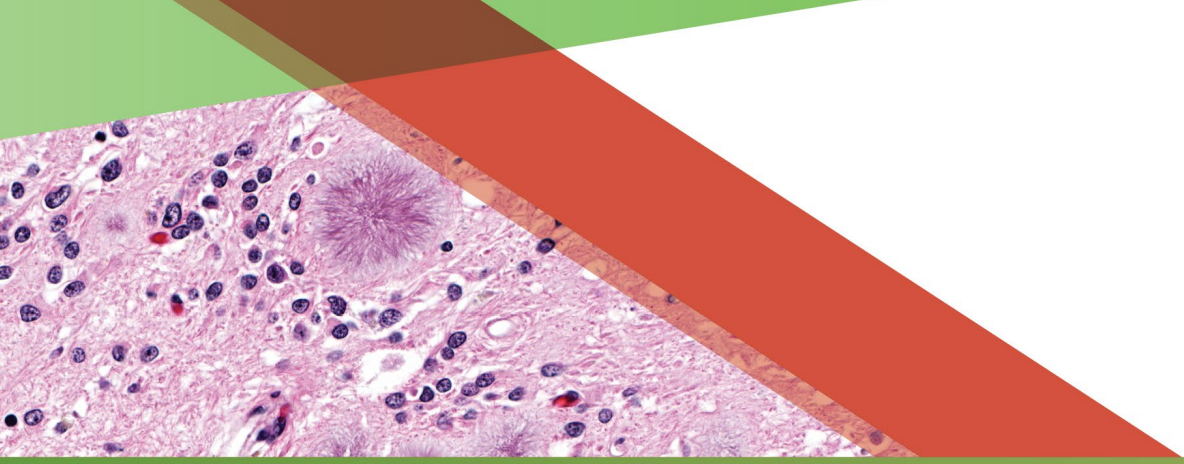

SURVEILLANCE REPORT

Variant Creutzfeldt–Jakob disease

Annual Epidemiological Report for 2019

Key facts

- No cases of variant Creutzfeldt–Jakob disease (vCJD) were identified in the EU/EEA in 2019.
- vCJD disease remains extremely rare. This is consistent with the current understanding of the underlying epidemiology of vCJD, and with the positive impact of risk mitigation measures introduced in the EU from the late 1980s to remove potentially infectious animal material from the human food chain.

Introduction

Variant Creutzfeldt–Jakob disease (vCJD) is a rare neurological disease caused by prions composed of misfolded prion proteins (PrPSc). This form of prion aggregates in neurological tissue leading to progressive brain damage, causing psychiatric or sensory symptoms, neurological abnormalities and eventual death. The disease was first identified in the United Kingdom, and in March 1996, an association was identified between vCJD and the consumption of products from animals infected with bovine spongiform encephalopathy (BSE) or the mad cow disease [1].

Methods

This report is based on data for 2019 retrieved from The European Surveillance System (TESSy) on 5 October 2020. TESSy 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, refer to the 'Methods' chapter in the 'Introduction to the Annual Epidemiological Report' [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].

The ECDC-operated TESSy database includes individual case data from all vCJD cases diagnosed in the EU. Prospective reporting of 'probable' or 'confirmed' new cases is done in accordance with the 2018 EU case definition.

The clinical presentation and associated diagnostic criteria for vCJD are relatively unusual. Suspected cases are typically reported to national surveillance centres. The centres offer diagnostic support and post-mortem analysis when needed. Ultimately, successful vCJD surveillance requires the identification of patients as 'possible' CJD cases, supported by accurate differential diagnosis between vCJD and other more common forms of CJD (sporadic, iatrogenic and familial).

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A further diagnostic constraint is the need to obtain appropriate tissue samples post-mortem to determine neuropathological characteristics associated with vCJD. In many cases, such tissue is not available and in these situations, cases can only be classified as 'possible' or 'probable' based on the clinical and diagnostic criteria available.

Cases reported here are restricted to 'confirmed' and 'probable' cases.

Epidemiology

No cases of vCJD were reported in the EU/EEA in 2019. The overall mortality rate remains below 0.01 cases per one million population in this long post-epidemic tail.

Table 1. Distribution of variant Creutzfeldt–Jakob disease cases by country and year, EU/EEA, 2015–2019

Country	2015	2016	2017	2018	2019
	Number	Number	Number	Number	Number
Austria	0	0	0	0	-
Belgium	0	0	0	0	0
Bulgaria	0	0	0	0	-
Croatia	0	0	0	0	-
Cyprus	0	0	0	0	-
Czechia	0	0	0	0	0
Denmark	0	0	0	0	0
Estonia	0	0	0	0	0
Finland	ND	ND	ND	ND	ND
France	0	0	0	1	0
Germany	ND	ND	ND	ND	ND
Greece	0	0	0	0	0
Hungary	0	0	0	0	0
Iceland	0	0	0	0	0
Ireland	0	0	0	0	0
Italy	-	1	0	0	0
Latvia	0	0	0	0	0
Liechtenstein	ND	ND	ND	ND	ND
Lithuania	0	0	0	0	-
Luxembourg	-	0	0	0	0
Malta	0	0	0	0	-
Netherlands	0	0	0	0	0
Norway	0	0	0	0	0
Poland	0	0	0	0	0
Portugal	0	0	0	0	0
Romania	0	0	0	0	0
Slovakia	0	0	0	0	0
Slovenia	0	0	0	0	0
Spain	0	0	0	0	0
Sweden	0	0	0	0	0
United Kingdom	0	1	0	0	0
EU-EEA	**0**	**2**	**0**	**1**	**0**

Source: Country reports
-: no cases reported
ND: no data reported

Discussion

The vCJD epidemic peaked in the EU from 1999–2004, but the number of cases have subsequently decreased. No cases were reported in 2019 [5]. vCJD has become a very rare neurodegenerative disease in the EU/EEA. This is due to the successful implementation of prevention and control measures to remove bovine spongiform encephalopathy (BSE) prions from the animal and human food chains aimed at the cattle trade (since 1989) and animal feed production (since 1994).

