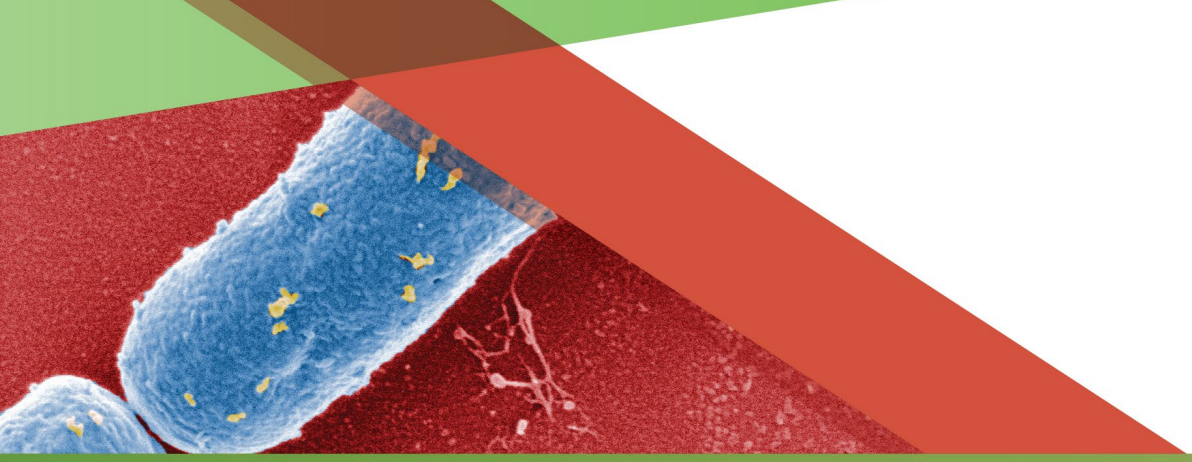

SURVEILLANCE REPORT

Anthrax

Annual Epidemiological Report for 2021

Key facts

- Anthrax continues to be uncommon in humans in the EU/EEA, with only a few cases reported every year.
- For 2021, four confirmed anthrax cases were reported by Bulgaria (one case) and Spain (three cases).
- Three probable cases were reported by France (one case) and Spain (two cases).
- Among 30 reporting EU/EEA countries, 27 notified zero cases.

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 appearing one to seven days (up to 60 days) later. Clinical presentations include:

- cutaneous anthrax, which is the most common and least severe presentation (accounting for >95% of cases);
- lung anthrax, which has a 75% death rate;
- gastrointestinal anthrax, which may progress to blood infection and death; and
- injectional anthrax, which is associated with injection drug use.

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.

Methods

This report is based on data for 2021 retrieved from The European Surveillance System (TESSy) on 9 October 2022. TESSy is hosted at ECDC and 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 [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, 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 29 of 30 countries (Spain did not have national coverage). Twenty-five countries used various versions of the EU case

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definition (2008, 2012 and 2018 versions) and five 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 29 countries and Bulgaria reported aggregated data.

No data for 2020 and 2021 were reported by the United Kingdom, due to its withdrawal from the EU on 31 January 2020.

Epidemiology

For 2021, seven cases of anthrax (four confirmed and three probable) were reported by three EU/EEA countries. Four cases were male and three were female. Among six cases for which information on age was available, the age ranged from 24 to 74 years (median 54 years).

In Spain, five cases (three confirmed, two probable) were reported, linked to an outbreak involving several farms in one Spanish region [personal communication with C. Varela Martínez, April 2023]. Cases included three men and two women, with an age range of 24 to 74 years (median 54 years). Three cases developed cutaneous anthrax and one case developed gastrointestinal anthrax. The clinical presentation for the fifth case was unknown. Three cases were hospitalised. No deaths were reported. Further information on the outbreaks in Spain is provided in the Discussion.
In Bulgaria, one confirmed anthrax case was reported. No further information on the case was available. One probable case of cutaneous anthrax via contact with infected animals was reported by France. The individual is reported to have recovered from the illness [personal communication with A. Mailles, April 2022].

From 2017 to 2021, only a few sporadic cases were reported each year (Table 1).

Table 1. Number of confirmed and probable anthrax cases by country and year, EU/EEA, 2017–2021

