

Tetanus

Annual Epidemiological Report for 2021

Key facts

- In 2021, 50 tetanus cases were reported in the EU/EEA, 10 of which were confirmed cases.
- The number of cases reported in 2021 was higher than that reported in 2020 (32 cases), but lower than the numbers reported in 2019 and 2018 (73 and 92 respectively). The use of the EU case definition for reporting was quite varied, with four countries using a different case definition for reporting; most often this definition corresponds to the national case definitions.
- Adults aged 65 years and above were the most affected age group, with women accounting for most cases. The current epidemiology in the EU/EEA may be explained by lower vaccination coverage or waning immunity in older populations.
- The average estimated vaccination coverage of DTP3 among one-year-olds in the EU/EEA remained high throughout the period 2017–2021 (2021: 94%, range 86–99%).
- Due to the severity of tetanus, there is a need to maintain high vaccination rates in all age groups and to continue developing and implementing strategies to protect specific groups, particularly the elderly, in countries with higher rates of disease.

Methods

This report is based on data for 2021 retrieved from The European Surveillance System (TESSy) on 14 April 2023. The European Surveillance System is a system for the collection, analysis and dissemination of data on communicable diseases.

For a detailed description of the methods used to produce this report, please refer to the 'Methods' chapter in the 'Introduction to the Annual Epidemiological Report' [1].

An overview of the national surveillance systems is available online [2].

A subset of the data used for this report is available through ECDC's online Surveillance Atlas of Infectious Diseases [3].

For 2021, 26 EU/EEA Member States reported data on tetanus cases to TESSy. All Member States except Denmark, France, Italy and Liechtenstein reported data on cases of tetanus in accordance with the 2008, 2012 or 2018 EU case definitions [4].

The majority of Member States reported case-based data from comprehensive and passive surveillance systems with national coverage; Bulgaria reported aggregated data. Tetanus is not under surveillance in Belgium and Finland. Germany has never reported tetanus data to ECDC and Austria last reported tetanus data to ECDC in 2011.

Vaccination coverage estimates presented in this report were obtained from the websites of the WHO Global Health Observatory, and WHO and UNICEF estimates of national immunisation coverage (WUENIC) [5]. The diphtheria tetanus toxoid and pertussis (DTP3) coverage is defined as the percentage of one-year-olds who have received three doses of the combined diphtheria, tetanus toxoid and pertussis vaccine in a given year. The method for calculating the DTP3 indicator is outlined in the metadata available online [6].

Epidemiology

For 2021, 26 EU/EEA countries reported 50 tetanus cases, 10 of which (20%) were classified as confirmed and 40 (80%) as probable. Italy accounted for 54% of all notified cases (Table 1, Figure 1). Poland, France and Romania accounted for 28% of all notified cases (Table 1 and Figure 1). Fifteen countries reported no cases. The number of cases reported in 2021 was higher than that reported in 2020 (32 cases), but lower than the numbers reported in 2019 and 2018.

The crude EU/EEA notification rate was 0.01 cases per 100 000 population, which is within the range reported since 2012. The highest rate was reported by Italy (0.05 cases per 100 000), followed by Lithuania (0.04 cases per 100 000 population).

Between 2017 and 2021, Italy reported 40% (n=131) of all cases reported in EU/EEA (n=329). For the years 2019–2021, Italy reported mostly probable cases (90%) while for the years 2017–2018 they reported mostly confirmed cases (95%). However, as noted in the 'Methods' section, the case definition used for reporting was not an EU definition. Of the 131 cases reported by Italy, 92% occurred in the age group 65 years and above.

