

TECHNICAL REPORT

"Schmallenberg" virus: analysis of the epidemiological data

(May 2013)

European Food Safety Authority^{1, 2, 3}

European Food Safety Authority (EFSA), Parma, Italy

SUMMARY

Following the request from the European Commission for EFSA to continue to collect data and provide updates of the epidemiological situation on Schmallenberg virus (SBV) in the EU, data received during the reporting period was analysed, updating the previously published report on the analysis of the epidemiological data and preliminary assessment of impact.

The analysis intends to give an overview of the SBV situation (reporting period from 1 August 2011 till 30 April 2013) together with an update of newly affected herds.

Most countries in Europe have reported SBV cases. It can be seen that in winter 2012 and spring 2013 the area where cases were reported has expanded. In the north the area in the United Kingdom has extended to Scotland, and in the Scandinavia mainland regions of Norway, Finland and Sweden are now affected. SBV has also spread to new regions in the east of Europe: Estonia, Latvia, Hungary, Slovenia and Croatia.

Cattle, sheep, goats, alpacas, bison, buffalos, camels, horses, llamas, moose, fallow deer roe deer and red deer have also been tested for SBV. SBV has been detected by RT-PCR in bison, deer and moose, plus alpacas, buffalos as well as cattle, sheep and goats; fallow deer roe deer and red deer have been found to be seropositive.

¹ On the request of European Commission, Question No. EFSA-Q-2012-00826, approved on 15 May, 2013.

² Correspondence: AHAW@efsa.europa.eu

³ EFSA wishes to thank: Ana Afonso, Franck Berthe, José Cortiñas Abrahantes, Jane Richardson, Didier Verloo, Andrea Bau (EFSA) for the preparatory work on this output; and to all reporting officers: Peter Schiefe (Austrian Agency for Health and Food Safety, Austria), Ingeborg Mertens (Federal Agency for the Safety of the Food Chain, Belgium), Heinzpeter Schwermer (Federal Veterinary Office, Switzerland), Apostolos Mazieri (Cyprus Veterinary Services Cyprus), Martin Benka (State Veterinary Administration of the Czech Republic, Czech Republic), Franz Conraths (Federal Research Institute for Animal Health, Germany), Anna Huda (Danish Veterinary and Food Administration, Denmark), Kärt Jaarma (Veterinary and Food Board, Estonia), Ulla Rikula (Finnish Food Safety Authority, Finland), Morgane Dominguez (ANSES, France), Kristel Gache (Groupeement Defence Sanitaire, France), Žaklin Acinger-Rogić (Ministry of Agriculture – Veterinary Directorate, Croatia), Marta Szalo (Ministry of Rural Development, Food Chain Control Department, Hungary), Bernard Bradshaw (Central Veterinary Research Laboratory, Department of Agriculture and the Marine Laboratories, Ireland), Pasquale Simonetti (Ministry of Health – DG animal health and veterinary medicinal products, Italy), Carlo Dahm (ASV, Luxembourg), Stinka Madara (Food and Veterinary Service of the Republic of Latvia, Latvia), Marcel Spierenburg (Netherlands Food and Consumer Product Safety Authority, Netherlands), Fredrik Andersen (Norwegian Food Safety Authorities, Norway), Krzysztof Smietanka (National Veterinary Research Institute, Poland), Maria Sofia Rebelo Quintans (Direcção Geral de Veterinária, Portugal), Kristina Mieziwska (Swedish Board of Agriculture, Sweden), Tina Arič (Veterinary Administration of Republic of Slovenia, Slovenia) Luis J. Romero González (Subdirección General de Sanidad e Higiene Animal y Trazabilidad – Magrama, Spain) and Helen Roberts (AHVLA, United Kingdom) for providing the data presented.

Acute cases in adult animals and arthrogryposis hydranencephaly syndrome (AHS) cases in fetuses and neonates (not all confirmed by laboratory testing) are still being observed in 2013. Acute adult cases in Germany were observed in all months from November 2012 to April 2013 suggesting virus circulation during the winter period. AHS cases are being reported in newly affected areas. In some of the previously affected countries the affected area is still expanding. Areas on the periphery of previously affected countries may have a lower prevalence and therefore susceptible animals may be present. There is no apparent evidence to refute the assumption that SBV infection results in long term immunity, but vigilance for evidence to the contrary is important.

Temporal analysis of cases with laboratory confirmation by pathogen detection shows the outbreak evolution over time. Serological results were excluded since the serological detection of SBV antibodies can only be used as evidence of infection and provide no information on whether detected cases are in the clinical phase of the disease (i.e. new occurrence) or correspond to a previous infection. Since September 2011 there has been no period where new SBV cases have not been detected, any temporal variation is most probably due to production practices in the affected species.

In the previous report (EFSA Nov 2012) a between herd impact assessment based upon the comparison between SBV confirmed herds and the total number of herds in each affected region by species was made. For all affected countries, the number of SBV confirmed herds was estimated to be low compared with the total number of herds. Nevertheless, under reporting or lack of confirmation was noted to affect the ratio. Considering the possibility of high under ascertainment the analysis previously done may not provide any additional information regarding between herd impact of the infection.

© European Food Safety Authority, 2013

Key words

Schmallenberg virus (SBV), data collection, epidemiological analysis, impact

TABLE OF CONTENTS

Summary	1
Table of contents	3
Background as provided by European Commission	4
Terms of reference as provided by the European Commission.....	4
Scope	4
Assessment	5
1. Data collection activities in Member States and reporting to EFSA	5
2. Minimum dataset – herd level	6
2.1. Number of affected herds.....	6
2.2. Additional information from MS	10
2.3. Temporal spread.....	10
2.4. Spatial spread.....	13
2.5. Impact analysis.....	14
Appendix	16
A. SBV Data Reporting Guidelines.....	16
Glossary.....	21
Abbreviations	21

BACKGROUND AS PROVIDED BY EUROPEAN COMMISSION

A recently detected virus circulated in the EU in the second semester of 2011 in domestic ruminants (cattle, sheep and goats) and in wild ruminants. The virus was named "Schmallenberg" virus (SBV) and during spring 2012 several EU countries notified cases of SBV in domestic ruminants.

EFSA assisted the Commission and the Member States by preparing of reports on the epidemiological situation based on the data gathered by the Member States.

The Commission and the Member States recognise the importance of transparency for the EU. The Commission would like EFSA to provide regular updates. Therefore, in the context of Article 31 of Regulation (EC) No 178/2002, EFSA was requested to continue providing assistance to the Commission.

TERMS OF REFERENCE AS PROVIDED BY THE EUROPEAN COMMISSION

1. Continue to collect data through the EFSA Data Collection Framework (DCF) from Member States in a structured manner in coordination with DG SANCO. This should allow for updates of EFSA reports (three times per year) on the description of the epidemiological situation of SBV in the EU. This needs to be done keeping the possibility to use it for further risk assessment. A first update should be produced by 15 November 2012. A second report on 31/05/2013 and a third on 01/12/2013.

