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The European Union summary report on surveillance for the presence of transmissible spongiform encephalopathies (TSE) in 2019

European Food Safety Authority (EFSA)

Abstract

This report presents the results of surveillance on transmissible spongiform encephalopathies (TSE) in cattle, sheep, goats, cervids and other species, and genotyping in sheep, carried out in 2019 by 28 Member States (MS), and by Iceland, Montenegro, North Macedonia, Norway, Serbia and Switzerland (non-MS). In total, 1,150,388 cattle were tested by MS, a 2.7% decrease from 2018 and 44,557 by the six non-MS. Six cases of H-BSE were reported by France (4) and Spain (2), and 1 L-BSE by Poland. The number of H- BSE cases was the largest reported per year including the youngest ever case (5.5 years of age). In total, 338,098 sheep and 143,529 goats were tested in the EU, an increase of 3.9% in both species compared with 2018. In sheep, 17 inconclusive cases by two MS and 997 cases of scrapie were reported: 911 classical (97 index cases (IC), one of ARR/ARR genotype and 98.7% with genotypes of susceptible groups) by seven MS, 86 atypical (AS) (80 IC) by 11 MS. Thirty-one ovine scrapie cases were reported by Iceland and Norway. Random genotyping was only reported by eight MS: Cyprus excluded, 15.7% of genotyped sheep carried genotypes of susceptible groups. In goats, three inconclusive cases by two MS and 390 cases of scrapie were reported: 379 classical (24 IC) by six MS, 11 atypical (10 IC) by six MS. The heterogeneous enforcement of a 3-year surveillance programme for chronic wasting disease (CWD) in six MS (Estonia, Finland, Latvia, Lithuania, Poland and Sweden) resulted in the testing of 7,980 cervids and confirmation of three CWD cases in wild moose in Sweden. Other seven MS tested 2,732 cervids with no positive results. Norway tested 30,147 cervids in 2019, with two new moose cases. In total, 122 animals from four other species reported by three MS TSE tested negative.

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Correspondence: zoonoses@efsa.europa.eu

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Summary

This report of the European Food Safety Authority (EFSA) presents the detailed results of surveillance activities on animal transmissible spongiform encephalopathies (TSE) carried out during 2019 in the European Union (EU) and in six non-Member States (non-MS), i.e. Iceland, Montenegro, North Macedonia, Norway, Serbia and Switzerland, as well as genotyping data in sheep. TSE monitoring data for cattle, sheep, goats, cervids and species other than domestic ruminants are reported by country according to Regulation (EC) 999/2001 (the TSE Regulation) and consist of testing data as well as case data.

Surveillance data were mainly submitted through the EFSA TSE data reporting tool. Six MS submitted data directly as eXtensible Markup Language (XML) files by using their own system for the automatic upload of data into the EFSA Data Collection Framework (DCF) whereas the rest of the reporting countries submitted XML files via the EFSA TSE data collection tool. The electronically submitted data were extracted from the EFSA database and further processed and validated by EFSA to summarise the information and to elaborate the summary tables presented in the current EU summary report (EUSR).

A descriptive summary of the reported data is provided at reporting country level or aggregated at EU level for all reporting countries. When possible, descriptions and calculations were stratified according to the available variables, such as surveillance target group (healthy slaughtered animals, animals culled under bovine spongiform encephalopathy (BSE)/TSE control and eradication measures, etc.) or surveillance type (passive vs. active), country, sampling year (since 2001 for bovine animals and 2002 for small ruminants), case type (i.e. classical BSE (C-BSE), atypical BSE (H-BSE or L-BSE), classical scrapie (CS) or atypical scrapie (AS)), flock/herd status (infected/non-infected), index case and age class.

In total, 1,150,388 cattle were tested in 2019 in the EU. BSE testing was concentrated in the group of risk animals (emergency slaughtered animals (ES), animals with clinical signs at *ante mortem* inspection (AM) and fallen stock (FS)) with over 83% of all cattle tested in the EU, with FS being the largest contributor with 918,182 cattle tested in 2019 (92.4% of all cattle in the risk group). An additional 44,557 cattle were tested by four of the six non-MS, with no cases reported. Serbia (the main contributor with 20,110 cattle tested) and Montenegro and reported mostly cattle from the HS target group.

Seven atypical cases of BSE were confirmed in 2019 by: Spain (2 H-BSE), France (4 H-BSE) and Poland (1 L-BSE), all born between 2001 and 2008 except one H-type case of 5.5 years in Spain. From an epidemiological point of view, the highlights in the BSE caseload of the reporting year are: the number of H-type BSE cases was the largest reported in a single year, equal to that of 2009 (6), (six cases per million tested) and the report by Spain of a H-type case of 5.5 years, the youngest atypical BSE ever reported since the TSE data are collected and published. An additional H-BSE case was reported by Brazil.

In total, 481,627 small ruminants were tested in 2019 in the EU: 338,098 sheep (3.9% increase from 2018) and 143,529 goats (3.9% increase). In addition, 23,473 sheep and 217 goats were tested by four and three of the six non-MS, respectively.

In sheep, 997 scrapie cases were reported in the EU in 2019, 64¹ more case than in 2018. A total 31 cases of scrapie in sheep were reported by two (Iceland and Norway) of the four non-MS that tested in total 23,473 sheep, namely, Iceland, North Macedonia, Norway and Serbia. Classical scrapie (CS) was reported by seven MS and one non-MS: Cyprus, Greece, Italy, Portugal, Romania, Spain, the United Kingdom and Iceland, whereas atypical scrapie (AS) was reported by 11 MS and one non-MS: Finland, France, Germany, Hungary, Ireland, Italy, Poland, Portugal, Slovakia, Spain, the United Kingdom and Norway. An additional total of 17 cases in sheep were reported as inconclusive by Spain (5) and Italy (12) (See Table 31), which are not included in the total scrapie caseloads for these two countries.

Most of the ovine cases (91.7%) were reported by four countries, namely Greece, Italy, Romania and Spain, as it was the case in the previous year. In total, 911 ovine cases in the EU were CS (91.4%) and 86 were AS (8.6%). Among the non-MS, 21 CS cases were reported by Iceland and 10 AS cases by Norway. In sheep, 17.8% (177) of all cases in the EU reported in 2019 were index cases, with a much higher proportion in AS cases (80/86: 93%) compared to CS cases (97/911: 10.6%). In total, 98.7% of the CS cases in sheep reported in 2019 with known genotypes belonged to

¹ Following the correction of the number of cases in EL in 2018 (178), the total number of scrapie cases in sheep in the EU in 2018 was 933: 820 classical and 113 atypical.

animals holding genotypes of the susceptible groups (NSP3, NSP30, NSP4 or NSP5). One CS case was reported by Spain in a sheep carrying the ARR/ARR genotype, a very rare occurrence.

In goats, 390 scrapie cases were reported in the EU in 2019, which is a reduction of 25.4% (-133) compared with 2018 when 523 cases were reported. Out of 390 caprine scrapie cases, 379 were CS (97.2%, with Cyprus accounting for 81.3% of these) and 11 were AS. This reduction is mainly due to the decrease in the number of cases in goats in two reporting countries: Cyprus (from 382 to 309), Spain (from 91 to 37). CS was reported by six MS, namely Cyprus, Greece, Hungary, Italy, Spain and the United Kingdom. AS was also reported by six MS: Cyprus, France, Italy, Poland, Portugal and Spain. The 217 goats tested by three non-MS (Iceland, North Macedonia and Norway) were all negative. An additional total of three cases in goats were reported as inconclusive by Spain (1) and Italy (2) (See Table 33), which are not included in the total scrapie caseloads for these two countries.

In goats, only 8.7% of all cases reported in the EU in 2019 were index cases, lower than in 2018 (9.6%), with a higher proportion in AS (10/11: 90.9%) than in CS (24/379: 6.3%). Currently, CS is still the most frequently reported type of scrapie in the EU in both species. Focusing on the last 10 years (2010–2019), in sheep, there has been a significant average decrease of, respectively, 5% per year in CS and 4% per year in AS. In goats, there was no detectable trend for both CS and AS.

The long-term trends of CS in terms of cases per 10,000 tests in both species, the situation in 2019 confirmed the 10-year statistically significant decreasing trend in sheep and no detectable trend in goats, respectively. With regard to the long-term trends of AS, there was also a 10-year statistically significant decreasing trend in sheep and no detectable trend in goats.

In 2019, the genotyping activity from random samples of the national EU sheep populations was carried out by eight MS: Belgium, Cyprus (where genotyping is conducted systematically in the breeding sheep population), France, Greece, Italy, Latvia, the Netherlands and Poland. After excluding Cyprus, 15.7% of the randomly genotyped sheep still carried genotypes of the susceptible groups, lower than the 19.2% in 2018. The percentage of susceptible sheep rose to 45.5% in Greece and 29.9% in Italy, two of the countries with the highest caseload in 2019, whereas the percentage was 10.3% in the other five MS.

The enforcement of a 3-year surveillance programme for CWD in six MS – Estonia, Finland, Latvia, Lithuania, Poland and Sweden – resulted in the testing of 7,980 cervids and the confirmation of three cases of CWD in wild moose by Sweden. The implementation of the mandatory surveillance in the six MS is quite heterogeneous in terms of design (number and characteristics of the declared primary sampling units, PSU), number of cervids tested in general and per PSU and distribution of testing by species and target groups. The targeting of mostly hunted/slaughtered fit for human consumption (HSHC) animals observed in the first year of implementation was increased in 2019 up to 60.5% of all tested cervids, consolidating a situation in which the sensitivity of the surveillance system is lower than expected. Other seven MS – Austria, Hungary, Italy, Romania, Slovenia, Spain and the United Kingdom – tested 2,732 cervids, all with negative results and with Romania accounting for 77.7% of all cervids tested by them. Norway continued its intensified testing programme in wild and captive cervids and tested 30,147 animals in 2019, mostly semi-domesticated reindeer (42.9%), followed by wild moose (19.7%) and red deer (17.2%), leading to the detection of two moose cases. Additionally, Iceland reported testing of 114 cervids, with no cases.

A total of 122 animals of other species were TSE tested by Finland (114), Estonia (6) and Spain (2): 12 raccoon dogs (*Nyctereutes procyonoides*), 66 American minks (*Neovison vison*), 42 foxes (genus *Vulpes*) and 2 chamois (*Rupicapra rupicapra*). None of them tested positive.

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1. Introduction

1.1. Background and Terms of Reference

According to Part I.A, Chapter B, Annex III of Regulation (EC) 999/2001² (here referred to as the transmissible spongiform encephalopathy (TSE) Regulation), the information to be presented by MS in their annual report, as provided for in Article 6(4), includes:

- 1) The number of suspected cases placed under official movement restrictions in accordance with Article 12(1), per animal species.
- 2) The number of suspected cases subject to laboratory examination in accordance with Article 12(2), per animal species, including the results of the rapid and confirmatory tests (number of positives and negatives) and, with regard to bovine animals, the age distribution of all tested animals. The age distribution should be grouped as follows: 'below 24 months', distribution per 12 months between 24 and 155 months, and 'above 155 months' of age.
- 3) The number of flocks where suspected cases in ovine and caprine animals have been reported and investigated pursuant to Article 12(1) and (2).
- 4) The number of bovine animals tested within each subpopulation referred to in Chapter A, Part I, points 2.1, 2.2, 3.1 and 5. The method of the sample selection, the results of the rapid and confirmatory tests and the age distribution of the tested animals grouped as set out in point 2 should be provided.
- 5) The number of ovine and caprine animals and flocks tested within each subpopulation referred to in Chapter A, Part II, points 2, 3, 5 and 6 together with the method for sample selection and the results of the rapid and confirmatory tests.
- 6) The geographical distribution, including the country of origin if not the same as the reporting country, of positive cases of BSE and scrapie. The year, and where possible the month of birth should be given for each TSE case in bovine, ovine and caprine animals. TSE cases that have been considered atypical shall be indicated. For scrapie cases, the results of the primary and secondary molecular testing, referred to in Annex X, Chapter C, point 3.2 (c), shall be reported, when appropriate.
- 7) In animals other than bovine, ovine and caprine animals, as well as in cervids other than those covered by the 3-year CWD monitoring programme referred to in Part III.A of Chapter A of this Annex, the number of samples and confirmed TSE cases per species.
- 8) The genotype, and, where possible, the breed, of each ovine animal found positive to TSE and sampled in accordance with Chapter A, Part II, point 8.
- 9) For Member States covered by the 3-year CWD monitoring programme referred to in Part III.A of Chapter A of this Annex, the annual report for the years 2018, 2019 and 2020 shall include:
 - a) The number of cervid samples submitted for testing, by target group according to the following criteria:
 - primary Sampling Unit (PSU) identifier,
 - species,
 - management system (farmed, captive, wild or semi-domesticated),
 - target group,
 - sex.
 - b) The results of the rapid and confirmatory tests (number of positives and negatives) and, where applicable, of further isolate characterisation investigations, the tissue sampled and the rapid test and confirmatory technique used.
 - c) The geographical location, including the country of origin if not the same as the reporting Member State, of positive cases of TSE.
 - d) The genotype and species of each cervid found positive for TSE.
 - e) Where tested, the genotype of cervids tested and found negative for TSE.

² Regulation (EC) No 999/2001 of the European Parliament and of the Council of 22 May 2001 laying down rules for the prevention, control and eradication of certain transmissible spongiform encephalopathies. OJ L 147, 31.5.2001, p. 1–40.

Changes in points 7 and 9 are the result of the amendment following Commission Regulation (EU) 2017/1972³ – amending Annexes I and III of the TSE Regulation (see Section 1.2.4).

According to Part I.B, Chapter B of the same Annex III 'The compilation of reports containing the information referred to in Section A and submitted to the Commission (which shall send it to the European Food Safety Authority) on a monthly basis in the electronic format agreed between the Member States, the Commission and the European Food Safety Authority or, with regard to the information referred to in point 8 on a quarterly basis, may constitute the annual report as required by Article 6(4), provided that the information is updated whenever additional information becomes available'.⁴

According to Part II of Chapter B, the Union summary shall be presented in a tabled format covering at least the information referred to in Part I.A for each Member State.

1.2. Surveillance of TSE in the European Union

1.2.1. Legal basis

Animals suspected of a TSE should be examined in accordance with Article 12.2 of the TSE regulation. The legal framework for the active surveillance (i.e. the testing of animals not reported as suspected of being infected by a TSE) of ruminants for the presence of TSE is laid down in Article 6 of the TSE regulation, and specified in its Annex III, Chapter A.

Of the 27 MS at that time, Commission Decision 2009/719/EC², allowed 25 MS (all except Bulgaria and Romania) to apply a revised BSE monitoring programme. Commission Implementing Decision 2013/76/EU⁵ of 4 February 2013, amending Commission Decision 2009/719/EC, authorised these 25 MS to decide to stop testing slaughtered bovine animals for human consumption. Within EU28, this monitoring programme is also applicable for Croatia.

The legal basis for the sample collection and for the test methods is laid down in Chapter C of Annex X of the TSE regulation. From 2005, Annex X (as amended by Commission Regulation (EC) No 36/2005) also provides for mandatory discriminatory testing for BSE of TSE cases detected in small ruminants.

There were not amendments of the TSE Regulation affecting 2019 TSE surveillance. For previous amendments, see 2018 EFSA EUSR (EFSA, 2019).

1.2.1.1. The EU reference laboratory for TSE

Commission Regulation (EU) 2018/221⁶ of 15 February 2018 amending Regulation (EC) No 999/2001 of the European Parliament and of the Council and Regulation (EC) No 882/2004 of the European Parliament and of the Council established that from 1 January 2019, the EU reference laboratory for TSE will be a consortium between the Istituto Zooprofilattico Sperimentale del Piemonte, Liguria e Valle d'Aosta (IZSPLVA) and the Istituto Superiore di Sanità (ISS), led by IZSPLVA.

1.2.2. BSE surveillance of bovine animals

As described in the 2016 European Union summary report (EUSR) (EFSA, 2017) on TSE, the BSE surveillance of bovine animals is based on the testing of samples from the following target groups: emergency slaughtered (ES); animals with clinical signs at *ante-mortem* (AM); fallen stock (FS); healthy slaughtered animals (HS); animals clinically suspected of being infected by BSE (SU); and animals culled under BSE eradication measures (EM).

The categories of bovine animals to be submitted for BSE testing are defined in the TSE Regulation and are based on a combination of age (age limits have been changed over time) and surveillance target groups. The general rules for BSE surveillance, applied in 2019, are summarised in Table 1. A

³ Commission Regulation (EU) 2017/1972 of 30 October 2017 amending Annexes I and III to Regulation (EC) No 999/2001 of the European Parliament and of the Council as regards a surveillance programme for chronic wasting disease in cervids in Estonia, Finland, Latvia, Lithuania, Poland and Sweden and repealing Commission Decision 2007/182/EC.

⁴ Since 2018, TSE data are submitted by reporting countries directly to the European Food Safety Authority (EFSA) with different frequency and periodicity.

⁵ Commission Implementing Decision of 4 February 2013 amending Decision 2009/719/EC authorising certain Member States to revise their annual BSE monitoring programmes.

⁶ Commission Regulation (EU) 2018/221 of 15 February 2018 amending Regulation (EC) No 999/2001 of the European Parliament and of the Council and Regulation (EC) No 882/2004 of the European Parliament and of the Council as regards the European Union reference laboratory for transmissible spongiform encephalopathies. OJ L 43, 16.2.2018, p. 6–7.

table summarising the evolution of the changes (age limits for different target groups) was published in the 2015 EU Summary Report (EFSA, 2016).

However, there are still some differences in the application of these general rules owing to specific national rules that provide some residual testing of HS or the testing of at-risk animals (*ante-mortem*, emergency slaughtered and fallen stock) at younger age. The age limits (in months) of bovine animals tested for BSE surveillance applied in 2019 by Member State (MS) or non-MS (Iceland, Montenegro, North Macedonia, Norway, Serbia and Switzerland,) are shown in Table 2.

Table 1: Criteria for BSE surveillance in bovine animals as applied in 2019 by country, age limit and surveillance target group, based on the TSE Regulation, as last amended, Commission Implementing Decision 2013/76/EU of 4 February 2013 and Commission Implementing Decision (EU) 2016/851 of 26 May 2016

Surveillance target group	EU 26	Romania, Bulgaria ^(a)
Emergency slaughtered animals (ES)	> 48 months	> 24 months
Animals with clinical signs at ante mortem (AM)		
Fallen stock (FS)		
Healthy slaughtered animals (HS)	No mandatory testing required	> 30 months
Animals clinically suspected of being infected by BSE (BSE suspects) (SU)	All	All
Animals culled under BSE eradication measures (EM)		

(a): Different criteria were applied in 2019 because Bulgaria and Romania were not in the list of the 26 Member States authorised to revise their BSE annual surveillance programmes.

