European Food Safety Authority

ZOONOSES MONITORING

Sweden

TRENDS AND SOURCES OF ZOONOSES AND ZOONOTIC AGENTS IN FOODSTUFFS, ANIMALS AND FEEDINGSTUFFS

including information on foodborne outbreaks, antimicrobial resistance in zoonotic and indicator bacteria and some pathogenic microbiological agents

IN 2018

PREFACE

This report is submitted to the European Commission in accordance with Article 9 of Council Directive 2003/99/ EC*. The information has also been forwarded to the European Food Safety Authority (EFSA).

The report contains information on trends and sources of zoonoses and zoonotic agents in Sweden during the year 2018.

The information covers the occurrence of these diseases and agents in animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and indicator bacteria as well as information on epidemiological investigations of foodborne outbreaks.
Complementary data on susceptible animal populations in the country is also given. The information given covers both zoonoses that are important for the public health in the whole European Union as well as zoonoses, which are relevant on the basis of the national epidemiological situation.
The report describes the monitoring systems in place and the prevention and control strategies applied in the country. For some zoonoses this monitoring is based on legal requirements laid down by the European Union legislation, while for the other zoonoses national approaches are applied.

The report presents the results of the examinations carried out in the reporting year. A national evaluation of the epidemiological situation, with special reference to trends and sources of zoonotic infections, is given. Whenever possible, the relevance of findings in foodstuffs and animals to zoonoses cases in humans is evaluated.
The information covered by this report is used in the annual European Union Summary Reports on zoonoses and antimicrobial resistance that are published each year by EFSA.

The national report contains two parts: tables summarising data reported in the Data Collection Framework and the related text forms. The text forms were sent by email as pdf files and they are incorporated at the end of the report.

---

* Directive 2003/ 99/ EC of the European Parliament and of the Council of 12 December 2003 on the monitoring of zoonoses and zoonotic agents, amending Decision 90/ 424/ EEC and repealing Council Directive 92/ 117/ EEC, OJ L 325, 17.11.2003, p. 31

List of Contents

ANIMAL POPULATION TABLES

Table Susceptible animal population

		Population			
Animal species	**Category of animals**	**holding**	**animal**	**slaughter animal (heads)**	**herd/flock**
Cattle (bovine animals)	Cattle (bovine animals)	16,317	1,506,637	425,720	
	Cattle (bovine animals) - calves (under 1 year)	14,139	474,817	15,480	
	Cattle (bovine animals) - dairy cows and heifers	3,477	319,387		
	Cattle (bovine animals) - meat production animals	10,418	214,257		
Deer	Deer - farmed	309	25,524	6,896	
	Deer - farmed - fallow deer		19,323	5,390	
	Deer - farmed - red deer		6,201	1,506	
Ducks	Ducks			9,150	
	Ducks - meat production flocks - before slaughter				21
Gallus gallus (fowl)	Gallus gallus (fowl) - broilers	213	9,196,953	100,535,195	4,955
	Gallus gallus (fowl) - laying hens	3,197	7,699,306	4,068,724	
	Gallus gallus (fowl) - laying hens - adult				678
Geese	Geese			15,472	
	Geese - meat production flocks - before slaughter				15
Goats	Goats	2,422	19,885	1,381	
Pigs	Pigs	1,346	1,393,248	2,646,170	
	Pigs - breeding animals	1,423	131,834		
	Pigs - fattening pigs	1,057	900,866		
Reindeers	Reindeers - semi-domesticated	1,047	248,142	53,150	
Sheep	Sheep	9,144	587,256	281,090	
	Sheep - animals over 1 year	9,120	295,912	43,170	
	Sheep - animals under 1 year (lambs)	7,480	291,235	237,120	
Solipeds, domestic	Solipeds, domestic	76,800	355,500	2,110	
Turkeys	Turkeys			525,705	
	Turkeys - meat production flocks				166
Wild boars	Wild boars			14,558	
	Wild boars - wild			106,055	

DISEASE STATUS TABLES

Table Bovine brucellosis in countries and regions that do not receive Community co-financing for eradication programme

Region	Number of animals serologically tested under investigations of suspect cases	Number of suspended herds under investigations of suspect cases	Number of seropositive animals under investigations of suspect cases	Number of animals positive to BST under investigations of suspect cases	Number of animals positive in microbiological testing under investigations of suspect cases	Number of herds with status officially free	Number of infected herds	Total number of animals	Number of herds tested under surveillance	Number of animals tested under surveillance	Total number of herds	Number of infected herds tested under surveillance	Number of herds tested under surveillance by bulk milk	Number of animals or pools tested under surveillance by bulk milk	Number of infected herds tested under surveillance by bulk milk	Number of notified abortions whatever cause under investigations of suspect cases	Number of isolations of Brucella abortus under investigations of suspect cases	Number of abortions due to Brucella infection under investigations of suspect cases	Number of animals tested by microbiology under investigations of suspect cases
SWEDEN	5	0	0	0	0	16,317	0	1,506,637	0	0	16,317	0	0	0	0	27	0	0	0

Table Ovine or Caprine brucellosis in countries and regions that do not receive Community co-financing for eradication programme

Region	Number of animals serologically tested under investigations of suspect cases	Number of suspended herds under investigations of suspect cases	Number of seropositive animals under investigations of suspect cases	Number of animals positive in microbiological testing under investigations of suspect cases	Number of herds with status officially free	Number of infected herds	Total number of animals	Number of herds tested under surveillance	Number of animals tested under surveillance	Total number of herds	Number of infected herds tested under surveillance	Number of animals tested by microbiology under investigations of suspect cases
SWEDEN	0	0	0	0	11,566	0	607,141	397	1,935	11,566	0	0

DISEASE STATUS TABLES

Table Bovine tuberculosis in countries and regions that do not receive Community co-financing for eradication programme

Region	Number of herds with status officially free	Number of infected herds	Total number of animals	Interval between routine tuberculin tests	Number of animals tested with tuberculin routine testing	Number of tuberculin tests carried out before the introduction into the herds	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination	Total number of herds
SWEDEN	16,317	0	1,506,637	(1)	0	0	4	0	16,317

Table Tuberculosis in farmed deer

Region	Number of infected herds	Number of herds with status free	Total number of animals	Interval between routine tuberculin tests	Number of animals tested with tuberculin routine testing	Number of tuberculin tests carried out before the introduction into the herds	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination	Total number of herds
SWEDEN	0	302	25,524	(1)	0	0	0	0	309

PREVALENCE TABLES

Table Brucella:BRUCELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Dogs - pet animals - Veterinary clinics - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Suspect sampling	N_A	Not Available	animal	1	0	Brucella	0
	Pigs - unspecified - Farm - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Suspect sampling	N_A	Not Available	animal	16	0	Brucella	0

Table Campylobacter:CAMPYLOBACTER in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
SWEDEN	Gallus gallus (fowl) - broilers - Slaughterhouse - Sweden - animal sample - caecum - Monitoring - active - Official sampling - Objective sampling	N_A	ISO 10272-1:2006 Campylobacter	slaughter animal batch	4394	401	Campylobacter jejuni	374
							thermotolerant Campylobacter, unspecified	27

Table Campylobacter:CAMPYLOBACTER in food

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
SWEDEN	Meat from broilers (Gallus gallus) - fresh - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		ISO 10272-1:2017 Campylobacter	2	0	Campylobacter	0
	Meat from broilers (Gallus gallus) - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		ISO 10272-1:2017 Campylobacter	4	0	Campylobacter	0
	Meat from broilers (Gallus gallus) - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		ISO 10272-1:2017 Campylobacter	2	0	Campylobacter	0
	Meat from other animal species or not specified - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		ISO 10272-2:2017 Campylobacter	2	0	Campylobacter	0
	Milk from other animal species or unspecified - raw milk - Retail - Not Available - food sample - milk - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		ISO 10272-1:2017 Campylobacter	1	0	Campylobacter	0
	Other processed food products and prepared dishes - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		ISO 10272-1:2017 Campylobacter	3	0	Campylobacter	0
	Other processed food products and prepared dishes - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		ISO 10272-1:2017 Campylobacter	10	0	Campylobacter	0
	Ready-to-eat salads - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		ISO 10272-2:2017 Campylobacter	1	0	Campylobacter	0
	Ready-to-eat salads - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		ISO 10272-1:2017 Campylobacter	1	0	Campylobacter	0
	Ready-to-eat salads - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		ISO 10272-1:2017 Campylobacter	4	0	Campylobacter	0
	Sauce and dressings - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		ISO 10272-1:2017 Campylobacter	4	0	Campylobacter	0
	Spices and herbs - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		ISO 10272-1:2017 Campylobacter	1	0	Campylobacter	0

