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The European Union summary report on surveillance for the presence of transmissible spongiform encephalopathies (TSE) in 2020

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 2020 by 27 Member States (MS, EU27), the United Kingdom (UK) and other seven non-EU countries: Bosnia and Herzegovina, Iceland, Montenegro, North Macedonia, Norway, Serbia and Switzerland. In total, 1,122,671 cattle were tested by EU27 and the UK (−2.4%, compared with 2019), and 51,775 cattle by the other seven non-EU, with three cases of H-BSE in France, Ireland and Spain, and two L-BSE in France and Switzerland. In total, 332,579 sheep and 120,615 goats were tested in the EU27 and the UK (−1.6% and −16%, respectively). In sheep, 688 cases of scrapie were reported by 16 MS and the UK: 589 classical scrapie (CS) by seven MS [81 index cases (IC), one of ARR/ARR genotype and 97% with genotypes of susceptible groups], 98 atypical scrapie (AS) (88 IC) by 14 MS and the UK, and one CH1641-like. In addition, Italy reported 12 inconclusive cases. In total, 26,053 sheep and 712 goats were tested in the other non-EU countries with 53 CS in Iceland and 12 AS in Norway. Random genotyping was reported by nine MS: with Cyprus excluded, 8.8% carried the genotypes of susceptible groups. In goats, 328 cases of scrapie were reported: 319 CS (52 IC) by six MS and the UK, and nine AS (9 IC) by five MS. The last of the 3-year surveillance programme for chronic wasting disease (CWD) in Estonia, Finland, Latvia, Lithuania, Poland and Sweden resulted in 6,974 tested cervids and two CWD cases in wild moose, in Finland and Sweden. Other six MS and the UK tested 2,197 cervids, all negative. Norway tested 22,528 cervids of which one wild moose and one wild reindeer were positive. In total, 101 animals from three other species tested negative in Finland.

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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 2020 in the European Union (EU), in the United Kingdom (UK) and in other seven non-Member States (MS), i.e. Bosnia and Herzegovina, Iceland, Montenegro, North Macedonia, Norway, Serbia and Switzerland, as well as genotyping data in sheep. With regard to the withdrawal of the UK from the EU, on 29 October 2019 (European Council Decision (EU) 2019/1810), the European Council agreed to an extension of Art. 50 of the Treaty on European Union (2012/C 326/01) until 31 January 2020. On this basis, the UK remained a Member State (MS) with all rights and obligations until 31 January 2020 (included) and became a non-member country on 1 February 2020.

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 and 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 by the EFSA TSE data collection tool. The electronically submitted data were extracted from the EFSA database and further processed and validated to summarise the information and to draft the summary tables presented in the current EU summary report (EUSR).

To allow direct comparisons of 2020 data with those of the previous year at EU level and to obtain comparable trend data, in this report, the 2020 EU27 data (i.e. data from the current 27 European Union MS, referred to in the report as 'EU27') have been summed up with those provided by the UK. However, all tables have been amended by presenting separately the EU27 totals and those including EU27 data plus the UK data. Totals obtained from the three European Free Trade Association (EFTA) countries (Iceland, Norway and Switzerland) and the four non-EFTA IPA (Instrument for Pre-Accession Countries) (Bosnia and Herzegovina, Montenegro, North Macedonia and Serbia) were referred as to other non-EU reporting countries (shortened in the text 'other non-EU').

In total, 1,122,671 cattle were tested in 2020 in the EU27 and the UK, a 2.4% reduction compared with the previous year. Over 88.5% of all cattle tested in the EU27 and the UK 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 FS being the largest contributor with 924,698 cattle tested in 2020 (93.1% of all cattle in the risk group). Additional 51,775 cattle were tested by the other seven non-EU. Serbia (the main contributor with 13,978 cattle tested) and Bosnia and Herzegovina reported mostly cattle from the healthy slaughtered (HS) target group (12,848).

In the EU, four atypical cases of BSE were confirmed in 2020 by France (one H-BSE and one L-BSE), Ireland (one H-BSE) and Spain (one H-BSE), all born between 2003 and 2008 and detected in the FS testing group. In addition, one L-BSE case, submitted to the ES testing group, was reported by Switzerland.

In total, 453,194 small ruminants were tested in 2020 in the EU27 and the UK: 332,579 sheep (a 1.6% decrease from 2019) and 120,615 goats (a 16% decrease). In addition, 26,053 sheep were tested by four of the seven other non-EU, namely Iceland, North Macedonia, Norway and Serbia, and 712 goats by three, namely, Iceland, North Macedonia and Norway.

In sheep, 688 scrapie cases were reported in the EU27 and the UK in 2020, 309 less cases than in 2019. In total, 65 cases of scrapie in sheep were reported by two (Iceland and Norway) of the four other non-EU that tested sheep. Classical scrapie (CS) was reported by seven MS and one other non-EU, namely Bulgaria, Cyprus, Greece, Italy, Portugal, Romania, Spain and Iceland; whereas atypical scrapie (AS) was reported by 14 MS, namely Belgium, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Poland, Portugal, Romania, Slovakia, Spain, Sweden; plus the United Kingdom and other non-EU (Norway). An additional total of 12 cases in sheep were reported as inconclusive by Italy, which are not included in the total scrapie caseload for this country. Most of the ovine cases in the EU27 and the UK (97.4%) were reported by four countries: Greece, Italy, Romania and Spain, as it was the case in previous years.

In total, 589 ovine cases in the EU27 and the UK were CS (85.7%), 98 were AS (14.3%) and Italy reported one CH1641-like case. Among the other non-EU, 53 CS cases were reported by Iceland and 12 AS cases by Norway. In sheep, 24.6% (169) of all cases in the EU27 and the UK reported in 2020 were index cases (IC), with a much higher proportion in AS cases (89.8%) compared with CS cases (13.8%). In total, 97% of the CS cases in sheep reported in 2020 with known National Scrapie Plan

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

In goats, in total, 328 scrapie cases were reported in the EU27 and the UK: nine were AS cases and 319 CS (97.3 with Cyprus accounting for 74% of these). Compared with 2019, when 379 CS cases were reported, there was a 15.8% reduction (–60) mainly due to the situation in Cyprus that has improved continuously over the last 7 years. Four MS (Bulgaria, Cyprus, Romania, Greece) and the UK reported CS, whereas three MS (Denmark, France, and Portugal) reported AS. Italy and Spain reported both CS and AS. The three other non-EU (Iceland, Serbia and Norway) that reported tested goats did not report any scrapie cases.

In goats, 18.6% of all cases reported in the EU27 and the UK in 2020 were IC, higher than in 2019 (8.7%), with a higher proportion in AS (100%) than in CS (16.3%).

CS is still the most frequently reported type of scrapie in the EU in both species.

With regard to the long-term trends (cases per 10,000 tests), the situation in 2020 confirmed the 10-year statistically significant decrease in sheep (5% annually for both CS and AS) and no detectable trends in goats for either CS or AS.

In 2020, the genotyping activity from random samples of the national EU sheep populations was carried out by nine MS: Belgium, Cyprus (where genotyping is conducted systematically in the breeding sheep population), France, Germany, Greece, Italy, Latvia, the Netherlands and Poland. After excluding Cyprus, 8.8% of the randomly genotyped sheep still carried genotypes of the susceptible groups, lower than the 15.7% in 2019. The percentage of susceptible sheep stands at 44.4% in Greece and 27.3% in Italy, two of the countries with the highest case load in 2020, whereas it was between 12% and 30% in the remaining six MS.

The enforcement of a 3-year surveillance programme for CWD in six MS – Estonia, Finland, Latvia, Lithuania, Poland and Sweden – resulted in 2020 in the testing of 6,974 cervids and the confirmation of two cases of CWD in wild moose, one in Finland and one in 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. In 2020, the hunted/slaughtered fit for human consumption (HSHC) animals was the most tested target group with 56.8% of all tested cervids, as observed in the first 2 years of implementation, consolidating a situation in which the sensitivity of the surveillance system to detect cases of CWD was lower than expected. The other six MS – Austria, Belgium, Hungary, Italy, Romania and Spain – and the UK – tested 2,197 cervids, all with negative results and with Romania accounting for 68.9% of all cervids tested by them. In 2020, Norway continued its intensified testing programme in wild and captive cervids and tested 22,528 animals, mostly semi-domesticated reindeer (28.9%), followed by wild moose (27.5%) leading to the detection of two cases (one wild reindeer and one wild moose). Additionally, Iceland and Serbia reported testing of 33 and 76 cervids, respectively, which were all negative.

In total, a total of 101 animals of other species were TSE tested by Finland: 15 raccoon dogs (*Nyctereutes procyonoides*), 51 American minks (*Neovison vison*) and 35 foxes (genus *Vulpes*). 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) 999/2001¹ (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.

¹ 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) 2017/1972², – 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.’³

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.

Commission Decision 2009/719/EC⁴ allowed MS to apply a revised BSE monitoring programme. Commission Implementing Decision 2013/76/EU⁵ of 4 February 2013, amending Commission Decision 2009/719/EC, authorised 25 MS to decide to stop testing slaughtered bovine animals for human consumption. Following the EFSA scientific report on the valuation of the revision of the BSE monitoring regime in Croatia (EFSA, 2016) and the Commission Implementing Decision (EU) 2016/851⁶, Croatia was allowed to discontinue the testing of slaughtered bovine animals for human consumption, that is still required for Bulgaria and Romania.

With regard to the withdrawal of the United Kingdom (UK) from the EU, on 29 October 2019 (European Council Decision (EU) 2019/1810⁷), the European Council agreed to an extension of Art. 50 of the Treaty on European Union (2012/C 326/01) until 31 January 2020. On this basis, the UK remained an MS with all rights and obligations until 31 January 2020 (included) and became a third country on 1 February 2020. A transition period was agreed as part of the Agreement of the withdrawal and ended on 31 December 2020.

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 36/2005⁸] also provides for mandatory discriminatory testing for BSE of TSE cases detected in small ruminants.

There were two amendments of the TSE Regulation in 2020 affecting TSE surveillance:

Commission Regulation (EU) 2020/772 of 11 June 2020 amended Annexes I, VII and VIII to Regulation (EC) No 999/2001 regarding the eradication measures for transmissible spongiform encephalopathies in goats and endangered breeds: The amendment allows the exemption of caprine animals carrying K222, D146 and S146 from cull and complete destruction as they confer genetic resistance against CS.

² 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.

³ Since 2018, TSE data are submitted by reporting countries directly to the European Food Safety Authority (EFSA) with different frequency and periodicity.

⁴ Commission Decision 2009/719/EC of 28 September 2009 authorising certain Member States to revise their annual BSE monitoring programmes. OJ L 256, 29.9.2009, p. 35–37.

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 Implementing Decision (EU) 2016/851 of 26 May 2016 amending the Annex to Decision 2009/719/EC as regards the authorisation for Croatia to revise its BSE annual monitoring programme. OJ L 141, 28.5.2016, p. 131–132.

⁷ European Council Decision (EU) 2019/1810 taken in agreement with the United Kingdom of 29 October 2019 extending the period under Article 50(3) TEU XT/20024/2019/REV/2. OJ L 278I, 30.10.2019, p. 1–3.

⁸ Commission Regulation (EC) No 36/2005 of 12 January 2005 amending Annexes III and X to Regulation (EC) No 999/2001 of the European Parliament and of the Council as regards epidemio-surveillance for transmissible spongiform encephalopathies in bovine, ovine and caprine animals. OJ L 10, 13.1.2005, p. 9–17.

Commission Regulation (EU) 2020/1593 of 29 October 2020 on the further examination of positive cases of transmissible spongiform encephalopathies in ovine and caprine animals.⁹ Based on the low probability of BSE occurrence, for case of positive TSE cases in ovine and caprine animals, the new provision requires the discriminatory testing conducted only to the 'index case', amending point 3.2 of Chapter C of Annex X to Regulation (EC) No 999/2001. For previous amendments, see 2019 EFSA EUSR (EFSA, 2020).

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 animals (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 in EU, applied in 2020, are summarised in Table 1. A table summarising the evolution of the changes (age limits for different target groups) was published in the 2015 EUSR on TSE (EFSA, 2016).

However, there are still some differences in the application of these general rules due to specific national rules that provide some residual testing of HS or the testing of at-risk animals (AM, ES and FS) at younger age. The age limits (in months) of bovine animals tested for BSE surveillance applied in 2020 by Member State (MS), UK or the other non-EU (Bosnia and Herzegovina, 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 2020 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	EU25 + UK	Romania, Bulgaria ^(a)
Emergency slaughtered animals (ES)	> 48 months	> 24 months
Animals with clinical signs at <i>ante-mortem</i> (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 2020 because Bulgaria and Romania were not in the list of the 25 Member States and UK authorised to revise their BSE annual surveillance programmes.

Table 2: Age limits (in months) of bovine animals tested for BSE surveillance applied in 2020 by reporting country and surveillance target group

Country	Surveillance target group					
	ES	AM	FS	HS	SU	EM
AT	> 24	> 24	> 48 ^(a)	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

⁹ Commission Regulation (EU) 2020/1593 of 29 October 2020 amending Annex X to Regulation (EC) No 999/2001 of the European Parliament and of the Council as regards further examination of positive cases of transmissible spongiform encephalopathies in ovine and caprine animals. OJ L 360, 30.10.2020, p. 13–15.

Country	Surveillance target group					
	ES	AM	FS	HS	SU	EM
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 1/1/2002	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	> 48	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
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
BA						
CH	> 48	> 48	> 48	> 48	No age limit	> 48
IS	> 48	> 48	> 48	No testing	No age limit	No age limit
ME	> 24	> 24	> 24	> 30	No age limit	No age limit
MK	> 24	> 24	> 24	> 30	No age limit	No age limit
NO	> 48	> 48	> 48	No testing	No age limit	No age limit
RS	> 24 > 24 > 24 > 30 No age limit No age limit	> 24 > 24 > 30 No age limit No age limit	> 24 > 24 > 30 No age limit No age limit	> 72	No age limit	No age limit

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 countries not listed in Commission Decision 2009/719/EC, the age limit is > 24 months.

The eight non-EU (UK from 1 February 2020) are included in the table for information. The TSE regulation does not apply to the eight non-EU except UK (until 31 January 2020), in accordance with the Agreement on the Withdrawal of the UK from the EU, and in particular with the established transition period, the EU requirements on data sampling also applied to the UK (2019/C 384 I/01).

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 TSE¹⁰ 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).

¹⁰ 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.

Target surveillance groups in small ruminants to be reported for surveillance for TSE in 2020 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 out in Tables A and B of Annex III, Chapter A, Section II, point 3 and point 2(a) and (b), 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 the 2018 EUSR on TSE (EFSA, 2019), the Regulation (EC) 894/2017 amended in 2017 the TSE Regulation with regard to representative genotyping activities in the ovine populations. The changes in the TSE regulation no longer require genotyping 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 MS based on compliance with a set of criteria.

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 and 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 and 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 and 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 and 2	SU
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 and 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 be applied both to sheep and goats (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 2020

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	40–100	0	100% up to 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	40–100	0	100% up to 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	0	100% up to 100
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	40–100	0	100% up to 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
BA	> 750			40–250		
CH	–			–		
IS	100–750			< 40		
ME	100–750			< 40		
MK	100–750			40–250		
NO	>750			40–250		
RS	> 750	1,000 ^(b)	1,000 ^(b)	40–250	1,000 ^(c)	1,000 ^(c)

NSHC: animals not slaughtered for human consumption; SHC: animals slaughtered for human consumption; TSE: transmissible spongiform encephalopathy. (–): No active surveillance system (in CH only suspect animals are tested).

The eight non-EU reporting countries (UK from 1 February 2020) are included in the table for information. The TSE regulation does not apply to the eight non-EU except UK (until 31 January 2020), in accordance with the Agreement on the Withdrawal of the UK from the EU, and in particular with the established transition period, the EU requirements on data sampling also applied to the UK (2019/C 384 I/01).