2. An update of the report on the overall assessment of the impact of this infection on animal health, animal production and animal welfare. The intention would be, in particular, to fill the data gaps identified in the EFSA May 2012 report and to allow for completing the assessment of the impact, especially the within-herd impact. The report should also take into account the latest scientific findings on SBV, specially the studies co-financed by the EU, providing a comprehensive report on the state of art of the scientific knowledge. Notably this should track the research initiatives going on in several Member States, with a note of attention for the new data to be provided on the traded commodities and their risk of transmitting the infection. A report should be produced by 1 December 2013.

SCOPE

Guidance on data to be collected in Member States was provided in a previous EFSA report (EFSA 2012⁴) in order to optimise harmonisation and ensure coordination. The guidance was subsequently updated in August 2012. The guidance includes harmonised case definitions for both suspect and confirmed adult and newborn animals as well as a definition for an affected herd. Reporting guidelines for a minimum dataset at herd/flock level were also provided. Such data is currently being collected within the affected Member States. In this report, an analysis of the epidemiological data made available is presented in response to term of reference number 1. The deadline for submission of data to EFSA was shortened by 15 days to the 1 May as requested by the European Commission.

The analysis intends to give an overview of the SBV situation (reporting period from 1 August 2011 till 30 April 2013) together with an update of newly affected herds.

This epidemiological report presents the analysis of the data (Table 2), updating the previously published report on the analysis of the epidemiological data and preliminary assessment of impact (EFSA 2012⁵).

⁴ European Food Safety Authority; "Schmallenberg" virus: analysis of the epidemiological data. Supporting Publications 2012:EN-241. [31 pp.]. Available online: www.efsa.europa.eu/publications

⁵ European Food Safety Authority; "Schmallenberg" virus: analysis of the epidemiological data. (November 2012) Supporting Publications 2012:EN-360 [22 pp.]. Available online: www.efsa.europa.eu/publications

ASSESSMENT

At present, nineteen Member States (Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Hungary, Germany, Ireland, Italy, Latvia, Luxembourg, Netherlands, Poland, Slovenia, Spain, Sweden and United Kingdom), two countries in the European Free Trade Association (EFTA) area and one Accession Country (Switzerland, Norway and Croatia) have reported cases of SBV. The latest information can be found on the relevant competent authority websites (Table 1).

Table 1: URL links to SBV information in EU countries

Country		
Austria	AT	http://www.ages.at/ages/gesundheits/tier/schmallenberg-virus/schmallenberg-infektion-erstmalig-in-oesterreich-nachgewiesen/
Belgium	BE	in Dutch: http://www.favv.be/dierengezondheid/schmallenberg/ in French: http://www.favv.be/santeanimale/schmallenberg/ in German : http://www.favv.be/tiergesundheits/schmallenberg/
Denmark	DK	http://www.foedevarestyrelsen.dk/english/animal/animalhealth/schmallenberg%20virus/Pages/default.aspx
Estonia	EE	http://www.vet.agri.ee/?op=news&id=194
Finland	FI	http://www.evira.fi/portal/en/animals/current_issues/?bid=3179
France	FR	http://www.platforme-esa.fr/
Germany	DE	http://www.fli.bund.de/en/startseite/current-news/animal-disease-situation/new-orthobunyavirus-detected-in-cattle-in-germany.html
Ireland	IE	http://www.agriculture.gov.ie/press/pressreleases/2012/october/title.67350.en.html
Italy	IT	http://www.izs.it/IZS/Engine/RAServePG.php/P/357410010300/M/250010010303
Netherlands	NL	http://www.vwa.nl/onderwerpen/dierziekten/dossier/schmallenbergvirus (see link for PDF - Aantallen meldingen per provincie)
Norway	NO	http://tinyurl.com/8nasq9d
Poland	PL	http://www.piwet.pulawy.pl/piwet7/index_b_eng.php?strona=zawar_5
Spain	ES	http://rasve.mapa.es/Publica/InformacionGeneral/Enfermedades/enfermedades.asp
Sweden	SE	http://www.jordbruksverket.se/schmallenbergvirus
Switzerland	CH	German: http://www.bvet.admin.ch/gesundheits_tiere/01065/04051/index.html?lang=de French: http://www.bvet.admin.ch/gesundheits_tiere/01065/04051/index.html?lang=fr Italian: http://www.bvet.admin.ch/gesundheits_tiere/01065/04051/index.html?lang=it
United Kingdom	GB	http://www.defra.gov.uk/animal-diseases/a-z/schmallenberg-virus/

1. Data collection activities in Member States and reporting to EFSA

Chief Veterinary Officers of the EU Member States, Norway and Switzerland were requested to nominate an official reporting officer for their country. All reporting officers appointed (26 Member States, one EU Accession Country and two EFTA countries) were given access to the EFSA Data Collection Framework (DCF) system as well as detailed “SBV Data Reporting guidelines” (Appendix A), data entry templates and instructions for the use of Excel templates and the EFSA DCF.

The deadline of 30 April 2013 was given for the submission of the minimum dataset for inclusion in this report. A data submission summary report is presented in Table 2.

Table 2: Data submitted by Member States

Country	Date of Last Data Submission to EFSA	Confirmed Cases Cattle	Confirmed Cases Sheep	Confirmed Cases Goats
Austria	May 13, 2013	Y	Y	Y
Belgium	March 21, 2012	Y	Y	Y
Croatia	April 25, 2013	Y	N	N
Cyprus	E-mail only (30/04/2013)	N	N	N

Country	Date of Last Data Submission to EFSA	Confirmed Cases Cattle	Confirmed Cases Sheep	Confirmed Cases Goats
Czech Republic	April 30, 2013	Y	Y	Y
Denmark	April 19, 2013	Y	Y	N
Estonia	May 13, 2013	Y	Y	N
Finland	May 03, 2013	Y	Y	N
France ANSES*	September 17, 2012	Y	Y	Y
France GDS*	April 30, 2013	Y	Y	Y
Germany	May 13, 2013	Y	Y	Y
Hungary	E-mail only (29/04/2013)	Y	Y	N
Ireland	April 29, 2013	Y	Y	N
Italy	May 02, 2013	Y	Y	Y
Latvia	E-mail only (30/04/2013)	Y	Y	N
Lithuania	E-mail only (31/10/2012)	N	N	N
Luxembourg	October 24, 2012	Y	Y	N
Netherlands	September 24, 2012	Y	Y	Y
Norway	April 29, 2013	Y	N	N
Poland	April 30, 2013	Y	Y	N
Portugal	E-mail only (02/05/2013)	N	N	N
Slovenia	April 29, 2013	Y	Y	N
Spain	May 10, 2012	N	Y	N
Sweden	May 03, 2013	Y	Y	N
Switzerland	April 29, 2013	Y	Y	Y
United Kingdom	May 02, 2013	Y	Y	N

* In France the responsibility for reporting SBV results has been transferred from Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail (ANSES) to the Groupements de Défense Sanitaire (GDS).

