

## SURVEILLANCE

# Anthrax

## Annual Epidemiological Report for 2022

### Key facts

- Anthrax continues to be a rare disease in humans in Europe, with only a few cases reported every year.
- For 2022, 13 confirmed cases were reported by Croatia (eight cases), Romania (three cases) and Spain (two cases) and an additional nine probable cases were reported by Croatia.
- The number of confirmed anthrax cases reported in 2022 (13 cases) is more than the total number of cases reported in the past four years together (11 cases) in the EU/EEA. This can be explained by a large outbreak of anthrax in cattle in Croatia with associated human cases.
- The most at-risk populations for developing anthrax are those who are in close contact with animals and potentially contaminated animal products and those who live in endemic areas.

### Introduction

Anthrax is a zoonotic disease caused by the spore-producing bacterium *Bacillus anthracis*. It occurs naturally in soil and commonly affects domestic and wild animals. The disease is endemic in several regions of the world, including southern and eastern Europe. Humans may acquire the infection after exposure to spores, with symptoms usually appearing one to seven days later (in some instances up to 60 days later). Clinical presentations include:

- cutaneous anthrax, which is the most common and least severe presentation (accounting for >95% of cases with a mortality rate of less than 3–5%);
- lung or inhalation anthrax, which has a 75% mortality rate;
- gastrointestinal anthrax, which may progress to blood infection and death;
- injection anthrax, which is associated with injection drug use with a mortality rate of 9–33% [1].

Antibiotic treatment is effective if given at an early stage. Control measures include the correct disposal of dead animals: disinfection, decontamination and disposal of contaminated materials, and decontamination of the environment.

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## Methods

This report is based on data for 2022 retrieved from The European Surveillance System (TESSy) on 5 February 2024. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases.

For a detailed description of methods used to produce this report, please refer to the Methods chapter [2]. An overview of the national surveillance systems is available online [3].

A subset of the data used for this report is available through ECDC's online Surveillance Atlas of Infectious Diseases [4].

For 2022, data on anthrax were reported by 30 EU/EEA countries. The notification of anthrax is compulsory in all EU/EEA countries. Anthrax data were collected through surveillance systems with national coverage in all 30 countries. Twenty-six countries used various versions of the EU case definition (2008, 2012 and 2018 versions) and four countries used other or unknown/unspecified case definitions. The only difference between the 2018 definition and the 2012 and 2008 definitions is that the former considers laboratory confirmation as sufficient for identifying a case when information on clinical symptoms is missing. In 24 countries, both laboratories and physicians reported data. Case-based data were reported in 30 countries and passive surveillance was adopted in 28 countries (Czechia and Slovakia adopted active surveillance of the disease).

In addition to the European Surveillance System (TESSy) reporting, information from event-based surveillance for anthrax clusters or outbreaks with a potential EU dimension was collected through [EpiPulse - the European surveillance portal for infectious diseases \(europa.eu\)](https://europa.eu/epi).

## Epidemiology

For 2022, twenty-two cases of anthrax (thirteen confirmed and nine probable) were reported by three EU/EEA countries. Among the thirteen confirmed cases, nine were male and four were female. Five people were in the age group 25–44 years, four were 45–65 years and two each were in the age groups 15–24 and 5–14 years.

Croatia reported seventeen cases (eight confirmed, nine probable), Romania reported three confirmed anthrax cases and Spain two confirmed cases. All confirmed cases for which information was provided presented with cutaneous anthrax (N=4) after exposure to farm animals (N=3) and were domestically acquired (N=4). All individuals with information were hospitalised (N=4) and there were no fatalities. More information on the Croatian cases was published elsewhere [5].

Compared to the past four years (2018–2021), the number of confirmed anthrax cases reported in 2022 increased substantially (11 cases in the 2018–2021 period and 13 cases in 2022) (Table 1).

**Table 1. Confirmed anthrax cases by country and year, EU/EEA, 2018–2022**

Country	2018	2019	2020	2021	2022
	Number	Number	Number	Number	Number
Austria	0	0	0	0	0
Belgium	0	0	0	0	0
Bulgaria	0	0	0	1	0
Croatia	0	0	0	0	8
Cyprus	0	0	0	0	0
Czechia	0	0	0	0	0
Denmark	0	0	0	0	0
Estonia	0	0	0	0	0
Finland	0	0	0	0	0
France	0	0	0	0	0
Germany	0	0	0	0	0
Greece	0	0	0	0	0
Hungary	0	1	0	0	0
Iceland	0	0	0	0	0
Ireland	0	0	0	0	0
Italy	0	0	3	0	0
Latvia	0	0	0	0	0
Liechtenstein	NDR	NDR	NDR	0	0
Lithuania	0	0	0	0	0
Luxembourg	0	0	0	0	0
Malta	0	0	0	0	0
Netherlands	1	0	0	0	0
Norway	0	0	0	0	0
Poland	0	0	0	0	0
Portugal	0	0	0	0	0
Romania	1	0	0	0	3
Slovakia	0	0	0	0	0
Slovenia	0	0	0	0	0
Spain	1	0	0	3	2
Sweden	0	0	0	0	0
<b>EU/EEA (30 countries)</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>13</b>
United Kingdom	0	0	NA	NA	NA
<b>EU/EEA (31 countries)</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>13</b>

Source: Country reports.