(a): Thousand heads.

(b), (c): The 1,000 animals targeted are split between SHC and NSHC. Live sheep population in 2020 (or latest available) extracted from: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=apro_mt_lssheep&lang=en Live goat population in 2020 (or latest available) extracted from: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=apro_mt_lsgoat&lang=en

1.2.4. TSE surveillance in cervids and other species

By Commission Regulation (EU) 2017/1972¹¹ 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 MS that have a wild and/or farmed and/or semi-domesticated population of moose and/or reindeer (Estonia, Finland, Latvia, Lithuania, Poland and Sweden) had to carry out a 3-year monitoring programme for CWD in cervids, from 1 January 2018 to 31 December 2020. The 3-year monitoring programme for CWD in cervids is described in detail in Annex III, Chapter A, Part III of the TSE Regulation. Other MS and non-EU reporting countries 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-EU. 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. Six reporting countries (CZ, ES, FI, FR, IT and SE) transmitted data directly as eXtensible Markup Language (XML) files in 2020 by using their own system for the XML file generation and the upload of data into the DCF, whereas the rest of the reporting countries transmitted XML files to the DCF by 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 draft the summary tables presented in the current EUSR. The validation dashboard, available to all reporting countries to visualise the data since 2018, has been updated for 2020 data visualisation.

Finally, information on the population of small ruminants in 2020 as presented in Table 4 were obtained from the 2020 or latest available Eurostat annual data (<https://ec.europa.eu/eurostat/data/database>). The number of BSE cases worldwide (Table 12) 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 OIE-WAHIS (<https://wahis.oie.int/#/home>). 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.

The data in this report refer only to the samples collected and confirmed cases reported between 1 January 2020 and 31 December 2020 in the EU (referred to in the report as 'EU27') and other eight additional non-EU reporting countries (referred to in the report as 'non-EU'): Bosnia and Herzegovina,

¹¹ 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.

Iceland, Montenegro, North Macedonia, Norway, Serbia and Switzerland and the UK (from 1 February 2020¹²). Bosnia and Herzegovina (non-EU and non-EFTA country) submitted TSE data to EFSA for the first time and accepted their data to appear in the EUSR summary report.

EFSA validated the 2020 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 June 2021 and was finalised on 12 July 2021. The results and tables presented in the current EUSR are based on the data retrieved from the EFSA Scientific Data Warehouse on 13 July 2021. An additional consultation with reporting countries was conducted between XX September 2021 and XX October 2021. 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.

Historical data (data between 2001 and 2020 with focus on the last 5 years in cattle and sheep) are presented in tables and figures. As certain MS and non-EU 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 2020. 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 EUSR.

2.2. Presentation of the data

The current report should be considered the EU summary report for 2020 in compliance with Section II, Chapter B, Annex III of the TSE Regulation.

The 27 EU MS or EU27, the UK (from 1 February 2020 non-EU), the three EFTA members, Iceland, Norway and Switzerland, and the non-EFTA IPA (Instrument for Pre-Accession Countries) countries, Bosnia and Herzegovina, Montenegro, North Macedonia 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 1059/2003¹³.

To allow direct comparisons of 2020 data with those of the previous years at EU level, the 2020 EU27 data have been summed up in this report with those provided by the UK. However, all tables have been amended by presenting separately the EU27 totals and those including EU27 data plus the UK data. Totals obtained from the three EFTA countries and the four non-EFTA IPA were referred as to 'Other non-EU MS'.

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 in which the probability of detecting 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 2020, 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. When it was considered relevant, multi-year and historical data are shown. Surveillance data were available in the period 2001–2020, 2002–2020 and 2018–2020 for bovine animals, small ruminants, and cervids and other species, respectively.

¹² Data collected by the UK during 2020 and until end of transition period (i.e. until 31 December/12/2020) are used in this report. In accordance with the Agreement on the Withdrawal of the UK from the EU, and in particular with the established transition period, the EU requirements on data sampling also applied to the UK.

¹³ 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.

For bovine animals, summary statistics were obtained based on the total number of tests performed in 2020 by reporting country and surveillance target group. In addition, historical data on confirmed cases since 2016 are presented in detail whereas those on the 2001–2015 period have been summed up. This 5-year period has been selected as during the period 2016–2020 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. 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 2020, EFSA asked for additional information from the individual concerned reporting countries by a small questionnaire.

For small ruminants, summary statistics are presented in this report, and when 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 (2011–2020) 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 as the total subpopulation of NSHC in the country is not known.

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 IC, 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.

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 present the temporal change in evolution of BSE cases (C-BSE, L-BSE and H-BSE) in tables or graphs, 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 was considered for reporting purposes as 'non-infected flocks/herds'.
- To describe the change in evolution of the total number of scrapie IC, it was assumed that all IC were confirmed in non-infected flocks/herds. If a case was reported as non-index or unknown index status, 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 2020 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 2020 per PSU by MS and management system.
- For all reporting countries, the number of tested cervids in 2020 by target group, species, management system and reporting country.

A number of tested animals in species other than cattle, sheep, goats and cervids tested for TSE in reporting countries in 2020 are presented in tabular format by species and reporting country.

2.3.2. Data analysis 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 2011–2020) has 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. 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 to 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 2011–2020) have been used to check if any significant temporal trend was detectable. As per BSE, a Poisson regression model has been fitted for each case type (CS and AS) and for each species (ovine and caprine) separately, using the number of cases as dependent variable and the year as 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. 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 to 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.

Over the same 10-year period, and considering cases from all reporting countries, 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 for all the above-described statistical analyses.

3. Assessment

3.1. BSE surveillance in bovine animals

Approximately 119.9 million bovine animals have been tested for BSE in EU, including UK, since 2001. In 2020, there was a 2.4% reduction in the number of tested bovine animals in the EU27 and UK, from 1,150,388 in 2019 to 1,122,671 in 2020. This reduction was due to a reduction in the HS target group of 17.7% (from 156,229 in 2019 to 128,648 in 2020) mainly due to the decrease of 23.7% in the number of tested animals in Romania from 121,599 in 2019 to 92,727 in 2020 despite the increase of 44.6% and 32.2% in the number of cattle tested by Lithuania and Bulgaria, respectively. A slight overall increase of animals tested in the FS group (from 918,182 in 2019 to 924,698 in 2020) was observed in 2020. Romania and Bulgaria continue being the main contributors to the HS testing group with 115,428 (89.7%) tested cattle.

The other seven non-EU (Bosnia and Herzegovina, Iceland, Montenegro, Norway, North Macedonia, Serbia and Switzerland) tested 51,775 cattle in 2020. Serbia was the main contributor with 13,978

cattle tested (a reduction of 30.5% from 2019), followed by Bosnia and Herzegovina, a country reporting data for the first time, that tested 12,848 cattle. Both countries reported mostly cattle tested in the HS target group. Serbia and Switzerland tested 19 and 24 cattle, respectively, as clinical suspect and Norway reported 113 animals with clinical signs at AM inspection.

The number of animals tested in the risk group (ES + AM + FS) remained stable, from 993,332 in 2019 to 993,190 in 2020 (−0.01%), in EU27 and the UK. Similar to the previous year, cattle in the risk group accounted for over 88.5% of all tested cattle in the EU27 and UK and cattle tested in the FS target group accounted for 93.1% of all risk cattle tested.

The number of cattle tested for BSE per reporting country for each target group in 2020 is shown in Table 5.

Table 5: Number of bovine animals tested for BSE by reporting country and surveillance target group in 2020 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	2,932	16	15,494	18,442	61	8		69	18,511
BE	758	2	25,555	26,315	6	6		12	26,327
BG	2,860	7	4,501	7,368	29,355			29,355	36,723
CY	53		1,751	1,804	50			50	1,854
CZ	4,255	2	21,336	25,593	14	5		19	25,612
DE	9,530		165,837	175,367	427	697		1,124	176,491
DK	1,756		22,450	24,206				0	24,206
EE	136	61	3,494	3,691				0	3,691
EL	609	7	1,021	1,637	8,106			8,106	9,743
ES	802	46	61,510	62,358	206	1		207	62,565
FI	7		11,240	11,247	4			4	11,251
FR	1,723		198,599	200,322	3,893	3		3,896	204,218
HR	10		4,924	4,934	132	2		134	5,068
HU	97	9	10,714	10,820	10	13		23	10,843
IE		358	63,618	63,976		9		9	63,985
IT	14,811	299	33,953	49,063	210			210	49,273
LT	15	5	4,136	4,156				0	4,156
LU			2,724	2,724		2		2	2,726
LV	213	136	2,910	3,259		1		1	3,260
MT	97		194	291	2			2	293
NL	5,868		54,113	59,981	6	1		7	59,988
PL	8,139	1,122	43,579	52,840	32	4		36	52,876
PT	1,301	1,023	14,727	17,051		14		14	17,065
RO	2,363	1,563	2,689	6,615	86,073	39		86,112	92,727
SE	142	39	8,868	9,049		10		10	9,059
SI	362	74	5,781	6,217	52	16		68	6,285
SK	18	1	9,814	9,833				0	9,833
Total EU27	58,857	4,770	795,532	859,159	128,639	831	0	129,470	988,629
UK	4,372	493	129,166	134,031	9	2		11	134,042
Total EU27 + UK	63,229	5,263	924,698	993,190	128,648	833	0	129,481	1,122,671
BA			22	22	12,826			12,826	12,848
CH	4,097		6,954	11,051		24		24	11,075

Country	Surveillance target group								Total
	Risk animals				Other target groups				
	ES	AM	FS	Subtotal risk animals	HS	SU	EM	Subtotal other target groups	
IS	1		13	14				0	14
ME			1	1	4,944			4,944	4,945
MK				0	2,211			2,211	2,211
NO	5,065	113	1,526	6,704				0	6,704
RS	146		3,780	3,926	10,033	19		10,052	13,978
Total other Non-EU	9,309	113	12,296	21,718	30,014	43	0	30,057	51,775
Total	72,538	5,376	936,994	1,014,908	158,662	876	0	159,538	1,174,446

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

The distribution of the number of bovine animals tested for BSE by age group, surveillance target group and reporting country in 2020 can be found in the following link <https://doi.org/10.5281/zenodo.5602749> distributed as follows:

- **Table 6:** Number of bovine animals tested by age group in the EU MS and non-EU reporting countries in 2020.
- **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-EU reporting countries in 2020.
- **Table 8:** Number of tested healthy slaughtered bovine animals by age group in EU MS and in non-EU reporting countries in 2020.
- **Table 9:** Number of BSE suspected bovine animals, by age group, tested in EU MS and in non-EU-reporting countries in 2020.
- **Table 10:** Number of bovine animals culled under BSE eradication measures, by age group, tested in EU MS and in non-EU-reporting countries in 2020. The table is empty because no animals in this category were tested for the year 2020.

In the EU27 and UK, four BSE cases were reported in 2020, all atypical BSE submitted to the FS testing group: three H-type (one by Spain, one by France and one by Ireland) and one L-type (by France). Switzerland has also reported an L-type case submitted to the ES testing group. Table 11 reports the main clinical and epidemiological data of all the positive cases. No other cases of BSE were reported in the rest of the world in 2020 (<https://wahis.oie.int/#/home>).

The number of H-type and L-type BSE cases was in line with the number of cases reported in the last few years. Figure 1 illustrates the proportion of cases per million tests from 2015 to 2020. Most of the atypical cases reported in 2020 were detected in beef cattle older than 12 years.

Based on 119 atypical BSE cases with known age since 2001, the average age at detection was 11.9 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 2020, with a focus on the last 5 years) is shown in Tables 12–14 for total cases, classical BSE and atypical BSE, respectively.

Time series analysis carried out over the last 10-year period (period 2011–2020) 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: 1.06 $p = 0.93$; L-BSE: 1.05 $p = 0.54$).

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 2001–2020 are shown in Appendix B.

Table 11: Clinical and epidemiological description of the BSE cases detected in 2020

Country	CH - atypical 1	ES - atypical 2	FR- atypical 3	FR- atypical 4	IE- atypical 5
Surveillance target group	Emergency slaughter	Fallen stock	Fallen stock	Fallen stock	Fallen stock
Case type	L-BSE	H-BSE	L-BSE	H-BSE	H-BSE
Month and year of birth	November 2006	April 2003	March 2008	March 2004	March 2006
Age at detection (in months)	158	212	143	191	171
BARB status	–	–	–	–	–
Clinical signs	Recumbency at the transfer to the abattoir	No	No	No	n/a
Cattle type	Dairy cattle	Beef cattle	Beef cattle	Beef cattle	Beef cattle
Breed	Brown-Swiss	Mixed	Charolaise	Limousine	Limousine Cross
Was the case confirmed at herd/holding where the animal was born?	No (laboratory diagnosis after emergency slaughter)	Yes	No	Yes	No
Location (NUTS3) of natal herd or herd where case found	Canton of Schwyz	Viniegra de Arriba, La Rioja	Cher (18)	Aquitaine (24)	Tipperary
Herd size	124 (23,1,2020)	353	1	120	63
Herd type	Unknown	Beef cattle	Beef cattle	Beef cattle	Suckler
Feeding system during first year of life	Unknown	Mixed		Milk, grass and hay	Suckled till 8 months, Calf ration at 12 weeks to 52 weeks, Grass fed thereafter
Feed cohorts? Tested? If Yes: Results (number tested; number positives)	No	9 tested/all negative	6 tested/all negative	14 tested/all negative	No
Birth cohorts? Tested? If Yes: Results (number tested; number positives)	No	9 tested/all negative	13 tested/all negative	2 tested/all negative	7 tested/all negative
Offspring? Tested? If Yes: Results (number tested; number Positives)	No	15: 4 stay alive; 11 were sacrificed at lower age (< 24 m)	No	No	1 negative progeny
Sire? Tested? (Yes/No), If Yes: Results (positive? Negative?)	No	No	No	No	No
Dam? Tested (Yes/No), If Yes: Results (positive? Negative?)	No	No	No	No	No

BARB: born after the revised feed ban; H-BSE: H-type bovine spongiform encephalopathy; L-BSE: L-type bovine spongiform encephalopathy; n/a: Not available.

Table 12: Total number of reported BSE cases (classical-BSE + atypical H-BSE + atypical L-BSE) in reporting countries and worldwide by year (period 1991–2020) and country

Country	Year						Total
	Up to 2015	2016	2017	2018	2019	2020	
AT	8						8
BE	133						133
CZ	30						30
DE ^(a)	421						421
DK ^(a)	16						16
EL	1						1
ES	813	1	3		2	1	820
FI	1						1
FR ^(a)	1,000	4	2	3	4	2	1,015
IE ^(a)	1,660		1			1	1,662
IT ^(a)	147						147
LU	3						3
NL	88						88
PL	74				1		75
PT ^(a)	1,086						1,086
RO	2						2
SE ^(b)	1						1
SI ^(a)	9						9
SK	27						27
Total EU27	5,520	5	6	3	7	4	5,545
UK	184,594			1			184,595
Total EU27 + UK	190,114	5	6	4	7	4	190,140
BRA	2						3
CAN ^(a)	20						20
ISR	1						1
JPN	36						36
LI	2						2
NO	1						1
CH ^(a)	465					1	466
USA ^(a)	4		1	1			6
Total other non-EU	531	0	1	1	1	1	535
Total	190,645	5	7	5	8	5	190,675

BRA: Brazil; BSE: bovine spongiform encephalopathy; CAN: Canada; H-BSE: H-type BSE; ISR: Israel; JPN: Japan; L-BSE: L-type BSE; USA: United States of America.

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 where at least one BARB case was detected (EFSA BIOHAZ Panel, 2017a). EU countries without BSE cases (Bulgaria, Cyprus, Estonia, Croatia, Hungary, Lithuania, Latvia and Malta) are not reported.

(a): Included imported cases: Canada 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): Gavier-Widén et al. (2008).

Source: Data on 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 (<https://wahis.oie.int/#/home>).