Table 2: Age limits (in months) of bovine animals tested for BSE surveillance applied in 2019 by reporting country and surveillance target group

Country	Surveillance target group					
	ES	AM	FS ^(a)	HS	SU	EM
AT	> 24	> 24	> 48	No testing	No age limit	No age limit
BE	> 48	> 48	> 48	No testing	No age limit	> 24
BG	> 24	> 24	> 24	> 30	No age limit	No age limit
CY	> 48	> 48	> 48	No testing	No age limit	>48
CZ	>24	>24	>24	No testing	No age limit	No age limit
DE	>48	>24	>48	No testing	No age limit	No age limit
DK	>48	>48	>48	No testing	No age limit	> 48
EE	> 48	> 48	> 48	No testing	No age limit	No age limit
EL	> 48	> 48	> 48	> 72	No age limit	No age limit
ES	> 48	> 48	> 48	Born before 2001 and coming from herds with BSE positive cases	No age limit	No age limit
FI	> 48	> 48	> 48	No testing	No age limit	No age limit
FR	> 48	> 48	> 48	Born before 01/01/2002	No age limit	48
HR	> 48	> 48	> 48	No testing	No age limit	No age limit
HU	> 24	> 24	> 24	No testing	No age limit	No age limit
IE	> 48	> 48	> 48	No testing	No age limit	> 48
IT	> 48	> 48	> 48	No testing	No age limit	No age limit
LT	> 48	> 48	> 48	No testing	No age limit	No age limit
LU	> 48	> 48	> 48	No testing	No age limit	> 48
LV	> 24	> 24	> 24	No testing	No age limit	No age limit
MT	> 48	> 48	> 48	No testing	No age limit	No age limit
NL	> 48	> 48	> 48	No testing	No age limit	No age limit
PL	> 48	> 48	> 48	No testing	No age limit	No age limit
PT	> 48	> 48	> 48	No testing	No age limit	No age limit

Country	Surveillance target group					
	ES	AM	FS ^(a)	HS	SU	EM
RO	> 24	> 24	> 24	> 30	No age limit	No age limit
SE	> 48	> 48	> 48	No testing	No age limit	No age limit
SI	> 48	> 48	> 48	No testing	No age limit	No age limit
SK	> 24	> 24	> 24	No testing	No age limit	No age limit
UK	> 48	> 48	> 48	No testing	No age limit	No age limit
CH	> 48	> 48	> 48	> 48	No age limit	> 48
IS	> 48	> 48	> 48	No testing	No age limit	No age limit
ME						
MK	> 24	> 24	> 24	> 30	No age limit	No age limit
NO	> 48	> 48	> 48	No testing	No age limit	No age limit
RS						

ES: emergency slaughtered; AM: animals with clinical signs ante-mortem; FS: fallen stock; HS: healthy slaughtered; SU: animals clinically suspected of being infected with BSE; EM: animals culled under BSE eradication measures.

(a): If surveillance target group is FS and animals are born in Romania, Bulgaria or Switzerland, then the age limit is > 24 months.

1.2.3. TSE surveillance of small ruminants

As described in the 2016 EUSR on TSE (EFSA, 2017), the surveillance of ovine and caprine animals for the presence of TSE⁷ is performed based on testing samples obtained from the following surveillance target groups: animals culled under TSE eradication measures (EM); animals not slaughtered for human consumption (NSHC); healthy animals slaughtered for human consumption (SHC) and animals clinically suspected of being infected by TSE (SU).

Target surveillance groups in small ruminants to be reported for surveillance for TSE based on the infection status of flock/herd/holding, the case type detected and the control measures taken according to the TSE Regulation have been summarised in Table 3.

The minimal sample sizes for NSHC and SHC are set in Tables A and B of Annex III, chapter A, Section II, point 3 and point 2(a), respectively, of the TSE Regulation. The application of the quotas according to sheep and goat populations in each MS is displayed in Table 4. MS may choose to replace up to a maximum of 50% of their SHC ovine and caprine animals by animals obtained from NSHC, e.g. dead ovine and caprine animals over the age of 18 months and up to a maximum of 10% of their ovine and caprine animals tested in SHC and NSHC by animals (> 18 months of age) killed as part of disease eradication campaign(s) at a ratio of 1:1.

1.2.3.1. Genotyping in sheep

The prion protein genotype for the codons 136, 154 and 171 should be determined for each positive TSE case in sheep.

As described in Section 1.2.1, in 2017, the Regulation (EC) 894/2017 amended the TSE Regulation with regards to representative genotyping activities in the ovine populations. However, as it has come into force on 1 January 2018, the changes in the TSE regulation do not require to genotype a minimum sample of at least 600 animals for MS with an adult sheep population of > 750,000 animals, and for other MS, to genotype a minimum sample of at least 100 animals. The new requirements establish to genotype once every 3 years with a minimum sample of at least 1,560 ovine animals; or at a frequency and with a sample size determined by the Member State based on compliance with a set of criteria.

⁷ The term TSE surveillance is used in small ruminants as both scrapie and BSE have been detected naturally in small ruminants. When reporting TSE cases in small ruminants, the TSE type assigned is scrapie, unless stated otherwise.

Table 3: Target surveillance groups in small ruminants to be reported for surveillance for TSE based on the infection status of flock/herd/holding, the case type detected and the control measures taken according to the TSE Regulation

Reported flock/herd status	Index case	Case type	Control measures taken	Sampled population	Surveillance target group to be reported
Non-infected flock/herd ^(b)	Yes	CS or AS	n/a	Slaughtered for human consumption. Annex III, Chapter A, Part II, point 2	SHC
				Not slaughtered for human consumption. Annex III, Chapter A, Part II, point 3	NSHC
				TSE suspects	SU
TSE infected flock/herd under official control at sampling ^(c)	No	CS	Killing and complete destruction of all animals (option 1), TSE Regulation, Annex VII, Chapter B, point 2.2.2 ^(b) or killing and complete destruction of the susceptible animals only (option 2 ^(a)) Annex VII, Chapter B, point 2.2.2 ^(c)	Culled and destroyed under options 1 or 2	EM
				Slaughtered for human consumption after application of option 1 or option 2 ^(a)	SHC
				TSE clinical suspects Chapter 4, Article 12, points 1-2	SU
TSE infected flock/herd under official control at sampling ^(c)	No	CS	Follow-up after implementation of control measures according to Annex VII, point 2. Intensified TSE monitoring protocol (Annex VII, point 3) after option 1 or option 2, or if derogation of option 2 was established, after complete destruction or slaughtering for human consumption of identified animals.	Slaughtered for human consumption point 3.1 ^(a)	SHC
				Not slaughtered for human consumption point 3.1 ^(b)	NSHC
				TSE clinical suspects Chapter 4, Article 12, points 1-2	SU
TSE infected flock/herd under official control at sampling ^(c)	No	CS	Follow-up after implementation of control measures according to Annex VII, point 2. Intensified TSE monitoring protocol (Annex VII, point 4) after option 3.	Slaughtered for human consumption point 4.1 ^(a)	SHC
				Not slaughtered for human consumption point 4.1 ^(b)	NSHC
				TSE clinical suspects Chapter 4, Article 12, points 1-2	SU
TSE infected flock/herd under official control at sampling ^(c)	No	CS	Intensified TSE monitoring protocol pending the implementation of control measures according to the derogation in point 2.2.2.(c)(iii) and after the implementation of the control measures	Slaughtered for human consumption. Points 4.1 ^(a) and 3.1 ^(a)	SHC
				Not Slaughtered for human consumption. Points 4.1 ^(b) and 3.1 ^(b)	NSHC
				TSE clinical suspects Chapter 4, Article 12, points 1-2	SU

Reported flock/herd status	Index case	Case type	Control measures taken	Sampled population	Surveillance target group to be reported
TSE infected flock/herd under official control at sampling ^(c)	No	AS	Intensified TSE monitoring protocol after the detection of an Atypical Scrapie case (Annex VII point 2.2.3)	Slaughtered for human consumption point 2.2.3	SHC
				Not slaughtered for human consumption point 2.2.3	NSHC
				TSE clinical suspects Chapter 4, Article 12, points 1-2	SU

TSE: transmissible spongiform encephalopathy; CS: classical scrapie; AS: atypical scrapie;

EM: animals culled under TSE eradication measures; NSHC: animals not slaughtered for human consumption; SHC: animals slaughtered for human consumption; SU: animals clinically suspected of being infected by TSE.

(a): Option 2 can only be applied to sheep (genotyping and culling).

(b): Sheep flocks or goat herds that are not under control measures or intensified TSE protocols or a sheep flock or goat herd that has never been infected with scrapie and for which every new detected case will be an index case.

(c): Sheep flocks or goat herds that are under control measures or intensified TSE protocols or a sheep flock or goat herd that has been infected during reporting year.

Table 4: Minimum sample size for the TSE surveillance in small ruminants by reporting country in 2019

Country	Sheep			Goats		
	Population size ^(a)	Surveillance target group		Population size ^(a)	Surveillance target group	
		SHC	NSHC		SHC	NSHC
AT	100–750	0	1,500	40–250	0	100% up to 500
BE	100–750	0	1,500	40–250	0	100% up to 500
BG	> 750	10,000	10,000	40–250	0	100% up to 500
CY	100–750	0	1,500	40–250	0	100% up to 500
CZ	100–750	0	1,500	< 40	0	100% up to 100
DE	> 750	10,000	10,000	40–250	0	100% up to 500
DK	100–750	0	1,500	< 40	0	100% up to 100
EE	40–100	0	100% up to 500	< 40	0	100% up to 100
EL	> 750	10,000	10,000	> 750	10,000	10,000
ES	> 750	10,000	10,000	> 750	10,000	10,000
FI	100–750	0	1,500	< 40	0	100% up to 100
FR	> 750	10,000	10,000	> 750	10,000	10,000
HR	100–750	0	1,500	40–250	0	100% up to 500
HU	> 750	10,000	10,000	< 40	0	100% up to 100
IE	> 750	10,000	10,000	40–250	0	100% up to 500
IT	> 750	10,000	10,000	> 750	10,000	10,000
LT	40–100	0	100% up to 500	< 40	0	100% up to 100
LU	< 40	0	100% up to 100	< 40	0	100% up to 100
LV	40–100	0	100% up to 500	< 40	0	100% up to 100
MT	< 40	0	100% up to 100	< 40	0	100% up to 100
NL	100–750	0	1,500	250–750	0	1,500
PL	100–750	0	1,500	40–250	0	100% up to 100
PT	> 750	10,000	10,000	250–750	0	1,500
RO	> 750	10,000	10,000	> 750	10,000	10,000
SE	100–750	0	1,500	< 40	0	100% up to 100
SI	100–750	0	1,500	< 40	0	100% up to 100
SK	100–750	0	1,500	< 40	0	100% up to 100
UK	> 750	10,000	10,000	40–250	0	100% up to 500
CH	–			–		
IS	100–750			< 40		
ME	100–750			< 40		
MK	100–750			40–250		
NO	>750			40–250		
RS	> 750			40–250		

TSE: transmissible spongiform encephalopathy; NSHC: animals not slaughtered for human consumption; SHC: animals slaughtered for human consumption.

The six non-MS reporting countries are included in the table for information. The TSE regulation does not apply to them.

(a): Thousand heads.

Live sheep population in 2019 (or latest available) extracted from: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=apro_mt_1ssheep&lang=en.

Live goat population in 2019 (or latest available) extracted from: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=apro_mt_1sgoat&lang=en.

(–): No active surveillance system (in CH only suspect animals are tested).

1.2.4. TSE surveillance in cervids and other species

By Commission Regulation (EU) 2017/1972⁸ requirements for a 3-year surveillance programme for chronic wasting disease (CWD) in cervids in Estonia, Finland, Latvia, Lithuania, Poland and Sweden were established. Annexes I and III of Regulation (EC) No 999/2001 are amended in accordance with the Annex to this Regulation, which describes the surveillance programme.

The Member States which have a wild and/or farmed and/or semi-domesticated population of moose and/or reindeer (Estonia, Finland, Latvia, Lithuania, Poland and Sweden) shall carry out a 3-year monitoring programme for CWD in cervids, from 1 January 2018 to 31 December 2020. The TSE tests performed for the purpose of this monitoring programme shall take place between 1 January 2018 and 31 December 2020; however, the collection of samples for the purpose of the monitoring programme may start in 2017. The 3-year monitoring programme for CWD in cervids is described in detail in Annex III, chapter A, Part III of the TSE Regulation. The other MS may carry out monitoring for CWD in cervids on a voluntary basis.

1.3. Testing protocols

The testing protocol for BSE surveillance in bovine animals is described in pages 8 and 9 of the 2016 EUSR on TSE (EFSA, 2017). The testing protocol for TSE surveillance in small ruminants is described in pages 13 and 14 of the 2016 EUSR on TSE (EFSA, 2017).

2. Data and methods

2.1. Origin of the data

The raw data are electronically submitted by MS and non-MS. The data to be submitted consist of testing data and case-based data for bovine animals, small ruminants, cervids and other species, according to the reporting periods (monthly basis) as described in Chapter B.I of Annex III of the TSE Regulation.

Surveillance data were mainly submitted through the EFSA TSE data reporting tool for the reporting of surveillance data on TSE as required by the TSE Regulation. The tool allows reporting countries to edit and automatically upload the data to the EFSA Data Collection Framework (DCF) for inclusion in the EFSA Scientific Data Warehouse (DWH). The tool has been applied for the first time during the 2018 TSE data collection period. A number of reporting countries (CZ, ES, FI, FR, IT and SE) transmitted data directly as eXtensible Markup Language (XML) files by using their own system for the automatic upload of data into the DCF, whereas the rest of the reporting countries transmitted XML files to the DCF via the EFSA TSE data collection tool. All data were then submitted to the EFSA DWH and confirmed by the reporting countries. The electronically submitted data were extracted from the EFSA DWH and further processed and validated by EFSA to summarise the information and to elaborate the summary tables presented in the current EUSR. A new validation dashboard has been made available to all reporting countries to visualise the 2018 and 2019 data.

Finally, information on the population of small ruminants in 2019 as presented in Table 4 were obtained from the 2019 or latest available Eurostat annual data (<https://ec.europa.eu/eurostat/data/database>). The number of BSE cases worldwide (Table 11) was obtained from the last available report on the monitoring and testing of ruminants for the presence of TSE in the EU (European Commission, 2016) and the OIE animal information system (<http://www.oie.int/wahis>).

During validation of the data with the reporting countries, additional information was asked with relation to the reporting according to i) Annex III, Chapter B, Section 1.A, point 1 of the TSE Regulation: the number of suspected cases placed under official movement restrictions in accordance with Article 12(1), per animal species; ii) Annex III, Chapter B, Section 1.A, point 3 of the TSE Regulation: the number of flocks for which suspected cases in ovine and caprine animals have been reported and investigated pursuant to Article 12(1) and (2); and iii) the number of ovine and caprine flocks tested within each subpopulation referred to in Annex III, Chapter A, Part II, points 2, 3, 5 and 6. The results of this questionnaire are summarised in Appendix D.

⁸ Commission Regulation (EU) 2017/1972 of 30 October 2017 amending Annexes I and III to Regulation (EC) No 999/2001 of the European Parliament and of the Council as regards a surveillance programme for chronic wasting disease in cervids in Estonia, Finland, Latvia, Lithuania, Poland and Sweden and repealing Commission Decision 2007/182/EC. OJ L 281, 31.10.2017, p. 14–20.

The data in this report refer only to the samples collected and confirmed cases reported between 1 January 2019 and 31 December 2019 in the EU and the six additional non-EU reporting countries: Iceland, Montenegro, North Macedonia, Norway, Serbia and Switzerland. Montenegro and Serbia (non-MS and non-EFTA countries) are the first-time submitting TSE data for the EU summary report.

EFSA validated the 2019 data by checking for inconsistencies in the electronically extracted data, and by comparing the reported data with previous years. Members of the TSE subgroup of the Scientific Network for Zoonoses Monitoring Data in the reporting countries were consulted during this validation. The data validation started on 1 April 2020 and was finalised on 16 July 2020. The results and tables presented in the current EUSR are based on the data retrieved from the EFSA Scientific Data Warehouse on 27 July 2020. An additional consultation with reporting countries was conducted between 25 September 2020 and 12 October 2020. If data were corrected by the reporting countries in the report but not updated in the EFSA Scientific Data Warehouse, the corrections will only be mentioned by means of footnotes in the current or future EUSR.

For some tables and figures, historical data (data between 2001 and 2019 with focus on the last 5 years in cattle and sheep) were extracted from the EU TSE database. As certain MS and non-MS may calculate their annual statistics using different reporting criteria (e.g. based on the date of final test results rather than the date of sampling), the data summarised in this report may differ slightly from the national figures published by single MS for 2019. In addition, subsequent submissions of updated/amended data by MS may have resulted in differences in the figures included in this report when compared with the same data presented in previous EU summary reports.

2.2. Presentation of the data

The current report should be considered the EU summary report for 2019 in compliance with Section II, Chapter B, Annex III of the TSE Regulation.

The 28 EU MS or EU28, the three EFTA members, Iceland, Norway and Switzerland, and the non-EFTA IPA (Instrument for Pre-Accession Countries) countries, North Macedonia, Montenegro and Serbia, are the reporting countries included in this report. The data reported by Switzerland include those of Lichtenstein. The countries are quoted in this report by using the country codes from the Nomenclature of Units for Territorial Statistics (NUTS) or the English name according to Regulation (EC) No 1059/2003⁹. For some tables and figures, the surveillance target groups were combined: FS, ES and AM in bovine animals have been included in the group 'risk animals'. The word 'risk animals' is used here to indicate those animals whose probability of being detected with the disease is higher than in the surveillance target group of HS animals. However, this does not imply that the risk animals experienced a higher level of exposure than normal (Doherr et al., 2001). The same holds for small ruminants from the NSHC target group (Bird, 2003) when tested from non-infected flocks/herds.

2.3. Methods

2.3.1. Descriptive methods

To describe the results of the TSE surveillance programme in the EU in 2019, a number of figures and tables have been produced along with a short narrative text to describe the main findings. The report is split into four sections: bovine animals (cattle), small ruminants (sheep and goats), cervids and species other than bovine, ovine and caprine animals and cervids. Both EU aggregated data and data at the national level are presented. Where it was considered relevant, multi-year and historical data are shown. Surveillance data were available for the period 2001–2019 for bovine animals, for 2002–2019 for small ruminants and for 2018 and 2019 for cervids and other species.

For bovine animals, summary statistics were obtained based on the total number of tests performed in 2019 by reporting country and surveillance target group. In addition, historical data relating to confirmed cases since 2015 are presented in detail whereas those on the 2001–2014 period have been summed up. This 5-year period has been selected as during the period 2015–2019 a harmonised EU-wide, active BSE surveillance was applied and restricted to at risk animals of ≥ 48 months of age, even though few exceptions are still in place in some countries as shown in Table 2.

Additional epidemiological parameters have been presented: number of cases by case type (e.g. C-BSE, H-BSE, L-BSE), target group and proportions (cases per million tests) by case type and year.

⁹ Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003 on the establishment of a common classification of territorial units for statistics (NUTS). OJ L 154, 21.6.2003, p. 1–41.

These have been used to describe the development of the BSE epidemic and to put into context the findings of the reporting year.

To obtain relevant epidemiological information about the BSE cases detected in 2019, EFSA asked for additional information from the individual concerned reporting countries via a small questionnaire.