NDR: no data reported.

NA: No data from 2020 onwards were reported by the United Kingdom, due to its withdrawal from the EU on 31 January 2020

## Outbreaks and other threats

In 2022, Greece reported three bovine animals, two goats and one sheep positive for *B. anthracis* to the European Food Safety Authority (EFSA) at farms investigated for suspected anthrax [6].

Croatia published a description of a large anthrax outbreak that affected both humans and animals in Lonjsko polje, Croatia in 2022–2023 [5]. Anthrax was confirmed in 29 animals (17 horses and 12 cattle) from 13 July 2022 to 15 May 2023, with 24 of the 29 cases reported in 2022. The human cases were detected between 15 July and 19 August 2022. Among them, three were children up to nine years old, six were teenagers in the 15-to-18-year age group, and eight were adults. All patients presented with cutaneous anthrax and were treated with antibiotic therapy after which they fully recovered. All patients had a history of contact with infected animals.

## Discussion

Anthrax is a rare disease in the EU/EEA. From 2018 to 2021, EU/EEA countries reported 11 confirmed cases to ECDC, ranging from one to six cases per year for both probable and confirmed cases. However, in 2022, the number of probable cases and confirmed cases (22 and 13 cases respectively) increased beyond the number of confirmed cases reported in the past four years together. The sharp increase in anthrax cases in Croatia calls for closer monitoring and coordinated control measures in the affected region. All cases reported in 2022 where information is available had been in contact with infected farm animals [5].

The area where the anthrax outbreak occurred in Croatia in 2022 is situated in a nature park with large wetland areas, mainly used for grazing livestock and previously considered unaffected by anthrax. The area was hit by earthquakes in 2020 and 2021, which caused the formation of sinkholes filled with water and vegetation, and the movement of soil and groundwater into the area from neighbouring anthrax-endemic areas [5]. In 2022, the water levels in the area were extremely low due to longer dry periods, resulting in livestock grazing in areas previously covered by water [5]. The combination of these factors could explain why the outbreak became so extensive and highlights the possible effects of natural events on anthrax revival.

*Bacillus anthracis* can be divided into separate genotypes. Whole genome sequencing can identify different genotypes and has become an integral part of surveillance and outbreak investigations. Two recent publications have provided updated frameworks for *Bacillus anthracis* genotyping, based on two different but congruent high-resolution methods: core genome multilocus sequence typing (cgMLST) and single nucleotide polymorphisms (SNP) analysis [7,8]. These authors' work can guide epidemiologists in future anthrax outbreak investigations and facilitate international collaboration in cases of multi-country events.

Antibiotics are the cornerstone of treatment for all anthrax types [9, 10]. However, antibiotics will only address the bacterium and not the toxins released by the pathogen [9]. As a result, the administration of antitoxins could be considered a complement to antibiotic therapy [10,11]. However, the additional benefits of antitoxins have been contested [12]. In cases of severe systemic disease, more supportive care might be needed [9].

## Public health implications

People most at risk of developing anthrax are those who are in close contact with animals in endemic areas and with potentially contaminated animal products (e.g. wool or hide), e.g. farmers, veterinarians or people working in the animal hide industry mainly on the appropriate handling of dead animals and animal products. This includes correct disposal of carcasses, decontamination of the environment, and disinfection and decontamination of animal products [13]. Workers carrying out these measures must use protective equipment [13]. Even though gastrointestinal anthrax due to the ingestion of contaminated meat is possible, meat-borne transmission of anthrax in the EU is considered a very rare event [14].

Depending on the mode of contact with spores, the disease presents as cutaneous, gastrointestinal, inhalational or injectional anthrax. Cutaneous anthrax is the most common form of anthrax (>95% of cases) and occurs after a spore has penetrated the skin barrier through damaged skin. If treated, this usually results in a localised infection and low mortality. Other forms of anthrax are more severe and are associated with greater mortality, even with appropriate treatment [9].

Vaccines against anthrax are available and are approved in some EU/EEA countries [10]. Guidelines recommend vaccination for people at risk, such as veterinarians, abattoir workers, those working with animal hides or furs, laboratory workers and members of the armed forces in areas with a high risk of exposure [10,15]. In addition to pre-exposure prophylaxis with vaccines, the anthrax vaccine is also recommended for post-exposure prophylaxis [10,15]. Antibiotics may also be considered for post-exposure prophylaxis of inhalation anthrax.

Animals can be vaccinated to prevent them from being infected and passing the spores on to humans [13]. In areas prone to the disease, particularly those that experience outbreaks or sporadic cases in livestock, susceptible animals are usually vaccinated annually [13].

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