Table 13: Number of reported classical BSE cases in the reporting countries by year (period 1991–2020) and country

Country code	Year						Total
	up to 2015	2016	2017	2018	2019	2020	
AT	5						5
BE	133						133
CZ	29						29
DE	416						416
DK	15						15
EL	1						1
ES	798						798
FI	1						1
FR	968	1					969
IE	1,656						1,656
IT	142						142
LU	3						3
NL	84						84
PL	60						60
PT	1,079						1,079
SI	8						8
SK	27						27
Total EU27	5,425	1	0	0	0	0	5,426
UK	184,578			1			184,579
Total EU27 + UK	190,003	1	0	1	0	0	190,005
CH	464						464
Total other non-EU	464	0	0	0	0	0	464
Total	190,467	1	0	1	0	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 the reporting countries by year (period 2001–2020), type and country

Country code	Year												Total		
	Up to 2015		2016		2017		2018		2019		2020				
	H	L	H	L	H	L	H	L	H	L	H	L	H	L	
AT	1	2												1	2
CZ	1													1	
DE	2	3												2	3
DK		1													1
ES	7	8	1		1	2			2		1			12	10
FR	15	17	3		1	1	1	2	4		1	1		25	21
IE	4					1					1			5	1
IT		5													5
NL	1	3												1	3
PL ^(a)	2	12								1				2	13
PT	7													7	
RO		2													2

Country code	Year												Total		
	Up to 2015		2016		2017		2018		2019		2020				
	H	L	H	L	H	L	H	L	H	L	H	L	H	L	
SE	1													1	
SI	1													1	
Total EU27	42	53	4	0	2	4	1	2	6	1	3	1	58	61	
UK	7	9											7	9	
Total EU27 + UK	49	62	4	0	2	4	1	2	6	1	3	1	65	70	
NO	1												1		
CH	1											1	1	1	
Total other non-EU	2	0	0	0	0	0	0	0	0	0	0	1	2	1	
Total	51	62	4	0	2	4	1	2	6	1	3	2	67	71	

Each cell reports the total number of H-BSE and L-BSE cases. EU countries without atypical cases are not included in the table.

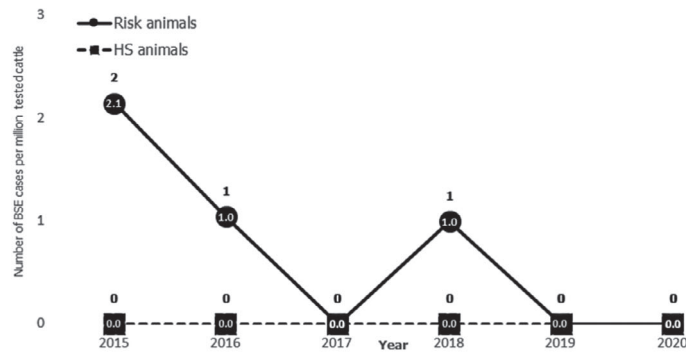
(a): In 2012, PL reported an atypical BSE case without specifying the type.

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

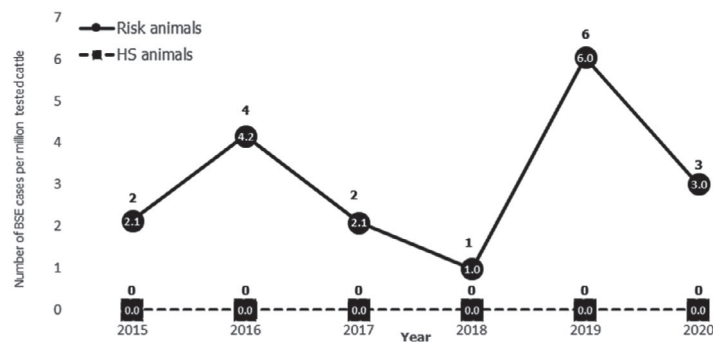
The number of historical reported BSE cases can be found in the following link <https://doi.org/10.5281/zenodo.5602725>, as follows:

- **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.

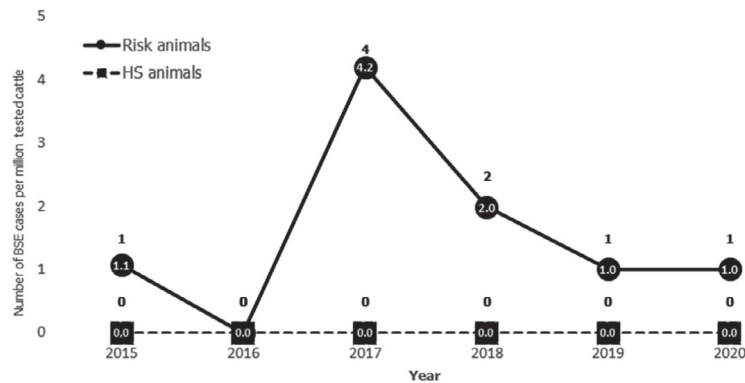
(a): C-BSE



(b): H-BSE



(c): L-BSE



BSE: bovine spongiform encephalopathy; C-BSE: classical BSE; H-BSE: H-type BSE; L-BSE: L-type BSE. Black numbers in white background: number of cases.

Figure 1: Cases per million tested bovine animals by surveillance target group and case type for the period 2015–2020 in the EU and the UK

3.2. TSE surveillance in small ruminants

Since 2002, more than 10 million small ruminants have been tested as part of the official EU TSE surveillance in the EU, including the UK. In 2020, 453,194 small ruminants were tested by the 27 MS and the UK: 332,579 sheep (73.4%) and 120,615 goats (26.6%), which represents an overall 5.9% decrease (28,433) in the number of tested small ruminants in the EU, compared with that of 2019.

In four of the seven other non-EU (Iceland, North Macedonia, Norway, Serbia), in total 26,765 small ruminants were tested: 26,053 sheep (97.3%) and 712 goats (2.7%), an increase of 3,075

(+13%) from 2019, mostly due to the increase in testing by Iceland and Norway. Bosnia and Herzegovina, Montenegro and Switzerland did not report data on small ruminants.

In sheep, the decrease in the total tested in the EU27 and the UK was 1.6% (332,579 tested in 2020 compared with 338,098 in 2019), due to the decrease of testing in TSE-infected flocks with a 29.4% decrease in 2020 (from 41,197 in 2019 to 29,094 in 2020), whereas testing in the non-TSE infected flocks had a 2.2% increase in 2020 (from 294,527 in 2019 to 301,089 in 2020). The number of sheep tested from flocks with unknown status remains the same, since Czechia Republic is the only country that does not report flock status (2,374 in 2019 and 2,396 in 2020).

In goats, there was also a 16% decrease in the tested animals in the EU27 and the UK (120,615 in 2020 compared with 143,529 in 2019), due to the decrease of testing in both TSE-infected herds with a 38% decrease in 2020 (from 13,013 in 2019 to 8,063 in 2020) and in non-TSE-infected herds with a 13.9% decrease in 2020 (from 129,810 in 2019 to 111,817 in 2020). The number of goats tested from herds with unknown status remains the same (Czechia with 706 in 2019 and 735 in 2020).

The numbers of sheep and goats tested for TSE by reporting country, surveillance target group and flock/herd status in 2020 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) and the criteria described in Section 2.3.1, 23 countries in the group EU27 and the UK fulfilled the requirements for sheep testing. Four of the five non-complaint reporting countries were very close to reach the required quota. In goat surveillance, 24 countries in the group EU27 and the UK fulfilled the requirements for goat testing.

The pattern of testing in 2020 in sheep by country and flock status was very similar to that of 2019. In 2020, for each sheep tested in a TSE-infected flock in the EU27 and the UK, there were more than 10 (10.3) sheep tested in non-TSE-infected flocks. The small decrease in the overall testing of sheep in 2020 is due to the balance between the higher level of testing in Bulgaria and Spain, with an overall increase of 17,060 (+82.4%) and 2,066 (+6%) sheep tested, respectively, and the lower level of testing in other five MS: Romania, Italy, France, Greece and Poland with an overall decrease of 12,288 (-28.2%), 5,329 (-16.3%), 1,629 (-6.5%), 1,505 (-23.6%) and 1,484 (-4.6%) sheep tested, respectively. It is important to highlight that Bulgaria is the reporting country with the largest contribution to the SHC in non-TSE-infected flocks with 32,978 (24.2% of the total in EU27 and the UK).

The pattern of testing in 2020 in goats by country and flock status was different to that of 2019. In 2020, for each goat tested in a TSE-infected herd in the EU27 and the UK, there were 14 (13.9) goats tested in non-TSE-infected herds, higher than that in 2018 and 2019 (with a value of approximately 10), but much lower than in 2017 with nearly 31 goats tested in non-TSE-infected herds in 2017. The decrease in the overall testing of goats in 2020 is mostly due to the throughput of Romania, Italy, Cyprus and Spain with an overall decrease of 16,014 (-44.3%), 3,114 (-8.6%), 2,757 (-37%) and 2,134 (-9.6%) goats tested, respectively.

Table 19: Number of sheep tested for TSE by reporting country, surveillance target group and flock status in 2020 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	Subtotal Non-infected flocks	EM	NSHC	SHC	SU	Subtotal Unknown	
AT		5			5		2,753	145		2,898						2,903
BE		1			1		1,495		3	1,498						1,499
BG	2		2		4		4,789	32,978		37,767						37,771
CY		682	377		1,059		1,556	14		1,570						2,629
CZ												2,382	14		2,396	2,396
DE	34				34		9,155	10,117	31	19,303						19,337
DK							509			509						509
EE							235			235						235
EL	521	1,667	295		2,483		936	1,458	5	2,399						4,882
ES	14,720				14,720		12,599	9,447	2	22,048						36,768
FI		47			47		1,576	21		1,597						1,644
FR	38				38		18,694	4,706		23,400						23,438
HR							1,544		1	1,545						1,545
HU		1,758	481		2,239		9,849	9,483		19,332						21,571
IE		41	64		105		12,188	9,301	1	21,490						21,595
IT	2,644	513	805		3,962		12,084	11,333	3	23,420						27,382
LT							664			664						664
LU							98			98						98
LV							365			365						365
MT							102	18		120						120
NL							1,568			1,568						1,568
PL							9,967	20,823	2	30,792						30,792
PT	373	372	5		750		15,318	4,949		20,267						21,017
RO		4	1,836		1,840		14,114	15,306	26	29,446						31,286
SE		22	69		91		1,679	10		1,689						1,780
SI							2,344	168	7	2,519						2,519

Flock status	TSE infected flocks					Non-infected flocks					Unknown/not available					Total
	EM	NSHC	SHC	SU	Subtotal TSE infected flocks	EM	NSHC	SHC	SU	Subtotal Non-infected flocks	EM	NSHC	SHC	SU	Subtotal Unknown	
SK		564	718		1,282		13,002			13,002						14,284
Total EU27	18,332	5,676	4,652		28,660		149,183	130,277	81	279,541		2,382	14		2,396	310,597
UK	4	430			434		15,489	6,059		21,548						21,982
Total EU27 + UK	18,336	6,106	4,652		29,094		164,672	136,336	81	301,089		2,382	14		2,396	332,579
BA																
CH																
IS	2,412				2,412		201	4,992	7	5,200						7,612
ME																
MK								292		292						292
NO	67				67		9,758	7,997	47	17,802						17,869
RS							74	206		280						280
Total other non-EU	2,479				2,479		10,033	13,487	54	23,574						26,053
Total	20,815	6,106	4,652		31,573		174,705	149,823	135	324,663		2,382	14		2,396	358,632

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).

Table 20: Number of goats tested for TSE by reporting country, surveillance target group and herd status in 2020 in the EU and other reporting countries

Herd status	Infected herds					Non-infected herds					Unknown/not available					Total
	EM	NSHC	SHC	SU	Subtotal infected herds	EM	NSHC	SHC	SU	Subtotal Non-infected herds	EM	NSHC	SHC	SU	Subtotal unknown/not-available	
AT							865	39		904						904
BE							825		1	826						826
BG	15		3		18		574	2,893		3,467						3,485
CY		2,809	1,052	130	3,991		634	68		702						4,693
CZ												735			735	735
DE							1,699	262	16	1,977						1,977
DK							92			92						92
EE							6			6						6
EL	187		52		239		603	732	5	1,340						1,579
ES	2,098			2	2,100		10,646	7,302		17,948						20,048
FI							291			291						291
FR							16,953	4,219		21,172						21,172
HR							376		1	377						377
HU							132	132		264						264
IE							93			93						93
IT	400	70	334		804		6,369	25,916		32,285						33,089
LT							32			32						32
LU							101			101						101
LV							31		1	32						32
MT							100	20		120						120
NL							1,568			1,568						1,568
PL							3,563	1,372	4	4,939						4,939
PT		14			14		1,579			1,579						1,593
RO				1	1		5,738	14,386	1	20,125						20,126
SE		1			1		120		1	121						122
SI							509	47	4	560						560

Herd status	Infected herds					Non-infected herds					Unknown/not available					Total
	EM	NSHC	SHC	SU	Subtotal infected herds	EM	NSHC	SHC	SU	Subtotal Non-infected herds	EM	NSHC	SHC	SU	Subtotal unknown/not-available	
SK		49	1		50		383			383						433
Total EU27	2,700	2,943	1,442	133	7,218		53,882	57,388	34	111,304		735			735	119,257
UK	478	367			845		513			513						1,358
Total EU27 + UK	3,178	3,310	1,442	133	8,063		54,395	57,388	34	111,817		735			735	120,615
BA																
CH																
IS	23				23		12	70		82						105
ME																
MK																
NO							554	39		593						593
RS							14			14						14
Total other non-EU	23	0	0	0	23		580	109	0	689		0			0	712
Total	3,201	3,310	1,442	133	8,086		54,975	57,497	34	112,506		735			735	121,327

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).

In total, 688 scrapie cases in sheep were reported in the EU27 and the UK in 2020, 309 (31.1%) less than in 2019. They were reported by 16 MS and the UK (two countries more than in 2019). All countries that reported cases in 2019 also reported cases in 2020 plus Bulgaria that reported CS cases and Belgium and Sweden that reported AS cases. In addition, 65 scrapie cases in sheep were reported by two other non-EU reporting countries: Iceland and Norway.

CS was reported by seven MS and one non-EU: Bulgaria, Cyprus, Greece, Italy, Portugal, Romania, Spain and Iceland, whereas AS was reported by 14 MS, the UK and by one other non-EU: Belgium, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Poland, Portugal, Romania, Slovakia, Spain, Sweden, the UK and Norway. Most of the ovine CS cases in the EU27 and the UK (97.5%) were reported by four countries, namely Greece, Italy, Romania and Spain, as it was the case in the previous years.

Out of the 688 sheep scrapie cases reported in the EU27 and the UK in 2020: 589 were CS cases (85.7%), 98 were AS cases (14.3%) and Italy reported 1 CH1641-like case. Among the non-EU countries, 53 CS cases were reported by Iceland and 12 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 2020 (the Italian CH1641-like case is not shown). The geographical distribution of AS and CS in 2020 in sheep is shown in Appendix C. An additional total of 12 cases in sheep were reported as inconclusive by Italy (see Table 31) which are not included in the caseload for this country.

In sheep, 24.6% (169) of all cases in the EU27 and the UK reported in 2020 were IC. This percentage is higher than the previous year (17.8% in 2019) even though the absolute number of all cases (177 in 2019) fell by 4.5%. There was a much higher proportion of IC in AS cases (88/98: 89.8%) than in CS cases (81/589: 13.8%), reflecting the within-flock spread of CS. Using the absolute number of IC as a proxy for the flock-level incidence in sheep and comparing 2019 with 2020, there was a decrease in the number of CS IC (from 97 in 2019 to 81 in 2020, -16.5%) and an increase in the number of AS IC (from 80 to 88, +10%). Six of the 53 CS cases reported by Iceland were IC (11.3%), and so were the 12 AS cases reported by Norway (100%).