Country	2017		2018		2019		2020		2021	
	Conf.	Prob.	Conf.	Prob.	Conf.	Prob.	Conf.	Prob.	Conf.	Prob.
Austria	0	0	0	0	0	0	0	0	0	0
Belgium	0	0	0	0	0	0	0	0	0	0
Bulgaria	1	0	0	0	0	0	0	0	1	0
Croatia	0	0	0	2	0	0	0	0	0	0
Cyprus	0	0	0	0	0	0	0	0	0	0
Czechia	0	0	0	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	0	0	0	0	0
Estonia	0	0	0	0	0	0	0	0	0	0
Finland	0	0	0	0	0	0	0	0	0	0
France	0	0	0	0	0	0	0	0	0	1
Germany	0	0	0	0	0	0	0	0	0	0
Greece	0	2	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	1	3	0	0	0	0
Iceland	0	0	0	0	0	0	0	0	0	0
Ireland	0	0	0	0	0	0	0	0	0	0
Italy	0	0	0	0	0	0	3	0	0	0
Latvia	0	0	0	0	0	0	0	0	0	0
Liechtenstein	NDR	NDR	NDR	NDR	NDR	NDR	NDR	NDR	0	0
Lithuania	0	0	0	0	0	0	0	0	0	0
Luxembourg	0	0	0	0	0	0	0	0	0	0
Malta	0	0	0	0	0	0	0	0	0	0
Netherlands	0	0	1	0	0	0	0	0	0	0
Norway	0	0	0	0	0	0	0	0	0	0
Poland	0	0	0	0	0	0	0	0	0	0
Portugal	0	0	0	0	0	0	0	0	0	0
Romania	5	3	1	2	0	1	0	1	0	0
Slovakia	0	0	0	0	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	0	0	0
Spain	0	1	1	2	0	0	0	0	3	2
Sweden	0	0	0	0	0	0	0	0	0	0
United Kingdom	0	0	0	0	0	0	NDR	NDR	NDR	NDR
EU/EEA	**6**	**6**	**3**	**6**	**1**	**4**	**3**	**1**	**4**	**3**

Source: Country reports
Conf.: Confirmed case
Prob.: Probable case
NDR: No data reported

Outbreaks and other threats

In the summer of 2021, there was a transition from the Epidemic Intelligence Information System for Food and Waterborne Diseases (FWD-EPIS) to the new EpiPulse system for the reporting of food- or waterborne disease outbreaks or unusual events. No national or multi-country anthrax outbreaks were reported through EpiPulse in 2021.

Discussion

Anthrax is a rare disease in the EU/EEA. From 2017 to 2021, EU/EEA countries reported 17 confirmed cases and 20 probable cases to ECDC, ranging from one to six cases per year for both probable and confirmed cases. For 2021, four confirmed cases and three probable cases were reported. Confirmed cases were reported by Bulgaria (one case) and Spain (three cases). Probable cases were reported by France (one case) and Spain (two cases).

In Spain, two independent anthrax outbreaks were reported in 2021 [4]. The first outbreak, which did not involve any human cases, was on a farm in the Castilla-La Mancha region where only cattle were infected. The animals were reported to have become infected at pasture, where a riverbed that had dried up following a drought was considered the likely source of infection. The second outbreak, in the Extremadura region, occurred between August and September 2021. Several farms were involved and a wide range of animals were infected (cattle, horses, pigs and wild boar). Five human anthrax cases (three confirmed and two probable) were linked to this outbreak [personal communication, C. Varela Martínez, April 2023], of which four were veterinarians and one was a rancher [5]. Among four of the cases with known clinical presentation, three cases presented with cutaneous anthrax and one case presented with gastrointestinal anthrax [5]. Three cases were reported as hospitalised [5]. In France, one probable case of cutaneous anthrax via contact with infected animals was also reported.

Anthrax disease, caused by the bacterium *Bacillus anthracis*, can form highly resistant spores and mainly affects herbivores and domestic animals. Humans can become infected after contact with spores through infected animals or contaminated animal products (e.g. wool or hide). As a result, people in close contact with infected animals or contaminated animal products (e.g. farmers, veterinarians or people working in the animal hide industry) are at highest risk of becoming infected [6].

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 [7].

The first case of injectional anthrax was described in 2000 and was attributed to the injection of contaminated heroin [8]. From 2009 to 2010, Scotland experienced the largest ever outbreak of injectional anthrax, with 119 cases identified [9]. In 2012 and 2013, cases of injectional anthrax were also identified in Denmark, France, Germany and the United Kingdom [10].

Bacillus anthracis can be divided into separate genotypes. Whole genome sequencing (WGS) can be used to 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 [11,12]. 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 [7,13]. However, antibiotics will only address the bacterium and not the toxins released by the pathogen [7]. As a result, the administration of antitoxins could be considered as a complement to antibiotic therapy [13,14]. However, the additional benefits of antitoxins have been contested [15]. In cases of severe systemic disease, more supportive care might be needed [7].

Public health implications

People most at risk of developing anthrax are those who are in close contact with animals and potentially contaminated animal products. Control measures focus 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 [6]. Workers carrying out these measures must use protective equipment [6]. 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 [16].

It is presumed that there is still a risk of exposure to anthrax spores for heroin users in European countries and it is possible that additional cases among people who inject drugs will be identified in the future. Information on anthrax should be disseminated to healthcare workers, as well as drug treatment and harm reduction centres, supporting early diagnosis and treatment. The provision of appropriately dosed opiate substitution treatment could

also help prevent further injectional anthrax cases [17]. In addition, the development of a prototype syringe filter for spore-forming bacteria could be a potential tool for the prevention of infections in people who inject drugs [18].

Vaccines against anthrax are available and are approved in some EU/EEA countries [13]. 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 [13,19]. Animals can be vaccinated to prevent them from being infected and passing the spores on to humans [6]. In areas prone to the disease, particularly those that experience outbreaks or sporadic cases in livestock, susceptible animals are usually vaccinated on an annual basis [6]. In addition to pre-exposure prophylaxis with vaccines, the anthrax vaccine is also recommended for post-exposure prophylaxis [13,19]. Antibiotics may also be considered for post-exposure prophylaxis of inhalation anthrax.

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