Table 1. Distribution of tetanus cases and rates per 100 000 population by country and year, EU/EEA, 2017–2021

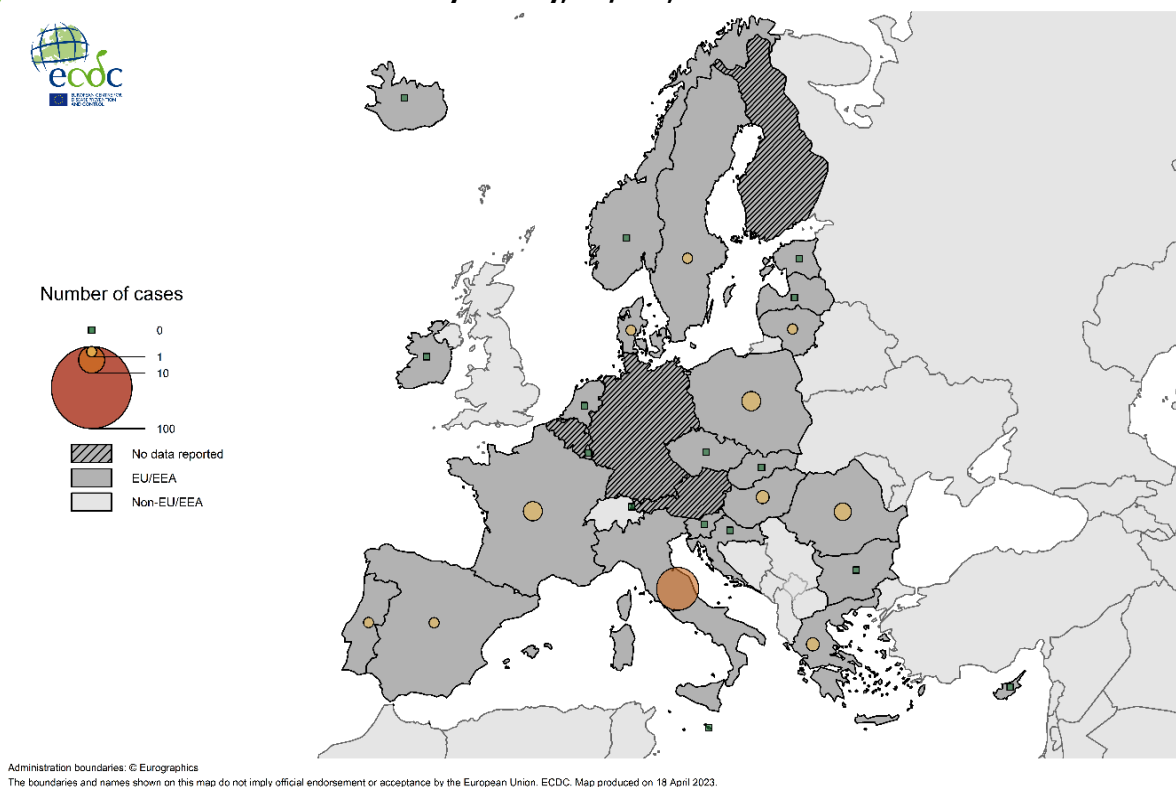
Country	2017		2018		2019		2020		2021	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Austria	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Belgium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bulgaria	0	0.00	1	0.01	0	0.00	0	0.00	0	0.00
Croatia	2	0.05	3	0.07	2	0.05	0	0.00	0	0.00
Cyprus	0	0.00	1	0.12	0	0.00	0	0.00	0	0.00
Czechia	0	0.00	0	0.00	1	0.01	0	0.00	0	0.00
Denmark	2	0.03	2	0.03	ND	ND	ND	ND	1	0.02
Estonia	1	0.08	1	0.08	0	0.00	0	0.00	0	0.00
Finland	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
France	4	0.01	2	0.00	4	0.01	3	0.00	5	0.01
Germany	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Greece	2	0.02	4	0.04	5	0.05	2	0.02	2	0.02
Hungary	0	0.00	1	0.01	5	0.05	3	0.03	2	0.02
Iceland	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Ireland	1	0.02	0	0.00	0	0.00	0	0.00	0	0.00
Italy	33	0.05	36	0.06	25	0.04	10	0.02	27	0.05
Latvia	0	0.00	0	0.00	1	0.05	0	0.00	0	0.00
Liechtenstein	ND	ND	ND	ND	ND	ND	ND	ND	0	0.00
Lithuania	3	0.11	1	0.04	1	0.04	0	0.00	1	0.04
Luxembourg	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Malta	1	0.22	0	0.00	0	0.00	0	0.00	0	0.00
Netherlands	1	0.01	1	0.01	0	0.00	2	0.01	0	0.00
Norway	0	0.00	3	0.06	0	0.00	0	0.00	0	0.00
Poland	11	0.03	8	0.02	17	0.04	2	0.01	5	0.01
Portugal	0	0.00	2	0.02	0	0.00	0	0.00	1	0.01
Romania	7	0.04	6	0.03	5	0.03	3	0.02	4	0.02
Slovakia	1	0.02	1	0.02	0	0.00	1	0.02	0	0.00
Slovenia	0	0.00	2	0.10	1	0.05	2	0.10	0	0.00
Spain	6	0.01	6	0.01	2	0.00	1	0.00	1	0.00
Sweden	2	0.02	4	0.04	0	0.00	3	0.03	1	0.01
UK	5	0.01	7	0.01	4	0.01	ND	ND	ND	ND
EU-EEA	82	0.02	92	0.02	73	0.02	32	0.01	50	0.01

