

## SURVEILLANCE REPORT

# Brucellosis

## Annual Epidemiological Report for 2019

### Key facts

- In 2019, 314 confirmed brucellosis cases were reported in the EU/EEA.
- The notification rate in the EU/EEA was 0.06 cases per 100 000 population. The highest rates were reported in Greece, Portugal and Slovenia.
- The EU/EEA notification rate decreased in the period 2015 to 2019.
- The highest rate was observed in 45–64-year-old males (0.10 per 100 000 population) and in females over 65 years (0.05 per 100 000 population).

### Introduction

Brucellosis is an infection caused by *Brucella* bacteria. Brucellosis occurs worldwide in cattle, sheep and goats. In Europe, the Mediterranean region has been particularly affected. Humans become infected by direct or indirect contact with animals or with contaminated animal products (including unpasteurised milk and dairy products) or by the inhalation of aerosols. The symptoms are both general (fever, weakness, joint pain) and organ-specific (including infections in the brain infection and heart valves). Untreated, brucellosis can become chronic or lead to death.

### Methods

This report is based on data for 2019 retrieved from The European Surveillance System (TESSy) on 05 November 2021. 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 [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].

Brucellosis data were reported by 29 EU/EEA countries for the year 2019. In Denmark, brucellosis is neither notifiable nor under surveillance. The notification of brucellosis is mandatory in all EU/EEA Member States except for two countries (Belgium and the United Kingdom), where notification is based on another (not specified) system. Ten Member States used the latest case definition (EU 2018), eight used the previous case definition from 2012, seven reported in accordance with the one from 2008 and one from 2002, two reported using other definitions or did not specify which case definition they used. The majority of Member States (26) undertook passive surveillance and in 21 countries had surveillance systems that integrate laboratory and epidemiological

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data from physicians or hospitals. The surveillance systems for brucellosis have national coverage in all reporting EU/EEA countries. Twenty-six Member States reported case-based data and two countries (Belgium and Bulgaria) reported aggregated data. Both reporting formats were included when calculating numbers of cases and notification rates.

## Epidemiology

In 2019, 314 confirmed cases of brucellosis were reported by 29 EU/EEA countries with an overall rate of 0.06 per 100 000 population. Ten Member States reported no cases. Greece and Italy reported the highest numbers of confirmed cases, accounting for 36.3 % of all cases reported in the EU/EEA. Greece had the highest rate at 0.61 per 100 000 population, followed by Portugal (0.32), Slovenia (0.29) and Sweden (0.14) (Table 1, Figure 1). In Sweden, all cases were travel-related or linked to food items imported from endemic areas.

The majority (71.8%) of 142 brucellosis cases with reported information were hospitalised. Two cases were fatal, giving a case-fatality rate of 1.7%.

**Table 1. Distribution of confirmed brucellosis cases and rates per 100 000 population by country and year, EU/EEA, 2015–2019**