In total, 328 scrapie cases in goats were reported in the EU27 and the UK in 2020, with a 15.9% reduction (-62) compared with 2019 when 390 cases were reported. This change is due mainly to the decrease in the number of cases in goats in Cyprus (from 309 to 236 cases). Only Italy and Spain reported both CS and AS. Bulgaria, Cyprus, Greece, Romania and the UK reported only CS cases whereas Denmark, France and Portugal reported only AS cases. As mentioned previously, most of the CS cases were reported by Cyprus with a slight decrease in the contribution of this country to the CS caseload in 2020 (from 81.3% in 2019 to 72% in 2020). The three other non-EU countries that reported tested goats did not report any scrapie cases.

In total, 319 caprine cases in the EU27 and the UK in 2020 were CS cases (97.3%) and nine were AS (2.7%). Table 22 shows the number of scrapie cases in goats by reporting country, case type, index case status and surveillance target group in 2020. The geographical distribution of AS and CS in 2020 in goats is shown in Appendix C.

In goats, 18.6% (61) of all cases reported in the EU27 and the UK in 2020 were IC. This percentage is higher than the 8.7% (34) observed in 2019, with a higher proportion in AS (9/9: 100%) than in CS (52/319: 16.3%). Cyprus and Greece accounted for 54% (33/61) of all IC in goats. Using the absolute number of IC in goats as a proxy for the herd-level incidence in goats and comparing 2020 with 2019, there was an increase in the number of CS IC (from 24 to 52, 116.7%) and there was nearly no difference in the number of AS IC (from 10 to 9).

In general, considering the total number of cases by type and without restricting the calculation to IC only, CS is still the most frequently reported type of scrapie in the EU27 and the UK in both the species. In 2020, the CS/AS ratio was 6:1 in sheep (lower than in 2019: 10.6:1) and 35.4:1 in goats (slightly higher than in 2019: 34.4:1). If, for goats, Cyprus is excluded, the CS/AS ratio was 9.2:1 in 2020 compared with 7.1:1 in 2019.

Table 21: Number of scrapie cases in sheep by country, case type, index case status, surveillance target group in 2020 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	SU	Subtotal		EM	NSHC	SHC	Subtotal	NSHC	SHC	SU			Subtotal	
BE					2			2	2											2
BG												2	2		6		6		8	8
CY												1	1	1			1		2	2
DE					14			14	14											14
EL					1			1	1	63	66	4	133	33	6	4	43		176	177
ES	2			2	4	4	2	10	12	241			241	3			3		244	256
FI					1			1	1											1
FR						3		3	3											3
HU		2	1	3	4	7		11	14											14
IE					1			1	1											1
IT ^(a)	2			2	3	1		4	6	52	28	6	86	9	7		16		102	108
PL					3	2		5	5											5
PT					13	5		18	18	4			4	1			1		5	23
RO			1	1					1		4	37	41	6	5		11		52	53
SE					1			1	1											1
SK		1		1	4			4	5											5
Total EU27	4	3	2	9	51	22	2	75	84	360	98	50	508	53	24	4	81	589	673	
UK		1		1	9	4		13	14											14
Total EU27 + UK	4	4	2	10	60	26	2	88	98	360	98	50	508	53	24	4	81	589	687	
IS										47			47	3	1	2	6		53	53
NO					7	5		12	12											12
Total other non-EU				0	7	5		12	12	47			47	3	1	2	6	53	65	
Total	4	4	2	10	67	31	2	100	110	407	98	50	555	56	25	6	87	642	752	

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 a TSE (transmissible spongiform encephalopathies).

Only the reporting countries in which scrapie cases in sheep were detected in 2020 are mentioned in the table.

(a): A CH1641-like case was reported by Italy. It is not included in the total. An additional total of 12 cases were reported as inconclusive by Italy (see Table 31). They are not included in the total.

Table 22: Number of scrapie cases in goats by country, case type, index case status, surveillance target group in 2020 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
BG										3		3		4		4	7	7	
CY										90	34	100	224	10	2		12	236	236
DK					1		1	1											1
EL									4		2		6	12	7	2	21	27	27
ES					3		3	3	23			2	25	3	1		4	29	32
FR					1		1	1											1
IT					3		3	3	1	2	4		7	1	5		6	13	16
PT					1		1	1											1
RO												1	1	3	1		4	5	5
Total EU27					9		9	9	28	92	43	103	266	29	20	2	51	317	326
UK										1			1	1		1	2	2	2
Total EU27 + UK					9		9	9	28	93	43	103	267	30	20	2	52	319	328
Total other non-EU							0	0					0				0	0	0
Total					9		9	9	28	93	43	103	267	30	20	2	52	319	328

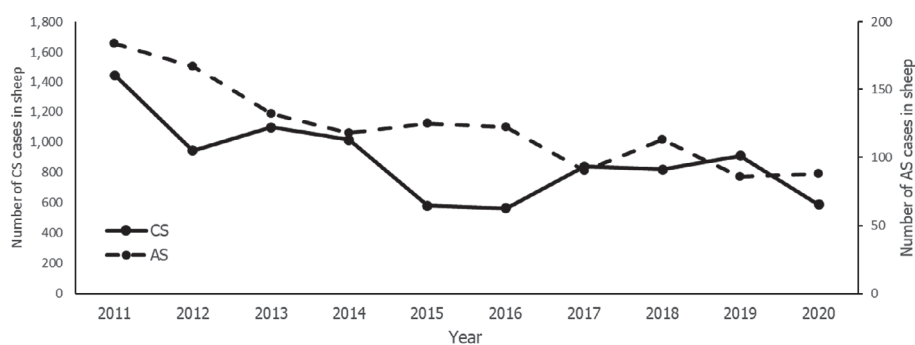
EM: animals culled under TSE eradication measures; NSHC: Animals not slaughtered for human consumption; SHC: animals slaughtered for human consumption; SU: animals clinically suspected of being infected by a TSE (transmissible spongiform encephalopathies).

Only the reporting countries in which scrapie cases in goats were detected in 2020 are included in the table.

Focusing on the last 10 years, the evolution in the number of scrapie cases detected at EU27 and the UK 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 was evident in 2019, mainly due to CS cases from TSE-infected flocks reported by Greece, Italy and Spain. A decrease to 589 CS cases was reported in EU27 and the UK in 2020, largely as a result of the decrease in cases in Greece, Spain, Italy and Romania with 100 (−36.2%), 68 (−21.8%), 69 (−40.4%) and 89 (−63.1%) less cases than in the previous year, respectively. This trend was likely to be associated with the decrease in the testing of TSE-infected flocks and the reduction of the number of IC in those four countries, 73 in 2020, 21 less than that in 2019 (94).

In goats, the decreasing trend in the absolute number of CS cases continued in 2020. 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 in EU27 and the UK has consistently decreased to 319 in 2020. In 2020 compared with 2019, there was also a small reduction in the number of CS in goats in Italy and Spain from 26 to 13 and from 35 to 29, respectively. Greece reported nearly a fourfold increase in the number of CS cases in 2020 (27), compared with 2019 (7). Cyprus, Greece and Spain reported an increase in index CS cases, from 8 to 12, from 2 to 21 and from 2 to 4, respectively. Italy reported a reduction in the number of index CS cases, from 10 to 6.

(a) Sheep



(b) Goats

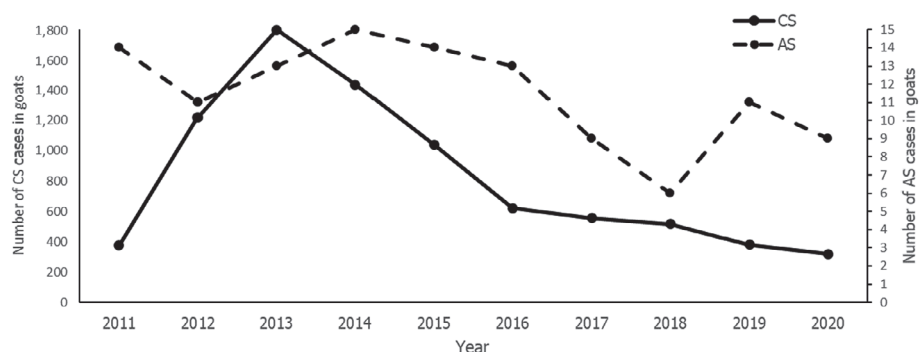


Figure 2: Number of reported scrapie cases in the EU and the UK by case type in the period 2011–2020 in (a) sheep and (b) goats

Based on the 35,269 cases of scrapie with known type, species and age between 2002 and 2020 in sheep, the average age of AS cases (82 months) is significantly higher ($p < 0.001$) than that of CS cases (47.8 months). Similarly, in goats, the average age of AS cases (84 months) is significantly

higher ($p < 0.001$) than that of CS cases (51.6 months). When comparing sheep with goats, there was no significant difference in the average age for AS ($p = 0.52$) whereas the average age for CS in sheep is lower than in goats ($p < 0.001$).

Tables 23 and 24 show the cases of CS and AS, respectively, in sheep for the period 2002–2020, 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 2002–2020, with a focus on the last 5 years.

In sheep, in 2020, the number of IC of CS and AS per 10.000 tests carried out by target group at EU27 and the UK level was: (1) for CS: 3.2 in NSHC and 1.7 in SHC; (2) for AS: 3.9 in NSHC and 2.5 in SHC.

In goats, in 2020, the number of IC of CS and AS per 10.000 tests carried out by target group at EU27 and the UK level was: (1) for CS: 5.1 in NSHC and 2.8 in SHC; (2) for AS: 1.5 in NSHC and 0 in SHC.

Table 23: Number of classical scrapie cases in sheep by year and reporting country up to 2020

Country	Up to 2015	2016	2017	2018	2019	2020	Total CS
BE	38						38
BG	11		1	5		8	25
CY	3,197	7	2	4	1	2	3,213
CZ	56						56
DE	116						116
EL ^(a)	5,517	227	247	178	276	176	6,621
ES	1,048	91	247	279	312	244	2,221
FR	1,532	2					1,534
HU	10						10
IE	574	1	11	1			587
IT	2,516	143	240	150	171	102	3,322
NL	401						401
PT	26	7			1	5	39
RO	658	75	76	203	141	52	1,205
SI ^(b)	174						174
SK	107	10	15				132
Total EU27	15,981	563	839	820	902	589	19,694
UK	1,995				9		2,004
Total EU27+UK	17,976	563	839	820	911	589	21,698
IS	195	11	1	21	21	53	302
NO	12						12
Total other non-EU	207	11	1	21	21	53	314
Total	18,183	574	840	841	932	642	22,012

Note: Only the reporting countries in which classical scrapie cases in sheep were detected are included in the table. 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 at <https://doi.org/10.5281/zenodo.5602725>

(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 country up to 2020 in the reporting countries

Country	Up to 2015	2016	2017	2018	2019	2020	Total AS
AT	12	1	1	1			15
BE	8					2	10
BG	4	2					6
CZ	5	2	1				8
DE	115	5	4	4	4	14	146

Country	Up to 2015	2016	2017	2018	2019	2020	Total AS
DK	12	1		1			14
EE	2						2
EL	30	2				1	33
ES	198	13	12	9	7	12	251
FI	11	2		2	3	1	19
FR	550	4	3	6	8	3	571
HR	2						2
HU	106	23	14	13	17	14	187
IE	34	1	1	8	6	1	51
IT	86	5	3	8	7	6	115
NL	18						18
PL	39	8	7	6	4	5	69
PT ^(a)	591	26	29	30	20	18	714
RO						1	1
SE	42	3	2	2		1	50
SI	7	3					10
SK	22	5	5	6	4	5	47
Total EU27	1,894	106	82	96	80	84	2,342
UK	319	14	12	17	6	14	382
Total EU27 + UK	2,213	120	94	113	86	98	2,724
IS	8						8
NO	124	14	13	8	10	12	169
Total other non-EU	132	14	13	8	10	12	189
Total	2,345	134	107	121	96	110	2,913

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

(a): In 2018, it includes one imported case: an animal imported for slaughter from Spain that 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 country up to 2020 in the reporting countries

Country	Up to 2015	2016	2017	2018	2019	2020	Total CS
BG	5	2	2	5		7	21
CY	9,716	570	484	381	308	236	11,695
EL	539	11	25	19	7	27	628
ES	87	19	34	89	35	29	293
FI	8						8
FR	168			5			173
HU					1		1
IT	93	8	8	15	26	13	163
RO	8	3	2	3		5	21
SI	4						4
Total EU27	10,628	613	555	517	377	317	13,007
UK	218	8	3		2	2	233
Total EU27 + UK	10,846	621	558	517	379	319	13,240
Total other non-EU	0						0
Total	10,846	621	558	517	379	319	13,240

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 country up to 2020 in the EU and other reporting countries

Country	Up to 2015	2016	2017	2018	2019	2020	Total AS
AT	1						1
CY	1		1	1	1		4
DE	1		1				2
DK						1	1
EL	3	1		1			5
ES	44	5	2	2	2	3	58
FI	1						1
FR	53	3	2		3	1	62
IT	18	3	3	2	3	3	32
PL					1		1
PT	12	1			1	1	15
SI	1						1
Total EU27	135	13	9	6	11	9	183
UK							0
Total EU27+UK	135	13	9	6	11	9	183
NO	1						1
Total other non-EU	1						1
Total	136	13	9	6	11	9	184

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

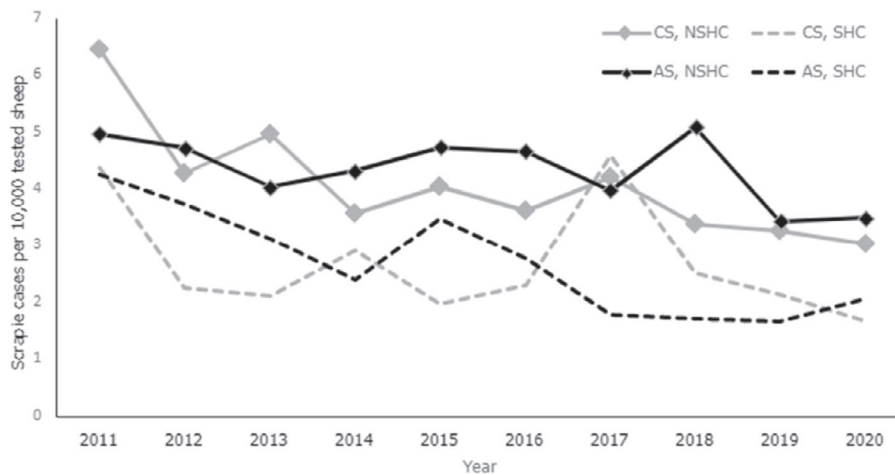
The number of historical reported scrapie cases can be found in the following <https://doi.org/10.5281/zenodo.5602725>, as follows:

- **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.