For small ruminants, summary statistics are presented in this report, and where possible, stratified according to the relevant variables in the database such as surveillance target group (SHC, NSHC, SU, EM), flock/herd status (infected, non-infected, unknown/not available), surveillance type (passive surveillance restricted to SU vs. active surveillance restricted to SHC and NSHC in non-infected flocks/herds), country, year (since 2002), case type (CS or AS), index case (yes/no). In particular, when historical data have been considered for trend analysis, the last 10-year period (2010–2019) has been included in the analysis.

Based on the minimum testing requirements for TSE surveillance in small ruminants (Table 4), a check has been carried out of the compliance of each MS. For assessing compliance, the following criteria have been applied:

- For testing in the NSHC surveillance target group: if the difference between observed testing and expected testing (minimum requirements) was positive, then the MS is compliant with the testing requirements.
- For testing in the SHC surveillance target group: if the difference between observed testing and expected testing (minimum requirements) was positive, the MS is compliant. When the difference was negative, a further calculation was performed to check if the MS compliance had been achieved by applying the derogation provided by the TSE Regulation (according to point II.2(c), Chapter A, Annex III of the TSE Regulation) i.e. replacing up to 50% of its minimum SHC sample size by testing dead ovine or caprine animals over the age of 18 months at the ratio of 1:1 and in addition to the minimum sample size for NSHC.
- If the MS is required to test 100% up to 500 of the NSHC in sheep, and the reported number of tested sheep was, e.g. 350 – the MS was categorised as compliant since it is not known the total subpopulation of NSHC in the country.

An MS has been considered to meet the minimum requirements when the above criteria have been met in both target groups.

The reporting system of TSE surveillance data does not allow the collation of the number of newly infected flocks and herds during the reporting year but only the number of index cases, considered to be a proxy for the number of incident scrapie cases.

Finally, the classification originally developed by the Great Britain's National Scrapie Plan (NSP) was used to summarise and describe the data on genotyping.

In order to describe and plot the reported data, some assumptions were made for reporting the results in bovine animals and small ruminants (sheep and goats):

- To plot the temporal evolution of BSE cases (C-BSE, L-BSE and H-BSE), cases for which the type was reported as 'unknown' or was missing were considered for reporting purposes as C-BSE, since most of these were reported before 2005.
- To plot the reported scrapie cases according to the flock/herd status, it was assumed that flocks/herds with status reported as 'unknown', 'other' or blank were considered for reporting purposes as 'non-infected flocks/herds'.
- To describe the evolution of the total number of scrapie index cases, it was assumed that all index cases ('yes') were confirmed in non-infected flocks/herds. If an index case was reported as 'no' or 'unknown', it was considered for reporting purposes as 'infected flocks/herds'.
- To describe the results of the discriminatory TSE testing, it was assumed that all scrapie cases with 'BSE-like', 'non-BSE-like' or 'inconclusive' results in the primary or secondary molecular tests have been submitted for discriminatory testing.

For cervids, summary statistics were extracted and presented in tabular format as follows:

- for all reporting countries, number of tested cervids in 2019 by reporting country, species and management system (wild and semi-domesticated/farmed).
- for the six MS subject to mandatory surveillance, number of PSU declared, proportion tested and median, minimum and maximum number of tested cervids in 2019 per PSU by MS and management system.
- for all reporting countries, the number of tested cervids in 2019 by target group, species, management system and reporting country.

Number of tested animals in species other than cattle, sheep, goats and cervids tested for TSE in reporting countries in 2019 are presented in tabular format by species and reporting country.

2.3.2. Analytical methods

With regard to surveillance in cattle, the average number of cases detected per million tests at the EU level in both the risk animals and HS target groups (period 2010–2019) have been used to check if any significant temporal trend was detectable. For this purpose, a Poisson regression model has been fitted for each BSE type (C-BSE, H-BSE and L-BSE) separately, using the number of cases as dependent variable and the year as a continuous independent variable. The number of tests was taken into account in the model (offset).

The target group (risk animals vs. HS), potentially affecting the probability of detecting the disease, was added to the model as covariate to adjust for any confounding effect. A $p \leq 0.05$ was considered statistically significant. The relative risk (RR) obtained by exponentiating the beta coefficient associated with the 'year' variable was used as a measurement of the annual variation in the probability of detection, i.e. the temporal trend for the entire period. In the model, the RR indicates the average annual change in the proportion of cases per animals tested corresponding with the annual probability of detecting the disease: an $RR > 1$ indicates an average annual increase in the number of cases per million whereas an $RR < 1$ indicates an average annual decrease.

TSE data of small ruminants from the last 10 years (period 2010–2019) have been used to check if any significant temporal trend was detectable. As per BSE, a Poisson regression model has been fitted for ovine and caprine animals separately, using the number of cases as dependent variable and the year as a continuous independent variable. The number of tests was taken into account in the model (offset). The target group (NSHC vs SHC), potentially affecting the probability of detecting the disease, was added to the model as covariate to adjust for any confounding effect. A $p \leq 0.05$ was considered statistically significant for both the statistical analyses. The RR obtained by exponentiating the beta coefficient associated with the 'year' variable was used as a measurement of the annual variation in the probability of detection, i.e. the temporal trend for the entire period. In the model, the RR indicates the average annual change in the proportion of cases per animals tested corresponding with the annual probability of detecting the disease: an $RR > 1$ indicates an average annual increase in the number of cases per million whereas an $RR < 1$ indicates an average annual decrease.

The mean age of the AS cases has been compared with that of CS cases in sheep and goats by applying a two-sample t-test with unequal variances. A $p \leq 0.05$ was considered statistically significant.

3. Assessment

3.1. BSE surveillance in bovine animals

About 118.8 million bovine animals have been tested for BSE in EU since 2001. In 2019, there was a 2.7% reduction in the number of tested bovine animals in the EU, from 1,181,934 in 2018 to 1,150,388 in 2019, due to a reduction in the HS target group: from 177,536 in 2018 to 156,229 in 2019 and the slight reduction in the number of tested animals in the FS from 932,049 in 2018 to 918,182 in 2019, despite a 7.3% increase of animals tested in the ES group (from 64,262 in 2018 to 68,969 in 2019). Romania and Bulgaria continue being the main contributors to the HS testing group with 137,463 (88%) tested cattle.

The six non-MS (Iceland, Montenegro, Norway, North Macedonia, Serbia and Switzerland) tested 44,557 cattle in 2019; Serbia, a new reporting country, was the main contributor with 20,110 cattle tested. The two new reporting countries, Montenegro and Serbia, reported mostly cattle tested in the HS target group and Serbia 30 extra cattle as clinical suspects.

There was a decrease of 1% in the number of animals tested in the risk group (ES+AM+FS), from 1,003,707 in 2018 to 993,332 in 2019. Similar to the previous year, cattle in the risk group accounted for over 86.4% of all tested cattle in the EU and cattle tested in the FS target group accounted for 92.4% of all risk cattle tested.

The number of cattle tested for BSE per reporting country for each target group in 2019 is shown in Table 5.

Table 5: Number of bovine animals tested for BSE by reporting country and surveillance target group in 2019 in the EU and other reporting countries

Country	Surveillance target group								Total
	Risk animals				Other target groups				
	ES	AM	FS	Subtotal risk animals	HS	SU	EM	Subtotal other target groups	
AT	3,659	29	15,326	19,014	64	19		83	19,097
BE	785	3	25,335	26,123	2	8		10	26,133
BG	844		2,144	2,988	24,781	6		24,787	27,775
CY	53		1,686	1,739	22			22	1,761
CZ	2,848	3	21,497	24,348	78	2		80	24,428
DE	10,240		162,896	173,136	339	584		923	174,059
DK	1,705		22,872	24,577		1		1	24,578
EE	140	44	3,578	3,762				0	3,762
EL	107	10	1,190	1,307	10,366	5		10,371	11,678
ES	556	16	60,609	61,181	185		21	206	61,387
FI	14		11,272	11,286	3			3	11,289
FR	3,410		203,849	207,259	7,100	1	13	7,114	214,373
HR	22		4,992	5,014	118			118	5,132
HU	81	76	10,927	11,084	170	12		182	11,266
IE		427	56,426	56,853		8		8	56,861
IT	19,048	381	34,356	53,785	242			242	54,027
LT	15	37	2,823	2,875				0	2,875
LU			2,593	2,593		3		3	2,596
LV	279	258	2,831	3,368		1		1	3,369
MT	60		232	292				0	292
NL	5,037		46,964	52,001	27			27	52,028
PL	10,692	714	48,753	60,159	2	14	21	37	60,196
PT	1,440	1,224	14,246	16,910	3	6		9	16,919
RO	2,855	2,714	3,278	8,847	112,682	70		112,752	121,599
SE	152	26	8,227	8,405		19		19	8,424
SI	409	78	5,822	6,309	30	8		38	6,347
SK	60		9,656	9,716	2			2	9,718
UK	4,185	414	133,802	138,401	13		5	18	138,419
Total EU	68,696	6,454	918,182	993,332	156,229	767	60	157,056	1,150,388
CH	4,159		7,016	11,175		26		26	11,201
IS	3		9	12				0	12
ME				0	4,227			4,227	4,227
MK				0	2,123			2,123	2,123
NO	5,147	153	1,584	6,884				0	6,884
RS	57		2,779	2,836	17,244	30		17,274	20,110
Total Non-EU	9,366	153	11,388	20,907	23,594	56	0	23,650	44,557
Total	78,062	6,607	929,570	1,014,239	179,823	823	60	180,706	1,194,945

BSE: bovine spongiform encephalopathy, ES: emergency slaughtered; AM: animals with clinical signs at ante-mortem; FS: fallen stock; HS: healthy slaughtered; SU: animals clinically suspected of being infected with BSE; EM: animals culled under BSE eradication measures.

The distribution of the number of bovine animals tested for BSE by age group, surveillance target group and reporting country in 2019 can be found in the following link <https://doi.org/10.5281/zenodo.4087794> distributed as follows:

- **Table 6:** Number of bovine animals tested by age group in the EU MS and non-MS reporting countries in 2019.
- **Table 7:** Number of bovine animals in the risk group (animals with clinical signs at ante-mortem, emergency slaughtered and fallen stock), by age group, tested in EU MS and non-MS reporting countries in 2019.
- **Table 8:** Number of tested healthy slaughtered bovine animals by age group in EU MS and in non-MS reporting countries in 2019.
- **Table 9:** Number of BSE suspected bovine animals, by age group, tested in EU MS and in non-MS-reporting countries in 2019.
- **Table 10:** Number of bovine animals culled under BSE eradication measures, by age group, tested in EU MS and in non-MS-reporting countries in 2019.

In the EU, seven BSE cases were reported in 2019, all atypical BSE submitted to the FS testing group: six H-type (two by Spain and four by France) and one L-type by Poland. Table 11 reports the main clinical and epidemiological data of the positive cases. One additional H-type case was reported outside Europe, by Brazil in a 17-year-old beef cow found dead during ante-mortem inspection at abattoir. The animal was born and raised on a full-cycle beef farm on extensive grazing.¹⁰

The number of H-type BSE cases in the EU was the largest reported in a single year (6), equal to the number reported in 2009. As a result, the proportion of cases per million tests raised to 6 for H-type BSE in 2019 (Figure 1). The number of L-type BSE was in line with the number of cases reported in the last few years. Most of the atypical cases reported in 2019 were detected in beef cattle older than 11 years, except one of the two H-type BSE cases reported by Spain, an unusually young dairy animal (5.5 years). In fact, it is the youngest atypical BSE case ever reported since the TSE data are collected and published.

Based on 115 atypical BSE cases with known age of, the average age at detection was 11.85 years (range: 5.5–18.5 years) and tested in the FS target group that accounts, as mentioned above, for most of the tested animals.

The number of BSE cases by reporting country, type and year (up to 2019, with a focus on the last 5 years) is shown in Tables 12–14.

Time series analysis carried out over the last 10-year period (period 2010–2019) shows a significant decreasing trend in the occurrence of C-BSE (annual RR = 0.59 i.e. an annual decrease of 41% in the proportion of cases per tested animals; $p < 0.0001$), whereas no significant trend for the two atypical BSE forms was found (H-BSE: 1.05 $p = 0.43$; L-BSE: 1.05 $p = 0.47$).

Maps showing the geographical distribution of the cumulative number of cases and the cumulative proportion of cases per million tests of C-BSE cases born after the total (reinforced) feed ban (BARB), H-BSE and L-BSE for the period 2001–2019 are shown in Appendix B.

¹⁰ https://www.oie.int/wahis_2/temp/reports/en_imm_0000030678_20190603_110419.pdf

Table 11: Clinical and epidemiological description of the seven BSE cases detected in 2019

Country	ES - atypical 1	ES - atypical 2	FR- atypical 3	FR- atypical 4	FR- atypical 5	FR- atypical 6	PL- atypical 7
Surveillance target group	Fallen Stock	Fallen Stock	Fallen Stock	Fallen Stock	Fallen Stock	Fallen Stock	Fallen Stock
Case type	H-BSE	H-BSE	H-BSE	H-BSE	H-BSE	H-BSE	L-BSE
Month and year of birth	July 2013	January 2001	January 2003	March 2008	November 2003	April 2003	July 2007
Age at detection (in months)	66	222	193	132	192	200	138
BARB status	No	No	No	No	No	No	No
Clinical signs	No	Not specific: Limp, ataxia, and weight loss	None	None	Weight loss during previous months	None	No
Cattle type	Dairy	Beef	Beef cattle	Beef cattle	Beef cattle	Beef cattle	Beef cattle
Breed	Holstein-Friesian	Mixed	Limousine	Aubrac	Charolais	Mixed breed (Blond d'Aquitaine x mixed)	Limousine
Was the case confirmed at herd/ holding where the animal was born?	Yes	No	No	No	Yes	Yes	No
Location (NUTS3) of natal herd or herd where case found	El Piñero-Zmora-Castilla y León	Mañon- A Coruña- Galicia	81190 Montauriol Tarn	43800 Chamalieres sur Loire (Haute-Loire)	23700 Dontreix (Creuse).	11230 Corbieres (Aude)	PL 515, (Mirsk, Mirsk, Lwowek Slaski, Dolnoslaskie)
Herd size	465	67	157	157	174	87	50
Herd type	Dairy	Beef	Beef	Beef	Beef	Beef	Beef
Feeding system during first year of life	Mixed	Unknown	Milk + forage	Unknown	Milk + granulated		Not born on farm. Feeding system unknown
Feed cohorts? Tested? If Yes: Results (number tested; number positives)	No	19. Not tested. No BSE case in natal herd	13 tested negative	3 tested negative	Ongoing (1)		8 tested negative

Country	ES - atypical 1	ES - atypical 2	FR- atypical 3	FR- atypical 4	FR- atypical 5	FR- atypical 6	PL- atypical 7
Birth cohorts? Tested? If Yes: Results (number tested; number positives)	50	16. Not tested.	13 tested negative	2 tested negative	2 tested negative	2 tested negative	21 tested negative
Offspring? Tested? If Yes: Results (number tested; number Positives)	Not tested	Not tested	0	0	No		Yes, not tested (dead)
Sire? Tested? (Yes/ No). If Yes: Results (positive? Negative?)	Unknown	Unknown	0	0	No		No
Dam? Tested (Yes/ No). If Yes: Results (positive? Negative?)	Not tested	Not tested	0	0	No		No

BSE: bovine spongiform encephalopathy; H-BSE: H-type BSE; L-BSE: L-type BSE.

Table 12: Total number of reported BSE cases (classical-BSE + atypical H-BSE + atypical L-BSE) in reporting countries and worldwide by year (up to 2019) and country

Country	Year						Total
	Up to 2014	2015	2016	2017	2018	2019	
AT	8	0	0	0	0	0	8
BE	133	0	0	0	0	0	133
CZ	30	0	0	0	0	0	30
DE ^(a)	421	0	0	0	0	0	421
DK ^(a)	16	0	0	0	0	0	16
EL	1	0	0	0	0	0	1
ES	812	1	1	3	0	2	819
FI	1	0	0	0	0	0	1
FR ^(a)	1,000	0	4	2	3	4	1,013
IE ^(a)	1,659	1	0	1	0	0	1,661
IT ^(a)	147	0	0	0	0	0	147
LU	3	0	0	0	0	0	3
NL ^(b)	88	0	0	0	0	0	88
PL	74	0	0	0	0	1	75
PT	1,086	0	0	0	0	0	1,086
RO	2	0	0	0	0	0	2
SE ^(c)	1	0	0	0	0	0	1
SI	8	1	0	0	0	0	9
SK	27	0	0	0	0	0	27
UK	184,592	2	0	0	1	0	184,595
Total EU-28	190,109	5	5	6	4	7	190,136
BRA	2	0	0	0	0	1	3
CAN ^(a)	19	1	0	0	0	0	20
ISR	1	0	0	0	0	0	1
JPN	36	0	0	0	0	0	36
LI	2	0	0	0	0	0	2
NO	0	1	0	0	0	0	1
CH ^(a)	465	0	0	0	0	0	465
USA ^(a)	4	0	0	1	1	0	6
Total non-EU	529	2	0	1	1	1	534
Total	190,638	7	5	7	5	8	190,670

BRA: Brazil; CAN: Canada; ISR: Israel; JPN: Japan; LI: Liechtenstein; NO: Norway; CH: Switzerland; USA: The United States of America. BSE: bovine spongiform encephalopathy; H-BSE: H-type BSE; L-BSE: L-type BSE.

(a): Included imported cases: CAN one case in 1993; Denmark one case in 1992; France one case in 1999; Germany one case in 1992, three cases in 1994, two cases in 1997; Ireland five cases in 1989, one case in 1990, two cases in 1991 and 1992, one case in 1994 and one case in 1995; Italy two cases in 1994, 2001 and 2002; Portugal one case in 1990, 1991, 1992, 2000 and 2004 and three cases in 1993; Slovenia one case in 2004; Switzerland one case in 2012; USA one case in 2003.

(b): NL: The number of classical scrapie for NL should be updated in the database for 2001 from 18 cases to 19 cases. Therefore, the total of the Netherlands for the column up to 2013 is 88 instead of 87.

(c): Gavier-Widen et al. (2008).

Each cell reports the total number of BSE cases (C-BSE + H-BSE + L-BSE). Grey-shaded cells indicate the year(s) and Member State(s) where at least one BARB case was detected (EFSA, 2017). EU countries without BSE cases are not included.

Source: data regarding non-EU cases and cases in EU Member States for the period 1987–2002 were made available by the European Commission (European Commission, 2016). Data were retrieved from the EU TSE Database and the OIE website (<http://www.oie.int/wahis>).

Table 13: Number of reported classical BSE cases in the EU and non-EU reporting countries by year (up to 2019) and country

Country code	Year						Total
	Up to 2014	2015	2016	2017	2018	2019	
AT	5	0	0	0	0	0	5
BE	133	0	0	0	0	0	133
CZ	29	0	0	0	0	0	29
DE	416	0	0	0	0	0	416
DK	15	0	0	0	0	0	15
EL	1	0	0	0	0	0	1
ES	798	0	0	0	0	0	798
FI	1	0	0	0	0	0	1
FR	968	0	1	0	0	0	969
IE	1,655	1	0	0	0	0	1,656
IT	142	0	0	0	0	0	142
LU	3	0	0	0	0	0	3
NL	84	0	0	0	0	0	84
PL	60	0	0	0	0	0	60
PT	1,079	0	0	0	0	0	1,079
SI	8	0	0	0	0	0	8
SK	27	0	0	0	0	0	27
UK	184,577	1	0	0	1	0	184,579
Total EU	190,001	2	1	0	1	0	190,005
CH	464	0	0	0	0	0	464
Total non-EU	464	0	0	0	0	0	464
Total	190,465	2	1	0	1	0	190,469

BSE: bovine spongiform encephalopathy.