Country	2015		2016		2017		2018		2019		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	1	0.01	4	0.05	6	0.07	7	0.08	6	0.07	0.06
Belgium	9	0.08	4	0.04	8	0.07	9	0.08	3	0.03	0.02
Bulgaria	36	0.50	0	0.00	2	0.03	1	0.01	0	0.00	0.00
Croatia	0	0.00	2	0.05	1	0.02	3	0.07	3	0.07	0.06
Cyprus	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00
Czechia	0	0.00	1	0.01	1	0.01	4	0.04	4	0.04	0.04
Denmark	.	.	.	.	.	.	.	.	.	.	.
Estonia	0	0.00	0	0.00	0	0.00	1	0.08	1	0.08	0.08
Finland	0	0.00	0	0.00	1	0.02	0	0.00	0	0.00	0.00
France	17	0.03	19	0.03	21	0.03	0	0.00	34	0.05	0.05
Germany	44	0.05	36	0.04	41	0.05	37	0.04	37	0.04	0.04
Greece	109	1.00	119	1.10	94	0.87	97	0.90	65	0.61	0.64
Hungary	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00
Iceland	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00
Ireland	0	0.00	2	0.04	2	0.04	0	0.00	0	0.00	0.00
Italy	105	0.17	211	0.35	99	0.16	94	0.16	49	0.08	0.08
Latvia	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.
Lithuania	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00
Luxembourg	0	0.00	1	0.17	0	0.00	0	0.00	0	0.00	0.00
Malta	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0.00
Netherlands	7	0.04	5	0.03	2	0.01	5	0.03	7	0.04	0.04
Norway	2	0.04	4	0.08	3	0.06	3	0.06	4	0.08	0.08
Poland	4	0.01	3	0.01	2	0.01	0	0.00	2	0.01	0.01
Portugal	46	0.44	50	0.48	16	0.16	19	0.18	33	0.32	0.29
Romania	0	0.00	1	0.01	3	0.02	1	0.01	1	0.01	0.00
Slovakia	1	0.02	1	0.02	1	0.02	0	0.00	1	0.02	0.02
Slovenia	0	0.00	1	0.05	1	0.05	3	0.15	6	0.29	0.28
Spain	33	0.07	37	0.08	63	0.14	40	0.09	20	0.04	0.04
Sweden	13	0.13	19	0.19	14	0.14	11	0.11	14	0.14	0.14
United Kingdom	12	0.02	14	0.02	-	-	-	-	24	0.04	0.04
<b>EU-EEA</b>	<b>439</b>	<b>0.09</b>	<b>534</b>	<b>0.10</b>	<b>381</b>	<b>0.09</b>	<b>335</b>	<b>0.08</b>	<b>314</b>	<b>0.06</b>	<b>0.06</b>

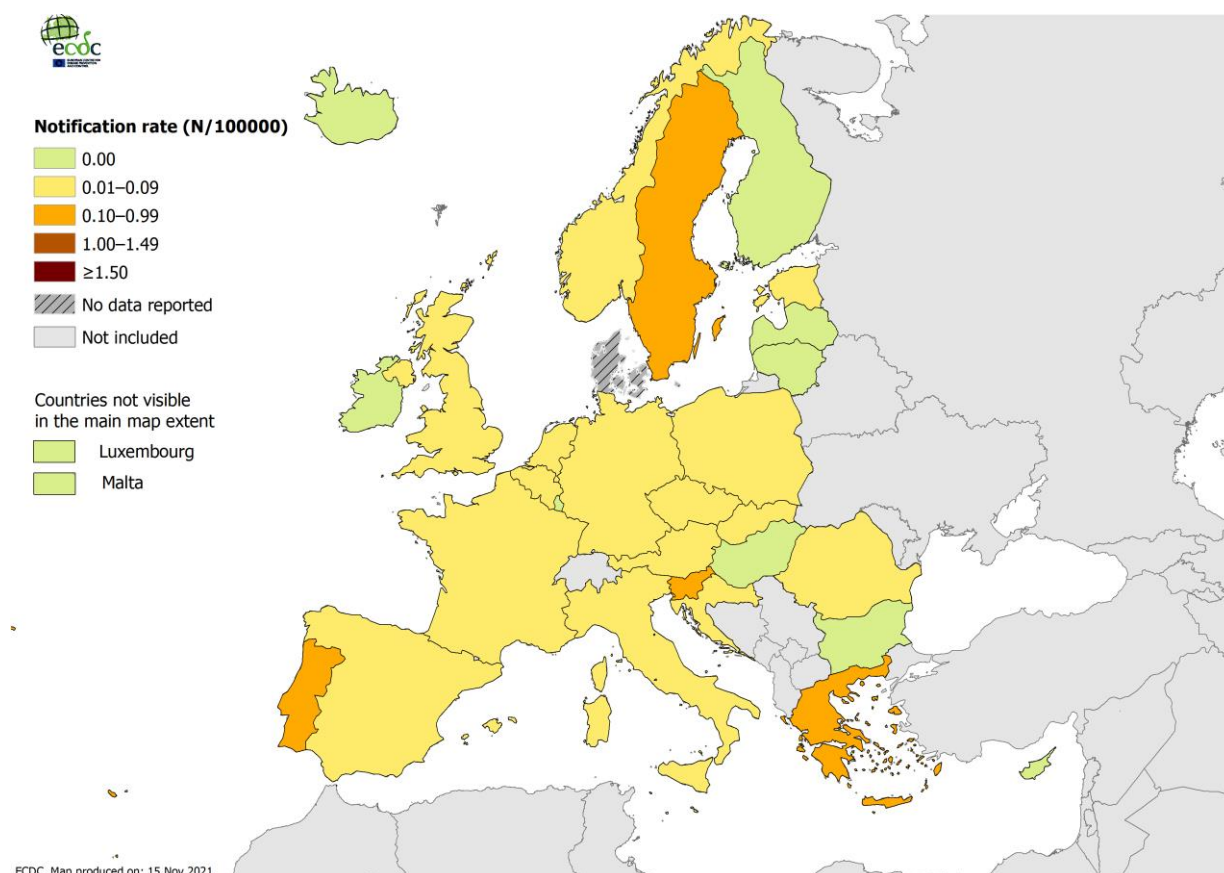
Source: Country reports.