Table COXIELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sampling Details	Method	Total units tested	Total units positive	N of clinical affected herds	Zoonoses	N of units positive
Not Available	Cattle (bovine animals) - breeding bulls - Artificial insemination station - Sweden - animal sample - blood - Monitoring - Official sampling - Selective sampling	animal	Export	Complement fixation test (CFT)	1	0		Coxiella	0
	Cattle (bovine animals) - breeding bulls - Artificial insemination station - Sweden - animal sample - blood - Monitoring - Official sampling - Selective sampling	animal	Export	Enzyme-linked immunosorbent assay (ELISA)	6	0		Coxiella	0
	Cattle (bovine animals) - dairy cows - Farm - Sweden - animal sample - blood - Clinical investigations - Official sampling - Suspect sampling	animal	N_A	Complement fixation test (CFT)	1	0		Coxiella	0
	Cattle (bovine animals) - dairy cows - Farm - Sweden - animal sample - blood - Clinical investigations - Official sampling - Suspect sampling	animal	N_A	Enzyme-linked immunosorbent assay (ELISA)	1	0		Coxiella	0
	Cattle (bovine animals) - dairy cows - Farm - Sweden - animal sample - milk - Monitoring - Official sampling - Selective sampling	holding	N_A	PCR	5	1		Coxiella burnetii	1
	Sheep - Farm - Sweden - animal sample - blood - Monitoring - Official sampling - Selective sampling	animal	Export	Complement fixation test (CFT)	18	0		Coxiella	0
	Zoo animals, all - Zoo - Sweden - animal sample - blood - Monitoring - Official sampling - Selective sampling	animal	Export	Complement fixation test (CFT)	2	0		Coxiella	0

Table Cysticercus:CYSTICERCUS in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
SWEDEN	Cattle (bovine animals) - unspecified - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	425720	0	Cysticercus	0
	Pigs - unspecified - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	2646170	0	Cysticercus	0

Table Echinococcus:ECHINOCOCCUS in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
SWEDEN	Cattle (bovine animals) - unspecified - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	425720	0	Echinococcus granulosus	0
	Deer - farmed - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	6896	0	Echinococcus granulosus	0
	Dogs - pet animals - Veterinary clinics - Sweden - animal sample - faeces - Monitoring - passive - Official sampling - Suspect sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	4	0	Echinococcus multilocularis	0
	Foxes - wild - Natural habitat - Sweden - animal sample - faeces - Monitoring - passive - Official sampling - Suspect sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	13	6	Echinococcus multilocularis	6
	Goats - mixed herds - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	1381	0	Echinococcus granulosus	0
	Pigs - mixed herds - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	2646170	0	Echinococcus granulosus	0
	Raccoon dogs - wild - Natural habitat - Sweden - animal sample - faeces - Monitoring - passive - Official sampling - Selective sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	4	0	Echinococcus multilocularis	0
	Reindeers - semi-domesticated - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	53150	0	Echinococcus granulosus	0
	Sheep - meat production animals - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	281090	0	Echinococcus granulosus	0
	Solipeds, domestic - horses - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	2110	0	Echinococcus granulosus	0
	Wild boars - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	14558	0	Echinococcus granulosus	0
	Wolves - wild - Natural habitat - Sweden - animal sample - faeces - Survey - national survey - Official sampling - Selective sampling	One of these sampled animals was a wolf-dog hybrid	Real-Time PCR (qualitative or quantitative)	animal	32	0	Echinococcus multilocularis	0

Table Escherichia coli:ESCHERICHIA COLI in animal

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	total units tested	total units positive	Zoonoses	ANTH	VTX	AG	N units positive
SWEDEN	Cattle (bovine animals) - Farm - Sweden - animal sample - faeces - Monitoring - Official sampling - Suspect sampling	holding		Not Available	N_A	OIE method for E.coli O157 in animal faecal samples	6	0	Verocytotoxigenic E. coli (VTEC)	Not Available	Not Available	Not Available	0
	Cattle (bovine animals) - Farm - Sweden - animal sample - faeces - Monitoring - Official sampling - Suspect sampling	holding		Not Available	N_A	In house real time PCR methods based on ISO/TS 13136:2012	2	1	VTEC O26	H-antigen unknown	VT1, gene identified, subtype unspecified	eae positive	1
	Sheep - Farm - Sweden - animal sample - faeces - Monitoring - Official sampling - Suspect sampling	holding		Not Available	N_A	OIE method for E.coli O157 in animal faecal samples	2	2	VTEC O157	H7	VT2, gene identified, subtype unspecified	eae positive	2

Table Escherichia coli:ESCHERICHIA COLI in food

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	total units tested	total units positive	Zoonoses	ANTH	VTX	AG	N units positive
SWEDEN	Fruits - products - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		In house real time PCR methods based on ISO/TS 13136:2012	1	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Meat from bovine animals - meat products - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		ISO 16654:2001 or NMKL 164:2005 or DIN 10167	2	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Meat from bovine animals - minced meat - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		ISO 16654:2001 or NMKL 164:2005 or DIN 10167	1	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Meat from bovine animals - minced meat - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		In house real time PCR methods based on ISO/TS 13136:2012	2	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Meat from bovine animals - Retail - Not Available - food sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram		In house real time PCR methods based on ISO/TS 13136:2012	100	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Meat, mixed meat - meat products - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		In house real time PCR methods based on ISO/TS 13136:2012	1	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Milk from other animal species or unspecified - raw milk - Retail - Not Available - food sample - milk - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		In house real time PCR methods based on ISO/TS 13136:2012	1	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Other processed food products and prepared dishes - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		ISO 16654:2001 or NMKL 164:2005 or DIN 10167	1	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Other processed food products and prepared dishes - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		In house real time PCR methods based on ISO/TS 13136:2012	1	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Sauce and dressings - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		In house real time PCR methods based on ISO/TS 13136:2012	1	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Vegetables - leaves - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		In house real time PCR methods based on ISO/TS 13136:2012	1	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Vegetables - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		ISO 16654:2001 or NMKL 164:2005 or DIN 10167	5	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Vegetables - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		ISO 16654:2001 or NMKL 164:2005 or DIN 10167	1	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Vegetables - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		In house real time PCR methods based on ISO/TS 13136:2012	2	0	Verocytotoxigenic E. coli (VTEC)	.			0
	Water - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		ISO 16654:2001 or NMKL 164:2005 or DIN 10167	1	0	Verocytotoxigenic E. coli (VTEC)	.			0

Table Francisella:FRANCISELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
SWEDEN	Hares - wild - Natural habitat - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Suspect sampling	N_A	PCR	animal	32	5	Francisella tularensis	5

Table LISTERIA in food

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Total units tested	Total units positive	Method	Zoonoses	N of units tested	N of units positive
SWEDEN	Bakery products - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		8	0	<= 100	Listeria monocytogenes	7	0
	Bakery products - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		8	0	detection	Listeria monocytogenes	1	0
	Cheeses, made from unspecified milk or other animal milk - hard - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Suspect sampling	batch (food/feed)	10	Gram		1	0	<= 100	Listeria monocytogenes	1	0
	Cheeses, made from unspecified milk or other animal milk - hard - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		1	0	detection	Listeria monocytogenes	1	0
	Cheeses, made from unspecified milk or other animal milk - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		5	0	<= 100	Listeria monocytogenes	1	0
	Cheeses, made from unspecified milk or other animal milk - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		5	0	detection	Listeria monocytogenes	5	0
	Cheeses, made from unspecified milk or other animal milk - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Suspect sampling	batch (food/feed)	10	Gram		4	0	<= 100	Listeria monocytogenes	2	0
	Cheeses, made from unspecified milk or other animal milk - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		4	0	detection	Listeria monocytogenes	4	0
	Cheeses, made from unspecified milk or other animal milk - soft and semi-soft - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Suspect sampling	batch (food/feed)	10	Gram		3	0	<= 100	Listeria monocytogenes	2	0
	Cheeses, made from unspecified milk or other animal milk - soft and semi-soft - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		3	0	detection	Listeria monocytogenes	3	0
	Crustaceans - prawns - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		1	0	detection	Listeria monocytogenes	1	0
	Eggs - Retail - Not Available - animal sample - eggs - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		1	0	detection	Listeria monocytogenes	1	0
	Fish - gravad /slightly salted - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		17	0	<= 100	Listeria monocytogenes	2	0
	Fish - gravad /slightly salted - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		17	0	detection	Listeria monocytogenes	16	0
	Fish - raw - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		7	2	detection	Listeria monocytogenes	7	2
	Fish - smoked - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		6	0	detection	Listeria monocytogenes	6	0
	Fish - smoked - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		7	0	detection	Listeria monocytogenes	7	0
	Fishery products, unspecified - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		2	0	detection	Listeria monocytogenes	2	0
	Fruits - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		1	0	<= 100	Listeria monocytogenes	1	0
	Fruits - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		3	0	detection	Listeria monocytogenes	3	0
	Meat from bovine animals - meat products - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		9	0	<= 100	Listeria monocytogenes	5	0