Each cell reports the total number of C-BSE cases.

Reporting countries that have never reported classical cases are not included in the table.

Grey-shaded cells indicate the year and Member State where at least one BARB case was detected (EFSA BIOHAZ Panel, 2017a).

Source: Data were retrieved from the EU TSE Database and from the OIE website for CH.

Table 14: Number of reported BSE atypical cases in EU and non-EU reporting countries by year (period 2001–2019), type and country

Country code	Year												TOTAL	
	2001–2014		2015		2016		2017		2018		2019		H	L
	H	L	H	L	H	L	H	L	H	L				
AT	1	2										1	2	
CZ	1	0										1	0	
DE	2	3										2	3	
DK	0	1										0	1	
ES	7	7	1	1			1	2			2	11	10	
FR	15	17		3			1	1	1	2	4	24	20	
IE	4	0						1				4	1	
IT	0	5										0	5	
NL	1	3										1	3	
PL ^(a)	2	12									1	2	13	
PT	7	0										7	0	
RO	0	2										0	2	
SE	1	0										1	0	

Country code	Year												TOTAL	
	2001–2014		2015		2016		2017		2018		2019		H	L
	H	L	H	L	H	L	H	L	H	L	H	L		
SI	0	0	1										1	0
UK	6	9	1										7	9
Total EU	47	61	2	1	4	0	2	4	1	2	6	1	62	69
NO	0	0	1										1	0
CH	1	0											1	0
Total non-EU	1	0	1	0	0	0	0	0	0	0	0	0	2	0
Total	48	61	3	1	4	0	2	4	1	2	6	1	64	69

BSE: bovine spongiform encephalopathy.

Each cell reports the total number of H-type BSE (H) and L-type BSE (L) cases.

Reporting countries that have never reported atypical cases are not included in the table.

(a): In 2012, PL reported an atypical BSE case without specifying the type.

Source: Data were retrieved from the EU TSE Database and from the OIE website for CH.

The number of historical reported BSE cases can be found in the following link <https://doi.org/10.5281/zenodo.4252322>, as follows:

- **Table 15:** Number of BSE cases per country and year until 2000 (included) in the EU and non-EU countries.
- **Table 16:** Number of classical BSE cases per country and year from 2001 in the EU and non-EU reporting countries.
- **Table 17:** Number of atypical H-BSE cases per country and year from 2001 in the EU and non-EU reporting countries.
- **Table 18:** Number of atypical L-BSE cases per country and year from 2001 in the EU and non-EU reporting countries.

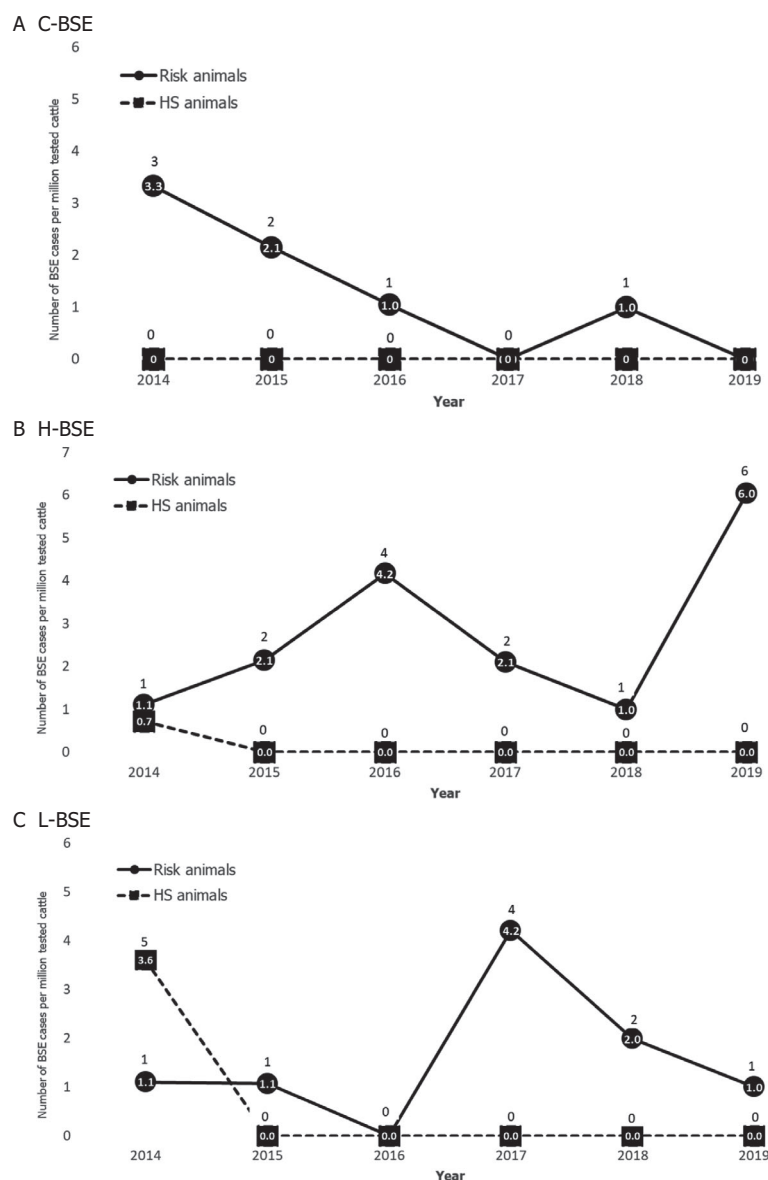


Figure 1: Cases per million tested bovine animals by surveillance target group and case type for the period 2014–2019 in the EU (black numbers in white background: number of cases). BSE: bovine spongiform encephalopathy; H-BSE: H-type BSE; L-BSE: L-type BSE

3.2. TSE surveillance in small ruminants

Since 2002, nearly 10 million small ruminants have been tested as part of the official EU TSE surveillance in the EU. In 2019, 481,627 small ruminants were tested by the 28 MS: 338,098 sheep (70.2%) and 143,529 goats (29.8%), which represents a 3.9% increase (18,113) in the number of tested small ruminants in the EU, compared with that of 2018.

In four of the six non-MS reporting countries (Iceland, North Macedonia, Norway, Serbia), a total of 23,690 small ruminants were tested: 23,473 sheep (99.1%) and 217 goats (0.9%), an increase of 1,740 from 2018, mostly due to the increase in testing by Norway and Iceland, and not by the addition of the two new reporting countries (only Serbia tested 165 sheep slaughtered for human consumption). Montenegro and Switzerland did not report data on small ruminants.

In sheep, the increase in the total tested in the EU was 3.9% (338,098 tested in 2019 compared with 325,386 in 2018), due to the increase of testing in both TSE-infected flocks with a 9.4% increase in 2019 (from 37,662 in 2018 to 41,197 in 2019), and non TSE-infected flocks with a 3% increase in 2019 (from 285,897 in 2018 to 294,527 in 2019).

In goats, there was also a 3.9% increase in the tested animals in the EU (143,529 in 2019 compared with 138,128 in 2018), due to the increase of testing in both TSE-infected herds with a 5.2% increase in 2019 (from 12,375 in 2018 to 13,013 in 2019) and non-TSE-infected herds with a 3.3% increase in 2019 (from 125,658 in 2018 to 129,810 in 2019).

The numbers of sheep and goats tested for TSE by reporting country, surveillance target group and flock/herd status in 2019 are summarised in Tables 19 and 20, respectively. Taking into account the number of samples tested in the SHC and NSHC target groups and those required according to the TSE Regulation (Table 4), 22 MS fulfilled the requirements for sheep testing. In goat surveillance, 23 MS fulfilled the requirements for goat testing.

The pattern of testing in 2019 in sheep by country and flock status was very similar to that of 2018. In 2019, for each sheep tested in a TSE-infected flock in the EU, there were 7.1 sheep tested in non-TSE-infected flocks, similar to 2018 and lower than in 2017 with nearly 11 tested in non-TSE-infected flocks. The increase in the overall testing of sheep in 2019 is mostly due to the higher level of testing in three reporting countries: Spain, Italy and Poland, with an overall increase of 4,776, 4,161 and 2,711 sheep tested, respectively.

The pattern of testing in 2019 in goats by country and flock status was very similar to that of 2018. In 2019, for each goat tested in a TSE-infected herd in the EU, there were 10 goats tested in non-TSE infected herds, similar to 2018 and much lower than in 2017 with nearly 31 goats tested in non-TSE-infected herds in 2017. The increase in the overall testing of goats in 2019 is mostly due to the higher level of testing in Italy, with an overall increase of 4,796 goats tested.

Table 19: Number of sheep tested for TSE by reporting country, surveillance target group and flock status in 2019 in the EU and other reporting countries

Flock status	TSE-infected flocks					Non-infected flocks					Unknown/not available					Total
	EM	NSHC	SHC	SU	Subtotal TSE infected flocks	EM	NSHC	SHC	SU ^(a)	Subtotal non-infected flocks	EM	NSHC	SHC	SU	Subtotal unknown/not available	
AT		11	6		17		2,922	166		3,088						3,105
BE							1,574		4	1,578						1,578
BG							2,678	18,028	5	20,711						20,711
CY		910	761		1,671		1,652	82		1,734						3,405
CZ												2,374			2,374	2,374
DE	19				19		10,865	9,837	50	20,752						20,771
DK							517			517						517
EE							326			326						326
EL	1,865	2,110	1,239	3	5,217		113	1,036	21	1,170						6,387
ES	12,156				12,156		13,554	8,987	5	22,546						34,702
FI		19	5		24		1,636	5		1,641						1,665
FR	41				41		19,682	5,341	3	25,026						25,067
HR							1,350			1,350						1,350
HU		4,128	397		4,525		7,996	8,760		16,756						21,281
IE		41	279		320		10,781	10,834	1	21,616						21,936
IT	5,422	459	802		6,683		13,656	12,362	10	26,028						32,711
LT							666			666						666
LU							100			100						100
LV							254			254						254
MT							302	139		441						441
NL							1,520			1,520						1,520
PL							10,843	21,360	73	32,276						32,276
PT		424	83		507		15,046	5,143		20,189						20,696
RO		180	6,999	12	7,191		19,141	17,231	11	36,383						43,574
SE		56	16		72		1,229	16	1	1,246						1,318
SI							2,500	203	11	2,714						2,714

Flock status	TSE-infected flocks					Non-infected flocks					Unknown/not available					Total
	EM	NSHC	SHC	SU	Subtotal TSE infected flocks	EM	NSHC	SHC	SU ^(a)	Subtotal non-infected flocks	EM	NSHC	SHC	SU	Subtotal unknown/not available	
SK		916	954		1,870		12,358			12,358						14,228
UK	356	528			884		15,536	6,004	1	21,541						22,425
Total EU	19,859	9,782	11,541	15	41,197		168,797	125,534	196	294,527		2,374			2,374	338,098
CH																
IS	353				353		34	3,516	6	3,556						3,909
ME																
MK								240		240						240
NO	136				136		9,661	9,349	13	19,023						19,159
RS								165		165						165
Total non-EU	489				489		9,695	13,270	19	22,984						23,473
Total	20,348	9,782	11,541	15	41,686		178,492	138,804	215	317,511		2,374			2,374	361,571

EM: animals culled under TSE eradication measures; NSHC: animals not slaughtered for human consumption; SHC: animals slaughtered for human consumption; SU: animals clinically suspected of being infected by TSE (transmissible spongiform encephalopathies).

(a): Sheep reported with clinical signs at ante-mortem (AM) have been included in this table as SU: 1 from EL, 71 from PL and 8 from NO.

Table 20: Number of goats tested for TSE by reporting country, surveillance target group and herd status in 2019 in the EU and other reporting countries

Herd status	TSE-Infected herds					Non-infected herds					Unknown/Not available					Total
	EM	NSHC	SHC	SU	Subtotal infected herds	EM	NSHC	SHC	SU ^(a)	Subtotal non-infected herds	EM	NSHC	SHC	SU	Subtotal unknown/not available	
AT							994	33		1,027						1,027
BE							709			709						709
BG							549	1,559		2,108						2,108
CY	188	3602	2758		6,548		678	224		902						7,450
CZ												705	1		706	706

Herd status	TSE-Infected herds					Non-infected herds					Unknown/Not available				Total	
	EM	NSHC	SHC	SU	Subtotal infected herds	EM	NSHC	SHC	SU ^(a)	Subtotal non-infected herds	EM	NSHC	SHC	SU		Subtotal unknown/not available
DE							1742	274	4	2,020						2,020
DK							110		1	111						111
EE							35			35						35
EL	377	273	96		746		314	465	1	780						1,526
ES	3059				3,059		10,728	8,395		19,123						22,182
FI							270			270						270
FR							18,292	4,232		22,524						22,524
HR							327			327						327
HU	32				32		97	151		248						280
IE							153			153						153
IT	836	52	964		1,852		6,939	27,406	6	34,351						36,203
LT							13			13						13
LU							103			103						103
LV							31			31						31
MT							164	126		290						290
NL							1528			1,528						1,528
PL							3,554	855	12	4,421						4,421
PT		11			11		1529	1		1,530						1,541
RO		12	220		232		7,593	28,314	1	35,908						36,140
SE							84			84						84
SI							476	45	10	531						531
SK		15	11		26		184			184						210
UK	219	288			507		499			499						1,006
Total EU	4,711	4,253	4,049		13,013		57,695	72,080	35	129,810		705	1		706	143,529
CH																
IS								7		7						7
ME																
MK								3		3						3

Herd status	TSE-Infected herds					Non-infected herds					Unknown/Not available					Total
	EM	NSHC	SHC	SU	Subtotal infected herds	EM	NSHC	SHC	SU ^(a)	Subtotal non-infected herds	EM	NSHC	SHC	SU	Subtotal unknown/not available	
NO							159	47	1	207						207
RS																
Total non-EU							159	57	1	217						217
Total	4,711	4,253	4,049		13,013		57,854	72,137	36	130,027		705	1		706	143,746

EM: animals culled under TSE eradication measures; NSHC: animals not slaughtered for human consumption; SHC: animals slaughtered for human consumption; SU: animals clinically suspected of being infected by TSE (transmissible spongiform encephalopathies).

(a): Goats reported with clinical signs at ante-mortem (AM) have been included in this table as SU: 1 from EL and 11 from PL.

In total, 997 scrapie cases in sheep were reported in the EU in 2019, 64 (6.9%) more than in 2018. They were reported by 14 MS, four less than in 2018. Austria, Denmark and Sweden, that reported AS in 2018, and Bulgaria, that reported CS in 2018, did not report scrapie cases in 2019. In addition, 31 scrapie cases in sheep were reported by two (Iceland and Norway) of the six non-MS reporting countries.

CS was reported by seven different MS and one non-MS: Cyprus, Greece, Spain, Italy, Portugal, Romania, the United Kingdom and Iceland, whereas AS was reported by 11 MS and one non-MS: Finland, France, Germany, Hungary, Ireland, Italy, Poland, Portugal, Slovakia, Spain, the United Kingdom and Norway. Most of the ovine cases in the EU (91.7%) were reported by four countries, namely Greece, Italy, Romania and Spain, as it was the case in the previous years.

In total, 911 sheep scrapie cases in the EU in 2019 were CS cases (91.4%) and 86 were AS cases (8.6%). Among the non-EU reporting countries, 21 CS cases were reported by Iceland and 10 AS cases by Norway. Table 21 shows the number of scrapie cases in sheep by reporting country, case type, index case status and surveillance target group in 2019. The geographical distribution of AS and CS in 2019 in sheep is shown in Appendix C. An additional total of 17 cases in sheep were reported as inconclusive by Spain (5) and Italy (12) (See Table 31), which are not included in the total scrapie caseloads for these two countries.

In sheep, 17.8% (177) of all cases in the EU reported in 2019 were index cases, a reduction of 12.8% from the previous year (203 cases), with a much higher proportion in AS cases (80/86: 93%) than in CS cases (97/911: 10.6%), reflecting the within-flock spread of CS. Using the absolute number of index cases as a proxy for the flock-level incidence in sheep and comparing 2018 with 2019, there was nearly no difference in the number of CS index cases (from 98 in 2018 to 97 in 2019, -1%) and a decrease in the number of AS index cases (from 105 to 80, -25.2%).

In total, 390 scrapie cases in goats were reported in the EU in 2019 by nine MS (two more than in 2018), with a 25.4% reduction (-133) compared with 2018 when 523 cases were reported. This change is due mainly to the decrease in the number of cases in goats in two reporting countries: Cyprus (from 382 to 309), Spain (from 91 to 37). Cyprus, Italy and Spain reported both CS and AS. Greece, Hungary and the United Kingdom reported only CS cases whereas France, Poland and Portugal reported only AS cases. As mentioned previously, most of the CS cases were reported by Cyprus with a slight increase in the contribution of this country to the CS caseload in 2019 (from 73.7% in 2018 to 81.3% in 2019). The three non-MS that reported tested goats did not report any scrapie cases.

In total, 379 caprine cases in the EU in 2019 were CS cases (97.2%) and 11 were AS (7.8%). Table 22 shows the number of scrapie cases in goats by reporting country, case type, index case status and surveillance target group in 2019. The geographical distribution of AS and CS in 2019 in goats is shown in Appendix C. An additional total of three cases in goats were reported as inconclusive by Spain (1) and Italy (2) (See Table 33), which are not included in the total scrapie caseloads for these two countries.

In goats, 8.7% (34) of all cases reported in the EU in 2019 were index cases, lower than the 9.6% (50) in 2018, with a higher proportion in AS (10/11: 90.9%) than in CS (24/379: 6.3%). Cyprus and Italy accounted for 61.8% of all index cases in goats. Using the absolute number of index cases in goats as a proxy for the herd-level incidence in goats and comparing 2019 with 2018, there was a decrease in the number of CS index cases (from 44 to 24, -45.5%) and an increase in the number of AS index cases (from 6 to 10).

In general, considering the total number of cases by type and without restricting the calculation to index cases only, CS is still the most frequently reported type of scrapie in the EU in both the species. In 2019, the CS/AS ratio was 10.6:1 in sheep (higher than in 2018: 7.3:1) and 34.4:1 in goats (lower than in 2018: 86.1:1). If, for goats, Cyprus is excluded, the CS/AS ratio in goats was 7.1:1 in 2019, higher than in 2018 (27.2:1).

