pm 0.5$ ) case per 1,000,000 population and the mean annual number of reported cases was 10.1 (standard deviation:  $\pm 5.7$ ).

Notification rates of typhoid and paratyphoid fever were 0.5 and 0.4 cases per 1,000,000, respectively.

### Age and gender distribution

For the 2004-2021 period, the disease had a higher mean annual notification rate in the age group 0-4 years (3.7 cases per 1,000,000 population), followed by the age group of 5-14 years (1.4 cases per 1,000,000 population) (**Graph 2**).

The mean annual notification rate for typhoid/paratyphoid fever for the same period was 1.2/1,000,000 in males and 0.6/1,000,000 in females.

As shown in **Table 2**, the majority of foreigners (nationality other than Greek) (83.9%) were males and 52.2% of them were between 25 and 44 years old.

### Seasonality

The mean monthly notification rate for the period 2004-2021 was higher during summer months reaching a peak in August (**Graph 3**).

### Geographical distribution

The geographical area of Epirus had the highest mean annual notification rate for 2004-2021 (1.78 cases per 1,000,000 population), and the area of Peloponnesos the lowest with 0.19 cases per 1,000,000 population. **Figure 1** depicts the mean annual notification rate of typhoid/paratyphoid fever by region for the period 2004-2021.

### Laboratory data

All notified cases during this period were laboratory-confirmed. *S. Paratyphi* type A was identified in 33 out of the 60 cases (54.1%) that the respective information was known and *S. Paratyphi* type B in 28 (45.9%).

## Risk factors

Ninety three (52.0%) of the laboratory-confirmed cases that were notified during 2004-2021 were of foreign nationality. Seventy-four (44.1%) of the reported cases, had traveled abroad during the incubation period; eight Greeks and 58 foreigners (**Table 3**), out of the sixty-six cases with the respective information available. Traveling abroad mainly regarded migrants, who had traveled to their country of origin prior to disease onset (VFRs, Visiting Friends or Relatives) (86.2%). Fourteen (8.2%) cases reported the presence of another person with similar symptoms among their contacts.

## Discussion

Typhoid and paratyphoid fever present a low notification rate in Greece (0.2 case/1,000,000 population for the year 2021). The mean notification rate in the EU and EEA/EFTA countries was 1.1 cases per 1,000,000 population for the year 2020 [2].

The high proportion of imported cases is consistent with data reported by other European countries [3-6]. This finding agrees with the fact that the majority of the economical migrants in the country are young adult men.

The low notification rate of typhoid/paratyphoid fever in the period 2020-2021 may be explained by the COVID-19 pandemic during which the frequency of travelling to other countries decreased. Moreover, prolonged lockdowns and other non-pharmaceutical mitigation measures may have reduced population exposure to risk factors associated with the occurrence of the disease. This finding is compatible with those of other European countries [2].