2. Minimum dataset – herd level

The herd level dataset was based upon data currently being collected within the Member States. The dataset was used to obtain information on the spread of SBV in the EU, both temporally (date of first suspicious report) and spatially (country/region of affected herd/flock). The dataset has also been used to estimate weighted prevalence in certain countries.

2.1. Number of affected herds

A summary of the number of suspect/confirmed holdings meeting the case definition is presented in Table 3 by species and country. The summary of test results in Table 3 is presented considering the number of holdings where at least one animal was tested.

SBV results from Belgium, Latvia and Hungary were not available in the specified format and as a consequence the information is incomplete (shaded rows). All the other affected countries have reported the number of confirmed herds following viral detection by PCR, virus neutralisation test or serological confirmation. SBV has been detected in many holdings in cattle, sheep and goats. Alpacas, bison, buffalos, camels, horses, llamas, moose, fallow deer, roe deer and red deer have also been tested for SBV. SBV has been detected by RT-PCR in bison, deer and moose, plus alpacas, buffalos, fallow deer roe deer and red deer have been found to be seropositive.

The total number of holdings with laboratory confirmed cases SBV in Europe September 2011 - April 2013 is greater than 8000.

Table 3: Number of reported herds by species (1 August 2011 – 30 April 2013)

<i>Ruminant</i>	<i>Country</i>	<i>Reported Holdings</i>	<i>Holdings SBV not confirmed</i>	<i>Holdings SBV confirmed</i>	<i>Holdings Foetus neonate RT-PCR tested</i>	<i>Holdings Foetus neonate RT-PCR confirmed</i>	<i>Holdings Adults RT-PCR tested</i>	<i>Holdings Adults RT-PCR confirmed</i>	<i>Holdings Adults serology tested</i>	<i>Holdings Adults serology confirmed</i>
Alpacas	Sweden	1	1	0	1	0	0	0	0	0
Alpacas		1	1	0	1	0	0	0	0	0
Bison	France	1	0	1	1	1	0	0	.	.
	Germany	1	0	1	1	1	1	1	0	0
	Sweden	1	1	0	1	0	0	0	0	0
Bison		3	1	2	3	2	1	1	0	0
Buffalos	Italy	1	0	1	0	0	1	0	1	1
Buffalos		1	0	1	0	0	1	0	1	1
Camels	Sweden	1	1	0	1	0	0	0	0	0
Camels		1	1	0	1	0	0	0	0	0
Cattle	Austria	57	0	57	57	57	4	0	25	25
	Belgium*	1206		427						
	Croatia	8	5	3	8	3	0	0	0	0
	Czech Republic	9	0	9	9	9	0	0	0	0
	Denmark	24	23	1	24	1	0	0	0	0
	Estonia	3	0	3	2	2	1	0	1	1
	Finland	18	9	9	17	8	0	0	2	2
	France	4784	1613	3171	3676	2054	0	0	927	923
	Germany	1314	0	1314	996	996	274	274	41	41
	Hungary*			1		1				
	Ireland	48	0	48	48	48	0	0	0	0
	Italy	9	4	5	6	1	7	0	7	4
	Latvia*			1				1		
	Luxembourg	36	14	22	35	22	1	0	0	0
	Netherlands	1303	1066	237	1303	236	.	.	132	128
	Norway	5	4	1	5	1	0	0	0	0
	Poland	3	1	2	2	1	0	0	1	1
	Slovenia	25	0	25	.	25	0	0	0	0
	Spain	8	8	0	3	0	6	0	1	0
	Sweden	99	81	18	98	17	0	0	1	1
	Switzerland	199	36	163	70	24	1	0	131	133
	United Kingdom	170	51	119		96	18	9	20	19
Cattle		9328	2915	5636	6360	3602	312	284	1289	1278
Deer	Germany	2	0	2			1	1	1	1
Deer		2	0	2			1	1	1	1
Goats	Austria	2	0	2	2	2	0	0	0	0
	Belgium*	14		2						
	Croatia	1	1	0	1	0	0	0	0	0
	Czech Republic	1	0	1	1	1	0	0	0	0
	Denmark	2	2	0	2	0	0	0	0	0
	France	133	77	56	113	36	0	0	21	19
	Germany	48	0	48	48	48
	Italy	6	0	6	4	3	5	0	6	5
	Luxembourg	1	1	0	1	0	0	0	0	0

<i>Ruminant</i>	<i>Country</i>	<i>Reported Holdings</i>	<i>Holdings SBV not confirmed</i>	<i>Holdings SBV confirmed</i>	<i>Holdings Foetus neonate RT-PCR tested</i>	<i>Holdings Foetus neonate RT-PCR confirmed</i>	<i>Holdings Adults RT-PCR tested</i>	<i>Holdings Adults RT-PCR confirmed</i>	<i>Holdings Adults serology tested</i>	<i>Holdings Adults serology confirmed</i>
	Netherlands	38	32	6	38	6	.	.	4	4
	Poland	2	2	0	1	0	0	0	1	0
	Spain	1	1	0	0	0	1	0	0	0
	Sweden	2	2	0	2	0	0	0	0	0
	Switzerland	10	0	10	10	9	0	0	0	0
Goats		280	132	136	239	106	6	0	35	31
Horses	Netherlands	1	1	0	1	0	.	.	0	0
Horses		1	1	0	1	0	0	0	0	0
Lamas	Switzerland	1	1	0	1	0	0	0	0	0
Lamas		1	1	0	1	0	0	0	0	0
Moose	Poland	1	0	1	0	0	1	1	0	0
Moose		1	0	1	0	0	1	1	0	0
Sheep	Austria	27	0	27	27	27	1	0	10	10
	Belgium*	260		169						
	Croatia	1	1	0	1	0	0	0	0	0
	Czech Republic	9	0	9	9	9	0	0	0	0
	Denmark	17	16	1	17	1	0	0	0	0
	Estonia	2	0	2	2	2	.	.	1	1
	Finland	11	2	9	10	8	1	1	1	1
	France	2013	683	1330	1892	1205	0	0	117	113
	Germany	732	0	732	657	657	72	72	3	3
	Ireland	30	0	30	30	30	0	0	0	0
	Italy	77	2	75	66	58	57	1	62	50
	Luxembourg	10	4	6	10	6	0	0	0	0
	Netherlands	349	241	108	349	107	.	.	82	81
	Norway	5	5	0	5	0	0	0	0	0
	Poland	2	0	2	2	2	0	0	2	2
	Slovenia	1	0	1	1	1	0	0	0	0
	Spain	8	3	5	6	1	5	0	5	5
	Sweden	61	28	33	61	33	0	0	0	0
	Switzerland	56	0	56	55	54	0	0	4	4
	United Kingdom	466	139	327		327	0	0	0	0
Sheep		4164	1142	2931	3229	2532	136	74	292	275
Unknown	France	63	42	21	63	21	0	0	.	.
Unknown		63	42	21	63	21	0	0	0	0
Total herds		13846	4236	8730	9898	6263	458	361	1618	1586

*SBV results from Belgium, Latvia and Hungary were not available in the specified format and as a consequence the information is incomplete, the results in the table refer only to information reported at herd level.

