



NATIONAL PUBLIC  
HEALTH ORGANIZATION

EPIDEMIOLOGICAL DATA OF  
ENTEROHAEMORRHAGIC *E. COLI* INFECTION (EHEC), GREECE, 2004-2022  
MANDATORY NOTIFICATION SYSTEM

Main points

- Enterohaemorrhagic *E. coli* infection (EHEC) is a mandatory notifiable disease with low notification rate in Greece.
- During the 2004-2022 period forty-eight cases were reported.
- In 2020, a waterborne gastroenteritis outbreak of mixed aetiology was notified and investigated. STEC and *E. coli* O157 were detected among other pathogens in clinical samples.
- In 2021 and 2022, an increase in the number of reported cases was noticed, probably due to the revision of case definition.
- The interpretation of the low notification rate of the disease should consider the surveillance systems' probable under-reporting, the differences of the laboratory capacity for the diagnosis of the disease and the different dietary habits of the populations among countries.

*Escherichia coli* is a Gram-negative, rod-shaped bacterium that belongs to the Enterobacteriaceae family. The terms “Enterohaemorrhagic *E. coli* (EHEC)”, “*Shiga*-toxin-producing *E. coli* (STEC)” and “*Vero*-toxin-producing *E. coli* (VTEC)” have all been used to describe a group of strains which have the ability to produce toxins similar to the one produced by *Shigella dysenteriae* (*Shiga*-toxin). An important characteristic of this serogroup is its inability to ferment sorbitol. There have been identified about 200 different serotypes

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of EHEC, out of which more than 100 have been implicated with the occurrence of disease in humans. Apart from the O157:H7 serovar, which is considered the most clinically important, other serovars, such as O26, O103, O91, O145, O146 and O128 can produce toxins and cause similar clinical conditions [1].

Similarly, the serotype that has been implicated for the majority of outbreaks worldwide is the O157:H7 [2]. However, there have been outbreaks caused by different serotypes, like the O104:H4 serotype that was the causative agent of a large outbreak in Germany and the other European countries in May 2011 [3-5]. The EHEC infection can cause severe bloody diarrhoea and abdominal cramps. Sometimes, diarrhoea can be non-haemorrhagic or the infection can be subclinical. In some cases, especially in children below five years old and in the elderly, becoming infected can lead to Haemolytic Uraemic Syndrome (HUS), a complication characterized by red cells destruction and probable renal failure [1]. The disease was introduced in the mandatory notification system in Greece in 2004. In 2018, the European EHEC's case definition changed and the laboratory criteria were updated by the European Commission [6].

### Time trend

The mean annual notification rate of EHEC infection for the period 2004-2022 was 0.2 cases per 1,000,000 population. In total 48 cases were reported, 27 of which females. The median age of the cases was 24 years (minimum: 0 - maximum: 83). The distribution of the reported cases per year for the period 2004-2022 is presented in **Table 1**. The number of EHEC infection reported cases increased in 2019; five cases were notified, four of which during April-July, in Magnisia and Imathia Regional Units. The investigation did not identify an epidemiological link among the cases.

In 2020, a waterborne gastroenteritis outbreak of mixed aetiology was notified and investigated in Argolida Regional Unit. STEC and *E. coli* O157 were detected among other pathogens in clinical samples. In the case-control study conducted, consumption of tap water (OR = 10.9, 95% CI = 3.1-38.0,  $p < 0.001$ ) and ice cubes (OR = 39.3, 95% CI = 10.3-150.9,  $p < 0.001$ ) were independently associated with the onset of gastroenteritis.

In 2021 and 2022, an increase in the number of notified cases was noticed; ten and fourteen cases of EHEC infection were reported respectively. Epidemiological investigation did not

reveal a link among the cases. This increase can probably be due to the introduction of the revised case definition, in 2021 in Greece.

## Conclusion

According to the latest data published by the European Centre for Disease Prevention and Control (ECDC) the mean annual notification rate in EU and EEA/EFTA (European Economic Area European Free Trade Association) countries, in 2021, was 21.8 cases per 1,000,000 population [7]. When interpreting the difference from the notification rate in Greece (1.3 cases per 1,000,000 population in 2022), it should be considered that the surveillance systems' probable under-reporting, the laboratory capacity for the diagnosis of the disease and the dietary habits of the populations may vary among countries [8].

## References

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[7] European Centre for Disease Prevention and Control. Surveillance Atlas of Infectious Diseases. Verotoxigenic Escherichia coli infection. Data by Country and Year. Current time period: 2021 Available from: <https://atlas.ecdc.europa.eu/public/index.aspx>

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**Table 1.** Annual distribution of notified cases of Enterohaemorrhagic *E. coli* (EHEC) infection in Greece, Mandatory Notification System, 2004-2022.

Year	Number of reported cases
2004	2
2005	0
2006	1
2007	1
2008	0
2009	0
2010	1
2011	1
2012	0
2013	2
2014	1
2015	1
2016	2
2017	3
2018	1
2019	5
2020	3
2021*	10
2022	14
<b>Total</b>	<b>48</b>

\*A revised case definition was used in 2021

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