ASR: age-standardised rate.

..: no data reported.

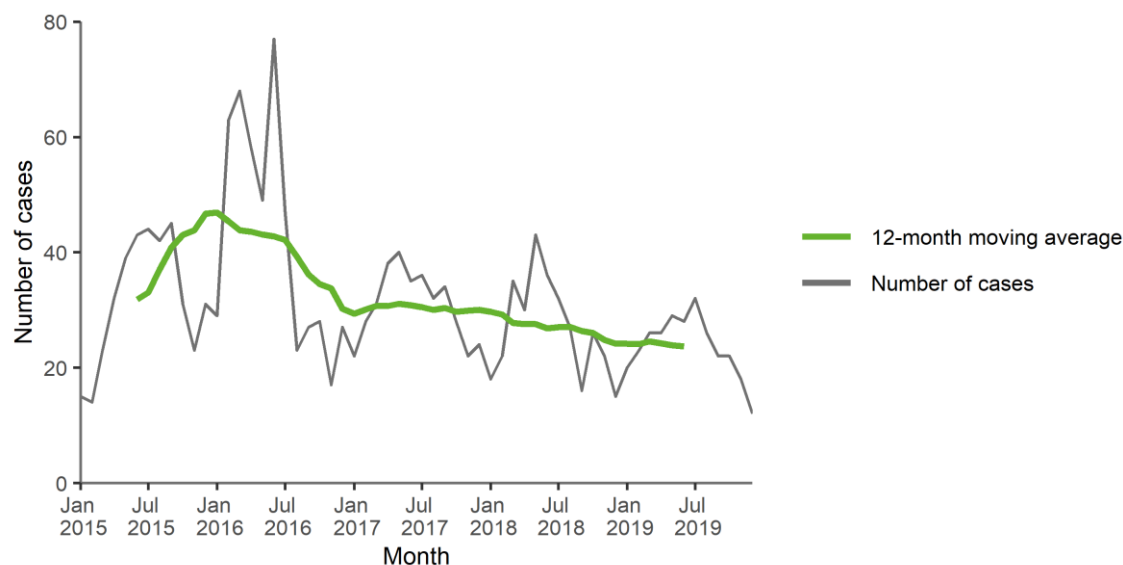
-.: no rate calculated.