Table 4: Recent SBV detections by month of first report and species (30 October 2012 – 30 April 2013)

Month	Species	Holdings Reported	Holdings with AHS cases	Holdings Positive Direct Detection	Foetus Neonates Positive Direct Detection	Holdings Acute Adults	Holdings Adults Positive Direct Detection	Adults Positive Direct Detection	Holdings Adults Positive Serology	Adults Positive Serology
Nov 2012	Cattle	155	69	41	41	44	43	43	66	93
	Goats	14	12	5	6	0	0	0	8	10
	Sheep	168	143	119	161	2	2	2	63	335
Dec 2012	Cattle	263	205	31	31	26	26	26	172	210
	Goats	15	10	6	6	0	0	0	6	30
	Sheep	213	137	137	166	26	26	26	59	328
Jan 2013	Cattle	599	518	60	60	20	19	19	389	448
	Goats	19	6	3	3	0	0	0	6	9
	Sheep	164	78	116	135	28	28	28	13	33
Feb 2013	Cattle	467	357	75	75	40	39	39	256	285
	Goats	4	1	1	1	1	0	0	1	1
	Sheep	38	20	11	13	10	9	9	10	15
Mar 2013	Cattle	314	197	126	127	61	60	60	80	99
	Goats	5	1	0	0	0	0	0	1	1
	Sheep	37	11	6	18	4	4	4	7	12
Apr 2013	Cattle	100	56	56	56	31	31	31	8	16
	Goats	2	0	0	0	0	0	0	0	0
	Sheep	3	0	0	0	0	0	0	0	0
Total		2580	1821	793	899	293	287	287	1145	1925

In Table 4 it can be seen that acute cases in adult animals and AHS cases in foetuses and neonates (not all confirmed by laboratory testing) are still being observed in 2013, indicating that the virus is still circulating in Europe.

Due to the production cycle for sheep, increased numbers of holdings with AHS cases were observed in November, December and January this was most evident in Italy, Switzerland and United Kingdom. March and April saw an increase in confirmed AHS cases in cattle in Germany, the Scandinavian countries and Eastern regions of Europe.

The majority of acute cases in adults were reported in Germany in both sheep and cattle. The acute adult cases in Germany were observed in all months from November 2012 to April 2013 suggesting virus circulation during the winter period.

New infections are being reported in newly affected countries but also in previously affected countries for example France, Germany, Switzerland and United Kingdom. In some of the previously affected countries the affected area is still expanding (United Kingdom, Italy) in other previously affected countries areas on the periphery may have a lower prevalence and therefore susceptible animals may

be present (France, Germany). There is no apparent evidence to refute the assumption that SBV infection results in long term immunity, but vigilance for evidence to the contrary is important.

2.2. Additional information from MS

Cyprus and Portugal have reported no laboratory confirmed cases of SBV.

Belgium reported only the total numbers of affected herds by species up to the end of April this is presented in Table 3. All other information presented for Belgium is derived from the submission to the DCF on March 21, 2012. For the Netherlands the data presented in the report was submitted September 24, 2012. The last submission for Spain was 10 May 2012.

Latvia and Hungary each reported a single case of SBV detected by RT-PCR in a bovine animal. The laboratory confirmation in Hungary occurred on the 18 October 2012. Both countries also reported seropositive animals as a result of ELISA tests. In Latvia 135 cattle and 21 sheep were seropositive. In Hungary 1049 cattle, 54 small ruminants, 3 alpacas and 34 deer were seropositive. Due the format in which this information was provided data for these two countries is only reported in Table 3.

The monitoring of the spread of SBV through the Scandinavian countries has provided some interesting insights into the progress of this virus. Testing of bulk milk samples in Norway in autumn 2012 detected antibodies in milk in the regions of Ostfold, Akershus, Oslo, Hedmark, Buskerud, Vestfold, Telemark, Aust Agder, Vest-Agder and Rogaland. The prevalence estimates in the regions was in the range of 0 to 76%. The first direct detection of the pathogen did not occur until 17/4/2013 in a cattle herd where one of two offspring with AHS symptoms tested positive with RT-PCR. In Sweden the first indication of SBV infection was also obtained from bulk milk screening in one of the 723 screened herds in June 2012. In the affected holding three cows out of twenty tested positive in June and when tested again in July, however, by November all 20 cows in the herd had seroconverted. The bulk milk screening in November showed widespread seroconversion. Finland reported that despite intensive testing for the presence of Schmallenberg virus and SBV antibodies during the first half of the year 2012 no positive samples were found. The first sample which tested SBV positive based on antibody results was taken on 30 August 2012 in the most south-western part of Finland. Consequently, it was concluded that Schmallenberg virus spread to Finland during late summer or early autumn of 2012. Since that, positive samples have been detected also elsewhere in the southern Finland up to the line drawn between the towns of Kokkola on the west coast of Finland and Kitee in the eastern part of Finland

2.3. Temporal spread

The temporal analysis was performed for SBV confirmed herd reports. The time of the first herd report by week per country from September 2011 to April 2013 is shown in Figure 1.

If laboratory confirmed herds based only on serology are excluded in order to determine newly affected holdings the number is notably reduced in 2013 (Figure 2). Serological detection of SBV antibodies can only be used as evidence of infection but provides no information on whether detected cases are in the clinical phase of the disease (i.e. new occurrence). The analysis of cases with laboratory confirmation by pathogen detection shows the outbreak evolution over time. Since September 2011 there has been no period where new SBV cases have not been detected, any temporal variation is most probably due to production practices in the affected species (Figure 3:).

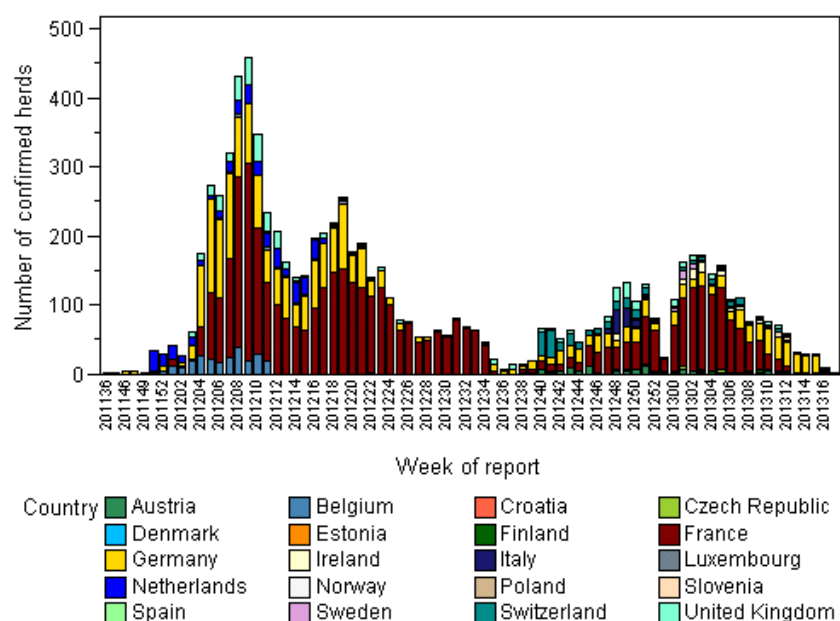


Figure 1: Confirmed herds by week of first report and country all species.