Source: Country reports.

ND : no data reported.

NR : no rate calculated.

Figure 1. Distribution of tetanus cases by country, EU/EEA, 2021

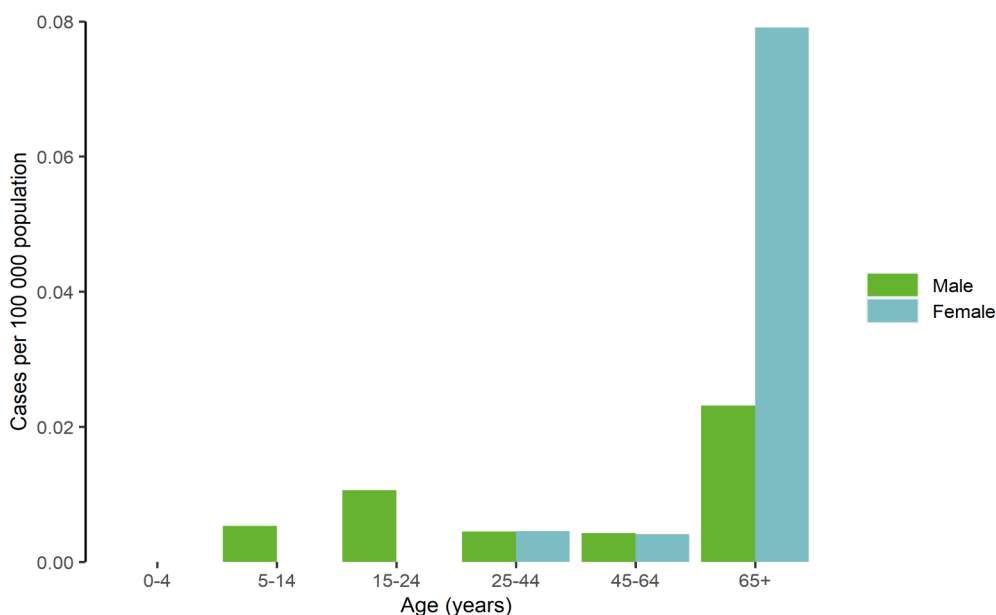


Age and gender distribution

In 2021, people aged 65 years and older were those most affected, accounting for 78% of all reported tetanus cases (Figure 2). A total of four cases aged 45–64 years were reported and four aged 25–44 years, while three cases were reported in the age group 5–24 years.

More than two thirds of the reported cases were women (72%). However, men were more frequently reported in the younger age groups from five to 24 years. Among those aged ≥65 years, 32 cases were reported among women and seven among men. The overall female-to-male ratio was 1:0.4.

Figure 2. Distribution of tetanus cases per 100 000 population, by age and gender, EU/EEA, 2021