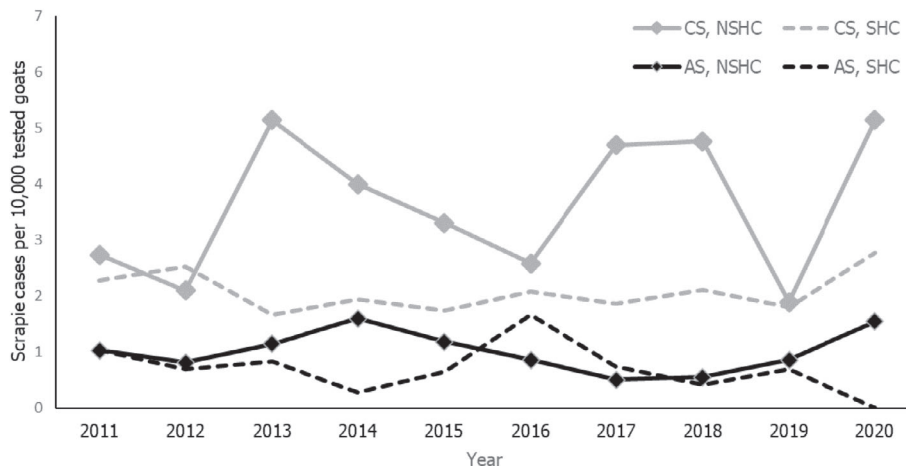
Over the last 10 years (2011–2020), the number of cases (index only) per 10,000 tested animals considering both the case types and the species ranged between 0.5 and 5.4. Figure 3 shows the 10-year trend in the EU27 and the UK by target group of the number of scrapie cases per 10,000 tests of sheep and goats in TSE non-infected flocks/herds and separately per case type. The results of the Poisson regression models, in sheep, showed a statistically significant decreasing trends for CS (annual RR: 0.946, $p < 0.0001$) and AS (annual RR = 0.951, $p < 0.0001$), i.e. in both cases, the average decrease was 5% per year. In goats, the model did not show any statistically significant trend for either CS or AS ($p = 0.141$ and 0.7 , 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 (RR: 1.54, $p < 0.0001$) and goats (RR: 1.7, $p < 0.0001$). In AS, a statistically significant higher probability was only observed in sheep (RR = 1.6, $p < 0.0001$).

(a) Sheep



(b) Goats



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. AS: Atypical scrapie; CS: classical 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 and the UK in (a) sheep and (b) goats in non-TSE-infected flocks/herds, reported by case type and target group in the period 2011–2020

Tables 31 and 32 summarise the number of discriminatory tests performed by country in 2020 for CS and AS in sheep. Tables 33 and 34 summarise the number of discriminatory tests performed by country in 2020 for CS and AS in goats. In sheep, 597 (99.2%) of the CS and all the inconclusive cases reported in the EU27 and the UK were submitted for discriminatory testing and so were 50 of the AS cases (51%). The 53 cases of CS reported by Iceland and the 12 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 12 cases reported by Italy, that were declared 'inconclusive'. One Italian case (with a result of 'BSE excluded') was characterised as CH1641-like. In goats, 92 (28.8%) of the CS reported in the EU were submitted for discriminatory testing and six of the AS cases (66.7%). All goat cases subjected to discriminatory testing were confirmed as 'BSE excluded'.

Table 31: Number of discriminatory tests and results in classical scrapie cases in sheep in 2020 by reporting country

Country	No. of classical scrapie, CH1641-like and inconclusive cases	Cases submitted for discriminatory testing				% of classical scrapie, CH1641-like and inconclusive cases ^(b)
		BSE-not excluded	BSE-excluded	Inconclusive ^(a)	Total	
BG	8		8		8	100%
CY	2		1		1	50%
EL	176		176		176	100%
ES	244		244		244	100%
IT	115 ^(c)		103 ^(c)	12	115	100%
PT	5		1		1	20%
RO	52		52		52	100%
Total EU27	602	0	585	12	597	99.2%
IS	53		53		53	100%
Total other non-EU	53	0	53	0	53	100%
Total	655	0	638	12	650	99.2%

Reporting countries without classical scrapie cases in sheep are not included in the table.

(a): The inconclusive cases have not been included in the total number of sheep scrapie cases of 2020.

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

(c): One CH1641-like case has been included.

Table 32: Number of discriminatory tests and results in atypical scrapie cases in sheep in 2020 by reporting country

Country	No. of atypical scrapie cases	Cases submitted for discriminatory testing				% of total atypical scrapie cases ^(a)
		BSE-not excluded	BSE-excluded	Total		
BE	2		1	1	50%	
DE	14				0%	
EL	1				0%	
ES	12		12	12	100%	
FI	1				0%	
FR	3				0%	
HU	14		14	14	100%	
IE	1				0%	
IT	6		6	6	100%	
PL	5		2	2	40%	
PT	18				0%	
RO	1		1	1	100%	
SE	1				0%	
SK	5				0%	
Total EU27	84	0	36	36	42%	
UK	14		14	14	100%	
Total EU27+UK	98	0	50	50	51%	
NO	12		12	12	100%	
Total other non-EU	12	0	12	12	100%	
Total	110	0	62	62	56.4%	

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

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

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

Table 33: Number of discriminatory tests and results in classical scrapie cases in goats in 2020 by reporting country

Country	No. of classical scrapie cases	Cases submitted for discriminatory testing			
		BSE-not excluded	BSE-excluded	Total	% of total classical scrapie cases ^(a)
BG	7		3	3	42.9%
CY	236		13	13	5.5%
EL	27		27	27	100%
ES	29		29	29	100%
IT	13		13	13	100%
RO	5		5	5	100%
Total EU27	317	0	90	90	28.4%
UK	2		2	2	100%
Total EU27+UK	319	0	92	92	28.8%
Total other non-EU	0	0	0	0	
Total	319	0	92	92	28.8%

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

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

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

Table 34: Number of discriminatory tests and results in atypical scrapie cases in goats in 2020 by reporting country

Country	No. of atypical scrapie cases	Cases submitted for discriminatory testing			
		BSE-not excluded	BSE-excluded	Total	% of total atypical scrapie cases ^(a)
DK	1				0.0%
ES	3		3	3	100.0%
FR	1				0.0%
IT	3		3	3	100.0%
PT	1				0.0%
Total EU27	9	0	6	6	66.7%
Total	9	0	6	6	66.7%

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

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

(a): It indicates the proportion of atypical TSE cases that are submitted to discriminatory testing by each reporting country.

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 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 (NSP3O)	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 2020 in the EU and other reporting countries.

In total, 541 (97%) of the 558 cases of CS in sheep with NSP genotype reported in the EU27 and the UK in 2020 (91.9% of the total CS caseload) were from the susceptible genotype groups (NSP3, NSP3O, NSP4 and NSP5). This is similar to previous years in which over 98.7% of all CS cases with known genotypes were from the susceptible groups. In the other non-EU reporting countries, all CS cases reported by Iceland were from the susceptible genotype groups or other non-NSP genotypes. In the current year, Romania has reported one case of CS in a sheep with the ARR/ARR genotype (NSP1), a very rare event already reported by Spain in 2019.

Among ovine AS cases, the same genotype groups (NSP3, NSP3O, NSP4 and NSP5) accounted for 49.5% (46/93) of all cases with known genotype (46.9% of the total AS caseload), very similar to 2019. Figure 4 shows the frequency distribution of genotypes of sheep scrapie cases by case type, year and NSP group in the period 2011–2020 in the reporting countries.

Table 37 shows the genotypes obtained in 2020 from the random samples of tested sheep in the reporting countries. In the EU27 and the UK, following the changes in the legislation that entered into force in 2018, nine MS conducted the genotype to a random sample of sheep: Belgium, Cyprus where genotyping is conducted systematically in the breeding sheep population, France, Germany, Greece, Italy, Latvia, the Netherlands and Poland. One of the seven other non-EU reporting countries, Iceland, also reported random genotype results. In the subset of EU27 and the UK that carried out the activity in 2020, and excluding data from Cyprus, 8.8% of the sheep population (with known NSP genotype) were susceptible to CS (NSP3, NSP3O, NSP4 and NSP5), lower than the 15.7% in 2019 and the 19.2% in 2018. This percentage stands at 44.4% in Greece and 27.3% in Italy, two of the countries with the highest case load in 2020, whereas it was between 12% and 30% in the remaining six MS.

Considering the past 10 years of random genotyping and excluding Cyprus, the proportion of sheep in the resistant genotype group (NSP1; black colour in the bars of Figure 5) shifted from 28.6% of the total number of genotyped sheep in 2011 (in which 23 MS contributed) to 70.1% in 2020 (in which eight MS contributed).

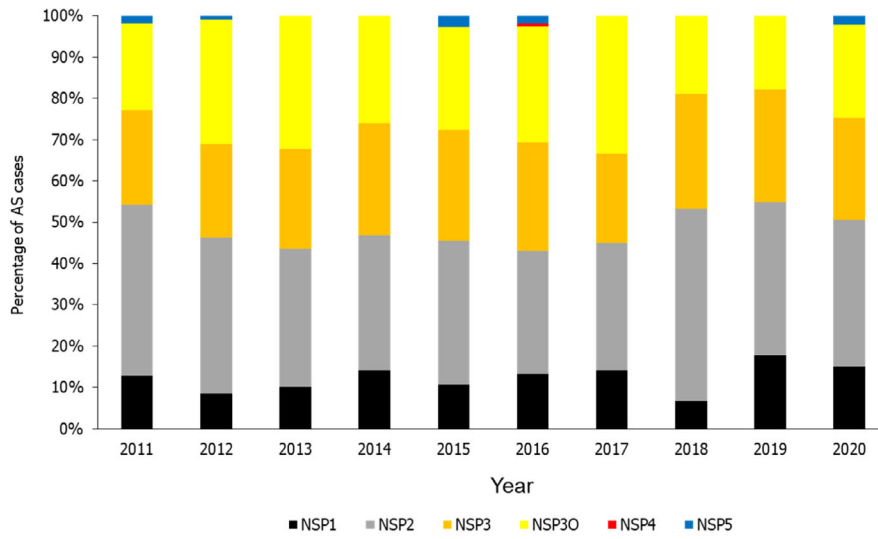
Table 36: Distribution of genotypes of confirmed scrapie cases in sheep by reporting country and National Scrapie Plan (NSP) group

Country/ NSP types	AS							CS							Total inconclusive			Total CH1641-like	Total scrapie cases				
	NSP1	NSP2	NSP3	NSP30	NSP4	NSP5	Unknown(a) N/G(b)	Total AS	NSP1	NSP2	NSP3	NSP30	NSP4	NSP5	Unknown N/G	Total CS	NSP3			NSP30	Unknown N/G	Total inconclusive	NSP3
BE				2				2								0				0		0	2
BG								0							8	8				0		0	8
CY								0	1						1	2				0		0	2
DE	1	8		5				14								0				0		0	14
EL			1					1	7	133	32	1	3		176					0		0	177
ES	2	2	1	5		1	1	12	1	225	7			11	244					0		0	256
FI							1	1							0					0		0	1
FR				1			2	3							0					0		0	3
HU	4	6	2	2				14							0					0		0	14
IE		1						1							0					0		0	1
IT		1	4	1				6		84	5		3	10	102	7	2	3	12	1	1	1	121
PL	1	2	2					5							0					0		0	5
PT	1	5	10	2				18		3	1			1	5					0		0	23
RO						1		1	1	7	18	3	3	20	52					0		0	53
SE				1				1							0					0		0	1
SK	2	1		1			1	5							0					0		0	5
Total EU27	11	26	20	20	0	2	5	84	1	16	463	48	4	26	31	589	7	2	3	12	1	1	686
UK	3	7	3	1				14							0					0		0	14
Total EU27 + UK	14	33	23	21	0	2	5	98	1	16	463	48	4	26	31	589	7	2	3	12	1	1	700
IS								0			9				44	53				0		0	53
NO		5		7				12							0					0		0	12
Total other non-EU	0	5	0	7	0	0	0	12	0	0	9	0	0	0	44	53	0	0	0	0	0	0	65
Total	14	38	23	28	0	2	5	110	1	16	472	48	4	26	75	642	7	2	3	12	1	1	765

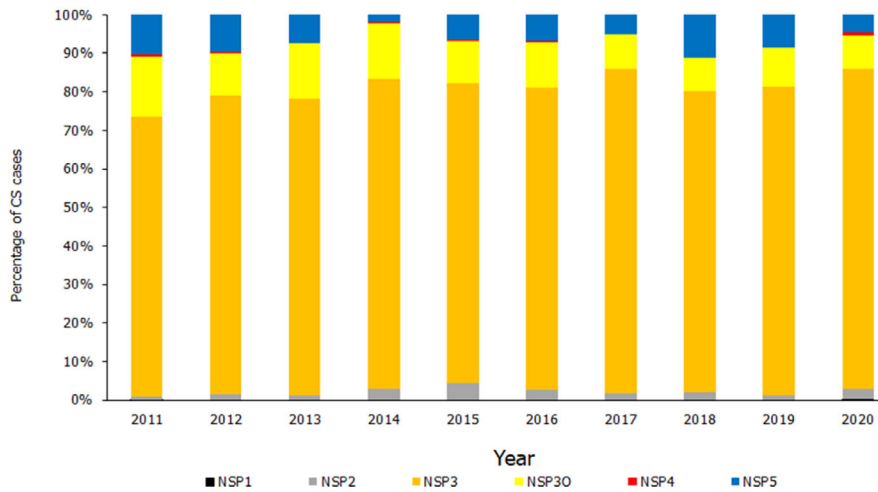
(a): Unknown: genotype other than those included in the NSP list.

(b): N/G: not genotyped.

(a): AS cases



(b): CS cases



(a) Atypical scrapie. (b) Classical scrapie. NSP1: resistant (black); NSP2: semi-resistant (grey); NSP3 (orange) + NSP3O (yellow) + NSP4 (red) + NSP5 (purple): susceptible as referred to in Table 35.

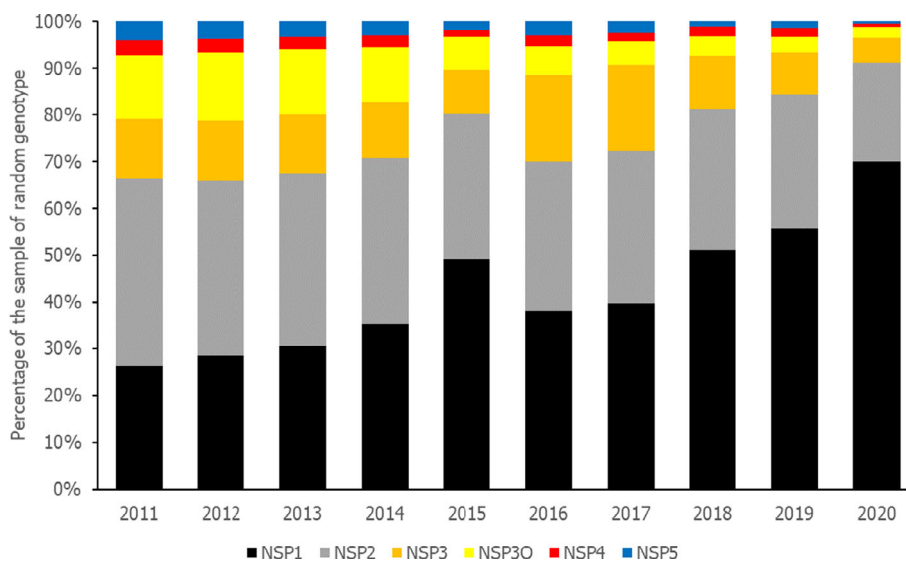
Figure 4: Frequency distribution of genotypes of sheep scrapie cases by case type, year and National Scrapie Plan (NSP) group in the period 2011–2020 in the reporting countries

Table 37: Number of genotyped animals (% of sample within country) in randomly selected sheep in the EU and other reporting countries in 2020 by reporting country and National Scrapie Plan (NSP) group, in accordance with Regulation (EC) 999/2001, Annex VII, Chapter C, Part I, point 8

Country	Number of genotyped animals (% of sample within country)							Total
	NSP1	NSP2	NSP3	NSP3O	NSP4	NSP5	Other/ unknown	
AT	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
BE	488 (68%)	145 (20.2%)	41 (5.7%)	33 (4.6%)	7 (1%)	4 (0.6%)	0 (0%)	718
BG	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
CY ^(a)	57,833 (91.6%)	4,677 (7.4%)	197 (0.3%)	64 (0.1%)	156 (0.2%)	17 (0%)	222 (0.4%)	63,166
CZ	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
DE	3,780 (78.9%)	803 (16.8%)	125 (2.6%)	64 (1.3%)	11 (0.2%)	1 (0%)	8 (0.2%)	4,792
DK	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
EE	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
EL	18 (13.5%)	56 (42.1%)	42 (31.6%)	12 (9%)	3 (2.3%)	2 (1.5%)	0 (0%)	133
ES	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
FI	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
FR	255 (64.9%)	95 (24.2%)	26 (6.6%)	4 (1%)	8 (2%)	5 (1.3%)	0 (0%)	393
HR	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
HU	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
IE	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
IT	175 (28.3%)	272 (44%)	126 (20.4%)	29 (4.7%)	2 (0.3%)	11 (1.8%)	3 (0.5%)	618
LT	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
LU	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
LV	39 (59.1%)	14 (21.2%)	13 (19.7%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	66
MT	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
NL	810 (67.5%)	260 (21.7%)	47 (3.9%)	27 (2.3%)	27 (2.3%)	5 (0.4%)	24 (2%)	1,200
PL	31 (31%)	39 (39%)	13 (13%)	2 (2%)	8 (8%)	7 (7%)	0 (0%)	100
PT	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
RO	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
SE	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
SI	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
SK	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
Total EU27	63,429 (89.1%)	6,361 (8.9%)	630 (0.9%)	235 (0.3%)	222 (0.3%)	52 (0.1%)	257 (0.4%)	71,186
UK	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
Total EU27+UK	63,429 (89.1%)	6,361 (8.9%)	630 (0.9%)	235 (0.3%)	222 (0.3%)	52 (0.1%)	257 (0.4%)	71,186
BA	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
CH	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
IS	0 (0%)	0 (0%)	634 (76.8%)	133 (16.1%)	0 (0%)	58 (7%)	0 (0%)	825
ME	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
MK	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
NO	Not done	Not done	Not done	Not done	Not done	Not done	Not done	
RS	Not done	Not done	Not done	Not done	Not done	Not done	Not done	

Country	Number of genotyped animals (% of sample within country)							Total
	NSP1	NSP2	NSP3	NSP3O	NSP4	NSP5	Other/ unknown	
Total other non-EU	0 (0%)	0 (0%)	634 (76.8%)	133 (16.1%)	0 (0%)	58 (7%)	0 (0%)	825
Total	63,429 (88.1%)	6,361 (8.8%)	1,264 (1.8%)	368 (0.5%)	222 (0.3%)	110 (0.2%)	257 (0.4%)	72,011

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



The table below the figure describes the numbers of contributing MS (Cyprus excluded).