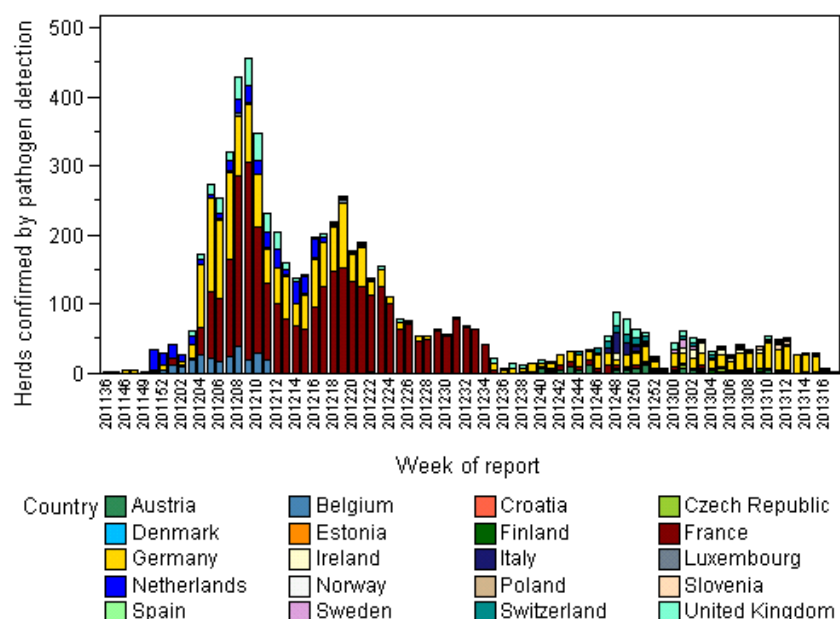


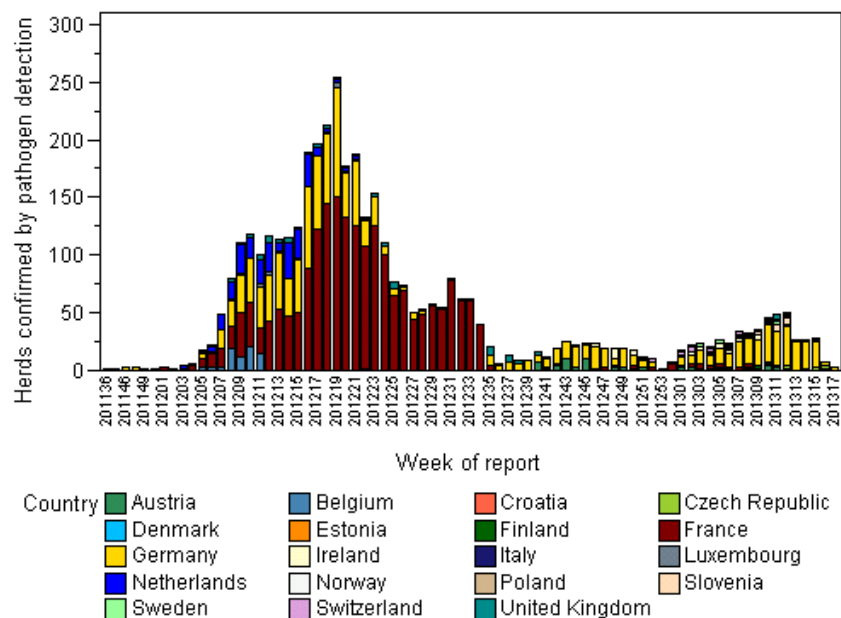
Figure 2: Herds confirmed by direct pathogen detection by week of first report and country all species.

A comparison of the temporal spread by week of first herd report for each species was carried out (Figure 3). In cattle newly affected herds (laboratory confirmation by direct detection) have been reported throughout 2012 and into 2013. Although a smaller number of herds were reported in spring 2013 compared with spring 2012. It is important to note that these reports occurred without interruption through the autumn and winter of 2012.

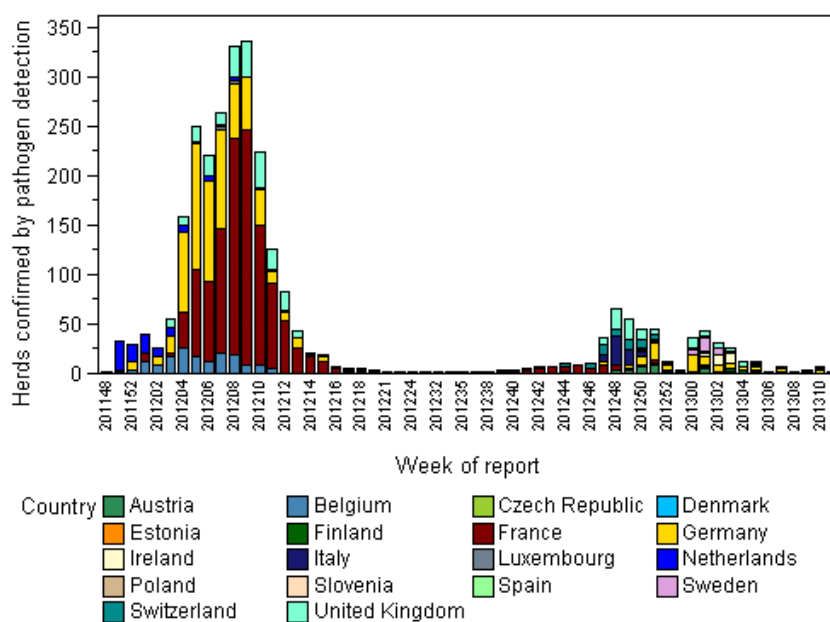
In sheep and goats again a smaller number of herds were reported in spring 2013 compared with spring 2012. An increase for sheep in early spring is still observed due to the production cycle (lambing season) of sheep farming.

Interpretation of the temporal analysis should be made with caution since SBV is not a notifiable disease and in most countries laboratory confirmation costs are incurred by the farmers. As a consequence it is likely that there is appreciable under ascertainment of SBV affected herds.