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Total units tested	Total units positive	Method	Zoonoses	N of units tested	N of units positive
SWEDEN	Meat from bovine animals - meat products - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		9	0	detection	Listeria monocytogenes	9	0
	Meat from broilers (Gallus gallus) - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		9	0	<= 100	Listeria monocytogenes	6	0
	Meat from broilers (Gallus gallus) - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		9	0	detection	Listeria monocytogenes	9	0
	Meat from deer (venison) - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		1	0	detection	Listeria monocytogenes	1	0
	Meat from other animal species or not specified - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		2	0	<= 100	Listeria monocytogenes	1	0
	Meat from other animal species or not specified - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		2	0	detection	Listeria monocytogenes	2	0
	Meat from pig - meat products - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		16	0	detection	Listeria monocytogenes	16	0
	Meat from pig - meat products - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Suspect sampling	batch (food/feed)	10	Gram		5	0	<= 100	Listeria monocytogenes	3	0
			25	Gram		5	0	<= 100	Listeria monocytogenes	3	0
	Meat from pig - meat products - Retail - Not Available - food sample - Surveillance - based on Regulation 2073 - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		5	0	detection	Listeria monocytogenes	5	0
	Other processed food products and prepared dishes - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		254	2	detection	Listeria monocytogenes	222	3
	Other processed food products and prepared dishes - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	10	Gram		10	0	<= 100	Listeria monocytogenes	9	0
			25	Gram		10	0	<= 100	Listeria monocytogenes	9	0
	Other processed food products and prepared dishes - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		10	0	detection	Listeria monocytogenes	10	3
	Other processed food products and prepared dishes - rice based dishes - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	10	Gram		2	0	<= 100	Listeria monocytogenes	2	0
	Other processed food products and prepared dishes - rice based dishes - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		2	0	detection	Listeria monocytogenes	2	0
	Other processed food products and prepared dishes - sandwiches - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		21	0	<= 100	Listeria monocytogenes	20	0
	Other processed food products and prepared dishes - sandwiches - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		21	0	detection	Listeria monocytogenes	1	0
	Ready-to-eat salads - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		16	0	<= 100	Listeria monocytogenes	6	0
	Ready-to-eat salads - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		16	0	detection	Listeria monocytogenes	10	0
	Ready-to-eat salads - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		1	0	detection	Listeria monocytogenes	1	0
	Sauce and dressings - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	10	Gram		30	0	<= 100	Listeria monocytogenes	1	0
	Sauce and dressings - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		30	0	detection	Listeria monocytogenes	29	0
	Sauce and dressings - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		2	0	detection	Listeria monocytogenes	2	0

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Total units tested	Total units positive	Method	Zoonoses	N of units tested	N of units positive
SWEDEN	Seeds, dried - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		1	0	detection	Listeria monocytogenes	1	0
	Soups - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		4	0	detection	Listeria monocytogenes	4	0
	Soups - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		1	0	detection	Listeria monocytogenes	1	0
	Spices and herbs - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		11	0	detection	Listeria monocytogenes	11	0
	Vegetables - leaves - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	10	Gram		1	0	<= 100	Listeria monocytogenes	1	0
	Vegetables - leaves - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		1	0	detection	Listeria monocytogenes	1	0
	Vegetables - products - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		1	0	detection	Listeria monocytogenes	1	0
	Vegetables - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	batch (food/feed)	25	Gram		9	0	detection	Listeria monocytogenes	9	0
	Vegetables - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	10	Gram		6	0	<= 100	Listeria monocytogenes	4	0
	Vegetables - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		6	0	detection	Listeria monocytogenes	6	1

Table Lyssavirus:LYSSAVIRUS in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Bats - wild - Natural habitat - Sweden - animal sample - brain - Surveillance - Official sampling - Suspect sampling	N_A	Immunofluorescence assay tests (IFA)	animal	3	0	Lyssavirus	0
	Bats - wild - Natural habitat - Sweden - animal sample - brain - Surveillance - Official sampling - Suspect sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	3	0	Lyssavirus	0
	Cats - pet animals - Veterinary clinics - Sweden - animal sample - brain - Surveillance - Official sampling - Selective sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	7	0	Lyssavirus	0
	Cats - pet animals - Veterinary clinics - Sweden - animal sample - brain - Surveillance - Official sampling - Suspect sampling	N_A	Immunofluorescence assay tests (IFA)	animal	4	0	Lyssavirus	0
	Dogs - pet animals - Veterinary clinics - Sweden - animal sample - brain - Surveillance - Official sampling - Selective sampling	N_A	Real-Time PCR (qualitative or quantitative)	animal	35	0	Lyssavirus	0
	Dogs - pet animals - Veterinary clinics - Sweden - animal sample - brain - Surveillance - Official sampling - Suspect sampling	N_A	Immunofluorescence assay tests (IFA)	animal	5	0	Lyssavirus	0
	Raccoon dogs - wild - Natural habitat - Sweden - animal sample - brain - Surveillance - Official sampling - Census	N_A	Real-Time PCR (qualitative or quantitative)	animal	5	0	Lyssavirus	0

Table Mycobacterium:MYCOBACTERIUM in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
SWEDEN	Alpacas - farmed - Farm - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Objective sampling	N_A	ELISA, Competitive ELISA (C-ELISA)	animal	322	0	Mycobacterium	0
	Camels - zoo animals - Farm - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Suspect sampling	N_A	Histology	animal	1	0	Mycobacterium	0
	Cats - pet animals - Veterinary clinics - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Suspect sampling	N_A	Histology	animal	4	0	Mycobacterium	0
	Dogs - pet animals - Veterinary clinics - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Suspect sampling	N_A	Histology	animal	1	0	Mycobacterium	0
	Pigs - unspecified - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Suspect sampling	N_A	Histology	animal	17	2	Mycobacterium avium complex	2
	Sheep - meat production animals - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Suspect sampling	N_A	Histology	animal	2	0	Mycobacterium	0
	Zoo animals, all - Farm - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Suspect sampling	Yak	Histology	animal	1	0	Mycobacterium	0
	Zoo animals, all - Zoo - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Suspect sampling	Geese	Histology	animal	1	1	Mycobacterium avium complex	1

Table Salmonella:SALMONELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Ducks - meat production flocks - before slaughter - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock		N_A	Official and industry sampling	Not Available	21	0	Salmonella	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	4799	3	Salmonella Mbandaka	1
									Salmonella Typhimurium	2
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	4955	Y	N_A	Not Available	4955	3	Salmonella Mbandaka	1
									Salmonella Typhimurium	2
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Objective sampling	herd/flock		N_A	N_A	Not Available	156	0	Salmonella	0
	Gallus gallus (fowl) - grandparent breeding flocks for broiler production line - adult - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	26	Y	N_A	Not Available	26	0	Salmonella	0
	Gallus gallus (fowl) - grandparent breeding flocks for broiler production line - during rearing period - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	18	N_A	N_A	Not Available	18	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - adult - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	678	Y	N_A	Not Available	678	4	Salmonella Mbandaka	2
									Salmonella Typhimurium	2
	Gallus gallus (fowl) - laying hens - during rearing period - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	149	N_A	N_A	Not Available	149	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - adult - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	137	Y	N_A	Not Available	137	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - during rearing period - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	98	N_A	N_A	Not Available	98	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - adult - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	20	Y	N_A	Not Available	20	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - during rearing period - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	6	N_A	N_A	Not Available	6	0	Salmonella	0
	Geese - meat production flocks - before slaughter - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock		N_A	Official and industry sampling	Not Available	15	0	Salmonella	0
	Ostriches - farmed - Farm - Sweden - animal sample - faeces - Control and eradication programmes - Official sampling - Census	animal		N_A	Official and industry sampling	Not Available	41	0	Salmonella	0
	Quails - meat production flocks - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock		N_A	Official and industry sampling	Not Available	11	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	145	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	166	Y	N_A	Not Available	166	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Objective sampling	herd/flock		N_A	N_A	Not Available	21	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	4	N_A	N_A	Not Available	4	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	4	Y	N_A	Not Available	4	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock	4	N_A	N_A	Not Available	4	0	Salmonella	0
	Turkeys - parent breeding flocks - during rearing period - Farm - Sweden - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	4	N_A	N_A	Not Available	4	0	Salmonella	0
SWEDEN	Birds - wild - Natural habitat - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Suspect sampling	animal		N_A	N_A	ISO 6579:2002/Amd 1:2007	52	26	Salmonella group O:4	10
									Salmonella Typhimurium	16
	Cats - pet animals - Veterinary clinics - Sweden - animal sample - faeces - Clinical investigations - Official sampling - Suspect sampling	animal		N_A	These figures cover only samples or isolates sent to SVA.	ISO 6579:2002/Amd 1:2007	1760	1185	Salmonella enterica, subspecies diarizonae	1
									Salmonella group O:4	877
									Salmonella Hessarek	1
									Salmonella Konstanz	1
									Salmonella Typhimurium	305