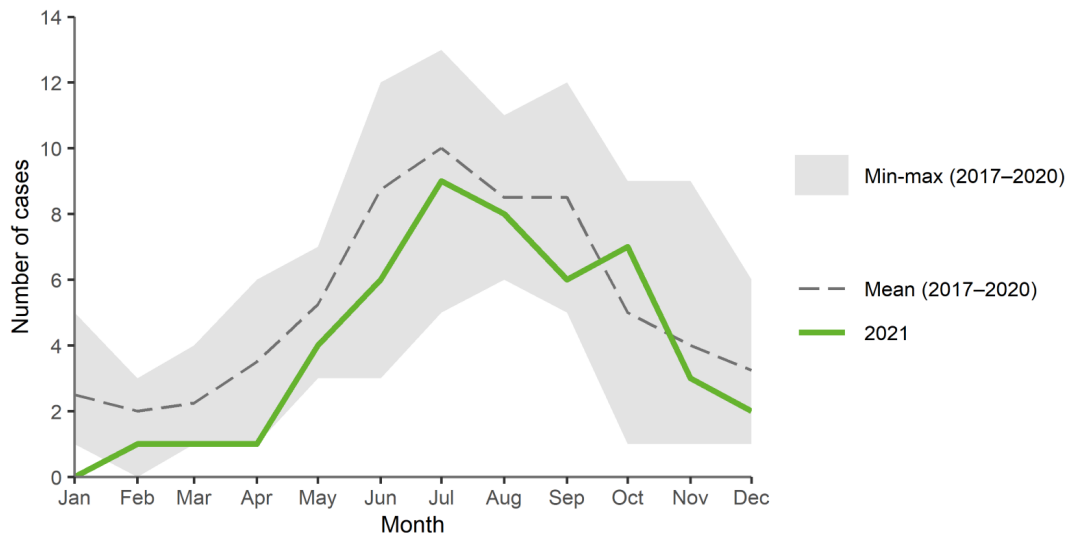


Source: Country reports from Bulgaria, Croatia, Cyprus, Czechia, Estonia, France, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

Seasonality

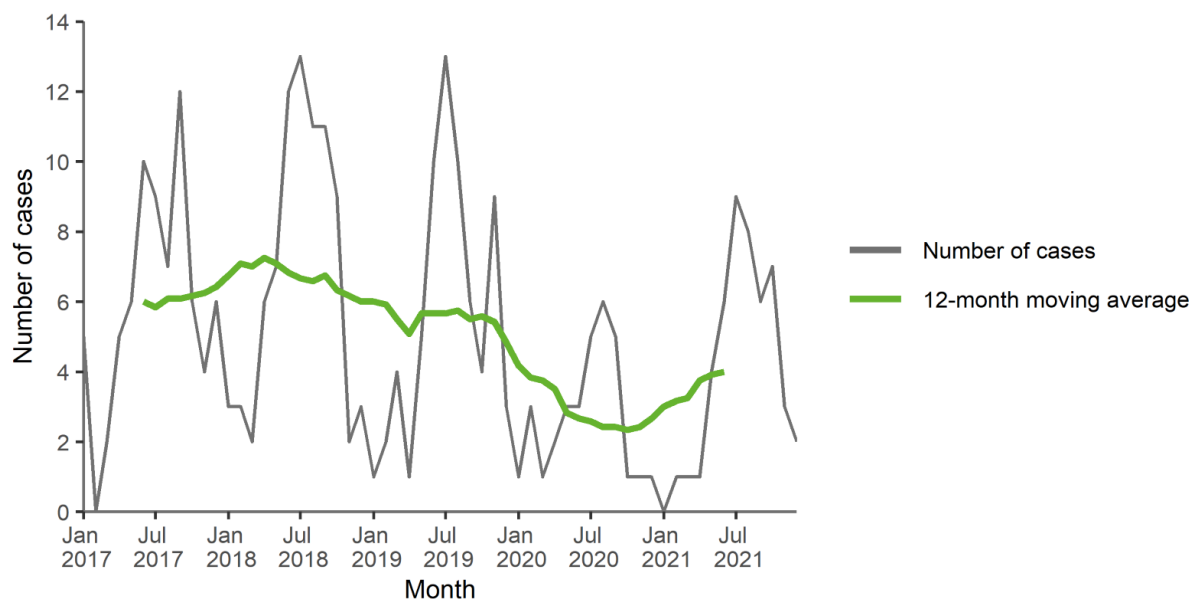
In 2021, most tetanus cases were reported between June and October, with a peak in July and a second peak in October. The peak in July was also observed in previous years. There was a slight increase in the number of cases in 2021, compared with 2020, but overall the number of cases reported was lower than that observed during the period 2017–2019 (Figures 3-4).

