Department of Epidemiological Surveillance and Intervention

**EPIDEMIOLOGICAL DATA FOR SALMONELLOSIS (NON TYPHOID/PARATYPHOID) IN GREECE
2004-2017
MANDATORY NOTIFICATION SYSTEM
NATIONAL REFERENCE CENTRE FOR *SALMONELLA* AND *SHIGELLA***

Main points

- The notification rate of salmonellosis in Greece was decreased in 2017 after the increase observed in previous two years.

- Based on the data for the period 2004-2017:

- The disease was more frequent among children <15 years old and especially in the age group of 0-4 years old.

- A seasonal pattern is apparent: the mean annual notification rate increases during summer, reaching a peak in August.

- 17% of the cases reported one or more persons with similar symptoms among their contacts.

- *S*. Enteritidis, *S*. Typhimurium and monophasic *S*. Typhimurium are the most frequently reported serovars.

Salmonella spp. is one of the etiological agents of foodborne infections, as well as the main bacterial cause of foodborne disease outbreaks, in many European countries. It is an important cause of diarrheal illness among children and the elderly [1].

Time trend

The number of reported cases per year, for the period 2004-2017, is presented in **Table 1**. The temporal distribution of salmonellosis notification rate for the period 2004-2017 is depicted in **Graph 1**. The mean annual notification rate of salmonellosis for the same period, in Greece, was 5.9 cases per 100,000 population.

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Age and gender distribution

For the period 2004-2017, the disease was more frequently reported among children, especially in the 0-4 years age group (**Graph 2**). In this age group, the mean annual notification rate was 46.9/100,000 population, whereas it was less than 13.8/100,000 in the rest of the population. There was no difference in the notification rate between males and females (6.1 and 5.6 cases per 100,000 population, respectively).

Seasonality

There is an apparent seasonal pattern of the disease frequency, with the mean annual notification rate for 2004-2017 increasing during summer, reaching a peak in August and gradually decreasing in autumn (**Graph 3**).

Geographical distribution

The geographical area of Northern Aegean islands had the highest mean annual notification rate (8.7/100,000 population) and Peloponnesos the lowest (3.2/100,000 population).

Laboratory data

The proportion of *Salmonella* serovars (out of the total number of identified serovars), for the period 2004-2017, is depicted in **Graph 4**. For the same period, *S*. Enteritidis and *S*. Typhimurium were the most frequently identified serovars, while in 2017 an increase was observed for the serovar monophasic *S*. Typhimurium. The frequency of the reported serovars for the 14-year period is presented in **Table 2**.

It should be noted that the presented data here regard the cases reported via the mandatory notification system. For some of them the respective information from the reference laboratory is available while for others it is not. Data on the total number of isolates serotyped at the Reference Laboratory can be found at: http://www.mednet.gr/whonet/.

Other data

During the period 2004-2017, 17% of the notified cases reported the presence of at least one person with similar symptoms among their contacts, whereas 240 (3%) reported to have travelled abroad within the incubation period.

Conclusion

The mean notification rate in the EU and EEA/EFTA countries was 20.4 cases per 100,000 population for the year 2016 (last published data) [2]. The decreasing trend of salmonellosis notification trend, in previous years, can probably be attributed, to the actual decrease of the disease incidence, which was a common finding among EU countries [2]. This is a result of the national control programs for salmonellosis and the enhancement of the legislation mainly aiming at the decrease of *S*. Enteritidis and *S.* Typhimurium prevalence in poultry populations.

The fact that for the most frequently reported *Salmonella* serovars in humans, *S.* Enteritidis and *S.* Typhimurium, an increase and decrease was observed, respectively, for the period 2004-2016, is in accordance with the findings of other European countries [2,3]. The third most frequently reported serovar, monophasic *S*. Typhimurium, has presented significant increase in Greece in 2017.