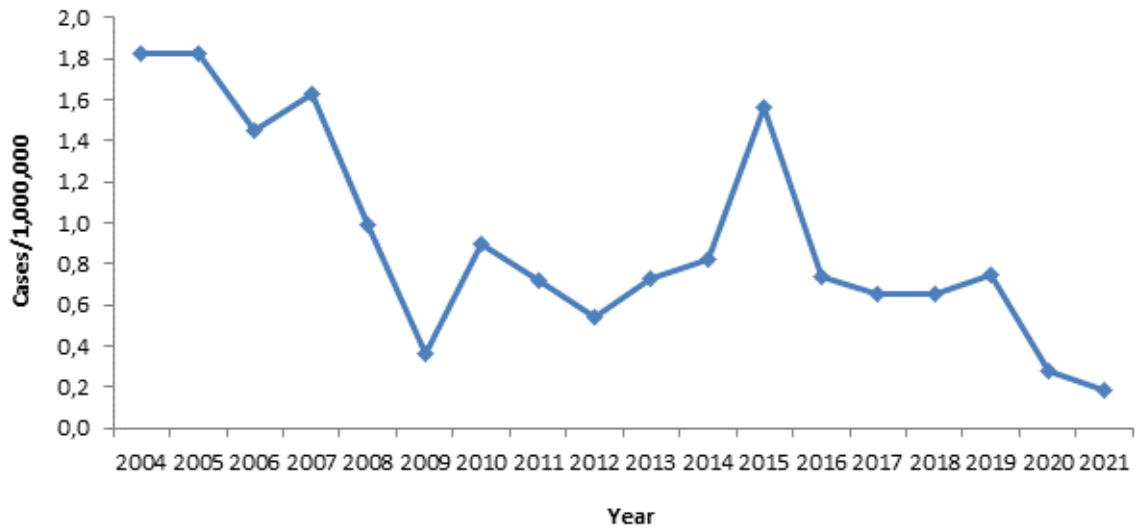
## References

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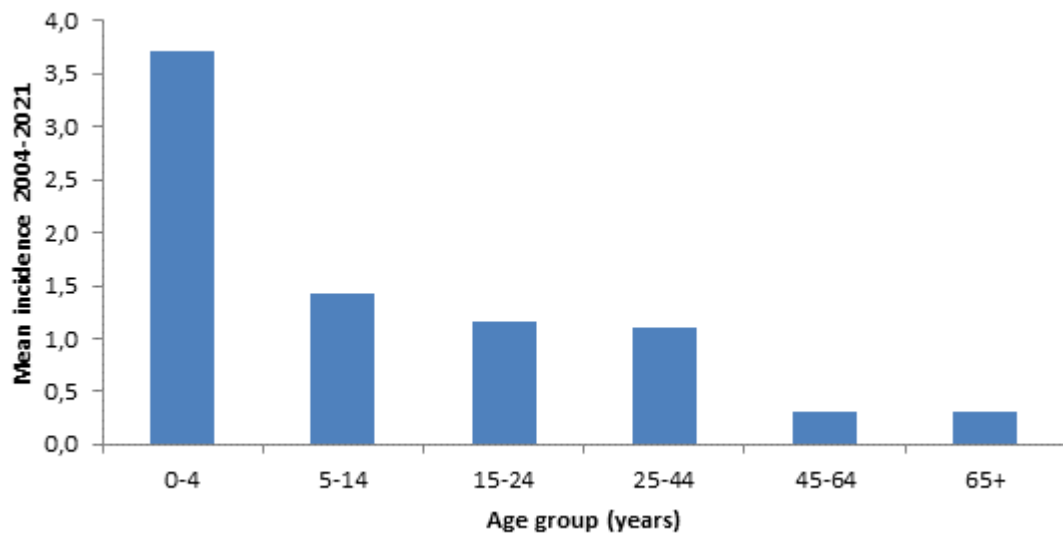
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**Table 1.** Number of reported cases of typhoid/paratyphoid fever, Mandatory Notification System, Greece, 2004-2021.

Year	Number of cases		Total
	Typhoid fever	Paratyphoid fever	
2004	14	6	20
2005	15	5	20
2006	10	6	16
2007	6	12	18
2008	8	3	11
2009	4	0	4
2010	6	4	10
2011	5	3	8
2012	4	2	6
2013	5	3	8
2014	3	6	9
2015	3	14	17
2016	4	4	8
2017	3	4	7
2018	7	0	7
2019	7	1	8
2020	2	1	3
2021	1	1	3
<b>Total</b>	<b>107</b>	<b>75</b>	<b>182</b>



**Graph 1.** Time trend of typhoid/paratyphoid notification rate (number of cases/1,000,000 population) in Greece, Mandatory Notification System, 2004-2021.



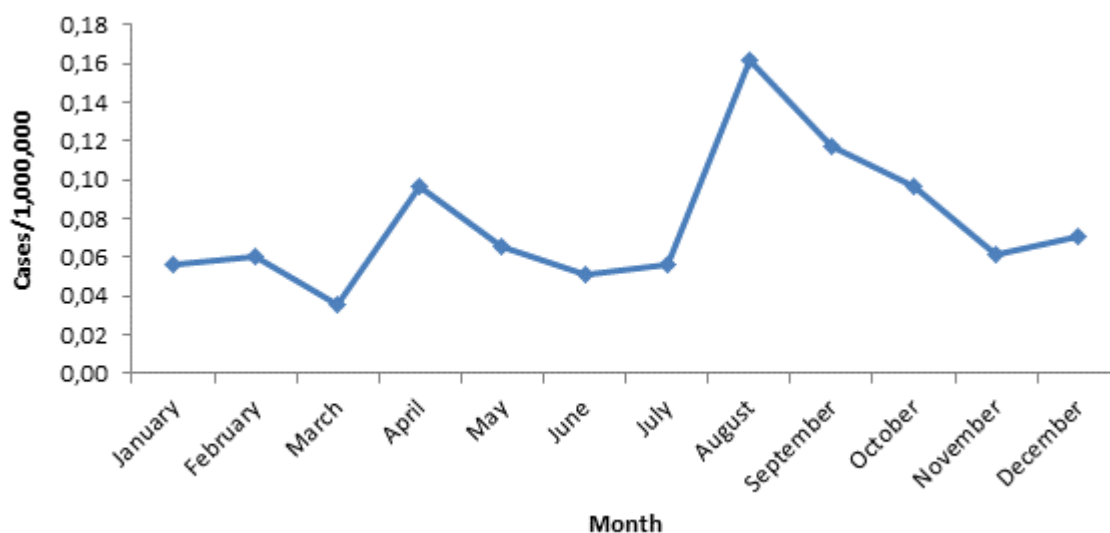
**Graph 2.** Mean notification rate of typhoid/paratyphoid fever (number of cases/1,000,000 population) in Greece by age group, Mandatory Notification System, 2004-2021.

**Table 2.** Distribution of typhoid/paratyphoid fever cases by age and gender in Greeks and people of foreign nationality, Mandatory Notification System, Greece, 2004-2021.