Figure 3. Distribution of tetanus cases by month, EU/EEA, 2021 and 2017–2020



Source: Country reports from Bulgaria, Croatia, Cyprus, Czechia, Estonia, France, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

Figure 4. Distribution of tetanus cases by month, EU/EEA, 2017–2021



Source: Country reports from Bulgaria, Croatia, Cyprus, Czechia, Estonia, France, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

Outcome

Of the 50 cases with a reported known outcome, 10 (20%) were fatal. Nine of the cases with a fatal outcome were in people over 80 years. One fatal outcome was reported in a person aged 64 years.

The number of cases with a reported fatal outcome has doubled since 2020 (n=5) but still remains within the range of reported fatal cases for the previous four years (range 7–11 cases).

Vaccination coverage

Estimations on vaccine coverage of the third dose of diphtheria, tetanus toxoid and pertussis-containing vaccine (DTP3) among one-year-olds related to the year for which the data is presented were available from WHO (WUENIC estimates). In 2021, the average estimated vaccine coverage for the EU/EEA countries was 94% (range 86–99%). Five countries (Greece, Hungary, Luxembourg, Malta and Portugal) reported an estimated 99% DTP3 coverage. Over the last five years, a small decrease in the vaccine coverage (range -1 to -9%) has been observed in twelve countries, and an increase (range 1–5%) in eight countries (Table 2). Overall, the DTP3 vaccine coverage among one-year-olds in the EU/EEA remains at very high levels.

Table 2. Diphtheria tetanus toxoid and pertussis-containing vaccine (DTP3) immunisation coverage among one-year-olds (%) (WUENIC), EU/EEA, 2017–2021

Country	2017	2018	2019	2020	2021	Percentage of change* (2017–2021)
Austria	95.0	95.0	95.0	95.0	95.0	0
Belgium	98.0	98.0	97.0	97.0	98.0	0
Bulgaria	92.0	92.0	93.0	91.0	89.0	-3
Croatia	92.0	93.0	94.0	94.0	92.0	0
Cyprus	97.0	99.0	96.0	96.0	96.0	-1
Czechia	96.0	97.0	97.0	97.0	94.0	-2
Denmark	98.0	97.0	97.0	97.0	97.0	-1
Estonia	97.0	92.0	91.0	91.0	90.0	-8
Finland	89.0	91.0	91.0	90.0	89.0	0
France	96.0	96.0	96.0	96.0	96.0	0
Germany	91.0	91.0	91.0	91.0	91.0	0
Greece	99.0	99.0	99.0	99.0	99.0	0
Hungary	99.0	99.0	99.0	99.0	99.0	0
Iceland	89.0	91.0	92.0	93.0	92.0	+3
Ireland	95.0	94.0	94.0	94.0	94.0	-1
Italy	95.0	95.0	96.0	94.0	94.0	-1
Latvia	98.0	96.0	99.0	99.0	94.0	-4
Liechtenstein	ND	ND	ND	ND	ND	NR
Lithuania	94.0	92.0	92.0	91.0	90.0	-4
Luxembourg	99.0	99.0	99.0	99.0	99.0	0
Malta	98.0	97.0	98.0	98.0	99.0	+1
Netherlands	94.0	93.0	94.0	94.0	95.0	+1
Norway	96.0	96.0	97.0	97.0	97.0	+1
Poland	96.0	95.0	95.0	90.0	90.0	-7
Portugal	98.0	99.0	99.0	99.0	99.0	+1
Romania	82.0	86.0	88.0	87.0	86.0	+5
Slovakia	96.0	96.0	97.0	97.0	97.0	+1
Slovenia	94.0	93.0	95.0	95.0	86.0	-9
Spain	95.0	96.0	95.0	94.0	92.0	-3
Sweden	97.0	97.0	98.0	97.0	98.0	+1
EU/EEA**	95.0	95.0	95.3	94.9	94.0	NR

Source: WHO Immunisation Data Portal, WHO and UNICEF estimates of national immunisation coverage (WUENIC). from Austria, Belgium, Bulgaria, Croatia, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

ND: no data reported.

NR: no rate calculated.

* The percentage of change was calculated for each dose as the percentage of increase or decrease between 2017 and 2021, i.e. $((\text{coverage in 2021} - \text{coverage in 2017}) / \text{coverage in 2017}) \times 100$.