The seasonality pattern of the disease occurrence is also consistent with findings from other European countries [2]. Finally, the number of salmonellosis outbreaks notified during 2004-2017 is significantly lower than that expected based on the high percentage of notified cases linked to other cases.
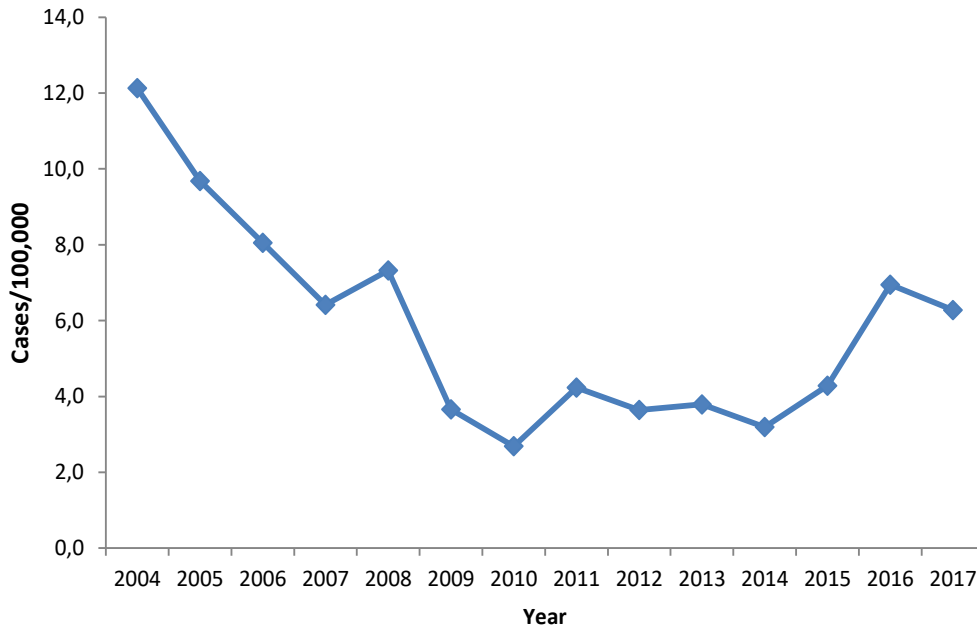
References

1. Heymann D, MD. Control of Communicable Diseases Manual. 20th Edition, 2015, American Public Health Association.

2. European Centre for Disease Prevention and Control. Surveillance Atlas of Infectious Diseases. Salmonellosis - Data by Country and Year. Current time period: 2016. Available from: http://ecdc.europa.eu/en/data-tools/atlas/Pages/atlas.aspx

3. European Food Safety Authority. The European Union summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks in 2016. EFSA Journal 2017, 15(12): 5077.
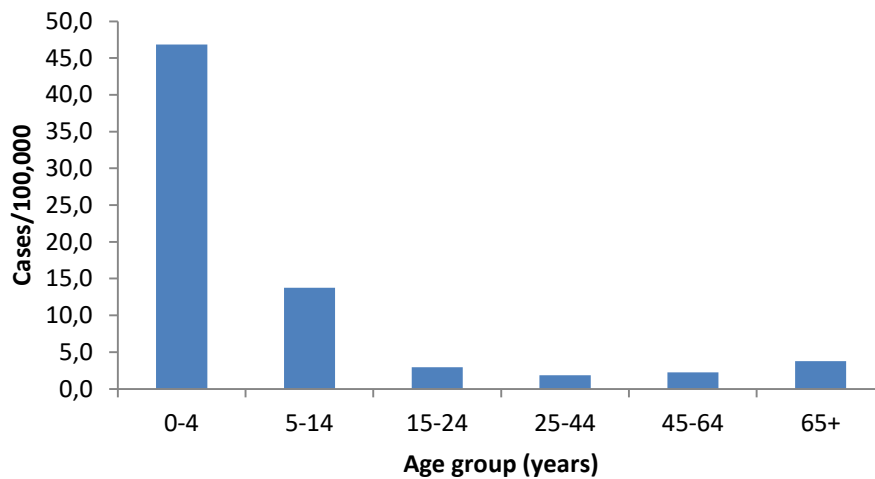
Table 1. Number of notified cases of salmonellosis per year, Mandatory Notification System & National Reference Centre for *Salmonella* and *Shigella*, Greece, 2004-2017.

| Year	Number of cases
2004	1327
2005	1062
2006	886
2007	708
2008	810
2009	406
2010*	299
2011	471
2012	404
2013	417
2014	349
2015	465
2016	749
2017	676