Table 21: Number of scrapie cases in sheep by country, case type, index case status, surveillance target group in 2019 in the EU and other reporting countries

Case type	Atypical scrapie (AS)								Classical scrapie (CS)								Total			
	No				Yes				Total AS	No				Yes				Total CS		
	EM	NSHC	SHC	Subtotal	NSHC	SHC	Subtotal	EM		NSHC	SHC	SU	Subtotal	NSHC	SHC	SU ^(a)			Subtotal	
CY															1			1	1	1
DE					3	1	4	4												4
EL									112	122	6		240	15	9	12	36	276	276	276
ES	1			1	2	4	6	7	302				302	9	1		10	312	319 ^(c)	319 ^(c)
FI					3		3	3												3
FR	1			1	6	1	7	8												8
HU		2		2	8	7	15	17												17
IE					3	3	6	6												6
IT					7		7	7	139	9	1		149	10	12		22	171	178 ^(d)	178 ^(d)
PL					3	1	4	4												4
PT					19 ^(b)	1	20	20						1			1	1	21	21
RO										26	81	8	115	19	5	2	26	141	141	141
SK			2	2	2		2	4												4
UK					3	3	6	6	4	4			8	1			1	9	15	15
Total EU	2	2	2	6	59	21	80	86	557	161	88	8	814	56	27	14	97	911	997	997
IS									19				19			2	2	21	21	21
NO					3	7	10	10												10
Total non-EU					3	7	10	10	19				19			2	2	21	31	31
Total	2	2	2	6	62	28	90	96	576	161	88	8	833	56	27	16	99	932	1028	1028

EM: animals culled under TSE eradication measures; NSHC: animals not slaughtered for human consumption; SHC: animals slaughtered for human consumption; SU: animals clinically suspected of being infected by TSE (transmissible spongiform encephalopathies).

Only the reporting countries in which scrapie cases in sheep were detected in 2019 are mentioned in the table.

(a): Sheep cases reported with clinical signs at ante-mortem (AM) have been included in this table as SU: 1 from EL.

(b): It includes one imported case: an animal imported for slaughter from Spain which died at lairage/resting area of the slaughterhouse and was tested as NSHC.

(c): An additional total of five cases were reported as inconclusive by Spain (See Table 31).

(d): An additional total of 12 cases were reported as inconclusive by Italy (See Table 31).

Table 22: Number of scrapie cases in goats by country, case type, index case status, surveillance target group in 2019 in the EU and other reporting countries

Case type Index case Surveillance target group	Atypical scrapie (AS)							Classical scrapie (CS)							Total				
	No			Yes			Total AS	No				Yes				Total CS			
	EM	NSHC	SHC	Subtotal	NSHC	SHC		Subtotal	EM	NSHC	SHC	SU	Subtotal	NSHC			SHC	SU	Subtotal
CY	1			1				1	147	97	56		300	6	2		8	308	309
EL									2	3			5	1	1		2	7	7
ES						2	2	2	33				33	2			2	35	37 ^(a)
FR					3		3	3											3
HU															1		1	1	1
IT					1	2	3	3	13	3			16	1	9		10	26	29 ^(b)
PL						1	1	1											1
PT					1		1	1											1
UK										1			1	1			1	2	2
Total EU	1			1	5	5	10	11	195	104	56		355	11	13		24	379	390
Total non-EU				0			0	0					0				0	0	0
Total	1			1	5	5	10	11	195	104	56		355	11	13		24	379	390

EM: animals culled under TSE eradication measures; NSHC: animals not slaughtered for human consumption; SHC: animals slaughtered for human consumption; SU: animals clinically suspected of being infected by TSE (transmissible spongiform encephalopathies).

Only the reporting countries in which scrapie cases in goats were detected in 2019 are mentioned in the table.

(a): An additional total of one case were reported as inconclusive by Spain (See Table 33).

(b): An additional total of two cases were reported as inconclusive by Italy (see Table 33).

Focusing on the last 10 years, the evolution in the number of scrapie cases detected at EU level is shown for each species and by case type in Figure 2. After the 2006 peak in the number of reported scrapie cases in sheep with 2,596 CS cases (when the number of tests also peaked), CS cases have decreased from 1,444 in 2011 to 554 in 2016. An increase was observed in 2017 (839 CS and unknown cases), and a similar order of magnitude was observed in 2018 (820 cases). A new increase to 911 is evident in 2019, mainly due to CS cases from TSE-infected flocks reported by Greece, Italy and Spain.

Greece, Spain and Italy increased the overall number of CS scrapie cases by nearly 55.1%, 11.8% and 14%, respectively, compared to the previous year. This trend was likely associated with the increase in the testing of TSE-infected flocks. In Romania, despite testing in both years around seven thousand sheep in TSE-infected flocks, the total number of CS cases decreased from 203 in 2018 to 141 in 2019 (-30.5%). The number of index cases of CS in the four most affected reporting countries was 94, very similar to that in 2018, 92.

In goats, the decreasing trend in the absolute number of CS cases is clear. The evolution is mainly affected by one single MS (Cyprus), where the number of detected cases has consistently declined since the peak in 2013 when 1,678 cases were reported by Cyprus and 1,799 in total including all other MS. Since then, the total number of CS cases has decreased consistently to 308 in 2019. Spain has also observed a substantial reduction in the number of CS in goats from 89 in 2018 to 35 in 2019, with only two index CS cases. Greece also reported fewer CS cases whereas the total number in Italy increased from 15 to 26, although the number of index cases remained stable.

Based on the 20,364 cases of scrapie with known type, species and age between 2009 and 2019, in sheep, the average age of AS cases (85.2 months) is significantly higher ($p < 0.001$) than that of CS cases (51.1 months). Similarly, in goats, the average age of AS cases (87.6 months) is significantly higher ($p < 0.001$) than that of CS cases (52.4 months). When comparing sheep with goats, there is no significant difference in the average age for AS (87.6 months in goats and 85.2 months in sheep) ($p = 0.54$), with the average age of CS cases in sheep (51.1 months) being very similar to that of goats (52.4 months) although statistically different ($p < 0.05$).

Tables 23 and 24 show the cases of CS and AS, respectively, in sheep for the period 2002–2019, with a focus on the last 5 years. Tables 25 and 26 show the cases of CS and AS, respectively, in goats for the period 2002–2019, with a focus on the last 5 years.

In sheep, in 2019, the number of index cases of CS and AS per 10,000 tests carried out by target group at EU level was: 1) for CS: 3.3 in NSHC, 2.2 in SHC and 714.3 in SU; 2) for AS: 3.4 in NSHC and 1.7 in SHC.

In goats, in 2019, the number of index cases of CS and AS per 10,000 tests carried out by target group at EU level was: (1) for CS: 1.9 in NSHC and 1.8 in SHC; (2) for AS: 0.9 in NSHC and 0.7 in SHC.

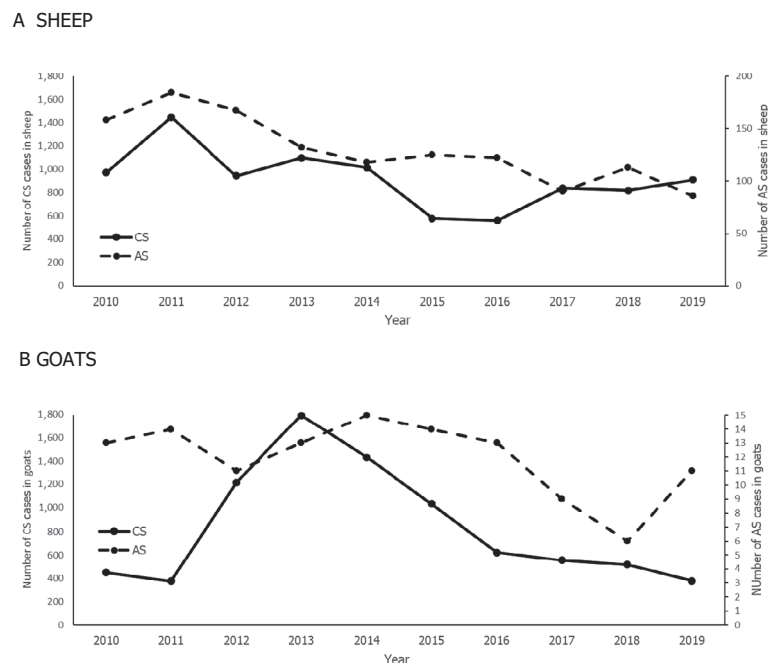


Figure 2: Number of reported scrapie cases in the EU by case type in the period 2010–2019 in (A) sheep and (B) goats

Table 23: Number of classical scrapie cases in sheep by year and reporting country up to 2019

Country code	Up to 2014	2015	2016	2017	2018	2019	Total CS
BE	38						38
BG	11			1	5		17
CY	3,184	13	7	2	4	1	3,211
CZ	56						56
DE	115	1					116
EL	5,265	252	227	247	178 ^(a)	276	6,445
ES	979	69	91	247	279	312	1,977
FR	1,531	1	2				1,534
HU	10						10
IE	573	1	1	11	1		587
IT	2,375	141	143	240	150	171	3,220
NL	401						401
PT	26		7			1	34
RO	560	98	75	76	203	141	1,153
SI	174 ^(b)						174
SK	104	3	10	15			132
UK	1,993	2				9	2,004
Total EU	17,395	581	563	839	820	911	21,109
IS	166	29	11	1	21	21	249
NO	12						12
Total non-EU	178	29	11	1	21	21	261
Total	17,573	610	574	840	841	932	21,370

EU and reporting countries without classical scrapie cases in sheep are not included in the table.

The table with all historical cases can be found on <https://doi.org/10.5281/zenodo.4252322>.

(a): The number of total cases in Greece in 2018 has been amended following the footnote in the republished 2018 TSE EUSR.

(b): The number of total cases up to 2014 in Slovenia has been amended following notification by the Slovenian competent authority. Subtotal and totals have been amended accordingly.

Table 24: Number of atypical scrapie cases in sheep by year and reporting country up to 2019

Country	Up to 2014	2015	2016	2017	2018	2019	Total AS
AT	11	1	1	1	1		15
BE	8						8
BG	4		2				6
CZ	2	3	2	1			8
DE	105	10	5	4	4	4	132
DK	12		1		1		14
EE	2						2
EL	28	2	2				32
ES	186	12	13	12	9	7	239
FI	11		2		2	3	18
FR	545	5	4	3	6	8	571
HR	1	1					2
HU	92	14	23	14	13	17	173
IE	27	7	1	1	8	6	50
IT	80	6	5	3	8	7	109
NL	18						18
PL	30	9	8	7	6	4	64
PT	561	30	26	29	30 ^(a)	20	696

Country	Up to 2014	2015	2016	2017	2018	2019	Total AS
SE	39	3	3	2	2		49
SI	5	2	3				10
SK	19	3	5	5	6	4	42
UK	302	17	14	12	17	6	368
Total EU	2,088	125	120	94	113	86	2,626
IS	7	1					8
NO	114	10	14	13	8	10	169
Total non-EU	121	11	14	13	8	10	177
Total	2,209	136	134	107	121	96	2,803

EU and reporting countries without atypical scrapie cases in sheep are not included in the table.

(a It includes one imported case an animal imported for slaughter from Spain which died at lairage/resting area of the slaughterhouse and was tested as NSHC.

Table 25: Number of classical scrapie cases in goats by year and reporting country up to 2019

Country	Up to 2014	2015	2016	2017	2018	2019	Total CS
BG	4	1	2	2	5		14
CY	8,793	923	570	484	381	308	11,459
EL	517	22	11	25	19	7	601
ES	71	16	19	34	89	35	264
FI	8						8
FR	128	40			5		173
HU						1	1
IT	72	21	8	8	15	26	150
RO	7	1	3	2	3		16
SI	4						4
UK	202	16	8	3		2	231
Total EU	9,806	1,040	621	558	517	379	12,921
Total non-EU	0						0
Total	9,806	1,040	621	558	517	379	12,921

EU and reporting countries without classical scrapie cases in goats are not included in the table.

Table 26: Number of atypical scrapie cases in goats by year and reporting country up to 2019

Country	Up to 2014	2015	2016	2017	2018	2019	Total AS
AT	1						1
CY	0	1		1	1	1	4
DE	1			1			2
EL	2	1	1		1		5
ES	39	5	5	2	2	2	55
FI	1						1
FR	48	5	3	2		3	61
IT	17	1	3	3	2	3	29
PL						1	1
PT	12		1			1	14
SI	0	1					1
Total EU	121	14	13	9	6	11	174
NO	1						1
Total non-EU	1						1
Total	122	14	13	9	6	11	175

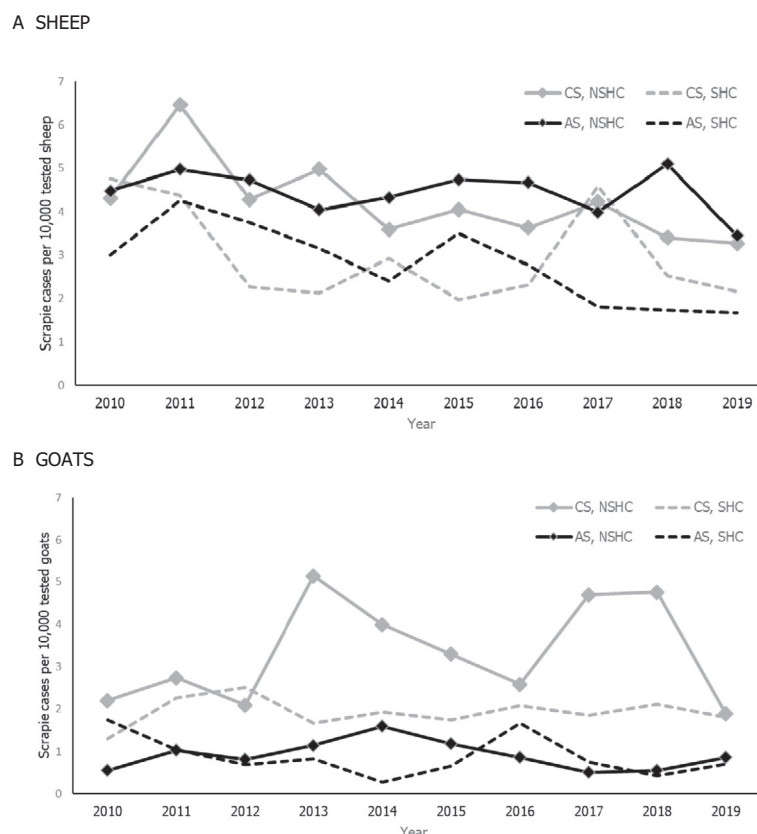
EU and reporting countries without atypical scrapie cases in goats are not included in the table.

The number of historical reported scrapie cases can be found in the following link <https://doi.org/10.5281/zenodo.4252322>, as follows:

- **Table 27:** Number of classical scrapie cases in sheep per country and year from 2002 in the EU and non-EU reporting countries
- **Table 28:** Number of atypical scrapie cases in sheep per country and year from 2002 in the EU and non-EU reporting countries
- **Table 29:** Number of classical scrapie cases in goats per country and year from 2002 in the EU and non-EU reporting countries
- **Table 30:** Number of atypical scrapie cases in goats per country and year from 2002 in the EU and non-EU reporting countries

Over the last 10 years (2010–2019), the number of cases per 10,000 tested animals considering both the case types and the species ranged between 0.5 and 5.4. Figure 3 shows the 10-year evolution by target group of the number of scrapie cases per 10,000 tests of sheep and goats in TSE non-infected flocks/herds and separately per case type. Based on those data, in sheep, there is a statistically significant decreasing trend for both CS and AS (respectively, for CS an annual RR = 0.95, i.e. an average 5% annual decrease in the probability of detecting CS: $p < 0.0001$. For AS, an annual RR = 0.96, i.e. an average 4% annual decrease in the probability of detecting AS: $p < 0.0001$). In goats, the outputs of the Poisson regression model did not show any statistically significant trend for both CS and AS ($p = 0.383$ and 0.247 , respectively).

Based on the same model, the probability of detecting CS in the NSHC surveillance target group was higher than in the SHC one in both sheep and goats (RR: 1.4, $p < 0.001$ in sheep and RR: 1.7, $p < 0.0001$ in goats). In AS, a statistically significant higher probability was only observed in sheep (RR = 1.6, $p < 0.0001$).



Note: This figure is restricted to active surveillance data, i.e. testing performed in NSHC and SHC target groups from non-infected flocks/herds or not previously known as infected. CS: classical scrapie; AS: Atypical scrapie; NSHC: animals not slaughtered for human consumption; SHC: animals slaughtered for human consumption.

Figure 3: Number of scrapie (index) cases per 10,000 tests in the EU in (a) sheep and (b) goats in non-TSE-infected flocks/herds, reported by case type and target group in the period 2010–2019

Tables 31 and 32 summarise the number of discriminatory tests performed by country in 2019 for CS and AS in sheep. Tables 33 and 34 summarise the number of discriminatory tests performed by country in 2019 for CS and AS in goats. In sheep, 677 (72.9%) of the CS and inconclusive cases reported in the EU were submitted for discriminatory testing and so were 37 of the AS cases (43%). The 21 cases of CS reported by Iceland and the 10 cases of AS reported by Norway were also submitted to discriminatory testing. All sheep scrapie cases submitted for discriminatory testing were confirmed as 'BSE excluded', except 5 cases and 12 cases reported by Spain and Italy, respectively, that were declared 'inconclusive'. In goats, 77 (20.2%) of the CS and inconclusive cases reported in the EU were submitted for discriminatory testing and 5 of the AS cases (45.4%). All goat cases subjected to discriminatory testing were confirmed as 'BSE excluded', except three inconclusive cases reported by Spain (1) and Italy (2).

Table 31: Number of discriminatory tests and results in classical scrapie cases in sheep in 2019 by reporting country

Country	No. of classical scrapie and inconclusive cases	Cases submitted for discriminatory testing				% of total classical TSE and inconclusive cases ^(a)
		BSE-not-excluded	BSE-excluded	Inconclusive	Total	
CY	1		1		1	100%
EL	276		35		35	12.7%
ES	317		312	5	317	100%
IT	183		171	12	183	100%
PT	1		1		1	100%
RO	141		131		131	92.9%
UK	9		9		9	100%
Total EU	928	0	660	17	677	72.9%
IS	21		21		21	100%
Total non-EU	21	0	21	0	21	100%
Total	949	0	681	17^(b)	698	73.5%

(a): Indicates the proportion of classical TSE and inconclusive cases that are submitted to discriminatory testing by each reporting country.

(b): The 17 inconclusive cases have not been included in the total number of sheep scrapie cases of 2019. EU and reporting countries without classical scrapie cases in sheep are not included in the table.

Table 32: Number of discriminatory tests and results in atypical scrapie cases in sheep in 2019 by reporting country

Country	No. of atypical scrapie cases	Cases submitted for discriminatory testing			% of total atypical TSE cases ^(a)
		BSE-not-excluded	BSE-excluded	Total	
DE	4		0	0	0%
ES	7		7	7	100%
FI	3		0	0	0%
FR	8		0	0	0%
HU	17		17	17	100%
IE	6		0	0	0%
IT	7		7	7	100%
PL	4		0	0	0%
PT	20		0	0	0%
SK	4		0	0	0%
UK	6		6	6	100%
Total EU	86	0	37	37	43.0%
NO	10		10	10	100%

Country	No. of atypical scrapie cases	Cases submitted for discriminatory testing			
		BSE-not-excluded	BSE-excluded	Total	% of total atypical TSE cases ^(a)
Total non-EU	10	0	10	10	100%
Total	96	0	47	47	49%

BSE: bovine spongiform encephalopathy, TSE: transmissible spongiform encephalopathies.