CATTLE



SHEEP



GOATS

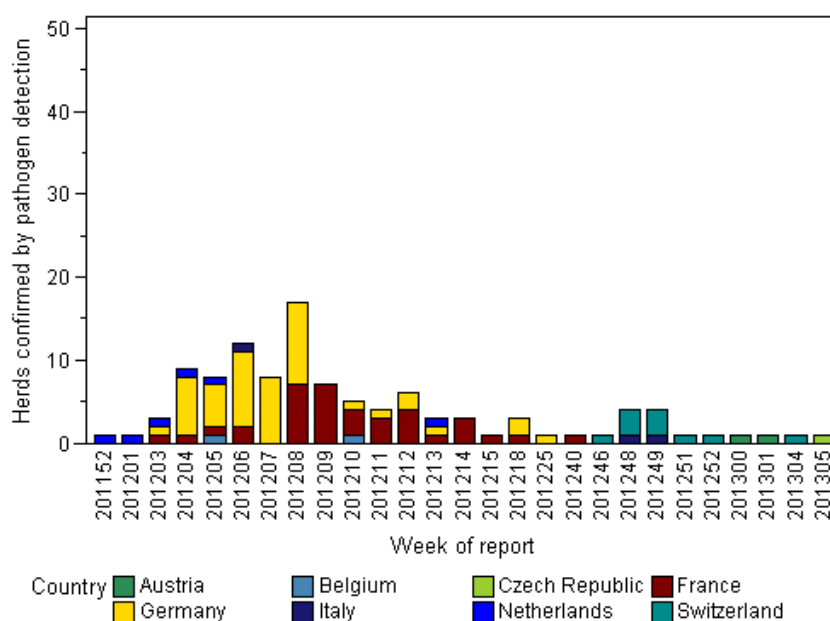


Figure 3: Herds confirmed by direct pathogen detection by week of first report, country and species.

2.4. Spatial spread

Not all countries reported the location of confirmed cases for cattle, sheep and goats herds using the NUTS geographical classification scheme. Figure 4: shows the status of the countries of Europe with regard to SBV detection. Figure 5: shows the spatial spread of confirmed SBV herds for all ruminants for NUTS 2 regions where this information was provided.

Most countries in Europe have reported SBV cases. It can be seen that in winter 2012 and spring 2013 the area where cases were reported has expanded. In the north the area in the United Kingdom has extended to Scotland, and in the Scandinavia mainland regions of Norway, Finland and Sweden are

now affected. SBV has also spread to new regions in the east of Europe: Estonia, Latvia, Hungary, Slovenia and Croatia.

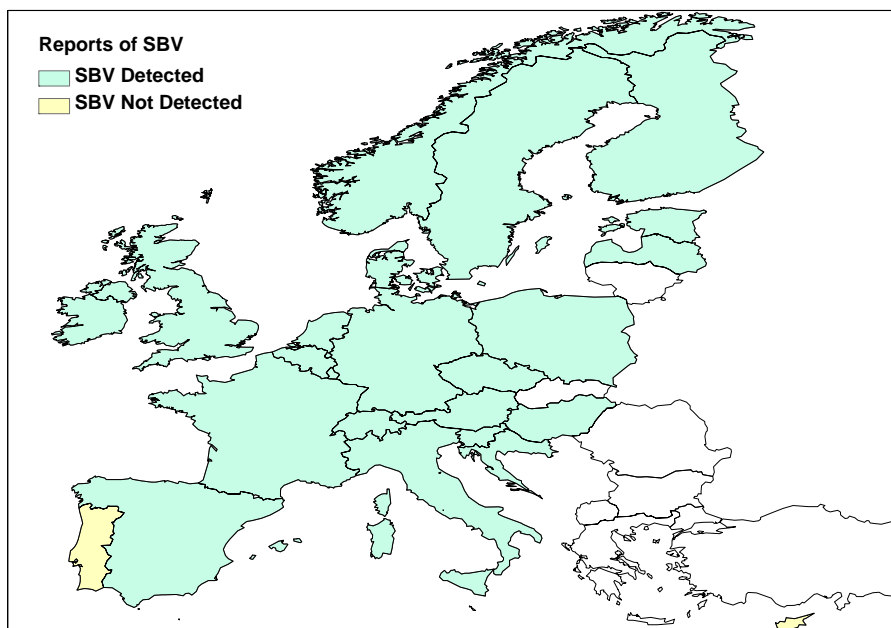


Figure 4: SBV status for European Countries

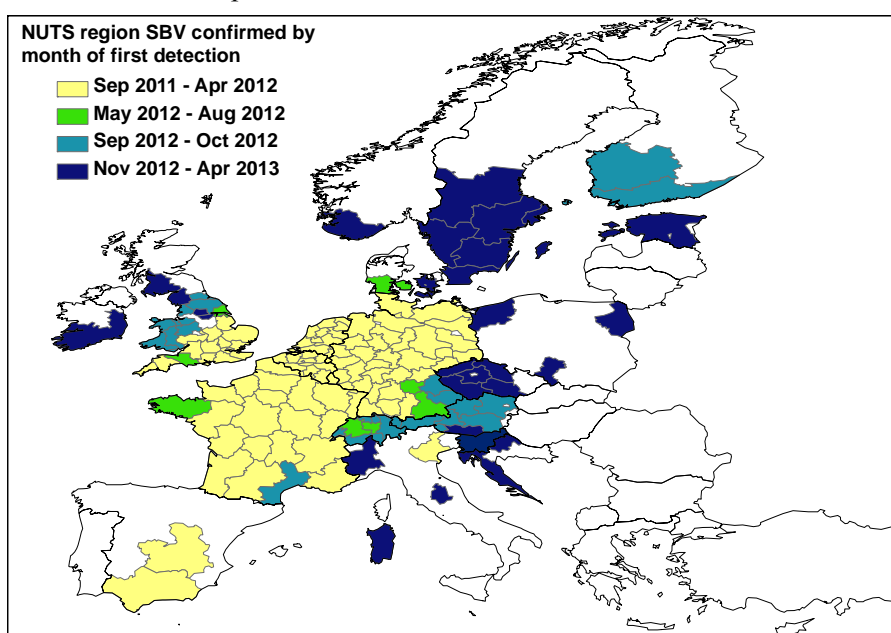


Figure 5: NUTS2 regions with at least one SBV herd confirmed by month of first report (for countries where regional data was available)

2.5. Impact analysis

In the previous report (EFSA Nov 2012) a between herd impact assessment based upon the comparison between SBV confirmed herds and the total number of herds in each region by species was made. For all affected countries, the number of SBV confirmed herds was estimated to be low compared with the total number of herds. Nevertheless, under reporting or lack of confirmation was noted to affect the ratio. Considering the possibility of high under ascertainment the analysis previously done may not provide any additional information regarding between herd impact of the infection.

