



**Directorate of Epidemiological Surveillance and Interventions  
for Infectious Diseases  
Department of Vaccine Preventable and Congenital Diseases**

**EPIDEMIOLOGICAL DATA FOR PERTUSSIS IN GREECE, 2004-2023  
(MANDATORY NOTIFICATION SYSTEM)**

**Key Points**

- Although pertussis is a vaccine preventable disease, it continues to be a public health concern in Greece.
- Unvaccinated pockets of population, in combination with the waning immunity after infection and after vaccination, contribute to the occurrence of new pertussis cases.
- Based on data for the period 2004-2023, the disease appears to affect all ages, but it presents the highest rate in the age group 0-4 years old (especially among children under the age of one year). The clinical presentation in adolescents and adults may be mild and is often not recognized which contributes to bacteria circulation in the population.
- No cases and only one case of pertussis was notified in the years 2021 and 2022, respectively. Underreporting might be related to the COVID-19 pandemic.

Pertussis is an acute bacterial infection of the respiratory tract, caused by *Bordetella pertussis*. The bacterium mode of transmission is airborne, via droplet spread or by direct contact with excretions from the respiratory tract of an infected person. Indirect contact, via air, or recently infected surfaces/objects, occurs rarely. Pertussis is rather easily transmitted (family members that have no immunoprotection, are affected up to 80%) [1].

**Time trend**

During the period 2004-2023, a total of 519 cases of pertussis were reported through the mandatory notification system to the National Public Health Organization (NPHO). It is worth mentioning that no cases and only one case of pertussis was reported in 2021 and 2022, respectively. The underreporting might be attributed to the ongoing COVID-19 pandemic.

The notification rate during the period 2004-2023, ranged between 0.00/100,000 population and 0.81/100,000 (Figure 1). The mean annual notification rate for the period 2004-2023 equaled 0.24 cases per 100,000 population (mean number of reported cases per year: 26, total number of reported cases for 2004-2023: 519).

### Age and gender distribution

During the period 2004-2023 the number of notified cases with known age and gender was 516. The highest incidence was recorded in the age group of 0-4 years old, with a mean annual notification rate of 3.84 cases /100,000 population (number of cases: 396, among which 333 were below one year of age). Three (3) cases were reported in the age group 15-24 years old (mean annual notification rate 0.071 cases/100,000 population), two (2) cases in the 45-64 years old (mean annual notification rate 0.010 cases/100,000 population), and another two (2) cases in >65 years old (mean annual notification rate 0.011 cases/100,000 population) (Figure 2). The mean annual notification rate was 0.26/100,000 population for women and 0.23/100,000 population for men.

### Geographical distribution

During this period, the highest mean annual notification rate was recorded in Attica (0.32/100,000 population) whilst slightly lower was the notification rate in the geographical areas of Central Greece (0.25/100,000 population). The notification rate for the geographical areas of Northern Greece and Aegean Islands – Crete was 0.14 and 0.19 cases / 100,000 population, respectively.

### Laboratory data

Among 519 notified cases during this period, 343 (66.1%) were laboratory confirmed, 47 (9.1%) had clinical symptoms of pertussis and an epidemiological link with another case and 129 (24.9%) had only clinical manifestations of the disease.

### Vaccination coverage

Among 519 notified cases during 2004-2023, the vaccination coverage was known for 451 cases (86.9%). Most cases (312 cases – 60.1%) were not vaccinated at all. In total, 67 cases (12.9%) reported vaccination with at least 3 doses of vaccine, another 25 cases (4.8%) vaccination with 4 doses, 26 cases (5.0%) vaccination with 5 doses, 2 cases (0.4%) vaccination with 6 doses, while 19 cases (3.7%) had no information available regarding the number of doses received (Figure 3).

It is widely known that vaccination against pertussis offers immunoprotection that decreases with time. In Greece, for cases vaccinated with at least 3 doses of vaccine, the disease is probably related to the decreasing over time immunoprotection, in approximately half of the cases (especially in the age group 10-19 years old) [2].

### Risk factors – Burden of disease

During the period 2004-2023, a considerable proportion of the reported cases pertained to Roma (30.4%, n=158); mainly children 0-14 years old. The cases that needed hospitalization during the same period reached 396 (76.3%), whilst 58 cases (11.2%) presented complications, mostly from the respiratory system. The outcome for pertussis was generally good. During the period 2004-2023, 3 deaths were notified, corresponding to a mortality rate of 0.6%.