(a): Indicates the proportion of atypical TSE cases that are submitted to discriminatory testing by each reporting country. EU and reporting countries without atypical scrapie cases in sheep are not included in the table.

Table 33: Number of discriminatory tests and results in classical scrapie cases in goats in 2019 by reporting country

Country	No. of classical scrapie and inconclusive cases	Cases submitted for discriminatory testing				
		BSE-not-excluded	BSE-excluded	Inconclusive	Total	% of total classical TSE and inconclusive cases ^(a)
CY	308		8		8	2.6%
EL	7		2		2	28.6%
ES	36		35	1	36	100%
HU	1		1		1	100%
IT	28		26	2	28	100%
UK	2		2		2	100%
Total EU	382	0	74	3	77	20.2%
Total non-EU	0				0	0%
Total	382	0	74	3^(b)	77	20.2%

BSE: bovine spongiform encephalopathy, TSE: transmissible spongiform encephalopathies.

(a): Indicates the proportion of classical TSE and inconclusive cases that are submitted to discriminatory testing by each reporting country.

(b): The three inconclusive cases have not been included in the total number of goat scrapie cases of 2019. EU and reporting countries without classical scrapie cases in goats are not included in the table.

Table 34: Number of discriminatory tests and results in atypical scrapie cases in goats in 2019 by reporting country

Country	No. of atypical scrapie cases	Cases submitted for discriminatory testing			
		BSE-not-excluded	BSE-excluded	Total	% of total classical TSE cases ^(a)
CY	1				0%
ES	2		2	2	100%
FR	3				0%
IT	3		3	3	100%
PL	1				0%
PT	1				0%
Total EU	11	0	5	5	45.4%
Total non-EU	0			0	
Total	11	0	5	5	45.4%

BSE: bovine spongiform encephalopathy, TSE: transmissible spongiform encephalopathies.

(a): Indicates the proportion of atypical TSE cases that are submitted to discriminatory testing by each reporting country. EU and reporting countries without atypical scrapie cases in goats are not included in the table.

3.2.1. Genotyping in sheep

The classification of genotypes of the sheep prion protein PRNP gene used in this report and based on to the Great Britain's National Scrapie Plan (NSP) is summarised in Table 35.

Table 35: Classification of the genotypes of the sheep prion protein PRNP gene according to Great Britain's National Scrapie Plan (NSP) and the three tiers of report groups

NSP group	Genotype	Comment	Report group
NSP1	ARR/ARR	Genetically most resistant	Resistant
NSP2	ARR/ARQ; ARR/ARH; ARR/AHQ	Genetically resistant	Semi-resistant
NSP3	ARQ/ARQ	Genetically little resistant (ARQ/ARQ may be scientifically reviewed)	Susceptible
NSP3 Other (NSP30)	AHQ/AHQ; ARH/ARH; ARH/ARQ; AHQ/ARH; AHQ/ARQ		Susceptible
NSP4	ARR/VRQ	Genetically susceptible	Susceptible
NSP5	ARQ/VRQ; ARH/VRQ; AHQ/VRQ; VRQ/VRQ	Genetically highly susceptible	Susceptible

Table 36 shows the genotypes of sheep scrapie cases in 2019 in the EU and other reporting countries.

In total, 855 (98.7%) of the 866 cases of CS in sheep with known genotype reported in the EU in 2019 (93.8% of the total CS caseload) were from the susceptible genotype groups (NSP3, NSP30, NSP4 and NSP5). This is very similar to previous years in which over 93% of all CS cases with known genotypes were of the susceptible groups. In non-MS reporting countries, all CS cases reported by Iceland were of the susceptible genotype groups. It is important to highlight the reporting of a CS case by Spain in a sheep holding the ARR/ARR genotype (NSP1), a very rare occurrence.

For AS, the same genotype groups (NSP3, NSP30, NSP4 and NSP5) accounted for 45.2% of all cases with known genotype (38.4% of the total AS caseload), very similar to 2018. Figure 4 shows the frequency distribution of genotypes of sheep scrapie cases by case type, year and NSP group in the period 2010–2019 in the reporting countries.

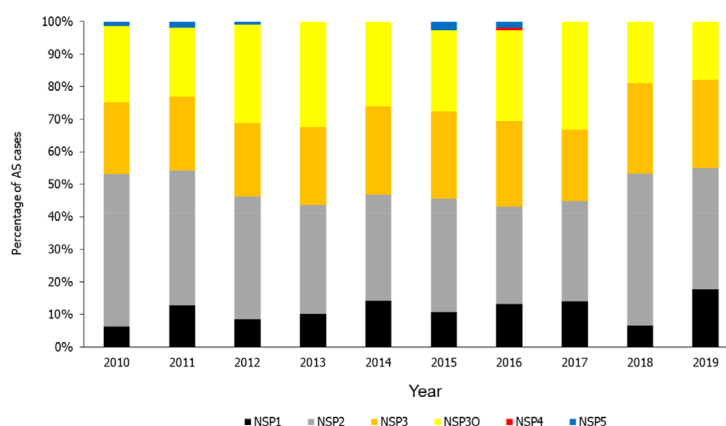
Table 37 shows the genotypes obtained in 2019 from the random samples of tested sheep in the reporting countries. The number of MS that did not report any random genotypes is 20, as in 2018, following the changes in the legislation that entered into force in 2018. The eight MS that conducted the genotype to a random sample of sheep were Belgium, Cyprus (where genotyping is conducted systematically in the breeding sheep population), France, Greece, Italy, Latvia, the Netherlands and Poland. One of the six non-MS reporting country, Iceland, also reported random genotype results. In the subset of EU MS that carried out the activity in 2019, excluding data from Cyprus, 15.7% of the sheep population (with known genotype) is susceptible to CS (NSP3, NSP30, NSP4 and NSP5), lower than the 19.2% in 2018 and the 26.5% in 2017. This percentage rose to 45.5% in Greece and 29.9% in Italy, two of the countries with the highest caseload in 2019, whereas it was 10.3% in the other five MS.

Considering the past 10 years of random sampling and excluding Cyprus, the proportion of sheep in the resistant genotype group (NSP1; black colour in the bars of Figure 5) shifted from 25.5% of the total number of genotyped sheep in 2010 (in which 24 MS contributed) to 55.7% in 2019 (on which seven MS contributed).

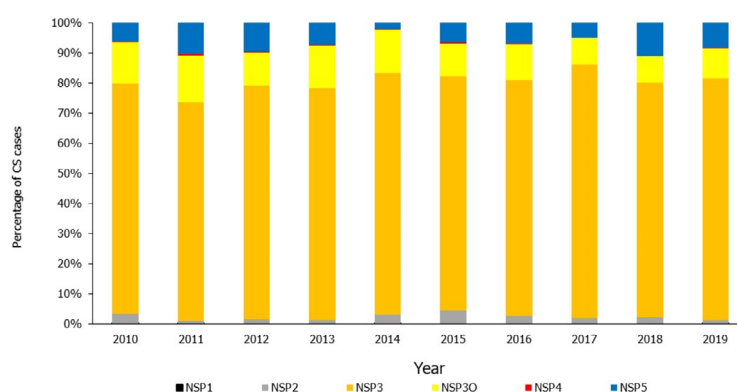
Table 36: Distribution of genotypes of confirmed scrapie cases in sheep in 2019 by reporting country and National Scrapie Plan (NSP) group

Type NSP group/ Country	Atypical scrapie (AS)								Classical scrapie (CS)							
	NSP1	NSP2	NSP3	NSP30	NSP4	NSP5	Unknown	Total AS	NSP1	NSP2	NSP3	NSP30	NSP4	NSP5	Unknown	Total CS
CY										1						1
DE	1	1		2				4								
EL									4	179	61	1	8	23		276
ES	2	3	1				1	7	1	3	292	3		1	12	312
FI			2				1	3								
FR							8	8								
HU	2	8	5	2				17								
IE		4	1	1				6								
IT			4	3				7			134	17		10	10	171
PL	1	3						4								
PT	5	6	4	2			3	20			1					1
RO									2	88	5	1	45			141
SK		2	1	1				4								
UK	2		2	2				6						9		9
Total EU	13	27	20	13	0	0	13	86	1	10	694	86	2	73	45	911
IS											19			2		21
NO	1	2	2	5				10								
Total non-EU	1	2	2	5	0	0	0	10	0	0	19	0	0	2	0	21
Total	14	29	22	18	0	0	13	96	1	10	713	86	2	75	45	932

A AS cases



B CS cases



(A) Atypical scrapie; (B) Classical scrapie. NSP1: Resistant (black); NSP2: Semi-resistant (grey); NSP3 (orange) + NSP30 (yellow) + NSP4 (red) + NSP5 (purple): susceptible as referred to in Table 35.

Figure 4: Frequency distribution of genotypes of sheep scrapie cases by case type, year and National Scrapie Plan (NSP) group in the period 2010–2019 in the reporting countries

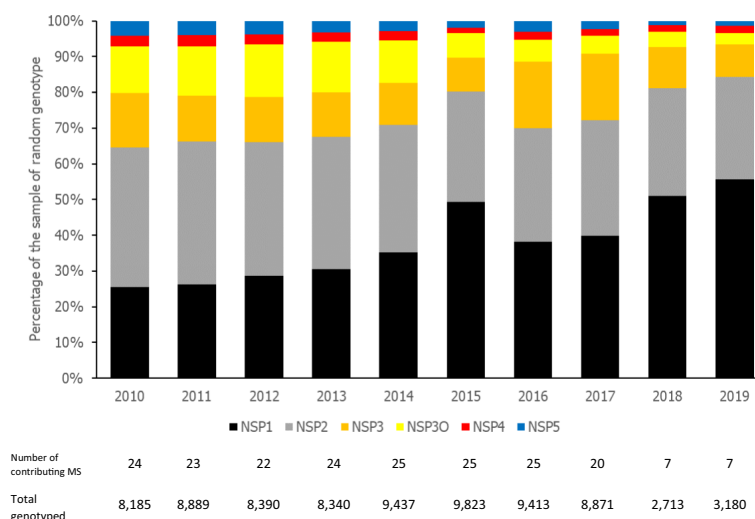
Table 37: Number of genotyped animals (% of sample within country) in randomly selected sheep in the EU and other reporting countries in 2019 by reporting country and National Scrapie Plan (NSP) group, in accordance with Regulation (EC) 999/2001 Annex VII, in Chapter C, in Part 1, point 8

Number of genotyped animals (% of sample within country)								
Country	NSP1	NSP2	NSP3	NSP30	NSP4	NSP5	Other/ Unknown	Total
AT	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
BE	434 (68.8%)	140 (22.2%)	26 (4.1%)	13 (2.1%)	11 (1.7%)	7 (1.1%)	0 (0%)	631
BU	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
CY ^(a)	53,240 (90.7%)	4,641 (7.9%)	179 (0.3%)	95 (0.2%)	234 (0.4%)	24 (0%)	277 (0.5%)	58,690
CZ	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
DE	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
DK	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
EE	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
EL	18 (15%)	43 (35.8%)	33 (27.5%)	10 (8.3%)	5 (4.2%)	3 (2.5%)	8 (6.7%)	120

Number of genotyped animals (% of sample within country)

Country	NSP1	NSP2	NSP3	NSP3O	NSP4	NSP5	Other/ Unknown	Total
ES	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
FI	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
FR	284 (63.8%)	119 (26.7%)	24 (5.4%)	1 (0.2%)	13 (2.9%)	4 (0.9%)	0 (0%)	445
HR	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
HU	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
IE	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
IT	173 (25.8%)	296 (44.2%)	143 (21.3%)	39 (5.8%)	6 (0.9%)	12 (1.8%)	1 (0.1%)	670
LT	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
LU	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
LV	55 (55.6%)	24 (24.2%)	11 (11.1%)	9 (9.1%)	0 (0%)	0 (0%)	0 (0%)	99
MT	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
NL	757 (67.9%)	240 (21.5%)	32 (2.9%)	30 (2.7%)	19 (1.7%)	9 (0.8%)	28 (2.5%)	1,115
PL	29 (29%)	36 (36%)	16 (16%)	3 (3%)	8 (8%)	8 (8%)	0 (0%)	100
PT	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
RO	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
SE	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
SI	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
SK	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
UK	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
Total EU	54,990 (88.9%)	5,539 (9%)	464 (0.7%)	200 (0.3%)	296 (0.5%)	67 (0.1%)	314 (0.5%)	61,870
CH	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
IS	0 (0%)	0 (0%)	255 (68.9%)	62 (16.8%)	0 (0%)	53 (14.3%)	0 (0%)	370
ME	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
MK	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
NO	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
RS	Not done	Not done	Not done	Not done	Not done	Not done	Not done	0
Total non-EU	0 (0%)	0 (0%)	255 (68.9%)	62 (16.8%)	0 (0%)	53 (14.3%)	0 (0%)	370
Total	54,990 (88.4%)	5,539 (8.9%)	719 (1.2%)	262 (0.4%)	296 (0.5%)	120 (0.2%)	314 (0.5%)	62,240

(a): Data of Cyprus are different from those of other reporting countries since Cyprus systematically genotypes the breeding sheep population.



Data from Cyprus were excluded. NSP1: Resistant (black); NSP2: Semi-resistant (grey); NSP3 (orange) + NSP30 (yellow) + NSP4 (red) + NSP5 (purple): susceptible as referred to in Table 21.

Figure 5: Frequency distribution of the six genotype National Scrapie Plan (NSP) groups in sheep sampled for genotyping in the EU in the period 2010–2019 according to Regulation (EC) 999/2001 Annex III, Chapter A, Part II, point 8 until end of 2017 and Annex VII, in Chapter C, in Part 1, point 8 from 2018

3.3. TSE surveillance in cervids

In 2019, 10,712 cervids were tested for TSE in the EU by 13 MS. Six of them were subject to mandatory surveillance (hereinafter referred to as the MS6) (Section 1.2.4): Estonia, Finland, Latvia, Lithuania, Poland and Sweden increased over 50% the number of cervids tested compared to the previous year from 5,110 to 7,980 (74.5% of the total). The seven MS not subject to mandatory surveillance that contribute to the monitoring were Austria, Hungary, Italy, Romania, Slovenia, Spain and the United Kingdom, reporting 2,732 tested cervids (25.5% of the total). However, Austria, Slovenia and the United Kingdom only reported one, one and two tested cervids, respectively.

Out of the 7,980 tested cervids by the MS6, 5,142 (64.4%) were wild animals, mostly roe deer (2,684), followed by moose (1,502) and red deer (807). Among the 2,838 (35.6%) captive, farmed or semi-domesticated cervids tested by the MS6, 2,565 (90.4%) were semi-domesticated reindeer reported by Sweden and Finland.

During the second year of mandatory surveillance in MS6, three cases of CWD in wild moose were reported by Sweden. The number of cervids tested and positive in 2019 by species, management system and reporting country are displayed in Table 38. The description of the CWD cases in 2019 is shown in Table 41.

In terms of testing at PSU¹¹ level, the number and proportion of PSU for wild/semi-domesticated and farmed/captive cervids declared and tested by the MS6 is shown in Table 39. There is also large variability in the proportion of PSU from which samples have been collected, which is determined by the number of PSU included in the sampling programme. E.g. Estonia sampled 9 (60%) of the 'PSU (wild)' and 1 'PSU (captive/semi-domesticated)' (6.7%). Poland sampled cervids from 100% and 18.8% of the 16 (wild) and 16 (captive/farmed), respectively. Sweden tested cervids from 49 out of the 50 PSU for wild (98%) and 34 of the 160 for farmed and semidomesticated cervids (21.3%). Finland sampled from 42% of the wild PSU and 90.7% of the semi-domesticated PSU. Latvia declared overall 100 PSU but submitted samples from 180 different PSU codes. Lithuania did not submit PSU codes for the tested cervids. Median, minimum and maximum number of cervids tested in the different types of PSU and countries of the MS6 are also displayed in Table 39.

The most common target group tested by the MS6 was the 'Hunted/slaughtered fit for human consumption' (HSHC) that accounted for 4,832 (60.5% of all tested cervids). Within this category,

¹¹ The criteria to identify the Primary Sampling Units (PSU) by each of the MS6 are described in the 2018 EFSA EUSR (EFSA, 2019).

Sweden reported 1,833 semi-domesticated reindeer tested. All the rest were risk animals in the different target groups: road/predator killed (RK): 1,988 (24.9%); fallen/culled (FC): 973 (12.2%); clinical suspect animals (SUS): 60 (0.75%); hunted/slaughtered not fit for human consumption (HSNHC): 127 (1.6%). There is a large variability between MS6 countries in the proportion of cervids tested in the HSHC, ranging from 3% tested by Finland to 93% by Latvia or 85.9% by Sweden. The numbers of tested cervids by reporting country, management system and target group in 2019 are displayed in Table 40.

Among the non-MS6, Romania accounted for 77.7% of all tested cervids (2,124), followed by Italy with 551. The majority of the tested cervids were roe deer (79.9%), followed by red deer (16.2%). All tested cervids by the non-MS6 resulted negative.

Norway continued its intensified testing programme in wild and captive cervids and tested 30,147 animals in 2019, mostly semi-domesticated reindeer (42.9%), followed by wild moose (19.7%) and red deer (19%) mostly from the hunted/slaughtered fit for human consumption target group, leading to the detection of two cases in moose (Table 41). Iceland also reported 114 reindeer tested in 2019, all negative.

Table 38: Number of cervids tested in the reporting countries in 2019 by management system, species and country^(a)

Management system country/species ^{(c),(d)}	Wild deer species ^(b)								Semi-domesticated/farmed deer species ^(b)								Total	
	Eurasian tundra reindeer	Finnish (Eurasian) forest reindeer	Moose	Roe deer	White-tailed deer	Red deer	Fallow deer	Other or unknown	Subtotal	Eurasian tundra reindeer	Finnish (Eurasian) forest reindeer	Roe deer	White-tailed deer	Red deer	Fallow deer	Other or unknown		Sub-total
AT														1			1	1
ES				4		32	9		45									45
HU				5		2	1		8									8
IT				458		62	24		544	1		1		5			7	551
RO				1,015		181	24	2	1,222			701		165	9	27	902	2,124
SI														1			1	1
UK																2	2	2
Subtotal non-MS6	0	0	0	1,482	0	277	58	2	1,819	1	0	702	0	167	14	29	913	2,732
EE			134	298		77			509			1					1	510
FI		14	162	205	130				511		600	3	1				604	1,115
LT			49	704		333			1,086					19			19	1,105
LV			219	508		245			972					104			104	1,076
PL			84	896		150			1,130			1		115			116	1,246
SE			854 (3)	73		2	5		934 (3)	1,965				29			1,994	2,928 (3)
Subtotal MS6	0	14	1,502 (3)	2,684	130	807	5	0	5,142 (3)	1,965	600	5	1	267	0	0	2,838	7,980 (3)
TOTAL EU	0	14	1,502 (3)	4,166	130	1,084	63	2	6,961 (3)	1,966	600	707	1	434	14	29	3,751	10,712 (3)
IS	114								114									114
NO	3,340		5,934 (2)	1,692		5,186		434	16,586 (2)	12,937				560	37	27	13,561	30,147 (2)
TOTAL non-EU	3,454		5,934 (2)	1,692		5,186		434	16,700 (2)	12,937				560	37	27	13,561	30,261 (2)
TOTAL	3,454	14	7,436 (5)	5,858	130	6,270	63	436	23,661 (5)	14,903	600	707	1	994	51	56	17,312	40,973 (5)

(a): Number of positives for chronic wasting disease (CWD) are given in brackets.