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
SWEDEN	Cattle (bovine animals) - unspecified - Farm - Sweden - animal sample - faeces - Surveillance - Official sampling - Suspect sampling	holding		N_A	N_A	ISO 6579:2002/Amd 1:2007	13	6	Salmonella Dublin	3
									Salmonella Infantis	1
									Salmonella Typhimurium	2
	Cattle (bovine animals) - unspecified - Slaughterhouse - Sweden - animal sample - lymph nodes - Surveillance - Official sampling - Objective sampling	animal		N_A	N_A	Not Available	3242	5	Salmonella Dublin	1
									Salmonella Duesseldorf	1
									Salmonella I 4,12:b:-	1
									Salmonella Mikawasima	1
									Salmonella Typhimurium	1
	Dogs - pet animals - Veterinary clinics - Sweden - animal sample - faeces - Clinical investigations - Official sampling - Suspect sampling	animal		N_A	These figures cover only samples or isolates sent to SVA.	ISO 6579:2002/Amd 1:2007	152	17	Salmonella Agona	1
									Salmonella group O:4	1
									Salmonella Infantis	2
									Salmonella London	3
									Salmonella Typhimurium	10
	Hedgehogs - wild - Natural habitat - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Suspect sampling	animal		N_A	These figures cover only samples or isolates sent to SVA.	ISO 6579:2002/Amd 1:2007	5	1	Salmonella Enteritidis	1
	Pigs - breeding animals - unspecified - Slaughterhouse - Sweden - animal sample - lymph nodes - Surveillance - Official sampling - Objective sampling	animal		N_A	N_A	Not Available	2930	1	Salmonella Hessarek	1
	Pigs - fattening pigs - unspecified - Slaughterhouse - Sweden - animal sample - lymph nodes - Surveillance - Official sampling - Objective sampling	animal		N_A	N_A	Not Available	3003	3	Salmonella Typhimurium	3
	Pigs - mixed herds - Farm - Sweden - animal sample - faeces - Surveillance - Official sampling - Suspect sampling	holding		N_A	N_A	ISO 6579:2002/Amd 1:2007	3	1	Salmonella enterica, subspecies enterica	1
	Solipeds, domestic - horses - Farm - Sweden - animal sample - faeces - Clinical investigations - Official sampling - Suspect sampling	holding		N_A	These figures cover only samples or isolates sent to SVA.	ISO 6579:2002/Amd 1:2007	57	2	Salmonella 4,5:i:-	1
									Salmonella Infantis	1
	Wild boars - wild - Natural habitat - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Suspect sampling	animal		N_A	These figures cover only samples or isolates sent to SVA.	ISO 6579:2002/Amd 1:2007	1	1	Salmonella I 6,7:-:1,5	1

Table Salmonella:SALMONELLA in food

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	All foodstuffs - Border inspection activities - Not Available - food sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	125	Gram	N_A	Not Available	1	0	Salmonella	0
	All foodstuffs - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	34	0	Salmonella	0
	Bakery products - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	11	0	Salmonella	0
	Cereals and meals - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Cheeses, made from unspecified milk or other animal milk - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0
	Crustaceans - lobsters - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Crustaceans - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Crustaceans - shrimps - Border inspection activities - Not Available - food sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	125	Gram	N_A	Not Available	3	0	Salmonella	0
	Crustaceans - shrimps - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	4	0	Salmonella	0
	Dairy products (excluding cheeses) - milk powder and whey powder - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Dairy products (excluding cheeses) - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	3	0	Salmonella	0
	Egg products - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	7	0	Salmonella	0
	Eggs - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Fish - cooked - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Fish - gravad /slightly salted - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Fish - raw - Border inspection activities - Not Available - food sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	125	Gram	N_A	Not Available	2	0	Salmonella	0
	Fish - raw - frozen - Border inspection activities - Not Available - food sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	125	Gram	N_A	Not Available	3	0	Salmonella	0
	Fish - raw - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Fish - smoked - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Fishery products, unspecified - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0
	Fruits - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Live bivalve molluscs - oysters - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Meat from bovine animals - Border inspection activities - Not Available - food sample - meat - Surveillance - Official sampling - Selective sampling	single (food/feed)	125	Gram	N_A	Not Available	20	0	Salmonella	0
	Meat from bovine animals - carcase - Slaughterhouse - Not Available - food sample - carcase swabs - Control and eradication programmes - Official sampling - Objective sampling	single (food/feed)	700	Square centimetre	N_A	NMKL 71, 1999, 5th Ed. Salmonella	3272	0	Salmonella	0
	Meat from bovine animals - meat products - Retail - Not Available - food sample - meat - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	10	1	Salmonella Typhimurium	1
	Meat from bovine animals - minced meat - Retail - Not Available - food sample - meat - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Meat from bovine animals - Retail - Not Available - food sample - meat - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	4	0	Salmonella	0
	Meat from bovine animals and pig - fresh - Cutting plant - Not Available - food sample - meat - Control and eradication programmes - Official sampling - Objective sampling	batch (food/feed)	25	Gram	Meat scrapings	NMKL 71, 1999, 5th Ed. Salmonella	5173	0	Salmonella	0
	Meat from broilers (Gallus gallus) - Border inspection activities - Not Available - food sample - meat - Surveillance - Official sampling - Selective sampling	single (food/feed)	125	Gram	N_A	Not Available	3	0	Salmonella	0
	Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Not Available - food sample - neck skin - Control and eradication programmes - Official sampling - Objective sampling	single (food/feed)	10	Gram	N_A	NMKL 71, 1999, 5th Ed. Salmonella	1289	0	Salmonella	0
	Meat from broilers (Gallus gallus) - carcase - spent hens - Slaughterhouse - Not Available - food sample - neck skin - Control and eradication programmes - Official sampling - Objective sampling	single (food/feed)	10	Gram	N_A	NMKL 71, 1999, 5th Ed. Salmonella	201	0	Salmonella	0
	Meat from broilers (Gallus gallus) - Cutting plant - Not Available - food sample - meat - Control and eradication programmes - Official sampling - Objective sampling	batch (food/feed)	25	Gram	Meat scrapings	Not Available	630	0	Salmonella	0
	Meat from broilers (Gallus gallus) - Retail - Not Available - food sample - meat - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	15	0	Salmonella	0
	Meat from duck - Border inspection activities - Not Available - food sample - meat - Surveillance - Official sampling - Selective sampling	single (food/feed)	125	Gram	N_A	Not Available	1	0	Salmonella	0
	Meat from duck - carcase - Slaughterhouse - Not Available - food sample - neck skin - Control and eradication programmes - Official sampling - Objective sampling	single (food/feed)	10	Gram	N_A	NMKL 71, 1999, 5th Ed. Salmonella	1	0	Salmonella	0
	Meat from geese - carcase - Slaughterhouse - Not Available - food sample - neck skin - Control and eradication programmes - Official sampling - Objective sampling	single (food/feed)	10	Gram	N_A	NMKL 71, 1999, 5th Ed. Salmonella	1	0	Salmonella	0
	Meat from other animal species or not specified - Retail - Not Available - food sample - meat - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	7	0	Salmonella	0
	Meat from pig - carcase - Slaughterhouse - Not Available - food sample - carcase swabs - Surveillance - based on Regulation 2073 - Official sampling - Objective sampling	single (food/feed)	700	Square centimetre	2926 of the samples were from breeding pigs, 2953 from fattening pigs	NMKL 71, 1999, 5th Ed. Salmonella	5879	1	Salmonella Typhimurium	1
	Meat from pig - meat products - Retail - Italy - food sample - meat - Surveillance - Official sampling - Suspect sampling	single (food/feed)	25	Gram	Salami	Not Available	14	1	Salmonella 4,5:i:-	1
	Meat from pig - Retail - Not Available - food sample - meat - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	13	0	Salmonella	0
	Meat from poultry, unspecified - Cutting plant - Not Available - food sample - meat - Control and eradication programmes - Official sampling - Objective sampling	batch (food/feed)	25	Gram	Meat scrapings	NMKL 71, 1999, 5th Ed. Salmonella	431	0	Salmonella	0
	Meat from poultry, unspecified - Slaughterhouse - Not Available - food sample - neck skin - Control and eradication programmes - Official sampling - Objective sampling	single (food/feed)	10	Gram	N_A	NMKL 71, 1999, 5th Ed. Salmonella	1207	0	Salmonella	0

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Meat from sheep - Border inspection activities - Not Available - food sample - meat - Surveillance - Official sampling - Selective sampling	single (food/feed)	125	Gram	N_A	Not Available	3	0	Salmonella	0
	Meat from sheep - meat products - Retail - Not Available - food sample - meat - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Meat from turkey - carcase - Slaughterhouse - Not Available - food sample - neck skin - Control and eradication programmes - Official sampling - Objective sampling	single (food/feed)	10	Gram	N_A	NMKL 71, 1999, 5th Ed. Salmonella	81	0	Salmonella	0
	Meat from turkey - Cutting plant - Not Available - food sample - meat - Control and eradication programmes - Official sampling - Objective sampling	batch (food/feed)	25	Gram	Meat scrapings	NMKL 71, 1999, 5th Ed. Salmonella	57	0	Salmonella	0
	Meat from turkey - Retail - Not Available - food sample - meat - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Molluscan shellfish - Retail - Not Available - food sample - meat - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Other processed food products and prepared dishes - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	268	0	Salmonella	0
	Ready-to-eat salads - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	39	0	Salmonella	0
	Sauce and dressings - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	single (food/feed)	25	Gram	N_A	Not Available	71	0	Salmonella	0
	Seeds, dried - Border inspection activities - Not Available - food sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	125	Gram	N_A	Not Available	60	0	Salmonella	0
	Seeds, dried - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0
	Soups - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	6	0	Salmonella	0
	Spices and herbs - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	37	0	Salmonella	0
	Surimi - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Vegetables - products - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	4	0	Salmonella	0
	Vegetables - Retail - Not Available - food sample - Surveillance - Official sampling - Convenient sampling	single (food/feed)	25	Gram	N_A	Not Available	13	0	Salmonella	0