There remains some uncertainty on the epidemiology and public health risk from vCJD. Studies on prevalence of abnormal prion protein in human appendixes conducted in the United Kingdom (UK) suggest a high prevalence of infection (493 cases per one million population) with abnormal prion protein, indicating a higher-than-expected potential vCJD carrier status in the population [6]. Furthermore, in 2016, the first confirmed vCJD case in a clinical patient expressing heterozygosity at codon 129 of the prion protein gene was identified [7].

It is suggested that MV heterozygotes, which make up approximately 50% of the EU population, may be potentially susceptible to infection but that the MV genotype may confer longer incubation periods [8]. Hence, there may be a hidden population of infected individuals which may develop the disease or cause secondary transmission through blood and/or organ donations. This has important implications in areas such as the management of blood and blood products, tissue transplantation, cellular therapies and the handling of surgical instruments [9-11].

As vCJD is associated with the transmission of BSE from infected animals, assessment of ongoing epidemiology of prion diseases in animals, and potential zoonotic transmission remains important for public health. Hence the EU Member States continue to implement an annual targeted surveillance programme to assess the prevalence of TSE infection in animal populations, coordinated by the European Food Safety Authority (EFSA). In 2019, a total of 1 150 388 cattle were tested by EU Member States, and a total of seven animals were identified with atypical BSE by three reporting countries: France (four H-BSE), Spain (two H-BSE) and Poland (one L-BSE). These animals were not destined for the human food chain, and so presented no direct risk to public health. Overall, the low prevalence of positive cases identified by EU surveillance strongly indicate that very few BSE-infected animals reside in EU cattle populations. Hence the public health risk of vCJD infection from consumption of cattle in the EU appears low. All seven cases are also classified as 'atypical BSE'. The origin of such cases is unclear, but the pathology differs from the 'classical BSE' associated with consumption of contaminated feed, which is believed to be the source of the primary BSE epidemic and subsequent causal association with vCJD cases.

Following the identification of the first case of chronic wasting disease (CWD) – a transmissible spongiform encephalopathy (TSE) that affects cervids (deer, elk and moose) in wild European cervid populations in 2016 [12] – six Member States (Estonia, Finland, Latvia, Lithuania, Poland and Sweden) undertook EU-mandated surveillance in cervid populations in 2019, as part of a three-year targeted surveillance program [13]. This resulted in the testing of 7 980 cervids in the EU, and confirmation of three CWD cases in wild moose (Eurasian/European elk) in Sweden in 2019. An additional seven Member States tested 2 732 cervids with no positive results. Further details on TSE surveillance in EU animal populations in 2019 is available in, 'The European Union summary report on surveillance for the presence of transmissible spongiform encephalopathies (TSE) in 2019' [14].

Importantly, no cases of human TSE have been directly attributed to the consumption of animal products made from cervids. But CWD can be highly contagious within infected wild cervid populations and transmission has been demonstrated between species under laboratory conditions. The pathogenesis and potential infectivity of CWD from both central nervous system and peripheral tissue is poorly understood, but is influenced by several factors including incubation period, agent strain and genetic factors in both infected hosts and naïve populations. As part of a package of risk assessment work undertaken by EFSA on CWD, the EFSA Panel on Biological Hazards (BIOHAZ) updated scientific evidence on CWD in late 2019. This reaffirmed that, 'the risk of CWD to humans through consumption of meat cannot be directly assessed. At individual level, consumers of meat, meat products and offal derived from CWD-infected cervids will be exposed to the CWD agent(s). Measures to reduce human dietary exposure could be applied, but exclusion from the food chain of whole carcasses of infected animals would be required to eliminate exposure' [15].

Public health implications

Public health measures are developed on the basis that all population groups are susceptible to vCJD infection and clinical disease, and the continued absence of clinical cases of vCJD in the EU gives confidence that EU-wide protection measures against prion disease infection continue to be effective. However, some uncertainties remain. The extended incubation periods mean there might be decades between infection to clinical manifestation of vCJD. The absence of a rapid diagnostic test means that the infection status of the EU population is unclear. In addition, the nature of CJD infection implies that the clinical presentation of disease in infected patients exposed through non-dietary routes or an infectious agent that is not BSE-derived may differ from that of vCJD. Hence prion transmission and circulation within human populations remains a potential risk.

The evolving epidemiology of TSEs in animal populations and potential zoonotic risk from animal TSEs also create some uncertainty for public health. Although TESSy supports data collection of vCJD cases, continued human and animal surveillance at the national and EU-level to monitor all forms of CJD and other human prion diseases is important to identify possible sources of public health risk. Monitoring will provide assurances that public health measures to minimise risk of vCJD infection in EU populations are effective, risk profiles from vCJD and other prion diseases remain unaltered and changes that may impact public health can be detected [5].

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