### Conclusion

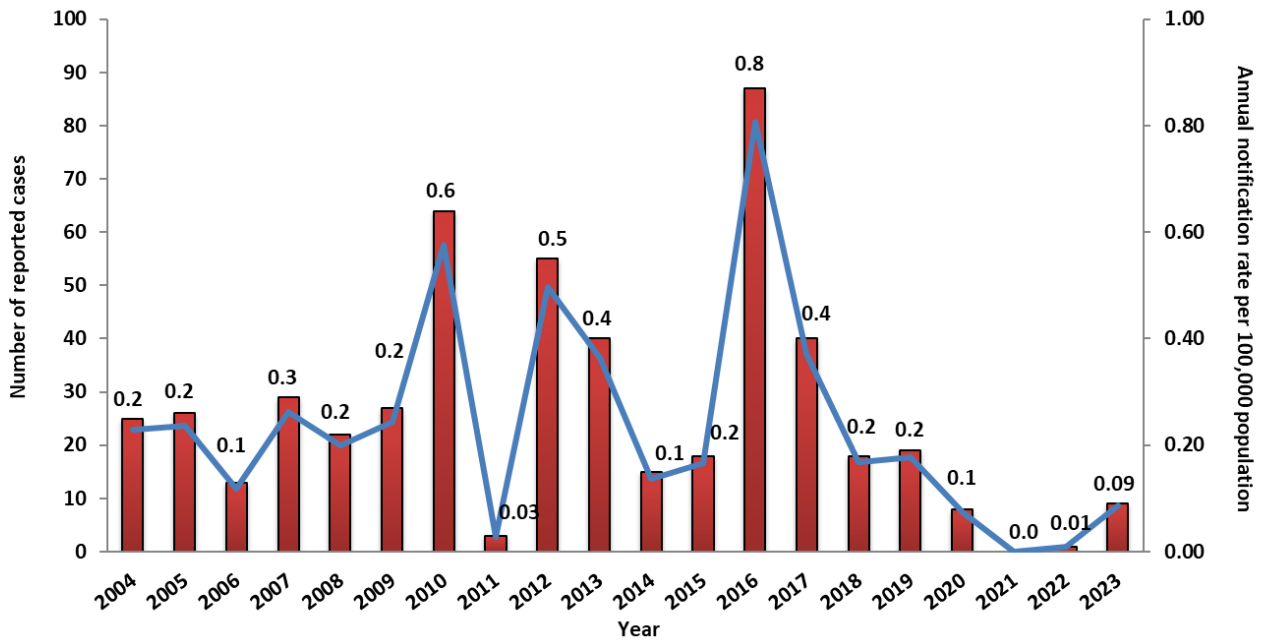
The ongoing COVID-19 pandemic in the years 2021 and 2022 may have adversely affected the reporting of pertussis cases. In general, the notification rate of pertussis in Greece is low. The mean annual notification rate for the period 2004-2023 was lower than the mean notification rate for the

EU/EEA countries (8.2/100,000 population for the year 2018) [3]. This low rate is related to the high vaccination coverage of the population ((89.5% of children aged 6 years is vaccinated with 5 doses of DTwP or DTaP, whilst 95.8% of preschool children attending nurseries-kindergartens aged 2-3 years old is vaccinated with 4 doses of DTaP) [4,5]. It should be noted, however, that pertussis is a disease that is under-diagnosed, due to difficulties in its clinical diagnosis, as well as due to the frequent unavailability of laboratory confirmation. The fact that vaccination against pertussis offers immunoprotection that decreases over time, as well as the increased proportion of reported cases among non-vaccinated Roma children, underline the need for re-designing the policy for pertussis prevention in Greece. Vaccination of adolescents with Tdap is expected to decrease the high incidence of pertussis in this age group [6]. It is also worth noting that according to the National Vaccination Program for adults [7] a dose of Tdap or Tdap-IPV vaccine is recommended during each pregnancy, preferably between 27 and 36 weeks of gestation, or during the postpartum period regardless of the interval since the last vaccination with Td/Tdap.

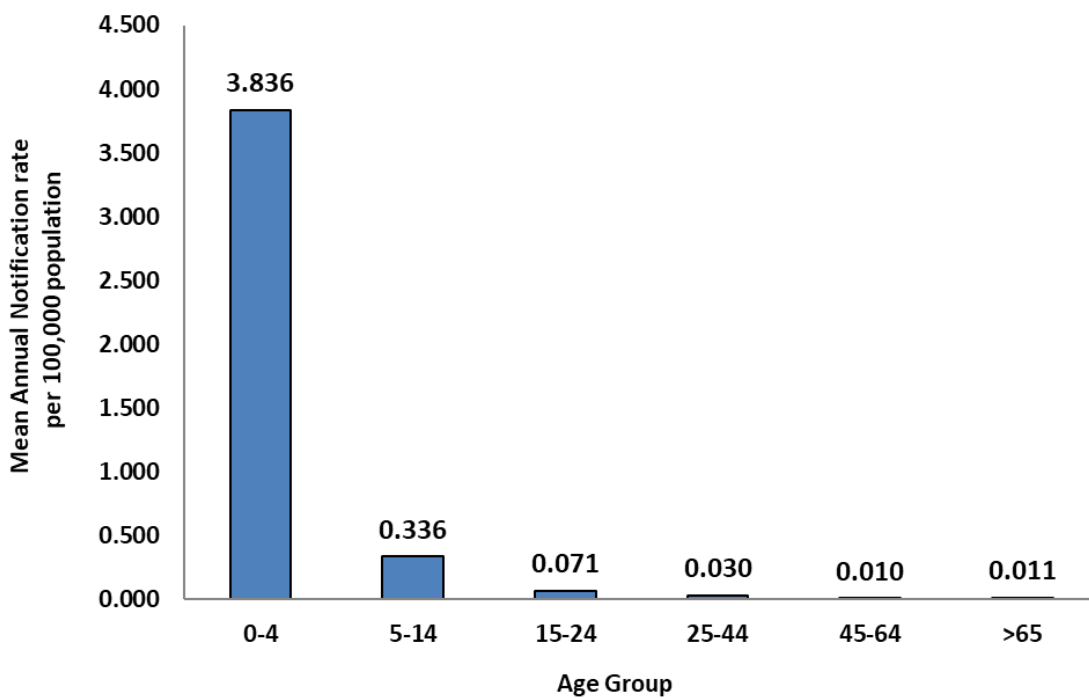
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**Figure 1.** Time trend of pertussis reported cases and annual notification rate /100,000 population in Greece, 2004-2023



**Figure 2.** Age distribution of the mean annual notification rate of pertussis (cases/100,000 population), Greece, 2004-2023.



**NATIONAL PUBLIC HEALTH ORGANIZATION (NPHO)**

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**Figure 3.** Frequency distribution of pertussis notified cases by number of vaccine doses, Greece, 2004-2023.