Table Salmonella:SALMONELLA in feed

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Complementary feedingstuffs - final product - Unspecified - European Union - feed sample - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	For horses	ISO 6579:2002/Amd 1:2007	2	0	Salmonella	0
	Complementary feedingstuffs - final product - Unspecified - Sweden - feed sample - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	For horses	ISO 6579:2002/Amd 1:2007	1	0	Salmonella	0
	Complementary feedingstuffs - process control - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	For horses	Not Available	104	0	Salmonella	0
	Complementary feedingstuffs - process control - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - Official sampling - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 6579:2002/Amd 1:2007	4	0	Salmonella	0
	Compound feedingstuffs for fur animal - final product - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Compound feedingstuffs for fur animal - process control - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - Official sampling - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 6579:2002/Amd 1:2007	10	0	Salmonella	0
	Compound feedingstuffs for horses - process control - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Compound feedingstuffs for poultry (non specified) - process control - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Compound feedingstuffs, not specified - final product - Feed mill - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	36	0	Salmonella	0
	Compound feedingstuffs, not specified - process control - Feed mill - Sweden - environmental sample - fabric swab - Surveillance - Official sampling - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 6579:2002/Amd 1:2007	169	0	Salmonella	0
	Compound feedingstuffs, not specified - process control - Feed mill - Sweden - environmental sample - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 6579:2002/Amd 1:2007	7840	16	Salmonella Agona	1
									Salmonella Bispebjerg	1
									Salmonella enterica, subspecies diarizonae	1
									Salmonella Kottbus	1
									Salmonella Mbandaka	1
									Salmonella Typhimurium	10
									Salmonella Vejle	1
	Feed material of cereal grain origin - barley derived - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	15	0	Salmonella	0
	Feed material of cereal grain origin - maize derived - Unspecified - European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	16	0	Salmonella	0
	Feed material of cereal grain origin - maize derived - Unspecified - Non European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0
	Feed material of cereal grain origin - oat derived - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	31	0	Salmonella	0
	Feed material of cereal grain origin - oat derived - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	58	0	Salmonella	0
	Feed material of cereal grain origin - other cereal grain derived - by-products of brewing and distilling - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	1552	69	Salmonella Agona	31
									Salmonella Amsterdam	7
									Salmonella enterica, subspecies enterica	9
									Salmonella Kedougou	22

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Feed material of cereal grain origin - other cereal grain derived - by-products of brewing and distilling - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - Official sampling - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 6579:2002/Amd 1:2007	12	0	Salmonella	0
	Feed material of cereal grain origin - other cereal grain derived - by-products of brewing and distilling - Processing plant - Sweden - feed sample - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	ISO 6579:2002/Amd 1:2007	294	2	Salmonella Agona	2
	Feed material of cereal grain origin - other cereal grain derived - by-products of brewing and distilling - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	477	0	Salmonella	0
	Feed material of cereal grain origin - other cereal grain derived - Unspecified - European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	19	0	Salmonella	0
	Feed material of cereal grain origin - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	44	0	Salmonella	0
	Feed material of cereal grain origin - rice derived - Unspecified - European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	10	0	Salmonella	0
	Feed material of cereal grain origin - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	9	0	Salmonella	0
	Feed material of cereal grain origin - wheat derived - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	28	0	Salmonella	0
	Feed material of cereal grain origin - wheat derived - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	70	1	Salmonella Newport	1
	Feed material of land animal origin - animal fat - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	25	0	Salmonella	0
	Feed material of land animal origin - dairy products - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - Official sampling - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 6579:2002/Amd 1:2007	2	0	Salmonella	0
	Feed material of land animal origin - dairy products - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	7	0	Salmonella	0
	Feed material of land animal origin - egg powder - Unspecified - European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of land animal origin - egg powder - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	51	0	Salmonella	0
	Feed material of land animal origin - greaves - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	280	0	Salmonella	0
	Feed material of land animal origin - meat meal - Unspecified - European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	30	0	Salmonella	0
	Feed material of land animal origin - poultry offal meal - Unspecified - European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	17	0	Salmonella	0
	Feed material of land animal origin - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Feed material of land animal origin - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - Official sampling - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 6579:2002/Amd 1:2007	13	0	Salmonella	0
	Feed material of land animal origin - protein meal - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	718	0	Salmonella	0
	Feed material of land animal origin - protein meal - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	765	0	Salmonella	0

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Feed material of land animal origin - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	6	0	Salmonella	0
	Feed material of marine animal origin - fish meal - Unspecified - European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	75	0	Salmonella	0
	Feed material of marine animal origin - fish oil - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	4	0	Salmonella	0
	Feed material of marine animal origin - other fish products - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - Official sampling - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 6579:2002/Amd 1:2007	7	0	Salmonella	0
	Feed material of oil seed or fruit origin - groundnut derived - Unspecified - Non European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	25	0	Salmonella	0
	Feed material of oil seed or fruit origin - linseed derived - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	825	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Unspecified - European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	136	2	Salmonella Agona	1
									Salmonella Poano	1
	Feed material of oil seed or fruit origin - rape seed derived - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	455	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Unspecified - Unknown - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	73	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Unspecified - European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	167	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Unspecified - Non European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	43	1	Salmonella Kedougou	1
	Feed material of oil seed or fruit origin - soya (bean) derived - Unspecified - Unknown - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	250	4	Salmonella Mbandaka	3
									Salmonella Senftenberg	1
	Feed material of oil seed or fruit origin - sunflower seed derived - Unspecified - European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	98	4	Salmonella enterica, subspecies enterica	3
									Salmonella Mbandaka	1
	Feed material of oil seed or fruit origin - sunflower seed derived - Unspecified - Non European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Feed material of oil seed or fruit origin - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Other feed material - Feed mill - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	For wild birds	Not Available	26	1	Salmonella Enteritidis	1
	Other feed material - legume seeds and similar products - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	3	0	Salmonella	0
	Other feed material - legume seeds and similar products - Unspecified - Non European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Other feed material - legume seeds and similar products - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	11	0	Salmonella	0
	Other feed material - minerals - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	And vitamines	Not Available	9	0	Salmonella	0

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
Not Available	Other feed material - minerals - Unspecified - Unknown - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	And vitamines	Not Available	10	0	Salmonella	0
	Other feed material - other plants - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	Berries	Not Available	1	0	Salmonella	0
	Other feed material - other plants - Unspecified - Non European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Other feed material - other plants - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	Berries	Not Available	3	0	Salmonella	0
	Other feed material - other plants - Unspecified - Unknown - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	4	0	Salmonella	0
	Other feed material - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	For wild birds	Not Available	248	3	Salmonella Enteritidis	3
	Other feed material - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - Official sampling - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 6579:2002/Amd 1:2007	1	0	Salmonella	0
	Other feed material - tubers, roots and similar products - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	55	0	Salmonella	0
	Other feed material - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	Algae meal	Not Available	10	0	Salmonella	0
	Other feed material - yeast - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	8	0	Salmonella	0
	Pet food - dog snacks (pig ears, chewing bones) - Border inspection activities - Non European Union - feed sample - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	ISO 6579:2002/Amd 1:2007	18	0	Salmonella	0
	Pet food - final product - Unspecified - European Union - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	19	0	Salmonella	0
	Pet food - final product - Unspecified - European Union - feed sample - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	For cats	ISO 6579:2002/Amd 1:2007	3	0	Salmonella	0
					For dogs	ISO 6579:2002/Amd 1:2007	1	0	Salmonella	0
	Pet food - final product - Unspecified - Non European Union - feed sample - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	For dogs	ISO 6579:2002/Amd 1:2007	5	0	Salmonella	0
	Pet food - final product - Unspecified - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	For dogs	Not Available	78	0	Salmonella	0
					N_A	Not Available	71	0	Salmonella	0
	Pet food - final product - Unspecified - Sweden - feed sample - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	For dogs	ISO 6579:2002/Amd 1:2007	4	0	Salmonella	0
	Pet food - process control - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	682	5	Salmonella Augustenborg	1
									Salmonella Montevideo	1
									Salmonella Typhimurium	3
	Pet food - process control - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - Official sampling - Objective sampling	single (food/feed)	25	Gram	For dogs	ISO 6579:2002/Amd 1:2007	57	2	Salmonella Agona	2
	Premixtures - final product - Feed mill - Sweden - feed sample - Surveillance - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Premixtures - process control - Feed mill - Sweden - environmental sample - fabric swab - Surveillance - Official sampling - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 6579:2002/Amd 1:2007	3	0	Salmonella	0
	Premixtures - process control - Processing plant - Sweden - environmental sample - fabric swab - Surveillance - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	For dog and horses	Not Available	22	0	Salmonella	0