(b): Eurasian tundra reindeer (*Rangifer tarandus tarandus*); Finnish (Eurasian) forest reindeer (*Rangifer tarandus fennicus*); Moose (or Eurasian/European elk) (*Alces alces alces*); Roe deer (*Capreolus capreolus*); White-tailed deer (*Odocoileus virginianus*); Red deer (*Cervus elaphus*); Fallow deer (*Dama dama*); Other or Unknown.

(c): Only countries that reported tested cervids are included in the table.

(d): Shaded in grey: MS conducting mandatory surveillance from 2018 (MS6).

Table 39: Number of PSU by management type in the MS6 with mandatory CWD surveillance in 2019

Management system	PSU (WILD)			PSU (CAPTIVE/FARMED DEER)			Total PSU			
	Country	Number PSU declared	Number of PSU tested (%)	Median number of cervids tested (min-max)	Number PSU declared	Number of PSU tested (%)	Median number of cervids tested (min-max)	Number PSU declared	Number of PSU tested (%)	Median number of cervids tested (min-max)
EE		15	9 (60%)	31 (1-135)	15	1 (6.7%)	1 (1-1)	15	9 (60%)	28 (1-135)
FI ^(a)		295	124 (42%)	1 (1-69)	54 ^(b)	49 (90.7%)	10 (1-40)	349	171 (49%)	3 (1-69)
LT		51	Not available		655 ^(c)	Not available		Not available		
LV ^(d)			180	5 (1-22)		3	2 (1-14)	100	180 (180%)	5 (1-22)
PL		16 ^(e)	16 (100%)	65 (6-160)	16	3 (18.8%)	10 (8-98)	16	16 (100%)	63 (1-160)
SE ^(f)		50	49 (98%)	5 (1-424)	160 (109 farmed + 51 semi-domesticated)	34 (21.3%)	10 (1-595)	210	82 (39%)	6 (1-595)

CWD: chronic wasting disease, PSU: primary sampling units.

(a): One wild deer reported with unknown PSU ID excluded.

(b): Semi-domesticated PSU.

(c): Each farm and each facility in which cervids are kept in an enclosed territory shall be considered as a PSU. There are approximately 655 permissions issued by the Ministry of the Environment for keeping wild animals, including cervids, but the active number (with cervids) is unknown.

(d): 87 semi-domesticated/farmed and 46 wild cervids reported with unknown PSU ID excluded.

(e): The PSU are not split by management systems.

(f) :Two semi-domesticated/farmed and five wild cervids reported with unknown PSU ID excluded.

Table 40: Number of tested cervids in the EU and reporting countries by management system, species, country and target group in 2019

Management system country/species ^{(b),(c)}		Wild deer species ^(a)									Semi-domesticated/farmed deer species ^(a)							Total	
		Eurasian tundra reindeer	Finnish (Eurasian) forest reindeer	Moose	Roe deer	White-tailed deer	Red deer	Fallow deer	Other or unknown	Subtotal	Eurasian tundra reindeer	Finnish (Eurasian) forest reindeer	Roe deer	White-tailed deer	Red deer	Fallow deer	Other or unknown		Subtotal
AT	RK													1				1	1
	Total													1				1	1
ES	HSHC				4		32	9		45									45
	Total				4		32	9		45									45
HU	SUS				4		2			6									6
	FC				1			1		2									2
	Total				5		2	1		8									8
IT	SUS				30		5	2		37					1			1	38
	RK				329		35	20		384									384
	FC				99		22	2		123	1		1		4			6	129
	Total				458		62	24		544	1		1		5			7	551
RO	SUS											1						1	1
	RK				7		4			11			4	3				7	18
	FC				77		5	2		84			10	7				17	101
	HSHC				931		172	22	2	1,127			686	155	9	27		877	2,004
	Total				1,015		181	24	2	1,222			701	165	9	27		902	2,124
SI	SUS													1				1	1
	Total													1				1	1
UK	SUS																2	2	2
	Total																2	2	2
Subtotal non-MS6		0	0	0	1,482	0	277	58	2	1,819	1	0	702	0	167	14	29	913	2,732

Management system	country/species ^{(b),(c)}	Wild deer species ^(a)									Semi-domesticated/farmed deer species ^(a)								Total	
		Eurasian tundra reindeer	Finnish (Eurasian) forest reindeer	Moose	Roe deer	White-tailed deer	Red deer	Fallow deer	Other or unknown	Subtotal	Eurasian tundra reindeer	Finnish (Eurasian) forest reindeer	Roe deer	White-tailed deer	Red deer	Fallow deer	Other or unknown	Subtotal		
EE	SUS			3	7		11			21									21	
	RK			3	99		2			104			1						1	105
	FC			12	46		1			59										59
	HSNHC				9					9										9
	HSHC			116	137		63			316										316
	Total				134	298		77			509			1						1
FI	RK		5	72	176	91				344	409	1							410	754
	FC		8	71	27	35				141	120	2							122	263
	HSNHC			5						5	59								59	64
	HSHC		1	14	2	4				21	12		1						13	34
	Total		14	162	205	130				511	600	3	1						604	1,115
LT	RK			12	152		28			192										192
	FC			7	69		15			91				9					9	100
	HSNHC			1	19					20				1					1	21
	HSHC			29	464		290			783				9					9	792
	Total			49	704		333			1086				19					19	1,105
LV	SUS				4		1			5										5
	RK			4	35		9			48										48
	FC			2	13		7			22										22
	HSHC			213	456		228			897				104					104	1,001
	Total			219	508		245			972				104					104	1,076

Management system country/species ^{(b),(c)}		Wild deer species ^(a)									Semi-domesticated/farmed deer species ^(a)							Total	
		Eurasian tundra reindeer	Finnish (Eurasian) forest reindeer	Moose	Roe deer	White-tailed deer	Red deer	Fallow deer	Other or unknown	Subtotal	Eurasian tundra reindeer	Finnish (Eurasian) forest reindeer	Roe deer	White-tailed deer	Red deer	Fallow deer	Other or unknown		Subtotal
PL	SUS				2		1			3								3	
	RK			67	649		69			785								785	
	FC			17	209		8			234		1		34				269	
	HSNHC													16				16	
	HSHC				36		72			108				65				173	
	Total			84	896		150			1130		1		115				116	1,246
SE	SUS			29				2		31								31	
	RK			7	31			1		39	65							104	
	FC			138	39		2	2		181	64			15				260	
	HSNHC			13	1					14	3							17	
	HSHC			667	2					669	1,833			14				2,516	
	Total			854	73		2	5		934	1,965			29				1,994	2,928
Subtotal MS6		0	14	1,502	2,684	130	807	5	0	5,142	1,965	600	5	1	267	0	0	2,838	7,980
Total EU			14	1,502	4,166	130	1,084	63	2	6,961	1,966	600	707	1	434	14	29	3,751	10,712
IS	HSHC	114								114								114	
	Total	114								114								114	
NO	RK	1		414	1,088		266	14		1,783	24					1	25	1,808	
	FC	80		323	400		176	97		1,076	249			27		4	280	1,356	
	HSHC	3,259		5,197	204		4,744	323		13,727	12,664			533	37	22	13,256	26,983	
	Total	3,340		5,934	1,692		5,186	434		16,586	12,937			560	37	27	13,561	30,147	
Total non-EU	3,454		5,934	1,692		5,186	434		16,700	12,937			560	37	27	13,561	30,261		
Total	3,454	14	7,436	5,858	130	6,270	63	436	23,661	14,903	600	707	1	994	51	56	17,312	40,973	

(a): Eurasian tundra reindeer (*Rangifer tarandus tarandus*); Finnish (Eurasian) forest reindeer (*Rangifer tarandus fennicus*); Moose (or Eurasian/European elk) (*Alces alces alces*); Roe deer (*Capreolus capreolus*); White-tailed deer (*Odocoileus virginianus*); Red deer (*Cervus elaphus*); Fallow deer (*Dama dama*); Other or unknown.

(b): Only countries that reported tested cervids are included in the table.

(c): SUS: clinical suspect animals; RK: Road/predator killed; FC: Fallen/culled; HSNHC: Hunted/slaughtered not fit for human consumption; HSHC: Hunted/slaughtered fit for human consumption.

Table 41: Description of the CWD cases in 2019

Country	National case ID	Management system	Species	Sex	Age group	Target group	Part sampled	Result
EU								
SE	6.3.17-13874/2019	Wild	European moose	Female	≥ 12 months	HSHC	Obex Retropharyngeal lymph node	POS NEG
	6.3.17-14115/2019	Wild	European moose	Female	≥ 12 months	FC	Obex Retropharyngeal lymph node	POS NEG
	6.3.17-14116/2019	Wild	European moose	Female	≥ 12 months	SUS	Brain Obex Retropharyngeal lymph node	POS POS NEG
Non-EU								
NO	10	Wild	European moose	Female	≥ 12 months	HSHC	Obex	POS
	6	Wild	European moose	Female	≥ 12 months	HSHC	Obex	POS

3.4. Other species

Three MS, Estonia, Finland and Spain reported results on samples tested for TSE in species other than cattle, domestic sheep and goats, and cervids. In total, 122 samples were collected and tested from the following species: raccoon dog (*Nyctereutes procyonoides*), American mink (*Neovison vison*), fox (genus *Vulpes*) and chamois (*Rupicapra rupicapra*). None of them tested positive (Table 42).

Table 42: Numbers of animals in species other than cattle, sheep, goats and cervids tested for TSE in reporting countries in 2019

Country	Raccoon dog (<i>Nyctereutes procyonoides</i>)	Fox (genus <i>Vulpes</i>)	American mink (<i>Neovison vison</i>)	Chamois (<i>Rupicapra rupicapra</i>)	Total
EE			6		6
ES				2	2
FI	12	42	60		114
Total	12	42	66	2	122

TSE: Transmissible spongiform encephalopathies.

4. Conclusions

As part of the BSE surveillance system in cattle in the EU, over 1.1 million cattle were tested in 2019, 2.7% less than in the previous year. The testing throughput combined with a risk-based strategy (86.4% of all tests were targeting risk animals) contributed to maximise the sensitivity of the BSE surveillance system considering the EU as a single epidemiological unit. Seven atypical cases of BSE (one L-BSE and six H-BSE cases) were confirmed in 2019 by three reporting countries: France (four H-BSE), Spain (two H-BSE) and Poland (one L-BSE). A total 44,557 cattle were tested by four of the six non-MS reporting countries, with no cases reported. In particular, in the two *new* reporting countries, Montenegro only tested cattle in the target group slaughter for human consumption and in Serbia, 85.7% cattle were tested in the same target group.

From an epidemiological point of view, the highlights in the BSE caseload of the reporting year are the number of H-type BSE cases was the largest reported in a single year, equal to that of 2009 (6) (six cases per million tested) and the report by Spain of a H-type case of 5.5 years, the youngest atypical BSE ever reported since the TSE data are collected and published. An additional H-BSE case was reported by Brazil.

A total of 481,627 small ruminants were tested in 2019 in the EU, as part of the TSE surveillance system, leading to an overall testing of about 10 million tests since 2002. Twenty-two MS complied with the EU monitoring requirements in sheep and 23 MS in goats. Compared with 2018, there was a decrease in the detection of the scrapie cases (CS and AS) in non-infected sheep flocks (from 203 to 177) despite the 3% increase in the level of testing in non-infected flocks. This may be consistent with a decrease in the overall incidence of the disease. In the same period, there was a similar decrease in the detection of the scrapie cases (CS and AS) in non-infected goat herds (from 50 to 34), despite the 3.3% increase in the testing in non TSE-infected herds, due to the low number of index cases reported by Cyprus (8). Out of the two new reporting countries, only Serbia tested small ruminants: 165 sheep slaughtered for human consumption without any case detected.

For CS in sheep, compared with 2018, the increase in the testing activity has resulted in an increase in the EU caseload but not in the proportion of cases per 10,000 tested animals or in the number of index cases, which were reduced again in 2019. Overall, the three countries with the largest number of CS cases, namely Greece, Italy and Spain, have reported more CS cases compared to 2018 but similar number of index cases and increased testing in TSE-infected flocks, where most of the CS cases are detected. Romania reported 30% fewer number of cases with the same level of testing than in 2018. From a geographical point of view, the disease is reported by a minority of the MS: seven in 2019, same number as in 2018 although some countries differ. As in 2018, only a very small proportion (1.2%) of the CS caseload is from MS other than Greece, Spain, Italy and Romania.

In goats, in total, 390 scrapie cases in goats were reported in the EU in 2019 by nine MS (two more than in 2018), with a 25.4% reduction (–133) compared with 2018 when 523 cases were reported, mainly due to the improved situation in Cyprus and Spain.

When looking at the long-term trends of CS in terms of cases per 10,000 tests in both species, the situation in 2019 confirmed the 10-year statistically significant decreasing trend in sheep and no detectable trend in goats, respectively, as estimated through modelling of the available epidemiological data. The disadvantage of the control of the disease in goat herds, due to the lack of both breeding for resistance programmes and genetic-based culling and restocking of infected herds, may explain to a certain extent this long-term trend. However, forthcoming amendments in the TSE regulation per Regulation (EU) 772/2020 will allow the management of outbreaks in goat herds with caprine animals carrying at least one of the following alleles: K222, D146 and S146.

For AS in sheep, compared with 2018, the above-described testing activity resulted in a decrease in the caseload and in the proportion of cases per 10,000 tested animals, a decrease in the number of index cases and the number of MS reporting cases, despite the overall increase in testing. The opposite occurred in goats where the increase in the testing activity compared with 2018 resulted in the increase of the AS caseload, in the proportion of cases per 10,000 tested animals and in the number of index cases. These changes could be due to the annual variability.

With regard to the long-term trends of AS, there was also a 10-year statistically significant decreasing trend in sheep and no detectable trend in goats.

The genotyping data collected in 2019 from ovine CS cases consistently confirm the association between the occurrence of the disease and the susceptible genotypes (NSP3, NSP30, NSP4 or NSP5), with 98.7% of the cases with known genotypes carrying them. The 2019 genotyping data from random samples of the EU sheep population (after excluding Cyprus) did show an improvement compared with the previous years with an average 15.7% of the genotyped sheep carrying genotypes of the susceptible group, from 19.2% in 2018. Some caution is needed in interpreting this result as it could reflect the implementation of the amendment of the TSE Regulation with the subsequent reduction in the number of contributing MS. A CS case in a sheep holding the ARR/ARR genotype (NSP1) was reported by Spain.

The enforcement of the 3-year surveillance programme for CWD in six MS – Estonia, Finland, Latvia, Lithuania, Poland and Sweden – resulted in 2019 in an increase of over 50% the number of cervids tested compared to the previous year: from 5,110 to the testing of 7,980 cervids and the confirmation of three cases of CWD by Sweden.

The surveillance was complemented by the additional 2,732 cervids tested by other six MS (77.7% of them tested by Romania) with no additional cases detected. The implementation of the mandatory surveillance in the six MS is quite heterogeneous in terms of the design (number and characteristics of the declared PSU), the number of cervids tested in general and per PSU in particular and the distribution of testing by species and target groups. The targeting of mostly hunted/slaughtered fit for human consumption (HSHC) animals observed in the first year of implementation was further increased in 2019 up to 60.5% of all tested cervids, consolidating a situation in which the sensitivity of the surveillance system is lower than expected, following the proposed surveillance system by EFSA in 2017 (EFSA BIOHAZ Panel, 2017b). No conclusions can be drawn about the presence of the disease in other MS and about the prevalence in the affected MS.

Norway continued its intensified testing programme in wild and captive cervids and tested 30,147 cervids in 2019, leading to the detection of two moose cases. At the end of the reporting year and since 2016, Norway had confirmed in total 19 cases in reindeer, 6 in moose and 1 in red deer. Iceland also reported 114 tested cervids in 2019, all negative.

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Abbreviations

AM	<i>Ante-mortem</i>
AS	Atypical scrapie
BARB	Born After the Revised feed Ban
BSE	Bovine spongiform encephalopathy
C-BSE	Classical bovine spongiform encephalopathy
CS	Classical scrapie
DCF	Data Collection Framework
DWH	Data Warehouse
EFTA	European Free Trade Association
EM	Eradication measures
ES	Emergency slaughtered
EUSR	European Union summary report
FS	Fallen stock
H-BSE	H-type bovine spongiform encephalopathy
HS	Healthy slaughtered
HSHC	Hunted/slaughtered fit for human consumption
HSNHC	Hunted/slaughtered not fit for human consumption
L-BSE	L-type bovine spongiform encephalopathy
MS	Member State/s
MS6	Estonia, Finland, Latvia, Lithuania, Poland and Sweden
NSHC	Not slaughtered for human consumption
NSP	National Scrapie Plan
PSU	Primary sampling units
RK	Road/predator killed
RR	Relative risk
SHC	Slaughtered for human consumption
SU	clinical suspect
SUS	clinical suspect (cervids)
TSE	Transmissible spongiform encephalopathies
WB	Western blot

Country codes

Austria	AT	France	FR	Luxembourg	LU	Serbia	RS
Belgium	BE	Germany	DE	Malta	MT	Slovakia	SK
Bulgaria	BG	Greece	EL	Montenegro	ME	Slovenia	SI
Croatia	HR	Hungary	HU	The Netherlands	NL	Spain	ES
Cyprus	CY	Iceland	IS	North Macedonia	MK	Sweden	SE
Czechia	CZ	Ireland	IE	Norway	NO	Switzerland	CH
Denmark	DK	Italy	IT	Poland	PL	The United Kingdom	UK
Estonia	EE	Latvia	LV	Portugal	PT		
Finland	FI	Lithuania	LT	Romania	RO		

MS countries: AT; BE; BG; HR; CY; CZ; DK; EE; FI; FR; DE; EL; HU; IE; IT; LV; LT; LU; MT; NL; PL; PT; RO; SK; SI; ES; SE; UK.

Non-MS countries: CH (including Lichtenstein); IS; ME; MK; NO; RS.