In order to account for uncertainties relating to sample collection, and testing procedures in the reporting country, weighted estimation of prevalence of infection (not disease incidence) based on available data reported to EFSA were obtained. The weighted prevalence is calculated based on the number of holdings tested, number of confirmed positive holdings and the number of holdings in the country. The uncertainty on the estimate increases if the number of the holdings tested decreases and this is reflected on a wider credible interval (CI). Seroprevalence studies in representative population samples could help in clarifying the real status.

Table 5: Weighted prevalence estimate for SBV in cattle and sheep

Country	Cattle		Sheep	
	Lower 2.5 CI	Upper 97.5 CI	Lower 2.5 CI	Upper 97.5 CI
Denmark	0	29.17	0	41.18
Finland	16.67	83.33	27.27	100
France	64.26	68.25	62.99	69.1
United Kingdom	58.82	79.41	63.73	75.97
Croatia	0	87.5	0	100
Italy	11.11	100	88.31	100
Luxembourg	36.11	83.33	10	100
Norway	0	100	0	80
Poland	0	100		
Sweden	8.08	32.32	36.07	72.13
Switzerland	72.86	88.94	62.65	89.16

The total number of sheep and cattle herds in EU were obtained from Eurostat 2007 (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database).

No information is available to assess the within herd impact of SBV infection.

APPENDIX

A. SBV DATA REPORTING GUIDELINES

Notification of "Schmallenberg" virus (SBV) at a European level is currently not obligatory but there is a need for harmonised case definitions and quantification of epidemiological parameters to allow assessment of impact and spread for this emerging disease in animals. EFSA has received a new mandate *"Request for maintaining technical assistance on the possible risks for animal health caused by the Schmallenberg virus"* and is requested *"Continue to collect data through the EFSA Data Collection Framework (DCF) from Member States in a structured manner in coordination with DG SANCO. This should allow for updates of EFSA reports (three times per year) on the description of the epidemiological situation of SBV in the EU"*. The reporting guidelines have been updated based on the experience gained from the reports submitted in spring 2012. Member States (MS) affected by SBV are kindly requested to submit data as described in the "MINIMUM DATASET" section of this document.

MINIMUM DATASET – HERD/FLOCK LEVEL

Reporting deadlines

- 1) MS should provide the minimum dataset for all herds affected between 1 August 2011 – 31 July 2012. This will be used to provide an overview of the SBV situation after 1 year. In MS where follow up studies have been completed the number of offspring with Arthrogryposis hydranencephaly syndrome (AHS) should be completed in the ahs element, as currently there is limited information on with-in herd impact for this disease. Dataset should be submitted by the **21 September 2012**
- 2) MS should provide the minimum dataset for the current situation, with a focus on newly affected herds, herds where acute adult cases have been observed and previously affected herds with new AHS cases. Dataset should be submitted by the **30 October 2012**

The information provided will be published in an Epidemiological update **15 November 2012**

- 3) MS should provide the minimum dataset for the current situation, with a focus on newly affected herds especially in new regions, previously affected herds with new AHS cases and the number of AHS cases observed in affected herds in order to measure with-in herd impact. Dataset should be submitted by the **10 May 2013**

The information provided will be published in an Epidemiological update **31 May 2013**

Objectives

This dataset will be used in the epidemiological updates published by EFSA. The dataset will be used to obtain information on the spread of SBV in Europe both temporally (Date of first suspicious report) and spatially (Country/Region of holding) and to identify newly affected regions. The information will also be used to investigate the with-in herd impact of SBV in terms numbers of AHS cases and acute adult cases observed in affected herds.

Plan of analysis

Descriptive statistics will be provided on the number herds with AHS cases, acute adult cases and results of laboratory testing by species at country and EU level. Temporal evaluation of spread based on date of first suspicious report in a herd by species. Spatial evaluation of spread by NUTS region based on confirmed herds. Within herd impact analysis considering reported AHS cases and acute adult cases by species, holding type and country.

Population: The virus has been detected in cattle, sheep, goats and bison. The data should be reported for cattle, sheep goats, other ruminant animals and closely related species.

Epidemiological unit: is the herd/flock, all ruminants of one species on a holding are considered to represent a herd/flock.

Case definitions:

Foetuses and neonates

Suspect case: Arthrogryposis hydranencephaly syndrome (AHS) in ruminants (stillbirths, premature births, mummified fetuses, and dysfunctions or deformities of foetuses or neonates with two or more of the following: arthrogryposis, hydranencephaly, ataxia, paralysed limbs, muscle atrophy, joint malformations, torticollis, kyphosis, scoliosis, brachygnathia inferior, behavioural abnormalities and blindness).

Confirmed case: Following suspicion, a confirmation of viral infection by RT-PCR, virus isolation or ELISA for blood samples taken pre-colostrum intake

Adult animals

Suspicious case: Ruminants with transient fever ($>40^{\circ}\text{C}$), diarrhoea, anorexia and reduced milk production (that is not attributed to a known cause)

Confirmed case: Confirmation of viral infection by RT-PCR, virus isolation, ELISA, VNT or IFAT.

Herd case definition

Any herd with one or more suspect or confirmed case.

Required information:

Unique herd identifier – Provide a code to uniquely identify the herd/flock within the reporting country. The code should be designed to ensure the individual holding remains anonymous and should be retained in each data submission (e.g IT0000001, IT0000002).

Location – report the geographical location of the holding

Countries should be encoded using the standard ISO-3166-1-alpha-2 coding system. Described in the COUNTRY catalogue.

Additional geographical detail about the region where the holding is located can be specified using the Nomenclature of territorial units for statistics (NUTS) code (as described in NUTS catalogue). http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/introduction

The two catalogues (COUNTRY, NUTS) are published on the EFSA website <http://www.efsa.europa.eu/en/efsajournal/pub/1457.htm> in the standard sample description excel file for download.

Animal species – report the code and the text describing species of animal in the herd/flock selected from the catalogue below

Species catalogue

<i>code</i>	<i>name</i>
04421	Alpaca (<i>Vicugna pacos</i>)
9281	Alpine chamois (<i>Rupicapra</i> spp.)
11681	Barbary sheep (<i>Ammotragus lervia</i>)
1601	Bison (<i>Bison bison</i>)
14001	Buffalos (<i>Syncerus caffer</i>)
81	Camels (<i>Camelus</i> spp.)
6581	Cattle (<i>Bos taurus</i>)

1401	Deer (<i>Capreolus</i> spp., <i>Cervus</i> spp., <i>Dama</i> spp.)
6761	Goats (<i>Capra aegagrus</i>)
14081	Lamas (<i>Lama glama</i>)
11501	Mouflons (<i>Ovis musimon</i>)
22101	Mountain goats (<i>Oreamnos americanus</i>)
281	Reindeers (<i>Rangifer tarandus</i>)
10061	Sheep (<i>Ovis aries</i>)
2861	Solipeds, domestic (<i>Equidae</i>)
6821	Water buffalos (<i>Bubalus</i> spp.)
00000	Other

Purpose of reproduction – indicate whether the animals are reared for milk, meat, mixed, wool or other production.