Table Trichinella:TRICHINELLA in animal

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
SWEDEN	Badgers - wild - Natural habitat - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	11	0	Trichinella	0
	Bears - wild - Hunting - Sweden - animal sample - organ/tissue - Monitoring - Official sampling - Convenient sampling	N_A	Not Available	animal	232	0	Trichinella	0
	Beavers - wild - Natural habitat - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	4	0	Trichinella	0
	Deer - wild - roe deer - Natural habitat - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	1	0	Trichinella	0
	Lion - zoo animals - Zoo - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	1	0	Trichinella	0
	Lynx - wild - Natural habitat - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	53	6	Trichinella britovi	1
							Trichinella nativa	5
	Pigs - breeding animals - not raised under controlled housing conditions - boars - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	635	0	Trichinella	0
	Pigs - breeding animals - not raised under controlled housing conditions - sows - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	30443	0	Trichinella	0
	Pigs - breeding animals - raised under controlled housing conditions - boars - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	392	0	Trichinella	0
	Pigs - breeding animals - raised under controlled housing conditions - sows - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	25981	0	Trichinella	0
	Pigs - fattening pigs - not raised under controlled housing conditions - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	549125	0	Trichinella	0
	Pigs - fattening pigs - raised under controlled housing conditions - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Objective sampling	N_A	Not Available	animal	1494474	0	Trichinella	0
	Raccoon dogs - wild - Natural habitat - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	23	1	Trichinella nativa	1
	Seals - wild - Natural habitat - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	2	0	Trichinella	0
	Solipeds, domestic - horses - Slaughterhouse - Sweden - animal sample - organ/tissue - Surveillance - Official sampling - Census	N_A	Not Available	animal	2324	0	Trichinella	0
	Tiger - zoo animals - Zoo - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	1	0	Trichinella	0
	Wild boars - wild - Hunting - Sweden - animal sample - organ/tissue - Monitoring - Official sampling - Objective sampling	N_A	Not Available	animal	106055	9	Trichinella britovi	1
							Trichinella pseudospiralis	7
							Trichinella, unspecified sp.	1
	Wolves - wild - Natural habitat - Sweden - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	N_A	Not Available	animal	17	3	Trichinella britovi	1
							Trichinella nativa	2

Table Yersinia:YERSINIA in food

Area of Sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	Total units tested	Total units positive	Zoonoses	N of units positive
SWEDEN	Meat from pig - Retail - Not Available - food sample - Surveillance - Official sampling - Suspect sampling	batch (food/feed)	25	Gram		ISO 10273:2003 Yersinia	1	1	Yersinia enterocolitica	1

FOODBORNE OUTBREAKS TABLES

Foodborne Outbreaks: summarized data

		Outbreak strenght	Strong			Weak			
Causative agent	Food vehicle	N outbreaks	N human cases	N hospitalized	N deaths	N outbreaks	N human cases	N hospitalized	N deaths
Bacillus cereus	Vegetables and juices and other products thereof	1	2	0	0				
Campylobacter coli	Unknown					1	3	0	0
Campylobacter jejuni	Milk	1	2	0	0				
	Broiler meat (Gallus gallus) and products thereof	1	100	0	0				
	Mixed food					1	4	0	0
Hepatovirus A	Fruit, berries and juices and other products thereof	1	20	0	0				
	Unknown					1	3	0	0
Histamine	Fish and fish products	3	17	0	0				
Lectins	Mixed food	1	30	0	0				
Listeria monocytogenes	Cereal products including rice and seeds/pulses (nuts, almonds)	1	2	0	0				
	Mixed food	1	7	4	4				
Norovirus	Broiler meat (Gallus gallus) and products thereof	1	50	0	0				
	Crustaceans, shellfish, molluscs and products thereof	4	88	0	0	1	2	0	0
	Fruit, berries and juices and other products thereof					1	6	0	0
	Tap water, including well water	1	100	0	0				
	Bakery products	1	30	0	0				
	Mixed food					1	7	0	0
	Buffet meals	1	60	0	0				
	Unknown					11	260	0	0
	Meat and meat products					1	11	0	0
Salmonella Bovismorbificans	Unknown					1	40	0	0
Salmonella Enterica, unspecified	Unknown					1	7	0	0
Salmonella Enteritidis	Unknown					2	43	0	0
Salmonella Mikawasima	Unknown					1	17	0	0
Salmonella Typhimurium	Unknown					1	18	0	0
Shigella sonnei	Vegetables and juices and other products thereof					1	11	0	0
Unknown	Dairy products (other than cheeses)					2	8	0	0
	Other or mixed red meat and products thereof					1	8	0	0
	Fish and fish products					4	21	0	0
	Crustaceans, shellfish, molluscs and products thereof					5	22	0	0
	Vegetables and juices and other products thereof					1	4	0	0
	Fruit, berries and juices and other products thereof					1	4	0	0
	Bakery products					1	6	0	0
	Mixed food					8	66	0	0
	Buffet meals					2	7	0	0

Causative agent	Food vehicle	Outbreak strenght	Strong				Weak			
			N outbreaks	N human cases	N hospitalized	N deaths	N outbreaks	N human cases	N hospitalized	N deaths
Unknown	Meat and meat products						1	5	0	0
VTEC O157	Vegetables and juices and other products thereof						1	116	0	0
	Unknown						1	5	0	0
VTEC O26	Unknown						2	18	0	0
Yersinia enterocolitica	Pig meat and products thereof		1	6	0	0				
	Unknown						1	3	0	0

Strong Foodborne Outbreaks: detailed data

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Bacillus cereus	Not Available	18/03 04	General	Vegetables and juices and other products thereof	N_A	Descriptive environmental evidence;Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Sweden	Inadequate chilling	N_A	1	2	unk	unk
Campylobacter jejuni	Not Available	19/02 02	General	Broiler meat (Gallus gallus) and products thereof	N_A	Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Multiple places of exposure in one country	Farm	Sweden	Not Available	The number of cases estimated. The outbreak was traced to domestically produced broiler meat.	1	100	unk	unk
		19/02 03	General	Milk	N_A	Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Others	Farm	Sweden	Not Available	N_A	1	2	unk	unk
Hepatovirus A	Not Available	19/01 95	General	Fruit, berries and juices and other products thereof	N_A	Product-tracing investigations;Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Multiple places of exposure in more than one country	Farm	Poland	Unprocessed contaminated ingredient	N_A	1	20	unk	unk

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Histamine	Not Available	18/0080	General	Fish and fish products	N_A	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Vietnam	Unprocessed contaminated ingredient	N_A	1	12	unk	unk
		18/0437	General	Fish and fish products	N_A	Descriptive environmental evidence;Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Vietnam	Unprocessed contaminated ingredient	N_A	1	3	unk	unk
		18/0458	General	Fish and fish products	N_A	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Unprocessed contaminated ingredient	N_A	1	2	unk	unk
Lectins	Not Available	19/0057	General	Mixed food	N_A	Descriptive epidemiological evidence	School or kindergarten	School or kindergarten	Sweden	Unprocessed contaminated ingredient	N_A	1	30	unk	unk
Listeria monocytogenes	Not Available	19/0204	General	Mixed food	N_A	Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans	Multiple places of exposure in one country	Processing plant	Sweden	Other contributory factor	An oubtreak among elderly persons residing at a care home or at home. L. monocytogenes detected in an equipment portioning mashed food to the elderly.	1	7	4	4
		19/0277	General	Cereal products including rice and seeds/pulses (nuts, almonds)	N_A	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans	Not Available	Not Available	Hungary	Unprocessed contaminated ingredient	Multi-country outbreak. True number of Swedish cases is 1.	1	2	unk	unk

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Norovirus	Not Available	18/0079	General	Bakery products	N_A	Descriptive epidemiological evidence	Canteen or workplace catering	Canteen or workplace catering	Not Available	Infected food handler	N_A	1	30	unk	unk
		18/0262	General	Crustaceans, shellfish, molluscs and products thereof	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Farm	France	Unprocessed contaminated ingredient	N_A	1	47	unk	unk
		18/0329	General	Broiler meat (Gallus gallus) and products thereof	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	Infected food handler	N_A	1	50	unk	unk
		18/0347	Household	Crustaceans, shellfish, molluscs and products thereof	Oysters	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Household	Farm	France	Unprocessed contaminated ingredient	N_A	1	2	unk	unk
		18/0435	General	Crustaceans, shellfish, molluscs and products thereof	N_A	Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Multiple places of exposure in one country	Farm	France	Unprocessed contaminated ingredient	N_A	1	31	unk	unk
		19/0028	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Infected food handler	N_A	1	60	unk	unk

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Norovirus	Not Available	19/0201	General	Crustaceans, shellfish, molluscs and products thereof	Oysters	Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Farm	France	Unprocessed contaminated ingredient	N_A	1	8	unk	unk
		V19/0012	General	Tap water, including well water	N_A	Descriptive epidemiological evidence	Multiple places of exposure in one country	Water distribution system	Sweden	Water treatment failure	N_A	1	100	unk	unk
Yersinia enterocolitica	Not Available	18/0373	General	Pig meat and products thereof	N_A	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Slaughterhouse	Not Available	Unprocessed contaminated ingredient	Ham, manufactured by the restaurant.	1	6	unk	unk

Weak Foodborne Outbreaks: detailed data

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Campylobacter coli	Not Available	19/0139	Not Available	Unknown	N_A	Unknown	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	3	unk	unk
Campylobacter jejuni	Not Available	18/0446	Not Available	Mixed food	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Cross-contamination	N_A	1	4	unk	unk
Hepatovirus A	Not Available	18/0396	Not Available	Unknown	N_A	Unknown	Not Available	Not Available	Not Available	Not Available	EPEC was also detected. During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	3	unk	unk
Norovirus	Not Available	18/0049	General	Unknown	N_A	Unknown	Not Available	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	22	unk	unk
		18/0294	Not Available	Unknown	N_A	Unknown	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	45	unk	unk
		18/0323	General	Unknown	N_A	Unknown	Multiple places of exposure in one country	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	37	unk	unk
		18/0346	General	Unknown	N_A	Unknown	Not Available	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	8	unk	unk
		18/0381	Not Available	Unknown	N_A	Unknown	Not Available	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	7	unk	unk
		18/0398	Not Available	Mixed food	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Storage time/temperature abuse	N_A	1	7	unk	unk