*The second semester of 2010 an effort for strengthening
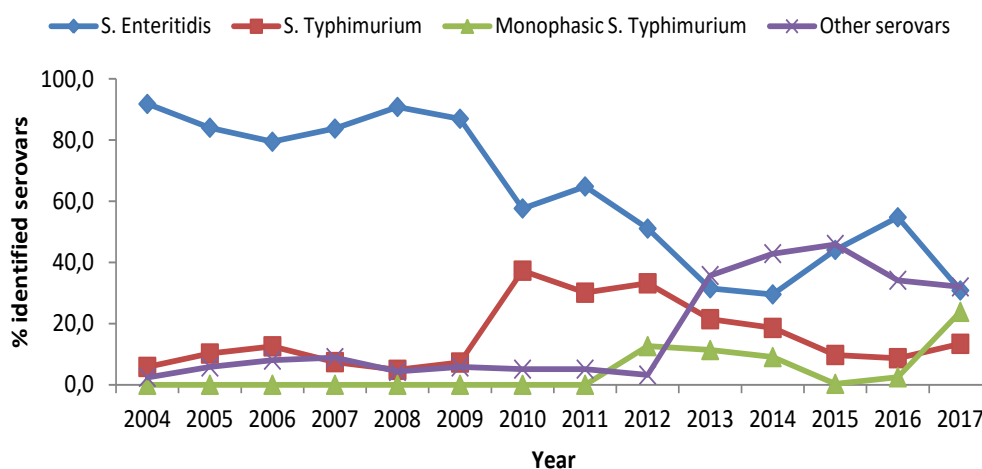salmonellosis notification to MNS initiated.

Graph 1. Time trend of salmonellosis notification rate, Mandatory Notification System & National Reference Centre for *Salmonella* and *Shigella*, Greece, 2004-2017.
The second semester of 2010 an effort for strengthening salmonellosis notification to MNS started.

Graph 2. Annual notification rate (cases/100,000 population) of salmonellosis by age group, Mandatory Notification System & National Reference Centre for *Salmonella* and *Shigella*, Greece, 2004-2017.

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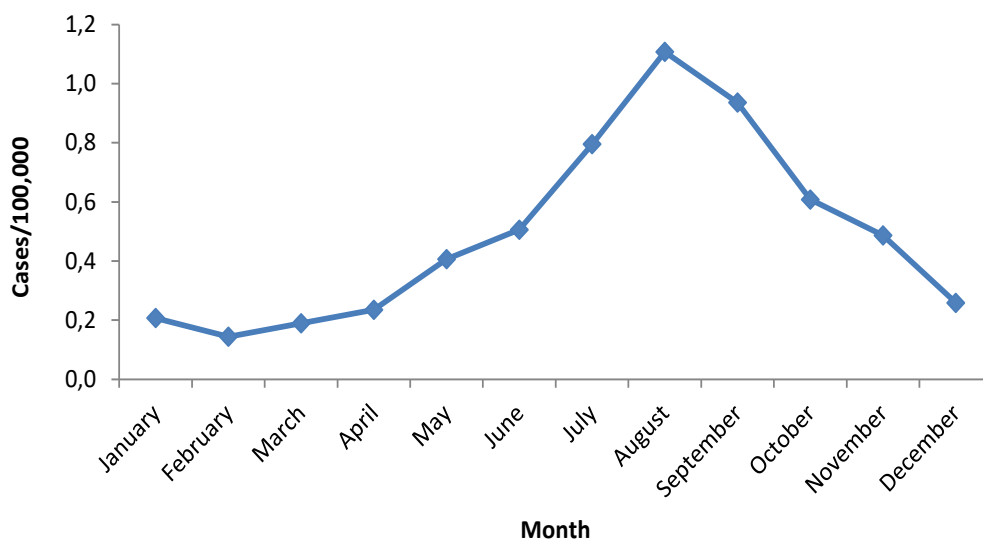
Graph 3. Mean annual notification rate (cases/100,000 population) of salmonellosis by month, Mandatory Notification System & National Reference Centre for *Salmonella* and *Shigella*, Greece, 2004-2017.

Graph 4. Annual percentage of identified *S*. Enteritidis, *S*. Typhimurium, monophasic *S*. Typhimurium and other serovars, Mandatory Notification System & National Reference Centre for *Salmonella* and *Shigella*, Greece, 2004-2017.

Table 2. Frequency distribution of *S*. Enteritidis, *S*. Typhimurium, monophasic *S*. Typhimurium and other serovars per year, Mandatory Notification System & National Reference Centre for *Salmonella* and *Shigella*, Greece, 2004-2017.

Year	*S.* Enteritidis	*S.*	Monophasic *S.*	Other	Total

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	n	Typhimurium n	Typhimurium n	serovars n	
2004	347	22	0	9	378
2005	305	37	0	21	363
2006	228	36	0	23	287
2007	170	15	0	18	203
2008	168	9	0	8	185
2009	60	5	0	4	69
2010	68	44	0	6	118
2011	140	65	0	11	216
2012	97	63	24	6	190
2013	75	51	27	85	238
2014	62	39	19	90	210
2015	145	32	1	151	329
2016	202	32	9	126	369
2017	106	46	82	110	344

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