Appendix A – Additional surveillance data

Table A.1: BSE active monitoring in relation to the adult bovine population (age > 2 years) in 2019

EU/non-EU groups ^(a)	Country code	Adult cattle (> 2 years) ^(a)	Number of tested bovine animals at risk ^(b)	Proportion (%) of tested bovine animals at risk ^(b)
EU	AT	847,770	19,014	2.2%
	BE	1,187,580	26,123	2.2%
	BG	369,000	2,988	0.8%
	CY	37,910	1,739	4.6%
	CZ	657,250	24,348	3.7%
	DE	5,402,850	173,136	3.2%
	DK	698,000	24,577	3.5%
	EE	133,200	3,762	2.8%
	EL	283,000	1,307	0.5%
	ES	3,214,460	61,181	1.9%
	FI	348,810	11,286	3.2%
	FR	9,883,010	207,259	2.1%
	HR	162,000	5,014	3.1%
	HU	458,000	11,084	2.4%
	IE	2,855,890	56,853	2.0%
	IT	3,029,900	53,785	1.8%
	LT	336,200	2,875	0.9%
	LU	101,170	2,593	2.6%
	LV	222,430	3,368	1.5%
	MT	6,880	292	4.2%
	NL	1,752,000	52,001	3.0%
	PL	2,757,500	60,159	2.2%
	PT	903,460	16,910	1.9%
	RO	1,299,200	8,847	0.7%
	SE	612,710	8,405	1.4%
	SI	196,520	6,309	3.2%
	SK	226,680	9,716	4.3%
UK	4,264,000	138,401	3.2%	
	Total EU	42,247,380	993,332	2.4%
Non-EU	CH	787,310	11,175	1.4%
	IS	38,500	12	0.0%
	ME	64,500	0	0.0%
	MK	141,000	0	0.0%
	NO	353,700	6,884	1.9%
	RS	492,000	2,836	0.6%
		Total non-EU	1,877,010	20,907
TOTAL		44,124,390	1,014,239	2.3%

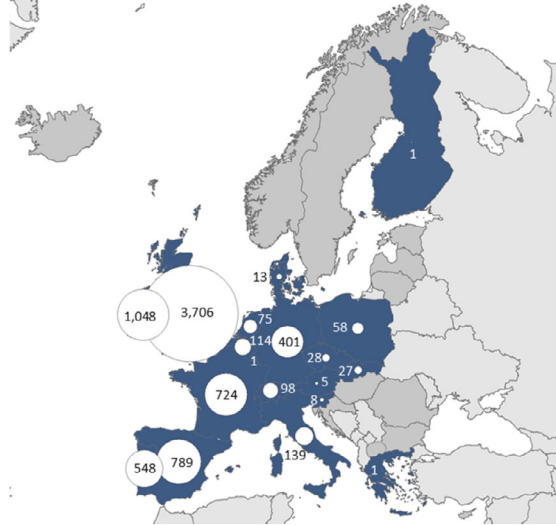
(a): Taken from https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=apro_mt_lscat&lang=en [Bovine animals, 2 years or over].

Norway's cattle population taken from the TSE EUSR report 2018 (EFSA, 2019).

(b): At risk animals is the sum of animals with clinical signs at *ante-mortem*, emergency slaughtered and fallen stock.

Appendix B – Geographical distribution of BSE in the period 2001–2019

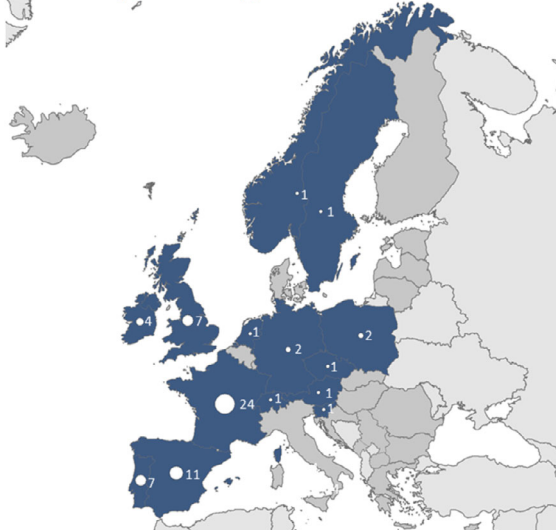
A Total classical cases



B Total classical BARB cases



C Total atypical H-type cases



D Total atypical L-type cases

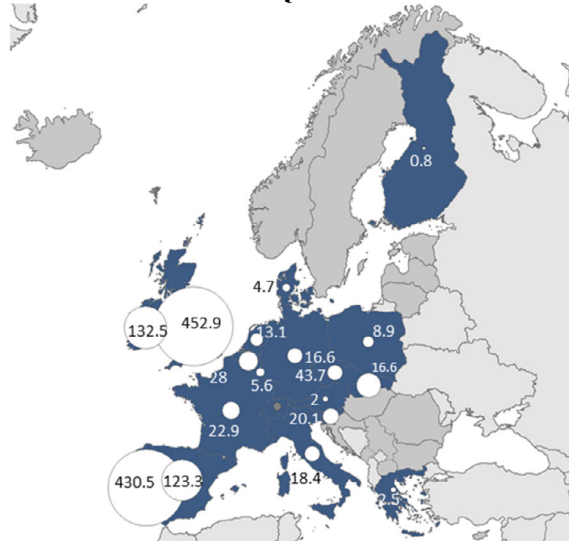


■ Reporting countries with cases ■ Reporting countries without cases ■ Other countries

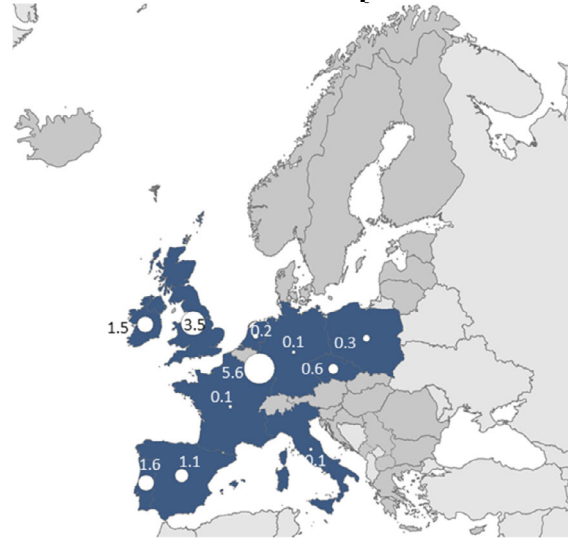
The size of the circles is proportional to the measurements and are only comparable within the map but not between maps.

Figure B.1: Geographical distribution of cumulative number of cases of C-BSE (A); BARB cases (B); H-BSE (C); and L-BSE (D) in the period 2001–2019

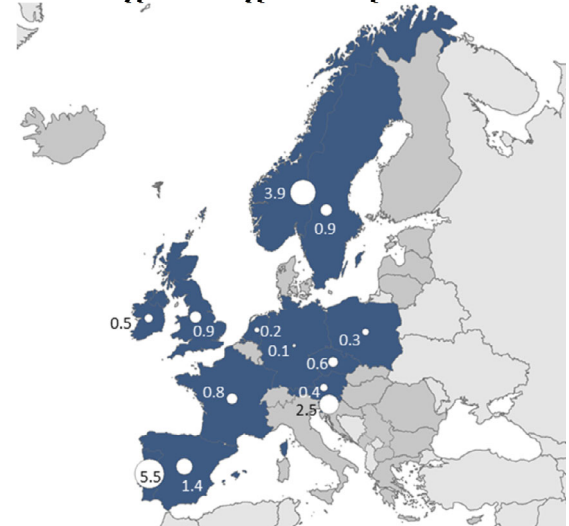
A Total classical cases per million tests



B Total classical BARB cases per million tests



C Total atypical H-type cases per million tests



D Total atypical L-type cases per million tests



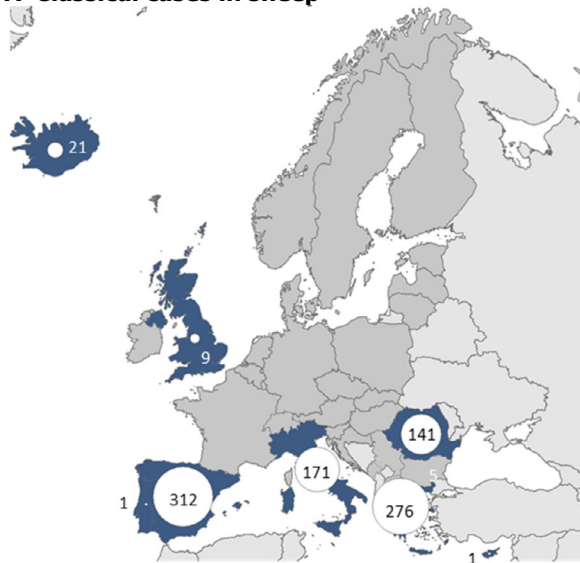
Reporting countries with cases Reporting countries without cases Other countries

The size of the circles is proportional to the measurements and are only comparable within the map but not between maps.

Figure B.2: Country-specific BSE cases per million tests by case type in the period 2001–2019 in the EU

Appendix C – Geographical distribution of scrapie in 2019

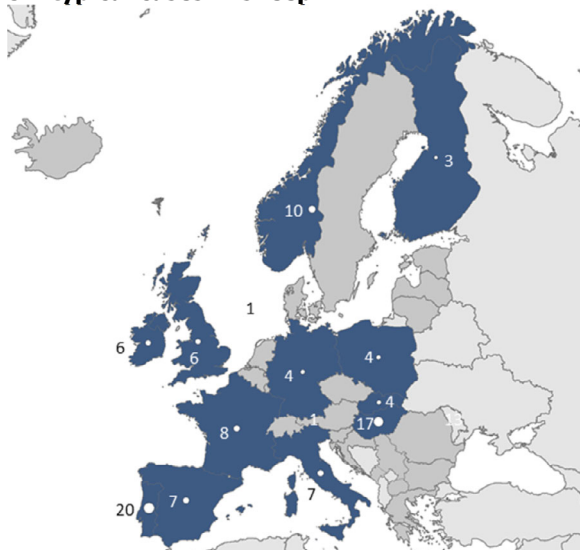
A Classical cases in sheep



B Classical cases in goats



C Atypical cases in sheep



D Atypical cases in goats

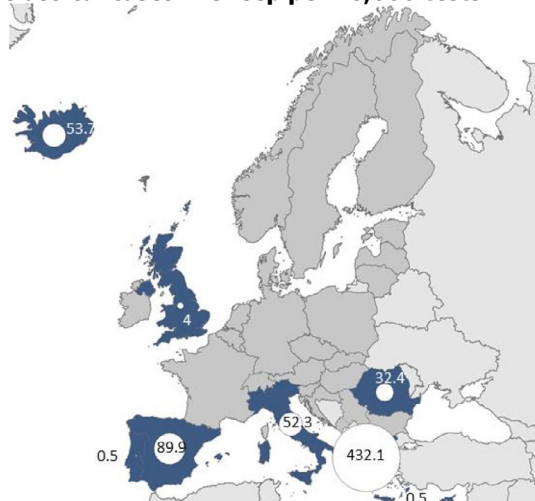


Reporting countries with cases
 Reporting countries without cases
 Other countries

The size of the circles is proportional to the measurements and are only comparable within the map but not between maps.

Figure C.1: Geographical distribution of numbers of cases of ovine CS (A); caprine CS (B); ovine AS (C); and caprine AS (D) in 2019 in the reporting countries

A Classical cases in sheep per 10,000 tests



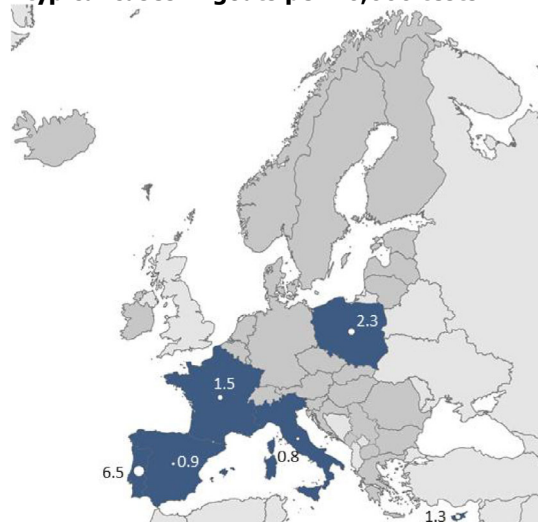
B Classical cases in goats per 10,000 tests



C Atypical cases in sheep per 10,000 tests



D Atypical cases in goats per 10,000 tests



■ Reporting countries with cases ■ Reporting countries without cases ■ Other countries

The size of the circles is proportional to the measurements and are only comparable within the map but not between maps.

Figure C.2: Geographical distribution of proportion of cases per 10,000 tests of ovine CS (A); caprine CS (B); ovine AS (C); and caprine AS (D) in 2019

Appendix D – Additional information asked by EFSA in relation to reporting, according to Annex III of Regulation 999/2001

Table D.1: The number of suspected cases placed under official movement restrictions in accordance with Article 12(1), in 2019

Country	Cattle	Sheep	Goats
AT	21	0	0
BE	142	0	0
BG	0	0	0
CY	0	7,124	17,410
CZ	2	0	0
DE	0	0	0
DK	1	0	1
EE	0	0	0
EL	790	4,420	690
ES	0	967	0
FI	0	0	0
FR	2	3	0
HR	0	0	0
HU	12	0	0
IE	1,235	0	0
IT	0	34	17
LV	1	2	1
LU	0	0	0
LT	0	0	0
MT	0	0	0
NL	0	0	0
PL	22	2	0
PT	6	0	0
RO	5,177	8,969	9
SI	0	0	0
SE	0	0	0
SK	0	0	0
UK	0	1	0
Total EU	7,409	21,519	18,128
CH	0	0	0
IS	0	0	0
ME	0	/	/
MK	0	0	0
NO	0	0	0
RS	30	/	/
Total non-EU	30	0	0
Total	7,439	21,519	18,128

Table D.2: Number of flocks where suspected cases in ovine and caprine animals have been reported and investigated pursuant to Article 12(1) and (2), in 2019

Country	Sheep	Goats
AT	0	0
BE	0	0
BG	0	0
CY ^(a)	28	28
CZ	0	0
DE	4	4
DK	1	1
EE	0	0
EL	4	4
ES	0	0
FI	0	0
FR	0	0
HR	0	0
HU	0	0
IE	0	0
IT	6	6
LV	1	1
LU	0	0
LT	0	0
MT	0	0
NL	0	0
PL	0	0
PT	0	0
RO	1	1
SI	0	0
SE	0	0
SK	0	0
UK	0	0
Total EU	45	45
CH	0	0
IS	0	0
ME	/	/
MK	0	0
NO	1	1
RS	/	/
Total non-EU	1	1
Total	46	46

(a): In addition, 6 mixed flocks (sheep and goats).

Table D.3: Number of ovine and caprine flocks tested within each subpopulation referred to in Chapter A, Part II, points 2, 3, 5 and 6 together with the method for sample selection and the results of the rapid and confirmatory tests in 2019

Country	Sheep SHC	Sheep NSHC	Sheep EM	Goats SHC	Goats NSHC	Goats EM	Other ^(a)
AT	110	1,814	2	22	590	0	0
BE	0	*	0	0	*	0	0
BG	N/a	N/a	N/a	N/a	N/a	N/a	
CY ^(b)	29	118	686	1	241	329	6
CZ	0	908	0	1	239	0	No
DE	4,377	4,793	2	161	698	0	1,135
DK							0
EE	0	70	0	0	5	0	0
EL	34	62	36	19	27	15	Non applicable
ES	963	4,996	80	751	2,092	23	
FI	3	464	0	0	43	0	Mink 60, fox 42, raccoon dog 12 ^(c)
FR	5529	20,355	0	4,240	18,678	0	0
HR	0	792	0	0	219	0	0
HU	1,521	1,140	0	47	59	1	0
IE	5,257	6,959	0	0	127	0	
IT	4,306	5,847	52	4,479	3,944	32	
LV	0	91	0	0	18	0	0
LU	0	Not available	0	0	Not available	0	0
LT	0	N/A	0	0	13	0	
MT	75	167	0	60	100	0	0
NL	0	1,520	0	0	1,528	0	0
PL	1,464	2,482	0	140	1,138	0	
PT	1,024	5,899	53	1	814	4	0
RO	12,267	9,684	22	5,495	3,798	0	0
SI	68	1,224	0	17	353	0	0
SE	5	699	0	0	48	0	0
SK	6	507	0	1	58	0	0
UK	> 4	> 5,470	1	0	> 167	1	0
CH	0	0	0	0	0	0	0
IS	283	30	1	5	0	0	0
ME	/	/	/	/	/	/	/
MK	240	0	0	3	0	0	0
NO	3,454	4,256	12	14	69	0	No other animals
RS	9	/	/	/	/	/	/

SHC: slaughtered for human consumption, NSHC: not slaughtered for human consumption; EM: emergency slaughter. n/a: Not available.

*: The Belgian competent authority informed that in the central database for sheep and goat identification, there is no direct link between the official eartag number and the last holding where the sheep or goat was kept. Only the herd of birth is registered in the central database. For this reason, it is impossible to answer question 3. At the rendering plant sheep and goats are randomly sampled during the year.

(a): Monitoring in other animals (= for dairy production, OR from countries with indigenous TSE, OR animals that have consumed potentially contaminated feeding stuffs, OR animals born or derived from TSE infected dams).

(b): In addition, 6 mixed flocks (sheep and goats).

(c): Included in Table 41.

Appendix E – Country Data sets

All country data sets containing the tables on the occurrence of TSE per country are available on the EFSA Knowledge Junction community on ZENODO – please see below the list and corresponding link to the data sets. The countries that submitted data sets on the 2019 monitoring data year are: the 28 EU Member States and 6 non-EU Member.

Table E.1: Links to the TSE data sets for 2019 by reporting country

Country	Link to the data set
EU Member States	
AT	https://doi.org/10.5281/zenodo.4091586
BE	https://doi.org/10.5281/zenodo.4091592
BG	https://doi.org/10.5281/zenodo.4091603
CY	https://doi.org/10.5281/zenodo.4091605
CZ	https://doi.org/10.5281/zenodo.4091617
DE	https://doi.org/10.5281/zenodo.4091622
DK	https://doi.org/10.5281/zenodo.4091628
EE	https://doi.org/10.5281/zenodo.4091636
EL	https://doi.org/10.5281/zenodo.4091642
ES	https://doi.org/10.5281/zenodo.4091644
FI	https://doi.org/10.5281/zenodo.4091648
FR	https://doi.org/10.5281/zenodo.4091650
HR	https://doi.org/10.5281/zenodo.4091654
HU	https://doi.org/10.5281/zenodo.4091656
IE	https://doi.org/10.5281/zenodo.4091660
IT	https://doi.org/10.5281/zenodo.4091664
LV	https://doi.org/10.5281/zenodo.4091666
LU	https://doi.org/10.5281/zenodo.4091672
LT	https://doi.org/10.5281/zenodo.4091674
MT	https://doi.org/10.5281/zenodo.4091679
NL	https://doi.org/10.5281/zenodo.4091685
PL	https://doi.org/10.5281/zenodo.4091687
PT	https://doi.org/10.5281/zenodo.4091689
RO	https://doi.org/10.5281/zenodo.4091692
SI	https://doi.org/10.5281/zenodo.4091694
SE	https://doi.org/10.5281/zenodo.4091704
SK	https://doi.org/10.5281/zenodo.4091710
UK	https://doi.org/10.5281/zenodo.4091712
Non-EU Member States	
CH	https://doi.org/10.5281/zenodo.4091717
IS	https://doi.org/10.5281/zenodo.4091720
ME	https://doi.org/10.5281/zenodo.4091724
MK	https://doi.org/10.5281/zenodo.4091726
NO	https://doi.org/10.5281/zenodo.4091728
RS	https://doi.org/10.5281/zenodo.4091730