**Figure 1. Distribution of confirmed brucellosis cases per 100 000 population by country, EU/EEA, 2019**

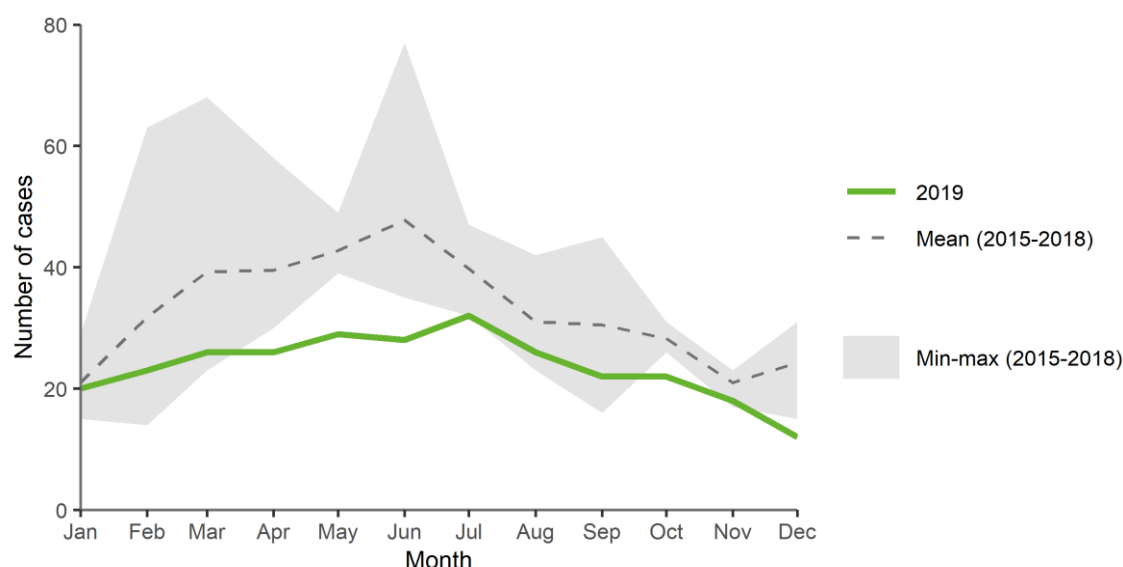


Source: country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

The number of brucellosis cases increased at the EU/EEA level in 2016 due to a tenfold increase of reported cases in southern Italy (Sicily) linked to the consumption of locally-produced unpasteurised fresh cheese. In 2019, cases at the EU/EEA level decreased to their lowest level compared with the previous four years (Figure 2). The usual seasonal pattern occurred in 2019 with more cases reported in February–June compared with the rest of the year. However, fewer cases were reported in all months compared with previous years (Figure 3).

**Figure 2. Distribution of confirmed brucellosis cases by month, EU/EEA, 2015–2019**

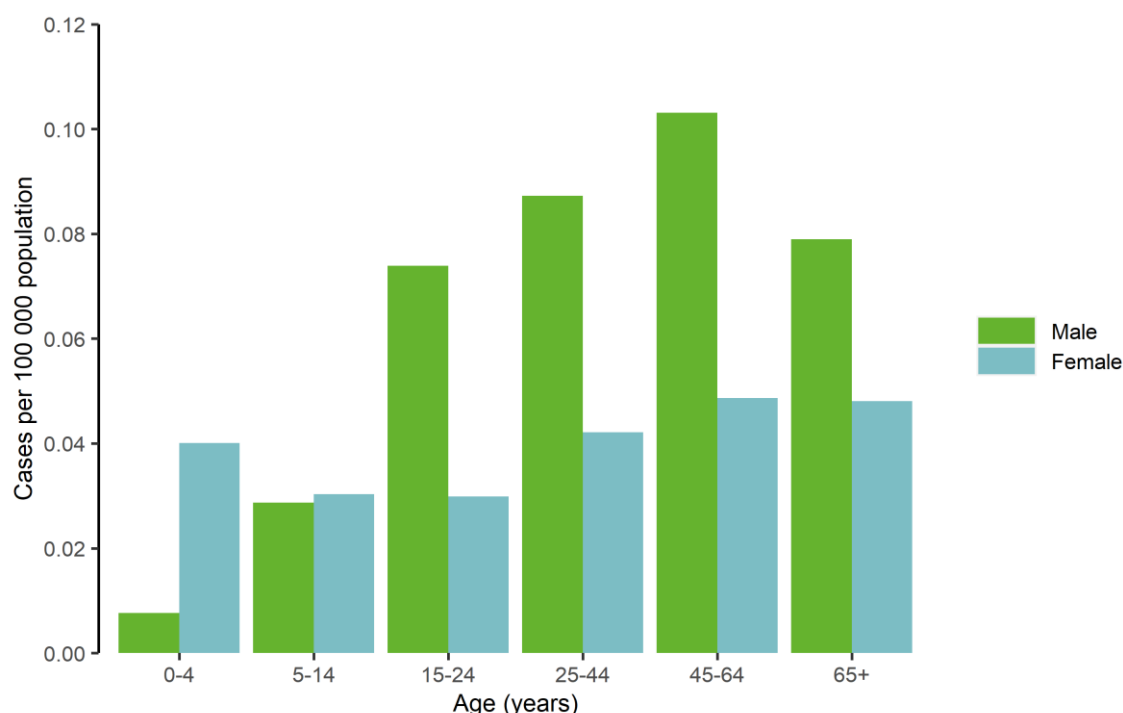
Source: Country reports from Austria, Cyprus, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