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of contributing MS	23	22	24	25	25	25	20	7	7	8
Total genotyped	8,889	8,390	8,340	9,437	9,823	9,413	8,871	2,713	3,180	7,985

Data from Cyprus were excluded. NSP1: resistant (black); NSP2: semi-resistant (grey); NSP3 (orange) + NSP3O (yellow) + NSP4 (red) + NSP5 (blue): susceptible as referred to in Table 36.

Figure 5: Frequency distribution of the six genotype National Scrapie Plan (NSP) groups in sheep sampled for genotyping in the EU in the period 2011–2020 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 2020, 9,171 cervids were tested for TSE in the EU27 by 12 MS and the UK. Six of them (Estonia, Finland, Latvia, Lithuania, Poland and Sweden, from this point forwards referred to as the MS6) were subject to mandatory surveillance (Section 1.2.4) and reduced the number of cervids tested compared with 2019, from 7,980 to 6,974 (–12.6%), but increased compared with 2018 when 5,110 were tested. The six MS not subject to mandatory surveillance that contributed to the monitoring were Austria, Belgium, Hungary, Italy, Romania and Spain that, together with the UK, tested 2,197 cervids (24% of the total). However, Austria, Belgium and the UK only reported three, one and two tested cervids, respectively.

Out of the 6,974 cervids tested by the MS6, 1,829 (26.2%) were captive, farmed or semi-domesticated animals, mostly reindeer (1,615), followed by red deer (206). Among the 5,145 (73.8%) wild cervids tested by the MS6, 3,178 (61.8%) were roe deer and 1,088 European moose (21.1%).

During the third year of mandatory surveillance in MS6, two cases of CWD in wild moose were reported by Finland and Sweden. The number of cervids tested in 2020 by management system, species and reporting country are displayed in Table 38. The description of the four CWD cases in 2020 is shown in Table 41.

When considering the target groups, the most common target group tested by the MS6 was the 'Hunted/slaughtered fit for human consumption' (HSHC) that accounted for 3,959 (56.8% of all tested cervids, being the main target group for Estonia, Lithuania, Latvia and Sweden). All the rest were risk animals in the different target groups: road/predator killed (RK): 1,953 (28%); fallen/culled (FC): 947 (13.6%); clinical suspect animals (SUS): 34 (0.5%); hunted/slaughtered not fit for human consumption (HSNHC): 81 (1.2%). There is a large variability between MS6 countries in the proportion of cervids tested in the HSHC, ranging from 8.9% tested by Poland to 92% by Latvia. The numbers of tested cervids by reporting country, management system and target group in 2020 are displayed in Table 39.

In terms of testing at PSU¹⁴ level, the number and proportion of PSU for wild/semi-domesticated and farmed/captive cervids declared and tested by the MS6 are shown in Table 40. There is a 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. The PSU data ranged from an average of one animal sampled from 6.7% (1/15) of the wild PSU in Estonia to an average of 5 (1–422) animals sampled from the 92% (46/50) of the wild PSU in Sweden. The same variability is also present in the captive/farmed deer PSU data; for some countries, the data were incomplete. Median, minimum and maximum number of cervids tested in the different types of PSU and countries of the MS6 are also displayed in Table 40.

Among the non-MS6 and the UK, Romania accounted for 68.9% of all tested cervids (1,515), followed by Italy with 437. Most tested cervids by the non-MS6 and the UK were roe deer (64.8%) due to the 70% of all cervids tested by Romania being roe deer, followed by red deer and unspecified deer. All tested cervids by the non-MS6 resulted negative.

Norway continued its intensified testing programme in wild and captive cervids and tested 22,528 animals in 2020, mostly semi-domesticated reindeer (28.9%), followed by wild moose (27.5%), leading to the detection of two cases of CWD: one in wild reindeer and one in moose (Table 41). Iceland and Serbia also reported 33 and 76 cervids tested in 2020, respectively, all negative.

¹⁴ The criteria to identify the Primary Sampling Units (PSU) by each of the MS6 are described in the 2018 EFSA EUSR (EFSA, 2019).

Table 38: Number of cervids tested in the reporting countries in 2020 by management system, species and country

Management system species ^(a) Country ^(b)	Semi-domesticated/farmed deer species								Wild deer species								Total
	Deer	Moose	Fallow deer	Reindeer	Roe deer	Red deer	White-tailed deer	Subtotal	Deer	European moose	Fallow deer	Reindeer	Roe deer	Red deer	White-tailed deer	Subtotal	
AT						3		3									3
BE														1			1
ES									90		14		9	112			225
HU						1		1					10	3			13
IT			6		2	1		9			34		339	55			428
RO									190		72		1064	189			1,515
Subtotal non-MS6	0	0	6	0	2	5		13	280				1,422	360			2,182
UK	2							2									2
Subtotal non-MS6 + UK	2	0	6	0	2	5		15	280				1,422	360			2,182
EE ^(c)	1							1		312			932	191			1,435
FI		1		624			3	628		199		7	255	1	122		584
LT						8		8		65	3		535	233			836
LV			1			21		22		198			496	250			944
PL					1	95		96		66			889	67			1,022
SE			1	991		82		1,074		248	3		71	2			324
Subtotal MS6	1	1	2	1,615	1	206	3	1,829	0	1,088	6	7	3,178	744	122		5,145
TOTAL EU27 + UK	3	1	8	1,615	3	211	3	1,844	280	1,088	126	7	4,600	1,104	122		7,327
IS												33					33
NO	45	1	87	6,517	2	823		7,475	361	6,199	5	3,210	1,829	3,449			15,053
RS					49	27		76									0
TOTAL other non-EU	45	1	87	6,517	51	850	0	7,551	361	6,199	5	3,243	1,829	3,449	0		15,086
TOTAL	48	2	95	8,132	54	1,061	3	9,395	641	7,287	131	3,250	6,429	4,553	122		22,413

(a): Deer: not specified. Moose (or Eurasian/European elk) (*Alces alces alces*). Fallow deer (*Dama dama*). Reindeer: Eurasian tundra reindeer (*Rangifer tarandus tarandus*) in Sweden; Finnish (Eurasian) forest reindeer (*Rangifer tarandus fennicus*) in Finland; Roe deer (*Capreolus capreolus*); Red deer (*Cervus elaphus*). White-tailed deer (*Odocoileus virginianus*).

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

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

Table 39: Number of cervids tested in the EU and reporting countries by management system, species, country and target group in 2020 (extended version of Table 38)

Management system species ^(a) Country ^(b) and target group ^(c)	Semi-domesticated/farmed deer species								Wild deer species								Total	
	Deer	Moose	Fallow deer	Reindeer	Roe deer	Red deer	White-tailed deer	Subtotal	Deer	European Moose	Fallow deer	Reindeer	Roe deer	Red deer	White-tailed deer	Subtotal		
AT	SUS					2		2									2	
	HSNHC					1		1									1	
	Total					3		3									3	
BE	FC												1			1	1	
	Total												1			1	1	
ES	SUS												1			1	1	
	RK												2			2	2	
	FC								60		14		4	111		189	189	
	HSNHC								30				3			33	33	
	Total								90		14		9	112		225	225	
HU	SUS												6	1		7	7	
	FC					1		1					4	2		6	7	
	Total					1		1					10	3		13	14	
IT	SUS					1		1			1		13	11		25	26	
	RK										25		249	29		303	303	
	FC			6		1	1	8			8		77	15		100	108	
	Total			6		2	1	9			34		339	55		428	437	
RO	RK								3				8			11	11	
	FC								15		11		67	10		103	103	
	HSHC								172		61		989	179		1401	1,401	
	Total								190		72		1,064	189		1,515	1,515	
UK	SUS	2						2									2	
	Total	2						2									2	
Subtotal non-MS6 + UK		2	0	6	0	2	5	0	15	280	0	120	0	1,422	360	0	2,182	2,197

Management system species ^(a) Country ^(b) and target group ^(c)	Semi-domesticated/farmed deer species								Wild deer species							Total	
	Deer	Moose	Fallow deer	Reindeer	Roe deer	Red deer	White-tailed deer	Subtotal	Deer	European Moose	Fallow deer	Reindeer	Roe deer	Red deer	White-tailed deer		Subtotal
EE^(d)	RK							0		10			265			275	275
	FC	1						1					31			31	32
	HSNHC									1						1	1
	HSHC									301			636	191		1128	1,128
	Total	1						1		312			932	191		1,435	1,436
FI	RK			406				406	42		4	216	1	82	345	751	
	FC			155			3	158	60		3	25		35	123	281	
	HSNHC			45				45	7					3	10	55	
	HSHC		1	18				19	90			14		2	106	125	
	Total		1	624			3	628	199		7	255	1	122	584	1,212	
LT	RK								5			103	31		139	139	
	FC							3	8			36	15		59	62	
	HSNHC											1			1	1	
	HSHC							5	52	3		395	187		637	642	
	Total						8	8	65	3		535	233		836	844	
LV	SUS		1					1	2			5	2		9	10	
	RK								2			18	3		23	23	
	FC								7			28	9		44	44	
	HSHC							21	187			445	236		868	889	
	Total		1				21	22	198			496	250		944	966	
PL	RK								45			609	37		691	691	
	FC							55	20			237	9		266	321	
	HSNHC											5	1		6	6	
	HSHC					1	40	41	1			38	20		59	100	
	Total					1	95	96	66			889	67		1,022	1,118	

Management system species ^(a) Country ^(b) and target group ^(c)	Semi-domesticated/farmed deer species								Wild deer species							Total		
	Deer	Moose	Fallow deer	Reindeer	Roe deer	Red deer	White-tailed deer	Subtotal	Deer	European Moose	Fallow deer	Reindeer	Roe deer	Red deer	White-tailed deer		Subtotal	
SE	SUS									19	2		3			24	24	
	RK				54			54		2			18			20	74	
	FC			1	38		7	46		111	1		47	2		161	207	
	HSNHC				2		1	3		13			2			15	18	
	HSHC				897		74	971		103			1			104	1,075	
	Total			1	991		82	1,074		248	3		71	2		324	1,398	
Subtotal MS6		1	1	2	1,615	1	206	3	1,829	0	1,088	6	7	3,178	744	122	5,145	6,974
Total EU+UK		3	1	8	1,615	3	211	3	1,844	280	1,088	126	7	4,600	1,104	122	7,327	9,171
IS	RK											1				1	1	
	HSHC											32				32	32	
	Total											33				33	33	
NO	RK	2			27			29	3	325			1,209	256		1793	1,822	
	FC	1	1		30	2	17	51	41	358		45	349	192		985	1,036	
	HSHC	42		87	6,460		806	7,395	317	5,516	5	3,165	271	3,001		12275	19,670	
	Total	45	1	87	6,517	2	823	7,475	361	6,199	5	3,210	1,829	3,449		15,053	22,528	
RS	RK					3	3	6									6	
	HSHC					46	24	70									70	
	Total					49	27	76									76	
Total non-EU		45	1	87	6,517	51	850	0	7,551	361	6,199	5	3,243	1,829	3,449	0	15,086	22,637
Total		48	2	95	8,132	54	1,061	3	9,395	641	7,287	131	3,250	6,429	4,553	122	22,413	31,808

(a): Deer: not specified. Moose (or Eurasian/European elk) (*Alces alces alces*). Fallow deer (*Dama dama*). Reindeer: Eurasian tundra reindeer (*Rangifer tarandus tarandus*) in Sweden; Finnish (Eurasian) forest reindeer (*Rangifer tarandus fennicus*) in Finland. Roe deer (*Capreolus capreolus*); Red deer (*Cervus elaphus*). White-tailed deer (*Odocoileus virginianus*).

(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.

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

Table 40: Number of PSU by management type in the six MS with mandatory CWD surveillance in 2020

Management system	PSU (wild)				PSU (captive/farmed deer)					
	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	1 (6.7%)	1 (1–1)	15	11 (73%)	159 (2–285)	15	11 (73%)	123 (1–285)
FI^(a)		295	56 (19%)	9 (1–38)	54 ^(b)	102 (188%)	2 (1–80)	349	155 (43.2%)	2 (1–80)
LT		51	Not available		655 ^(c)	Not available			Not available	
LV^(d)			3	8 (1–12)		176	5 (1–29)	100	179 (179%)	5 (1–29)
PL^(e)		16	2 (18.8%)	4 (1–7)	16	14 (93.7%)	15 (2–42)	16	14 (93.7%)	12 (1–42)
SE^(f)		50	46 (92%)	5 (1–422)	160 (109 (farmed) + 51 semi-domesticated)	44 (27.5%)	4 (1–74)	210	90 (43%)	5 (1–422)

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

(a): 1 semi-domesticated cervid 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): 1 semi-domesticated/farmed and 8 wild cervids reported with unknown PSU ID excluded.

(e): 88 semi-domesticated/farmed and 768 wild cervids reported with unknown PSU ID excluded.

(f): 1 semi-domesticated/farmed and 3 wild cervids reported with unknown PSU ID excluded.

Table 41: Description of the CWD cases in 2020

Country	National case ID	Management system	Species	Sex	Age group	Target group	Part sampled	Analytical method type	Analytical method	Result
EU										
FI	E20201029-178/ HVCW-1296	Wild deer	European moose	Female	≥ 12 months	FC ^(a)	Brain	Confirmatory	Bio-Rad TeSeE Western blot	Positive
SE	6.3.17-14619/2020	Wild deer	European moose	Female	≥ 12 months	HSNHC ^(b)	Obex	Screening	Bio-Rad TeSeE SAP rapid test (using the CWD protocol)	Positive
								Screening	Bio-Rad TeSeE SAP rapid test (using the CWD protocol)	Negative
								Confirmatory	Bio-Rad TeSeE Western blot	Positive
							Retropharyngeal lymph node	Screening	Bio-Rad TeSeE SAP rapid test (using the CWD protocol)	Negative
Non-EU										
NO	4	Wild deer	European moose	Female	≥ 12 months	FC	Obex	Screening	Bio-Rad TeSeE SAP rapid test (using the CWD protocol)	Positive
								Discriminatory test	APHA Bio-Rad TeSeE-based hybrid Western blotting Method	Positive
	7	Wild deer	Reindeer	Male	≥ 12 months	HSHC ^(c)	Retropharyngeal lymph node	Screening	Bio-Rad TeSeE SAP rapid test (using the CWD protocol)	Positive
								Discriminatory test	APHA Bio-Rad TeSeE-based hybrid Western blotting Method	Positive

(a): FC: fallen/culled.