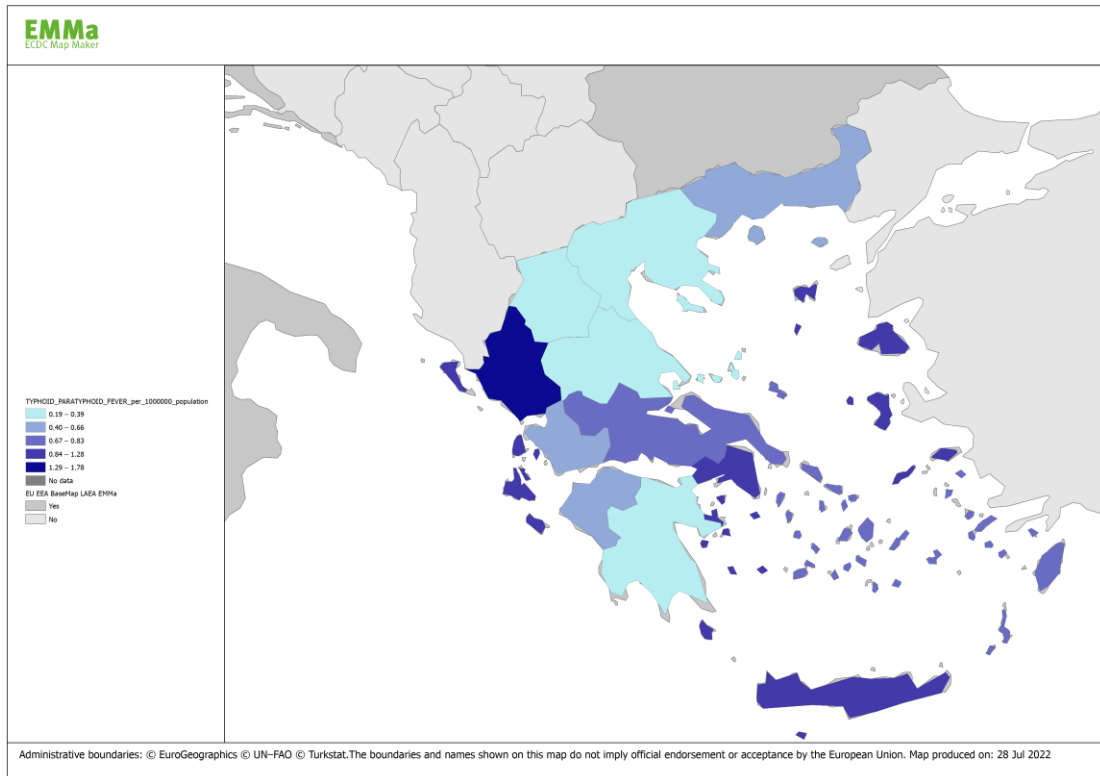
	Greeks n (%)*	Foreigners n (%)*	Total n (%)*
<b>Gender</b>			
Male	41 (48.2%)	78 (83.9%)	119 (66.5%)
Female	44 (51.8%)	15 (16.1%)	59 (33.0%)
<b>Age groups (years)†</b>			
0-4	22 (26.2%)	12 (13.0%)	34 (19.3%)
5-14	18 (21.4%)	10 (10.8%)	28 (15.9%)
15-24	10 (11.9%)	16 (17.4%)	26 (14.8%)
25-44	14 (16.7%)	48 (52.2%)	62 (35.2%)
45-64	9 (10.7%)	6 (6.5%)	15 (8.5%)
65+	11 (13.1%)	0 (0.0%)	11 (6.3%)

\*n = number of cases. %= percentage

†for the cases that the respective information was available



**Graph 3.** Mean notification rate of typhoid/paratyphoid fever (number of cases/1,000,000 population) by month, Mandatory Notification System, Greece, 2004-2021.



**Figure 1.** Mean annual notification rate (cases/1,000,000 population) of typhoid/paratyphoid fever by region, Mandatory Notification System, Greece, 2004-2021.

**Table 3.** Distribution of travel-related typhoid/paratyphoid fever cases by country of destination among Greeks and people of foreign nationality, Mandatory Notification System, Greece, 2004-2021.

Country	Foreigners n (%)*	Greeks n (%)*
Pakistan	28 (48)	1 (12.5)
India	15 (26)	3 (38)
Turkey	4 (7)	0 (0)
Bangladesh	4 (7)	0 (0)
Afghanistan	2 (3)	0 (0)
Nigeria	1 (2)	0 (0)
Nepal	1 (2)	1 (13)
Panama	1 (2)	0 (0)
Anguilla	1 (2)	0 (0)
Israel	1 (2)	0 (0)
Swaziland	0 (0)	1 (13)

Bulgaria	0 (0)	1 (13)
Peru	0 (0)	1 (13)
<b>Total</b>	<b>58 (100)</b>	<b>8 (100)</b>

\*n = number of cases, % = percentage

*Last updated: July 2022*