**Figure 3. Distribution of confirmed brucellosis cases by month, EU/EEA, 2019 and 2015–2018**

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

Among the 309 (98.4%) confirmed brucellosis cases for which sex was reported, 63.8% were males and 36.2% were females, corresponding to a male-to-female ratio of 1.8:1. The notification rate increased with age from 0.03 per 100 000 population in children 5–14 years to 0.08 in persons aged up to 64 years (Figure 4). By sex, the highest rates were detected in 45–64-year-old males (0.10 per 100 000 population) and in females over 45 years (0.05 per 100 000 population).

**Figure 4. Distribution of confirmed brucellosis cases per 100 000 population, by age and sex, EU/EEA, 2019**



## Outbreaks and other threats

No brucellosis-related national or multi-country threats were reported through ECDC's Epidemic Intelligence Information System for Food- and Waterborne Diseases (EPIS-FWD) in 2019.

## Discussion

Brucellosis remains a rare but severe disease in the EU/EEA, with the majority of cases hospitalised. The overall trend of reported brucellosis cases has steadily decreased since 2016. In 2019, the number of reported brucellosis cases was at the lowest level since the beginning of EU-level surveillance in 2007. *B. melitensis* is the predominant species causing human brucellosis, but the occurrence of different *Brucella* species varies among geographic regions. *B. abortus* or *B. suis* may significantly contribute to the number of human infections in endemic regions with extensive cattle or swine livestock farming.

As in previous years, the highest rates of domestically-acquired cases in the EU/EEA in 2019 were reported by Greece and Portugal, which continued reporting ten- and five-times higher notification rates, respectively, than the EU/EEA average. Greece continues to report the highest rate, albeit with a gradual decrease of cases since 2014. In Portugal, an outbreak of seven cases of *B. melitensis* from homemade fresh goat cheese, sold outside of the commercial circuit, was reported in the northern region of Portugal in 2018-2019 [4]. In Italy, an overall decrease of cases has been notified in all regions in the last 20 years, and its notification rate was similar to the EU average for the first time in 2019. Brucellosis remains, however, an important health problem, particularly in the southern part of the country, where 89% of the annual cases are reported [5]. These three countries have not yet obtained the status of being officially free from bovine (*B. abortus*) and ovine and caprine brucellosis (*B. melitensis*). Despite all elimination efforts in animals, brucellosis remains an endemic disease in humans in these countries.

A large proportion of cases occurred in working-age males, possibly indicating occupational exposure. Persons working with farm animals, including farmers, livestock breeders, butchers, abattoir workers and veterinarians, are known to be at increased risk of brucellosis [6].