(b): HSNHC: hunted/slaughtered not fit for human consumption.

(c): HSHC: hunted/slaughtered fit for human consumption.

3.4. Other species

Only one MS, Finland, reported results on samples tested for TSE in species other than cattle, domestic sheep and goats, and cervids. In total, 101 samples were collected and tested from the following species: American mink (*Neovison vison*), raccoon dog (*Nyctereutes procyonoides*) and fox (genus *Vulpes*). 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 2020

Country	American mink (<i>Neovison vison</i>)	Raccoon dog (<i>Nyctereutes procyonoides</i>)	Fox (genus <i>Vulpes</i>)	Total
FI	51	15	35	101
Total	51	15	35	101

4. Conclusions

As part of the BSE surveillance system in cattle in the EU, the EU27 and the UK tested over 1.12 million cattle in 2020, 2.4% less than in the previous year. The testing throughput combined with a risk-based strategy (88.5% of all tests targeted risk animals) contributed to maximise the sensitivity of the BSE surveillance system considering the EU27 and the UK as a single epidemiological unit. The epidemic of SARS-CoV-2 seems not to have affected the capacity of the reporting countries to collect, transport and test cattle samples in 2020.

In EU27, four atypical cases of BSE (one L-BSE and three H-BSE cases) were confirmed in 2020 by three reporting countries: France (one H-BSE and one L-BSE), Ireland (one L-BSE), and Spain (one H-BSE). In total, 51,775 cattle were tested by seven other non-EU reporting countries, with one additional L-BSE case reported by Switzerland. Among non-EU reporting countries, Serbia was the main contributor of testing activity with 13,978 cattle tested, followed by Bosnia and Herzegovina, a new reporting country, who tested 12,848 cattle. Both countries reported mostly cattle tested in the HS target group.

While 2017 was the first year in which there were no cases of C-BSE confirmed in the world, there have been for the first time two consecutive years (2019 and 2020) without C-BSE cases confirmed. The last case of C-BSE was reported in 2018. The monitoring of risk animals led the detection of H- and L- forms in both fallen stock (four cases) and emergency slaughter animals (the Swiss case). No other cases were reported outside Europe in 2020.

In total, 453,194 small ruminants were tested in 2020 in the EU27 and the UK, as part of the TSE surveillance system, leading to an overall testing of more than 10 million tests since 2002. Twenty-three countries in the group EU27 and the UK complied with the EU monitoring requirements for sheep and 24 countries for goats. Compared with 2019, there was a slight decrease in the detection of the ovine IC (CS and AS), from 177 to 169 and this occurred despite the 2.2% increase in the level of testing in non-infected flocks. This may be consistent with a continuous decrease in the overall incidence of the disease in this species. Over the same period, the number of caprine IC (CS and AS) increased by 79%, from 34 to 61, despite the 14% decrease in testing in non-infected herds. The new reporting country, Bosnia and Herzegovina, did not report any tests in small ruminants.

For CS in sheep in 2020 in the EU27 and the UK and compared with 2019, the caseload decreased by 35.4% as a result, partially, of a decrease in testing in TSE-infected flocks by 29.5%. The four largest contributors reduced their caseload from TSE-infected flocks: Greece by 36.2%, Italy by 40.4%, Romania by 63.1% and Spain by 21.8%. CS is reported by a minority of the MS, seven, as in 2019.

In goats, in total of 319 out of 328 scrapie cases reported in the EU27 and the UK in 2020 were CS (97.3%). They were reported by six MS and the UK. Compared with 2019 when 379 CS cases were reported, there was a 15.8% reduction (–60) mainly due to the situation in Cyprus that has improved continuously over the last 7 years.

When looking at the long-term trends of CS in terms of cases per 10,000 tests, the situation in 2020 confirmed the 10-year statistically significant decrease in sheep and no detectable trend in goats, respectively, as estimated by modelling of the available epidemiological data. Genetic-based culling and outbreak management in herds based on goats carrying at least one of the known resistant alleles (i.e.

K222, D146 and S146) are now applicable, following the amendment of the TSE regulation. If fully applied, the trend of CS in goats could be aligned with that of the CS in sheep in the next few years.

With regard to AS in sheep in EU27 and the UK, compared with 2019, testing activity resulted in a 14% increase in reported cases, from 86 in 2019 to 98 in 2020, which was similar for the proportion of cases per 10,000 tested animals (active surveillance) (from 2.5 to 2.6) and for the number of MS reporting cases (from 11 to 14). In goats, the AS situation was very similar to the previous year in terms of caseload and proportion of cases per 10,000 tested animals (0.76 in 2019 and 0.74 in 2020) and number of IC. 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 2020 from ovine CS cases consistently confirmed the association between the occurrence of the disease and the susceptible genotypes (NSP3, NSP30, NSP4 or NSP5), with 97% of the cases with known NSP genotype carrying them. Romania reported a CS case in a sheep holding the ARR/ARR genotype (NSP1), a very rare occurrence, that was also reported by Spain in one case in 2019. The 2020 genotyping data from random samples of the EU sheep population (data from eight MS after excluding Cyprus) did show an improvement compared with the previous years with an 8.8% of the genotyped sheep carrying genotypes of the susceptible group, compared with the 15.7% in 2019. The NSP1 group (i.e. ARR/ARR) accounted for 70% of all genotyped sheep. However, some caution is needed in interpreting this result as it could reflect the small number of MS contributing with data. Countries in which the caseload is large still showed a high proportion of susceptible sheep.

The enforcement of the 3-year CWD surveillance programme in six MS – Estonia, Finland, Latvia, Lithuania, Poland and Sweden – ended in 2020 with a 12.6% decrease in the number of cervids tested compared with the previous year and the confirmation of two cases of CWD in moose from Finland and Sweden. The implementation of the mandatory surveillance in the six MS has been 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 of the distribution of testing by species and target groups. The HSHC groups was the most tested group (56.8%) in 2020, consolidating a situation in which the sensitivity of the surveillance system to detect CWD is lower than expected following the proposed surveillance system by EFSA in 2017 (EFSA BIOHAZ Panel, 2017b).

The surveillance was complemented by the additional 2,197 cervids tested by other six MS (68.9% of them tested by Romania) with no additional cases detected. Iceland and Serbia also reported 33 and 76 cervids tested in 2020, all negative.

Norway continued its intensified testing programme in wild and captive cervids and tested 22,528 cervids in 2020, leading to the detection of two cases, one wild reindeer and one wild moose.

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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
CWD	Chronic wasting disease
DCF	Data Collection Framework
DWH	Data Warehouse
EFTA	European Free Trade Association
EM	Eradication measures
ES	Emergency slaughtered
EUSR	European Union summary report
FC	Fallen/culled
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
IC	Index case/s
IPA	Instrument for Pre-Accession Countries
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
NUTS	Nomenclature of Units for Territorial Statistics
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

Country codes

Austria	AT
Belgium	BE
Bosnia and Herzegovina	BA

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

EU-27 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.

Non-EU countries: BA, CH (including Lichtenstein); IS; ME; MK; NO; RS; UK.

Appendix A – Additional surveillance data

Table A.1: BSE active monitoring in relation to the adult bovine population (age > 2 years) in 2020

EU/non-EU groups	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	842,440	18,442	2.2%
	BE	1,162,810	26,315	2.3%
	BG	405,920	7,368	1.8%
	CY	40,270	1,804	4.5%
	CZ	640,010	25,593	4%
	DE	5,258,320	175,367	3.3%
	DK	697,000	24,206	3.5%
	EE	131,800	3,691	2.8%
	EL	295,000	1,637	0.6%
	ES	3,242,410	62,358	1.9%
	FI	344,310	11,247	3.3%
	FR	9,640,610	200,322	2.1%
	HR	166,000	4,934	3%
	HU	472,000	10,820	2.3%
	IE	2,764,830	63,976	2.3%
	IT	3,031,020	49,063	1.6%
	LT	332,400	4,156	1.3%
	LU	100,100	2,724	2.7%
	LV	221,188	3,259	1.5%
	MT	6,940	291	4.2%
	NL	1,716,000	59,981	3.5%
	PL	2,744,300	52,840	1.9%
	PT	908,730	17,051	1.9%
	RO	1,302,100	6,615	0.5%
	SE	603,140	9,049	1.5%
	SI	199,230	6,217	3.1%
SK	229,260	9,833	4.3%	
	Total EU	37,499,000	859,159	2.3%
	UK	3,994,000 ^(c)	134,031	3.4%
	Total EU + UK	41,493,000	993,190	2.4%
Other non-EU	BA	259,000	22	0%
	CH	n/a ^(d)	11,051	
	IS	37,000	14	0%
	ME	n/a ^(d)	1	
	MK	150,000	0	0%
	NO	353,700	6,704	1.9%
	RS	486,000	3,926	0.8%
	Total other non-EU	1,285,700	21,718	1.7%
	Total	42,778,700	1,014,908	4.1%

Norway's cattle population taken from the TSE EUSR report 2019 (EFSA, 2020).

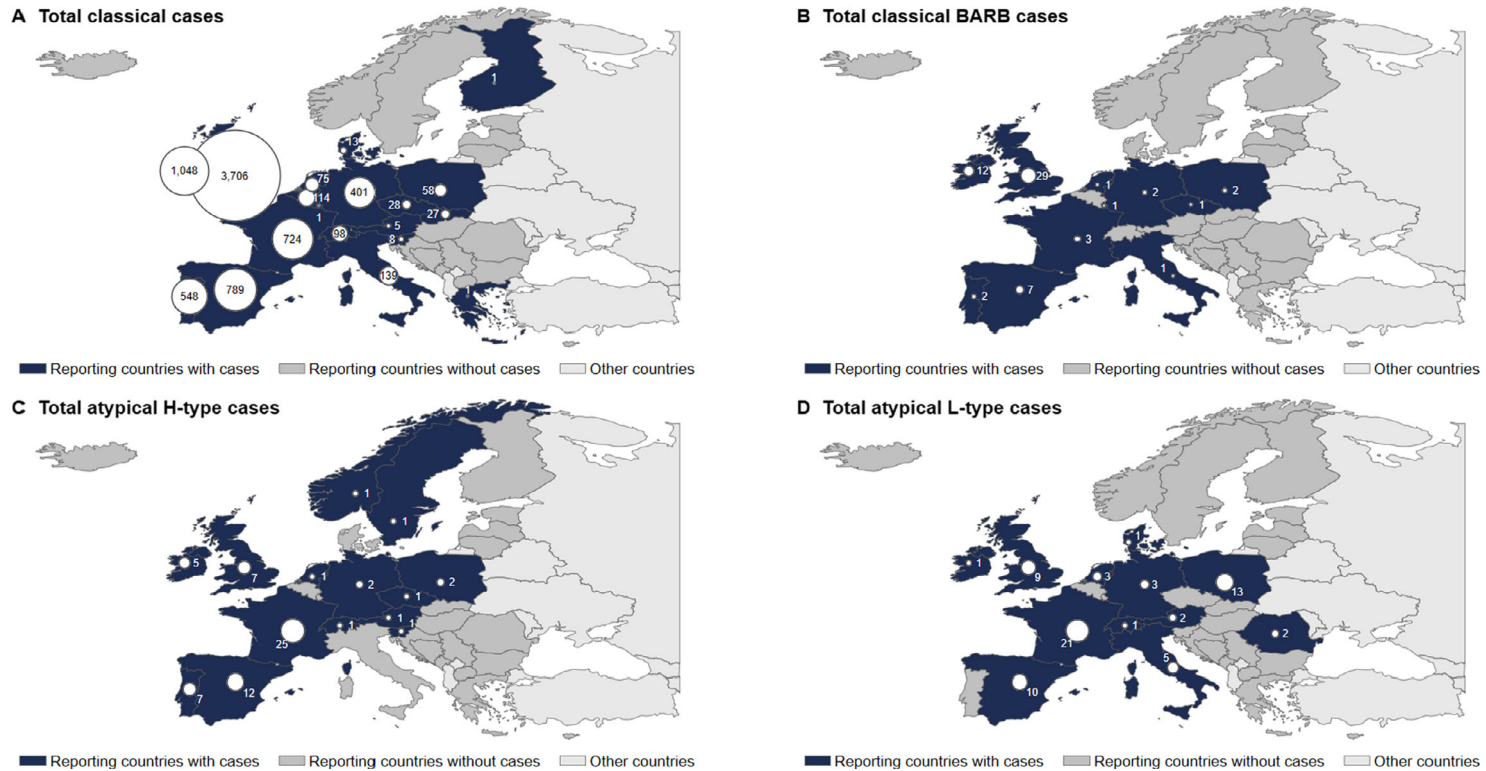
(a): Taken from https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=apro_mt_lscat&lang=en (Bovine animals, 2 years or older).

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

(c): Taken from <https://www.gov.uk/government/statistical-data-sets/structure-of-the-livestock-industry-in-england-at-December> (Bovine animals, 2 years or older in June 2020).

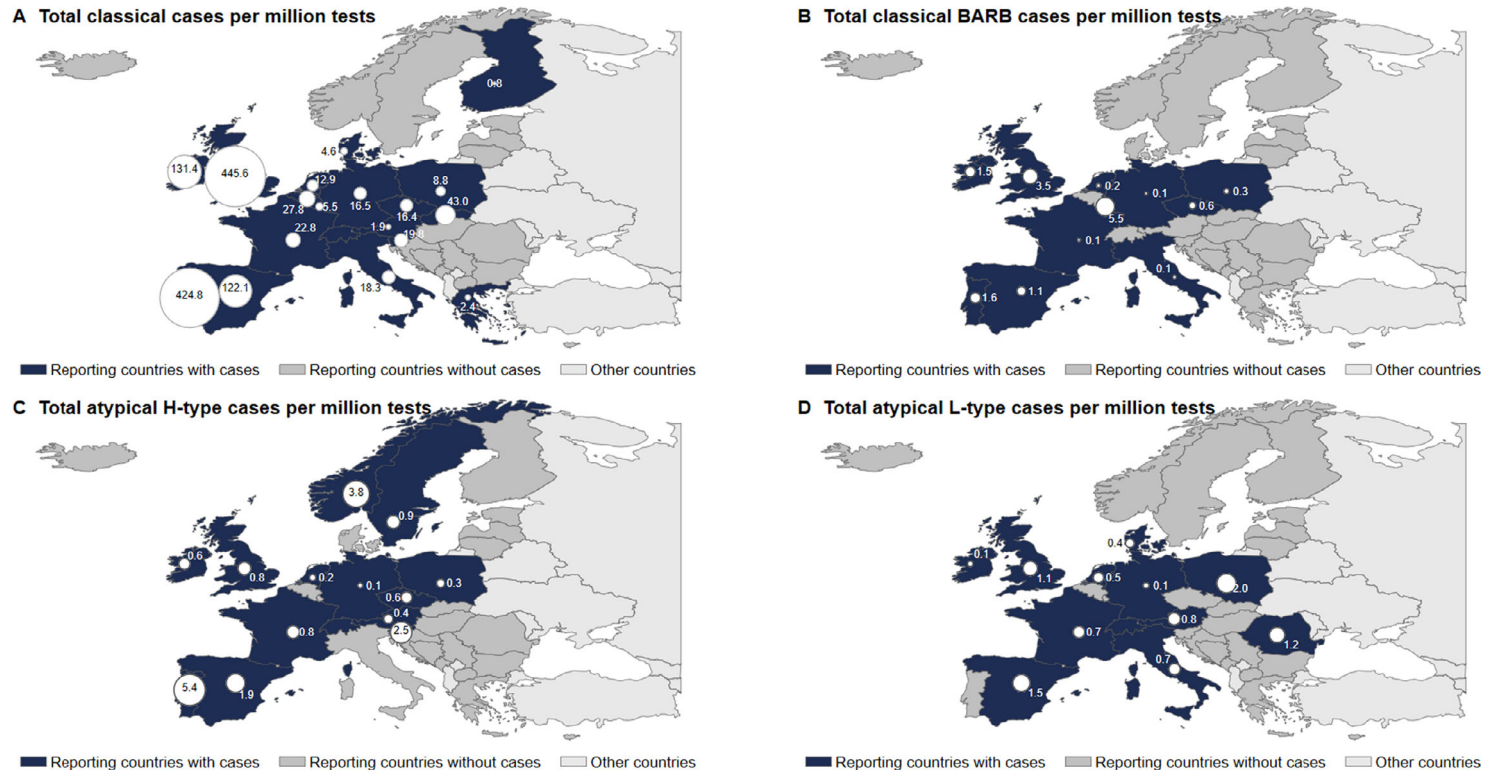
(d): Not available.