Date of first suspicious report – report the year, month and day of the first report to the veterinary services of a case according to the case definitions above within the herd/flock.

Herd statistics –the reporting of herd statistics has been simplified based on the previous data submissions, two new Boolean elements have been added to identify herds where AHS cases or acute adult cases have been observed even if the exact number of cases is not known. For each of the numerical elements where information has been collected and there are no animals within that category report 0, where no information has been collected report -9999.

Totals should be reported from the data of first suspicious report to the data transmission date, with the exception of “animals” and “females”. For “animals” and “females” report the number of animals either on the date of the first suspicious report or at the end of year. The time point for reporting the denominator information should be based on the ease of obtaining this information and the time point used should be specified in the “denominator” element.

New AHS cases in previously affected herds – for those holdings with first suspicious report date between 1 August 2011 and 31 July 2012 indicate if AHS cases have been reported in the herd of flock after 31 July 2012.

<i>Element name</i>	<i>Definition</i>	<i>Data type</i>	<i>Mandatory</i>	<i>Catalogue</i>
herdID	Unique identifier for herd/flock	String(50)	Y	
country	Country where the holding is located	String(2)	Y	COUNTRY
NUTSCode	Code for region where holding is located using Nomenclature for Territorial Units for Statistics	String(5)	Y	NUTS
NUTSregion	Text for region where holding is located using	String(250)		
speciesCode	Code for species of animal in herd/flock	String(5)	Y	SPECIES
speciesText	Text to describe the species of animal in the herd/flock	String(250)		
reproduction	Reproduction for production of milk, meat, mixed, wool or other	String(5)	Y	MEAT, MILK, MIXED, WOOL, OTHER
firstReportY	Year of first suspicious report in herd/flock	integer (4)	Y	
firstReportM	Month of first suspicious report in herd/flock	integer (2)	Y	
firstReportD	Day of first suspicious report in herd/flock	integer (2)	Y	
denominator	Indicate if the number of animals and number of females is for the end of year or the date of first suspicious report	String(4)	Y	ENDY, SUSP

animals	Number of adult animals in herd/flock (male and female; greater than 12 months for cattle, greater than 6 months for sheep and goats)	Integer(6)	Y	
females	Number adult females in herd/flock (greater than 12 months for cattle, greater than 6 months for sheep and goats)	Integer(6)	Y	
ahs	Number of arthrogryposis hydranencephaly syndrome cases observed in the herd from date of first suspicious report to date of data transmission	Integer(6)	Y	
offspringTestPD	Number of foetuses and neonates tested for SBV by pathogen detection methods in herd/flock	Integer(6)	Y	
offspringTestPDPos	Number of positive foetuses and neonates tested for SBV by pathogen detection methods in herd/flock	Integer(6)	Y	
offspringTestSero	Number of foetuses and neonates tested for SBV by indirect detection methods in herd/flock	Integer(6)		
offspringTestSeroPos	Number of positive foetuses and neonates tested for SBV by indirect detection methods in herd/flock	Integer(6)		
symptomatic	Number of symptomatic adult animals in herd/flock (fever, diarrhoea, anorexia, losses in milk production) from date of first suspicious report to date of data transmission	Integer(6)		
adultsTestPD	Number of adult animals tested for SBV by pathogen detection methods in herd/flock	Integer(6)	Y	
adultsTestPDPos	Number of positive adult animals tested for SBV by pathogen detection methods in herd/flock	Integer(6)	Y	
adultsTestSero	Number of adult animals tested for SBV by indirect detection methods in herd/flock	Integer(6)	Y	
adultsTestSeroPos	Number of positive adult animals tested for SBV by indirect detection methods in herd/flock	Integer(6)	Y	
ahsCases	Indicate if AHS has been observed in the foetuses or neonates in the herd/flock	String (1)	Y	Y/N/U
acuteAdults	Indicate if adults with acute symptoms and confirmation by laboratory testing have been observed in the herd/flock	String (1)	Y	Y/N/U
newAHSCases	For previously affected herds/flocks indicate if new AHS cases have been observed after 31 July 2012	String (1)		Y/N/U

Samples and Laboratory Methods

Pathogen detection: Pathogen detection is done by real-time RT-PCR⁶ or virus isolation (insect cells (KC), hamster cells (BHK), monkey kidney cells (VERO)).

Samples for pathogen detection in acute infection: serum or EDTA blood samples when clinical signs are observed (fever, drop in milk yield, diarrhoea).

Samples for pathogen detection in foetuses, abortions, stillbirths and malformed ruminants: brain (cerebrum and brainstem), amniotic fluid and placenta.

⁶ Bilk S, Schulze C, Fischer M, Beer M, Hlinak A, Hoffmann B. 2012. Organ distribution of Schmallenberg virus RNA in malformed newborns. Vet Microbiol. 2012 Mar 30.

Indirect detection: Antibody detection by indirect immuno-fluorescence, virus neutralization test or ELISA.

Samples for indirect detection foetuses, abortions, stillbirths and malformed ruminants: blood (pre-colostral) or pericardial fluid.

Samples for indirect detection in adult animals: EDTA blood or serum

GLOSSARY

arthrogryposis	also called multiple congenital contracture, characterized by bent limbs and joint contractures present at birth, fixing joints in abnormal positions and restricting their movement.
case definition	defines a case in surveillance. The case definition can be based on, for example, clinical signs, diagnostic testing, and animal or herd characteristics
herd	group of animals belonging to the same species
hydranencephaly	abnormal development of foetal nervous system, including loss of cerebral cortical tissue
sensitivity	the proportion of infected animals that are correctly identified as positive based on specified diagnostic criteria. The higher sensitivity of a diagnostic test, the lower the number of false negatives (infected animals incorrectly identified as negative for an infection).
serosurveillance	serological surveillance for presence of antibodies to a pathogen in a unit, can identify previous exposure of a population to a pathogen.
specificity	the proportion of non-infected animals that are correctly identified as negative based on specified diagnostic criteria. The higher specificity of a diagnostic test, the lower the number of false positives (non-infected animals incorrectly identified as positive for an infection).
torticollis	a lateral flexion of the neck (cervical spine)
vector	organism that carries and transmits an infectious pathogen from one host to another

ABBREVIATIONS

AHS	arthrogryposis hydranencephaly syndrome
ANSES	Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail
DCF	Data Collection Framework
DG SANCO	Direction générale de la santé et des consommateurs (Directorate-General for Health and Consumers)
EFSA	European Food Safety Authority
EFTA	European Free Trade Association
GDS	Groupements de Défense Sanitaire
EU	European Union
MS	Member State

NUTS	Nomenclature of territorial units for statistics
OIE	World Organisation for Animal Health
PCR	polymerase chain reaction
RT-PCR	reverse transcriptase PCR
SBV	Schmallenberg virus
SCoFCAH	Standing Committee on the Food Chain and Animal Health