Bovine brucellosis, as well as ovine and caprine brucellosis, has been widely eradicated by most EU Member States. As a result, brucellosis has become rare in northern and western Europe, where most of the cases are linked to travel outside the EU. Disease incidence may also be elevated among migrants who have recently arrived from geographic areas where brucellosis is endemic, such as the Middle East and parts of Africa, Asia and Central and South America [7,8]. In 2019, an unusual large-scale outbreak with over 10 000 human cases and infection in animals was reported in China. Contaminated pharmaceutical waste was identified as the main source of this outbreak [9]. Food-borne exposure is normally limited to persons consuming unpasteurised milk, dairy products or undercooked meat and is often the result of consuming food products from countries where brucellosis is endemic in animals. Recent studies showed that the uncontrolled or illegal trade of raw milk cheese challenges food safety standards in EU, and might explain human *Brucella* infections that are acquired in non-endemic EU countries [4,10].

## Public health implications

In Member States that are not free from ovine and caprine or bovine brucellosis, EU-co-funded national brucellosis eradication programmes are important for reducing brucellosis in animals. Besides efforts to control brucellosis in animals, organised prevention efforts and raised awareness are needed within the occupational health framework. The migration of persons from endemic areas may cause an increase in the number of cases in countries where brucellosis was not previously prevalent. Physicians and diagnosing laboratories should be aware of the symptoms of the disease, which is caused by highly pathogenic bacteria. Information on occupational and travel history should be consistently collected as part of brucellosis surveillance in humans. The isolation of antibiotic-resistant *Brucella* strains highlights emerging challenges for treatment.

# References

1. European Centre for Disease Prevention and Control (ECDC). Introduction to the Annual Epidemiological Report. In: ECDC. Annual epidemiological report. Stockholm: ECDC. Available from: <http://ecdc.europa.eu/annual-epidemiological-reports/methods>
2. European Centre for Disease Prevention and Control (ECDC). Surveillance systems overview. Stockholm: ECDC. Available from: <https://www.ecdc.europa.eu/en/publications-data/surveillance-systems-overview-2019>.
3. European Centre for Disease Prevention and Control (ECDC). Surveillance atlas of infectious diseases. Stockholm: ECDC. Available from: <http://atlas.ecdc.europa.eu/public/index.aspx?Dataset=27&HealthTopic=8>
4. Mendes A, Gomes B, Sousa I, Moreira H, Rosa I, et al. Brucellosis: A rapid risk assessment by a regional outbreak team and its coordinated response with the Directorate-General for Food and Veterinary, North region of Portugal. Zoon Public Health 2019; 67(5): 587-590.
5. Facciola A, Palamara MAR, D'Andrea G, Marano F, Magliarditi D, Puglisi G, et al. Brucellosis is a public health problem in southern Italy: Burden and epidemiological trend of human and animal disease. J Infect Public Health. 2018 Nov-Dec;11(6):861-866.
6. Lytras T, Danis K, Dounias G. Incidence Patterns and Occupational Risk Factors of Human Brucellosis in Greece, 2004–2015. Int J Occup Environ Med. 2016 Oct;7(4):221-6.
7. Norman FF, Monge-Maillo B, Chamorro-Tojeiro S, Pérez-Molina JA, López-Vélez R. Imported brucellosis: A case series and literature review. Travel Med Infect Dis. 2016 May-Jun;14(3):182-99.
8. Georgi E, Walter MC, Pfalzgraf MT, Northoff BH, Holdt ML, Scholz HC, et al. Whole genome sequencing of *Brucella melitensis* isolated from 57 patients in Germany reveals high diversity in strains from Middle East. PLoS One. 2017 Apr 7;12(4):e017425.
9. Lina SMM, Kunasekaran MP, Moa A. Brucellosis Outbreak in China, 2019. Global Biosecurity. 2021;3(1).
10. Jansen W, Linard C, Noll M, Nöckler K, Al Dahouk S. *Brucella*-positive raw milk cheese sold on the inner European market: A public health threat due to illegal import? Food Control. 2019; 100: 130–137.