Appendix B – Geographical distribution of BSE in the period 2001–2020



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

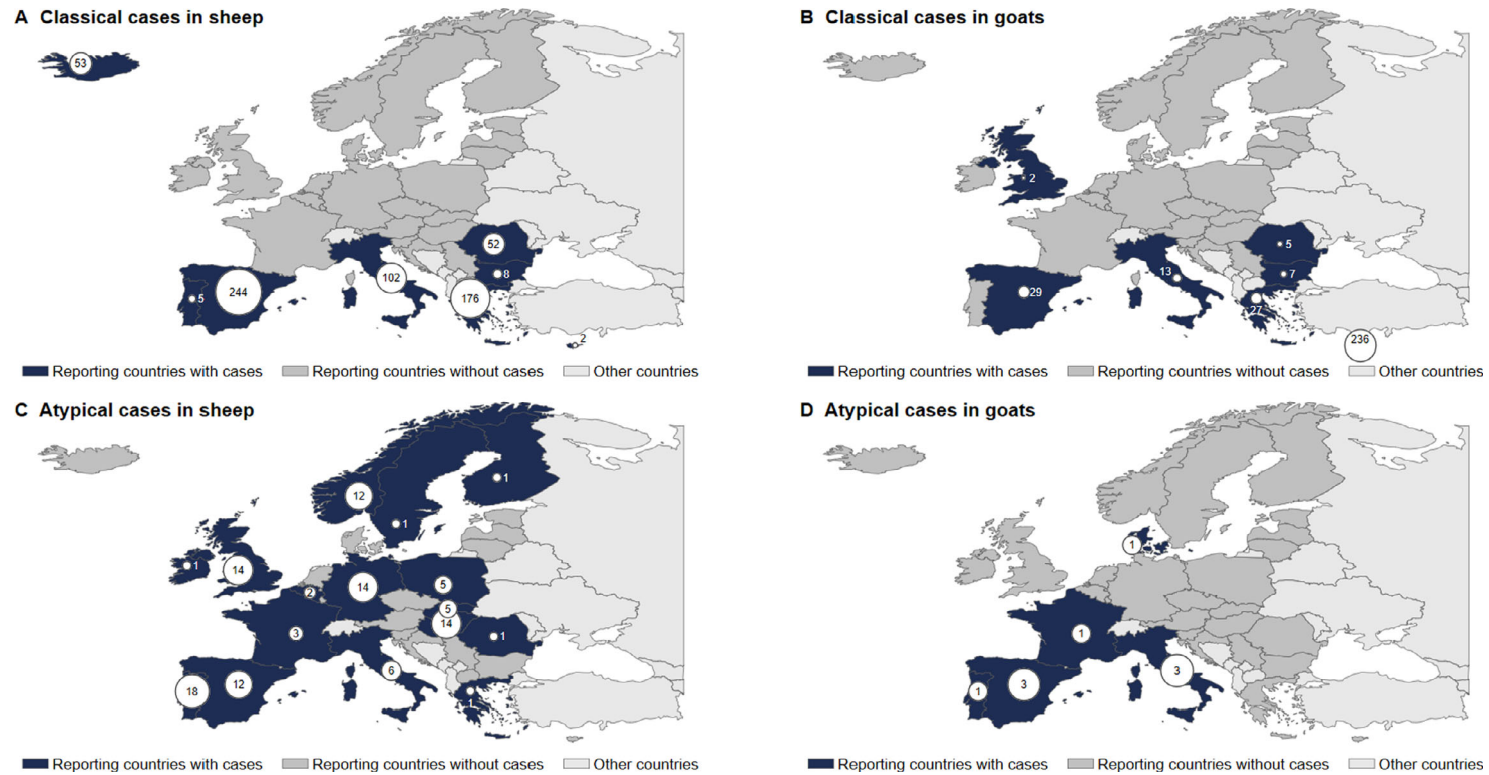
Figure B.1: Geographical distribution of cumulative number of cases of C-BSE (A), BARB cases (B), H-BSE (C) and L-BSE (D) in the period 2001–2020



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

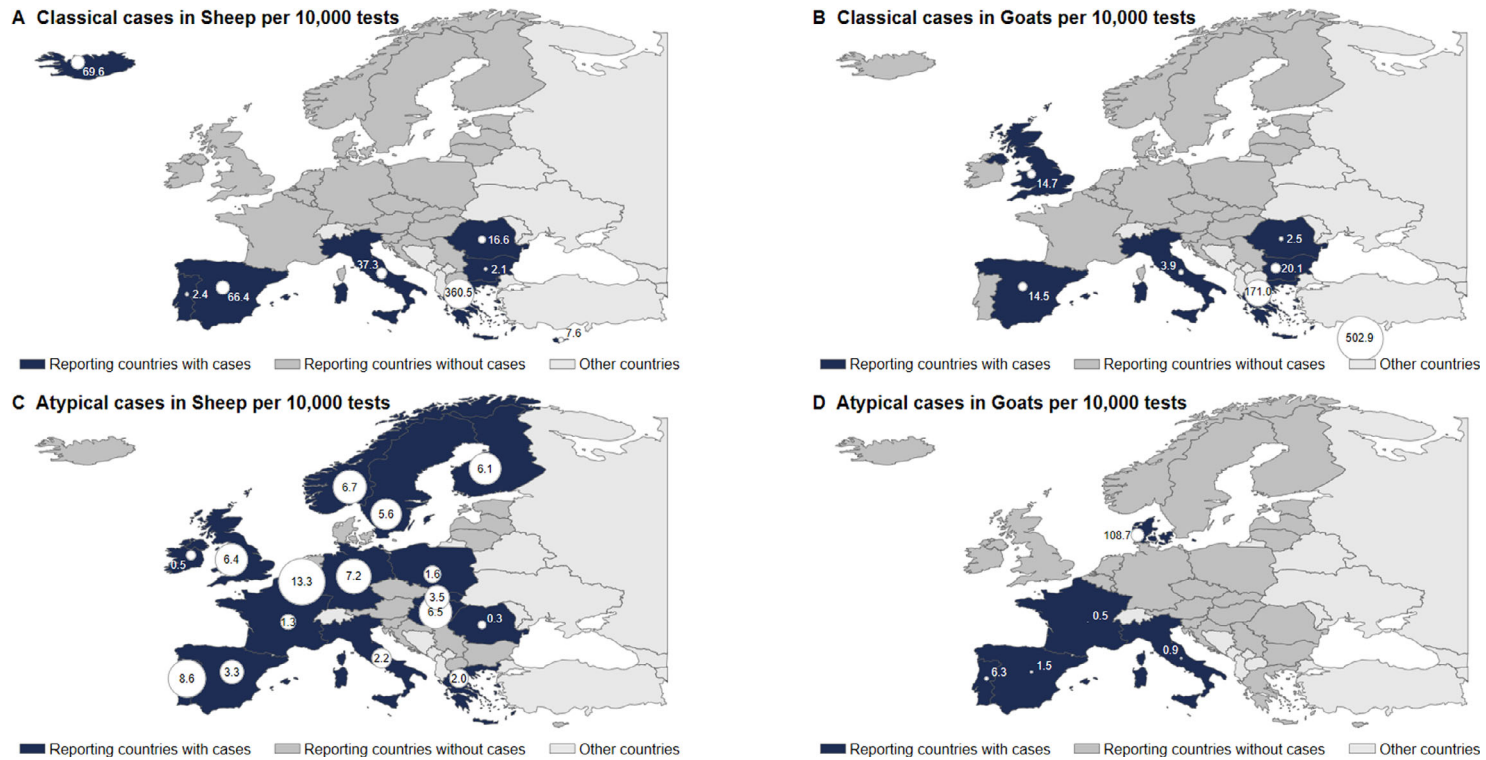
Figure B.2: Country-specific BSE cases per million tests by case type in the period 2001–2020 in the EU

Appendix C – Geographical distribution of scrapie in 2020



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 2020 in the reporting countries



The size of the circles is proportional to the measurements and is 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 2020

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 2020

Country	Cattle	Sheep	Goats
AT	9	0	0
BE	0	0	0
BG	0	8	7
CY	0	7,690	19,673
CZ	5	0	0
DE	0	12	8
DK	1	0	1
EE	0	0	0
EL	763	560	494
ES	0	0	259
FI	0	0	0
FR	3	0	0
HR	0	0	0
HU	13	0	0
IE	2,742	12	0
IT	0	3	0
LT	0	0	0
LU	0	0	0
LV	1	0	1
MT	0	0	0
NL	0	0	0
PL	1,052	2	0
PT	14	0	0
RO	406	5,402	260
SE	0	0	0
SI	0	0	0
SK	0	0	0
Total EU27	5,009	13,689	20,703
UK	1	0	1
Total EU27 + UK	5,010	13,689	20,704
BA	0	0	0
CH	24	0	0
IS	0	0	0
ME	0	0	0
MK	0	0	0
NO	0	2	0
RS	2,696	0	0
Total other non-EU	2,720	2	0
Total	7,730	13,691	20,704

Table D.2: Number of flocks for which suspected cases in ovine and caprine animals have been reported and investigated pursuant to Article 12(1) and (2) in 2020

Country	Sheep	Goats
AT	0	0
BE	0	0
BG	6	4
CY ^(a)	7	31
CZ	0	0
DE	12	8
DK	0	1
EE	0	0
EL	3	1
ES	0	1
FI	0	0
FR	0	0
HR	0	0
HU	0	0
IE	2	0
IT	1	0
LT	0	0
LU	0	0
LV	0	1
MT	0	0
NL	0	0
PL	2	0
PT	0	0
RO	14	5
SE	1	1
SI	0	0
SK	0	0
Total EU27	48	53
UK	0	1
Total EU27 + UK	48	54
BA	0	0
CH	0	0
IS	6	1
ME	0	0
MK	0	0
NO	2	0
RS	0	0
Total other non-EU	8	1
Total	56	55

(a): In addition, 34 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 2020

Country	Sheep SHC	Sheep NSHC	Sheep EM ^(a)	Goats SHC	Goats NSHC	Goats EM	Other ^(b)
AT	113	1,761	1	26	529	0	0
BE ^(c)	0	n/a	0	0	n/a	0	0
BG	12	22	2	109	6	15	0
CY ^(d)	0	569	0	0	270	0	57,288
CZ	9	955	0	0	206	0	0
DE	4,631	3,971	2	166	662	0	138
DK ^(e)	n/a	n/a	n/a	n/a	n/a	n/a	0
EE	0	58	0	0	3	0	0
EL	228	195	23	58	68	8	0
ES	812	4,424	68	823	2,005	12	0
FI	5	424	0	0	47	0	0
FR	4,706	18,694	41	4,219	16,953	0	0
HR	0	770	0	0	221	0	0
HU	1,619	1,755	0	38	48	0	0
IE	4,840	7,721	0	0	40	0	0
IT	4,015	5,286	44	4,161	3,635	21	0
LT	0	648	0	0	32	0	0
LU	0	98	0	0	101	0	0
LV	0	69	0	0	13	0	0
MT	13	45	0	10	66	0	0
NL	0	1,568	0	0	1,568	0	0
PL	1,258	3,239	0	141	1,157	0	0
PT	1,130	5,627	43	0	803	3	0
RO	9,648	5,506	10	2,383	1,985	2	0
SE	2	964	0	0	66	0	0
SI	49	1,286	0	14	363	0	0
SK	7	482	0	1	83	0	0
UK	> 322	> 6,128	1	0	> 195	1	0
BA	0	0	0	0	0	0	0
CH	n/a	n/a	n/a	n/a	n/a	n/a	0
IS	202	58	6	6	3	1	0
ME	0	0	0	0	0	0	0
MK	0	0	0	0	0	0	0
NO	3,241	3,976	10	18	199	0	0
RS	0	0	0	0	0	0	0

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

(a): Flocks and herds tested under EM include classical scrapie and atypical scrapie affected establishments.

(b): 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).

(c): The Belgian competent authority informed that, in the central database for sheep and goat identification, there is no direct link between the official ear tag number and the last holding where the sheep or goat was kept. Only the herd of birth is registered in the central database. At the rendering plant, sheep and goats are randomly sampled during the year.

(d): In addition, 34 mixed flocks (sheep and goats).

(e): The Danish competent authority informed that in the central database for sheep and goat identification, there is no direct link between the official ear tag number and the last holding where the sheep or goat was kept.

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 2020 monitoring data year are the 27 EU Member States, the UK and seven other non-EU Member States.

Table E.1: Links to the TSE data sets for 2020 by reporting country

Country	Link to the data set
EU Member States	
AT	https://doi.org/10.5281/zenodo.4091585
BE	https://doi.org/10.5281/zenodo.4091591
BG	https://doi.org/10.5281/zenodo.4091602
CY	https://doi.org/10.5281/zenodo.4091604
CZ	https://doi.org/10.5281/zenodo.4091616
DE	https://doi.org/10.5281/zenodo.4091621
DK	https://doi.org/10.5281/zenodo.4091627
EE	https://doi.org/10.5281/zenodo.4091635
EL	https://doi.org/10.5281/zenodo.4091641
ES	https://doi.org/10.5281/zenodo.4091643
FI	https://doi.org/10.5281/zenodo.4091647
FR	https://doi.org/10.5281/zenodo.4091649
HR	https://doi.org/10.5281/zenodo.4091653
HU	https://doi.org/10.5281/zenodo.4091655
IE	https://doi.org/10.5281/zenodo.4091659
IT	https://doi.org/10.5281/zenodo.4091663
LV	https://doi.org/10.5281/zenodo.4091665
LU	https://doi.org/10.5281/zenodo.4091671
LT	https://doi.org/10.5281/zenodo.4091673
MT	https://doi.org/10.5281/zenodo.4091678
NL	https://doi.org/10.5281/zenodo.4091684
PL	https://doi.org/10.5281/zenodo.4091686
PT	https://doi.org/10.5281/zenodo.4091688
RO	https://doi.org/10.5281/zenodo.4091691
SE	https://doi.org/10.5281/zenodo.4091703
SI	https://doi.org/10.5281/zenodo.4091693
SK	https://doi.org/10.5281/zenodo.4091709
UK	https://doi.org/10.5281/zenodo.4091711
Other non-EU Member States	
BA	https://doi.org/10.5281/zenodo.5652825
CH	https://doi.org/10.5281/zenodo.4091716
IS	https://doi.org/10.5281/zenodo.4091719
ME	https://doi.org/10.5281/zenodo.4091723
MK	https://doi.org/10.5281/zenodo.4091725
NO	https://doi.org/10.5281/zenodo.4091727
RS	https://doi.org/10.5281/zenodo.4091730