**EU/EEA: population-weighted average vaccination coverage rate.

Discussion

Since the beginning of the COVID-19 pandemic in 2020, there has been a 50% decrease in the reported number of tetanus cases in the EU/EEA. For 2020 and 2021, the overall notification rate for the EU/EEA was 0.01 cases per 100 000 population, compared to 0.02 cases per 100 000 population for 2017–2019.

The reduction in numbers observed from 2020 onwards may be attributed to the COVID-19 pandemic which had an overall effect on epidemiology and reporting for many notifiable diseases worldwide [7] [8] [9] [10]. The confinement strategies (lockdowns, restriction of outdoor activities, festivals, etc.) and control measures implemented during the pandemic probably played a role in the acquiring of tetanus infection. In addition to the change in access to healthcare services and test strategies, there were also changes to disease notification methodology and workloads at public health authorities due to the increased use of resources for the COVID-19 pandemic response. All these factors, and the fact that partially immunised patients may present with very mild disease, may have led to possible under-reporting or under ascertainment of the number of tetanus cases. This is particularly important, given that tetanus has become increasingly rare.

Most cases were reported in the elderly, probably due to lower vaccination coverage or waning immunity in this population, with higher notification rates observed in women. It is likely that women aged over 65 years had fewer opportunities for vaccination than men of the same age who had received the vaccine during compulsory military service in many countries [11]. Collection of data on vaccination status, which is currently not implemented in the EU/EEA surveillance, would help to better describe the characteristics of this population.

Italy accounted for more than one third ($n=131$) of the cases reported from 2017–2021 (total number of cases =329). Italy uses national case definitions that are different from the EU case definition [11] and therefore any interpretation in relation to the EU epidemiological picture should be undertaken with caution.

Over the past decade, routine immunisation services for children have expanded greatly. However, some of these services were affected by the COVID-19 pandemic. A recent study in the USA estimated that there was an 8.2% (95% CI: 4.3–12.1) increase in the risk of missed vaccination opportunities for the Tdap vaccine (tetanus, diphtheria, and acellular pertussis) among adolescents visiting healthcare services, compared to the pre-pandemic period [12]. WHO has estimated that DTP3 (third dose of diphtheria, tetanus toxoid and pertussis-containing vaccine) immunisation coverage among one-year-olds worldwide decreased from 86% in 2019 to 81% in 2021 [13]. In the EU/EEA, the overall estimated vaccine coverage was 94% (range 86–99%) for 2021. Although fluctuations in the coverage estimates were observed for some countries during the period 2017–2021, the overall vaccination levels remained quite high.

In the EU/EEA, tetanus vaccination is part of the infant primary immunisation schedule (3–4 doses in the first two years of life) [14]. Booster doses are recommended at different ages, depending on the country. The majority of Member States recommend a booster for adults aged 18 years or over.

According to the most recent WHO position paper on tetanus vaccines, a three-dose primary series is recommended in order to provide lifelong protection against tetanus, with the first dose administered from six weeks of age, and subsequent doses given with a minimum interval of four weeks in-between, as well as three booster doses. Ideally, there should be at least four years between booster doses given at 12–23 months; 4–7 years and 9–15 years. To protect against tetanus, WHO recommends that six doses of tetanus-containing vaccine be given to every individual, from childhood to adolescence and adulthood [15].

A recent WHO expert consultation reviewing the available evidence on immunogenicity and safety of Td vaccine use in 4–7-year-old children concluded that the Td vaccine given at ages 4–7 years, as a second booster dose in a six-dose series, would provide adequate protection against diphtheria and tetanus. It recommended steps to include this change in the age extension, listed in the Td vaccine package insert. At present, WHO's programmatic advice to use Td vaccine in ages ≥ 4 years is, in effect, an off-label recommendation [16].

Public health implications

Due to its severity, tetanus poses a risk to unvaccinated or insufficiently-vaccinated people. There is a need to maintain high vaccine-induced immunity in all age groups and raise awareness of the potential threat to the minority of non- and under-immunised people. Strategies to protect specific groups, particularly the elderly, need to be considered in countries with higher rates of disease.

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