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Norovirus	Not Available	18/0416	Household	Meat and meat products	N_A	Descriptive epidemiological evidence	Not Available	Not Available	Not Available	Inadequate heat treatment	N_A	1	11	unk	unk
		18/0423	General	Unknown	N_A	Unknown	Not Available	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	30	unk	unk
		18/0449	General	Unknown	N_A	Unknown	Take-away or fast-food outlet	Not Available	Not Available	Infected food handler	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	29	unk	unk
		19/0037	Not Available	Crustaceans, shellfish, molluscs and products thereof	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Inadequate heat treatment	N_A	1	2	unk	unk
		19/0043	General	Unknown	N_A	Unknown	Not Available	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	21	unk	unk
		19/0129	General	Fruit, berries and juices and other products thereof	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	Not Available	N_A	1	6	unk	unk
		19/0176	General	Unknown	N_A	Unknown	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	35	unk	unk
		19/0180	General	Unknown	N_A	Unknown	Residential institution (nursing home or prison or boarding school)	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	14	unk	unk
		19/0208	General	Unknown	N_A	Unknown	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	12	unk	unk

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Salmonella Bovismorbificans	Not Available	19/0205	General	Unknown	N_A	Unknown	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	40	unk	unk
Salmonella Enterica, unspecified	Not Available	18/0356	General	Unknown	N_A	Unknown	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	Not Available	ETEC was also detected. During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	7	unk	unk
Salmonella Enteritidis	Not Available	19/0199	General	Unknown	N_A	Unknown	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	9	unk	unk
		19/0200	General	Unknown	N_A	Unknown	Multiple places of exposure in more than one country	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	34	unk	unk
Salmonella Mikawasima	Not Available	19/0209	General	Unknown	N_A	Unknown	Multiple places of exposure in more than one country	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	17	unk	unk
Salmonella Typhimurium	Not Available	19/0194	General	Unknown	N_A	Unknown	Not Available	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	18	unk	unk
Shigella sonnei	Not Available	18/0372	General	Vegetables and juices and other products thereof	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	Not Available	N_A	1	11	unk	unk

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Unknown	Not Available	18/0093	General	Crustaceans, shellfish, molluscs and products thereof	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	3	unk	unk
		18/0246	Not Available	Mixed food	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	N_A	1	6	unk	unk
		18/0260	Not Available	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	N_A	1	4	unk	unk
		18/0275	Not Available	Fish and fish products	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	N_A	1	4	unk	unk
		18/0276	Not Available	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	N_A	1	4	unk	unk
		18/0279	General	Crustaceans, shellfish, molluscs and products thereof	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Farm	France	Unprocessed contaminated ingredient	N_A	1	3	unk	unk
		18/0289	Household	Crustaceans, shellfish, molluscs and products thereof	N_A	Descriptive epidemiological evidence	Not Available	Farm	Not Available	Unprocessed contaminated ingredient	N_A	1	8	unk	unk

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Unknown	Not Available	18/0333	Not Available	Fruit, berries and juices and other products thereof	N_A	Descriptive epidemiological evidence	Not Available	Not Available	Not Available	Inadequate heat treatment	N_A	1	4	unk	unk
		18/0366	Household	Bakery products	N_A	Descriptive epidemiological evidence	Not Available	Not Available	Not Available	Inadequate heat treatment	N_A	1	6	unk	unk
		18/0421	Not Available	Fish and fish products	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	N_A	1	7	unk	unk
		18/0422	General	Crustaceans, shellfish, molluscs and products thereof	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Farm	France	Unprocessed contaminated ingredient	N_A	1	5	unk	unk
		18/0447	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	N_A	1	3	unk	unk
		18/0453	General	Mixed food	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	3	unk	unk
		18/0463	General	Mixed food	N_A	Descriptive epidemiological evidence	School or kindergarten	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	N_A	1	10	unk	unk
		18/0469	Household	Crustaceans, shellfish, molluscs and products thereof	N_A	Descriptive epidemiological evidence	Not Available	Farm	France	Unprocessed contaminated ingredient	N_A	1	3	unk	unk

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Unknown	Not Available	18/0474	Not Available	Fish and fish products	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Not Available	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Storage time/temperature abuse	N_A	1	7	unk	unk
		18/0475	Not Available	Mixed food	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Storage time/temperature abuse	N_A	1	3	unk	unk
		19/0022	General	Mixed food	N_A	Descriptive epidemiological evidence	Not Available	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	20	unk	unk
		19/0036	Not Available	Other or mixed red meat and products thereof	N_A	Descriptive epidemiological evidence	Not Available	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Inadequate heat treatment	N_A	1	8	unk	unk
		19/0068	Not Available	Fish and fish products	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	N_A	1	3	unk	unk
		19/0071	Not Available	Vegetables and juices and other products thereof	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	N_A	1	4	unk	unk
		19/0104	General	Mixed food	N_A	Descriptive epidemiological evidence	Not Available	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	8	unk	unk

Causative agent	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Unknown	Not Available	19/01 38	Not Available	Meat and meat products	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Not Available	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	N_A	1	5	unk	unk
		19/01 43	General	Mixed food	N_A	Descriptive epidemiological evidence	School or kindergarten	Others	Not Available	Not Available	N_A	1	12	unk	unk
		19/01 71	Not Available	Dairy products (other than cheeses)	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	N_A	1	5	unk	unk
		19/01 75	Not Available	Dairy products (other than cheeses)	N_A	Descriptive environmental evidence;Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Others	Not Available	Not Available	N_A	1	3	unk	unk
VTEC O157	Not Available	19/01 92	General	Unknown	N_A	Unknown	Others	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	5	unk	unk
		19/01 97	General	Vegetables and juices and other products thereof	N_A	Product-tracing investigations	Multiple places of exposure in one country	Not Available	Not Available	Unprocessed contaminated ingredient	Clade 8. Lettuce was the most likely vehicle.	1	116	unk	unk
VTEC O26	Not Available	19/01 98	General	Unknown	N_A	Unknown	Others	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	13	unk	unk
		19/02 06	General	Unknown	N_A	Unknown	Others	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	5	unk	unk
Yersinia enterocolitica	Not Available	19/01 52	General	Unknown	N_A	Unknown	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Not Available	Not Available	Not Available	During the investigation it was difficult to point out a particular food or a foodstuff as a source of contamination.	1	3	unk	unk

ANTIMICROBIAL RESISTANCE TABLES FOR CAMPYLOBACTER

Table Antimicrobial susceptibility testing of Campylobacter jejuni in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse | Sampling Type: animal sample - caecum | Sampling Context: Monitoring - active

Sampler: Official sampling | Sampling Strategy: Objective sampling | Programme Code: AMR MON

Analytical Method:

Country of Origin: Sweden

Sampling details:

	AM substance	Ciprofloxacin	Erythromycin	Gentamicin	Nalidixic acid	Streptomycin	Tetracycline
	ECOFF	**0.5**	**4**	**2**	**16**	**4**	**1**
	Lowest limit	**0.12**	**1**	**0.12**	**1**	**0.25**	**0.5**
	Highest limit	**16**	**128**	**16**	**64**	**32**	**64**
	N of tested isolates	**174**	**174**	**174**	**174**	**174**	**174**
MIC	**N of resistant isolates**	**43**	**0**	**0**	**43**	**1**	**4**
<=0.12		125		1			
<=0.25						1	
0.25		5		25			
<=0.5							167
0.5		1		145		12	
<=1			170				
1				2		122	3
2			4	1	7	36	
4					99	2	
8		25			25		
16		18					1
32							3
>32						1	
>64					43		

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

Table Antimicrobial susceptibility testing of Salmonella Mbandaka in Gallus gallus (fowl) - broilers - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: Sweden

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										1					
<=0.25				1										1	
<=0.5					1										
0.5															1
<=1		1						1							
1									1						
<=2													1		
<=4											1				
<=8						1									
8			1												
64												1			

Table Antimicrobial susceptibility testing of Salmonella Mbandaka in Gallus gallus (fowl) - laying hens - adult

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: Sweden

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							2								
<=0.03										2					
<=0.25				2										2	2
<=0.5					2										
<=1		2						2							
1									2						
<=2													2		
<=4											2				
<=8						2									
8			2												
64												2			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium in Gallus gallus (fowl) - broilers - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: Sweden

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							2								
<=0.03										2					
<=0.25				2										2	2
<=0.5					2										
<=1		2						2							
1									2						
<=2													2		
<=4											2				
4			1												
<=8						2									
8			1												
32												2			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium in Gallus gallus (fowl) - laying hens - adult

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: Sweden

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										2					
0.03							1								
<=0.25				2										2	2
<=0.5					2										
<=1		2						1							
1									2						
<=2													2		
2								1							
<=4											2				
4			2												
<=8						2									
32												1			
64												1			

ANTIMICROBIAL RESISTANCE TABLES FOR INDICATOR ESCHERICHIA COLI

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method:

Country of Origin: Sweden

Sampling Details:

	AM substance	Cefepime		Cefotaxim		Cefotaxime + Clavulanic acid		Cefoxitin		Ceftazidim		Ceftazidime + Clavulanic acid		Ertapenem		Imipenem		Meropenem		Temocillin	
	Cefotaxime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
	Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
	ECOFF	0.125	0.125	0.25	0.25	0.25	0.25	8	8	0.5	0.5	0.5	0.5	0.064	0.064	0.5	0.5	0.125	0.125	32	32
	Lowest limit	0.064	0.064	0.25	0.25	0.064	0.064	0.5	0.5	0.25	0.25	0.12	0.12	0.015	0.015	0.12	0.12	0.03	0.03	0.5	0.5
	Highest limit	32	32	64	64	64	64	64	64	128	128	128	128	2	2	16	16	16	16	64	64
	N of tested isolates	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
MIC	N of resistant isolates	26	26	43	43	28	28	29	29	43	43	28	28	0	0	0	0	0	0	0	0
<=0.015														15	14						
<=0.03																		15	28		
0.03															13						
<=0.064			4			12															
0.064															1						
<=0.12												11				15	25				
0.12			13			3															
0.25			9									4					3				
0.5			2																		
1		1					4				4										
2					5		3	1			8		7								1
4		7			3		10	6		2	6		12							7	6
8		5		1	12		8	7		1	11		8							4	20
16		2		2	7		3	1			9		1							4	1
32				7	1				9		2										
64				4					15												
>64				1					4												

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method:

Country of Origin: Sweden

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**43**	**43**	**43**	**43**	**43**	**43**	**43**	**43**	**43**	**43**	**43**	**43**	**43**	**43**
MIC	**N of resistant isolates**	**43**	**0**	**43**	**43**	**4**	**6**	**0**	**0**	**0**	**5**	**14**	**12**	**0**	**5**
<=0.015							25								
<=0.03										43					
0.03							12								
<=0.25														43	15
<=0.5									35						
0.5							1								13
<=1								43							
1					2		3		5						10
<=2													31		
2				5	12		1		3						
<=4											37				
4			15	3	6										
>4				35											
<=8						39						1			
8			24		11		1				1				
>8					12										
16			4									16			
32												12			
>32															5
64		3				4							2		
>64		40											10		
128												1			
>128											5				
>1024												13			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON pnl2

Analytical Method:

Country of Origin: Sweden

Sampling Details:

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**
	Ceftazidime synergy test	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**	**Negative/Absent**
	ECOFF	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.064**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**64**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**0**
<=0.015								1			
<=0.03										1	
<=0.064		1									
<=0.12									1		
2							1				
4			1	1		1					
8											1
32					1						

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: Sweden

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**178**	**178**	**178**	**178**	**178**	**178**	**178**	**178**	**178**	**178**	**178**	**178**	**178**	**178**
MIC	**N of resistant isolates**	**29**	**0**	**1**	**1**	**0**	**12**	**0**	**1**	**0**	**12**	**26**	**24**	**0**	**19**
<=0.015							147								
<=0.03										178					
0.03							19								
0.12							6								
<=0.25				177										177	42
0.25							6								
<=0.5					177				139						
0.5														1	96
<=1		9						174							
1									35						19
<=2			1										154		
2		71						4	3						2
<=4											166				
4		67	52	1					1						
<=8						177						19			
8		2	112		1										
16			13			1						87			
32												43			
>32															19
64											7	3	9		
>64		29											15		
128											4				
>128											1				
>1024												26			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method:

Country of Origin: Sweden

Sampling Details:

	AM substance	Cefepime		Cefotaxim		Cefotaxime + Clavulanic acid		Cefoxitin		Ceftazidim		Ceftazidime + Clavulanic acid		Ertapenem		Imipenem		Meropenem		Temocillin	
	Cefotaxime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
	Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
	ECOFF	0.125	0.125	0.25	0.25	0.25	0.25	8	8	0.5	0.5	0.5	0.5	0.064	0.064	0.5	0.5	0.125	0.125	32	32
	Lowest limit	0.064	0.064	0.25	0.25	0.064	0.064	0.5	0.5	0.25	0.25	0.12	0.12	0.015	0.015	0.12	0.12	0.03	0.03	0.5	0.5
	Highest limit	32	32	64	64	64	64	64	64	128	128	128	128	2	2	16	16	16	16	64	64
	N of tested isolates	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
MIC	N of resistant isolates	26	26	42	42	28	28	28	28	39	39	28	28	2	2	0	0	0	0	0	0
<=0.015														13	15						
<=0.03																		14	28		
0.03														1	11						
<=0.064			6			14															
<=0.12												13				14	27				
0.12			10												2						
<=0.25										3											
0.25			10									1					1				
0.5		2	2																		
1		2					4	3		4										3	
2		1			4		3	1		6			7							2	
4		6		4	5		11	10			5		14							3	11
8		3			13		10				11		6							6	13
16				2	6						9		1								4
32				5					7		3										
64				3					17	1											
>64									4												

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method:

Country of Origin: Sweden

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**
MIC	**N of resistant isolates**	**42**	**0**	**42**	**37**	**0**	**0**	**0**	**1**	**0**	**0**	**11**	**10**	**0**	**0**
<=0.015							35								
<=0.03										41					
0.03							7								
0.064										1					
<=0.25														41	13
<=0.5					5				35						
0.5														1	19
<=1								41							
1					3				5						9
<=2													32		
2				6	5			1	1						1
<=4											42				
4			14	7	7										
>4				29											
<=8						42						1			
8			25		10										
>8					12										
16			3						1			16			
32												14	2		
64		3											1		
>64		39											7		
128												1			
>1024												10			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Turkeys - fattening flocks

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method:

Country of Origin: Sweden

Sampling Details:

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**66**	**66**	**66**	**66**	**66**	**66**	**66**	**66**	**66**	**66**	**66**	**66**	**66**	**66**
MIC	**N of resistant isolates**	**6**	**0**	**0**	**0**	**1**	**2**	**0**	**0**	**0**	**2**	**1**	**4**	**0**	**0**
<=0.015							56								
<=0.03										66					
0.03							8								
<=0.25				66										66	36
0.25							1								
<=0.5					66				54						
0.5															30
<=1		6						66							
1									8						
<=2													62		
2		37							4						
<=4											64				
4		17	20												
<=8						64						11			
8			41												
>8							1								
16			5			1						35			
32												18			
64											1	1	2		
>64		6											2		
>128						1					1				
>1024												1			

OTHER ANTIMICROBIAL RESISTANCE TABLES

Specific monitoring of ESBL-/AmpC-/carbapenemase-producing bacteria and specific monitoring of carbapenemase-producing bacteria, in the absence of isolate detected

Programme Code	Matrix Detailed	Zoonotic Agent Detailed	Sampling Strategy	Sampling Stage	Sampling Details	Sampling Context	Sampler	Sample Type	Sampling Unit Type	Sample Origin	Comment	Total Units Tested	Total Units Positive
CARBA MON	Gallus gallus (fowl) - broilers	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Slaughterhouse	N_A	Monitoring	Official sampling	animal sample - caecum	slaughter animal batch	Sweden	N_A	300	0
	Meat from broilers (Gallus gallus) - fresh	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Retail	N_A	Monitoring	Official sampling	food sample - meat	batch (food/feed)	Denmark	N_A	13	0
										Finland	N_A	3	0
										France	N_A	2	0
										Latvia	N_A	23	0
										Netherlands	N_A	1	0
										Poland	N_A	4	0
										Sweden	N_A	242	0
	Turkeys - fattening flocks	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Slaughterhouse	N_A	Monitoring	Official sampling	animal sample - caecum	slaughter animal batch	Sweden	N_A	72	0
ESBL MON	Turkeys - fattening flocks	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Slaughterhouse	N_A	Monitoring	Official sampling	animal sample - caecum	slaughter animal batch	Sweden	N_A	72	0

Specific monitoring of ESBL-/AmpC-/carbapenemase-producing bacteria and specific monitoring of carbapenemase-producing bacteria, in the absence of isolate detected

Latest Transmission set

Table Name	Last submitted dataset transmission date
Antimicrobial Resistance	16-Aug-2019
Esbl	16-Aug-2019
Animal Population	16-Aug-2019
Disease Status	16-Aug-2019
Food Borne Outbreaks	16-Aug-2019
Prevalence	16-Aug-2019

Table of contents

1. Institutions and laboratories involved in zoonoses monitoring and reporting

Data on animals and feed, data on antimicrobial resistance, coordinating data reporting: National Veterinary Institute (SVA), www.sva.se

Data on animals and feed: Swedish Board of Agriculture, www.jordbruksverket.se

Data on food-borne outbreaks, data on prevalence in food: National Food Agency, www.slv.se

Data on food-borne outbreaks and data on humans: Public Health Agency of Sweden, www.folkhalsomyndigheten.se

Data on food-borne outbreaks: Regional authorities

Data on food-borne outbreaks, data on prevalence in food: Swedish municipal author

Data on dairy cattle: Dairy Sweden, www.vxa.se

Data on food-producing animals (except for dairy cattle): Farm and Animal Health, www.gardochdjurhalsan.se

Data on pigs: Lunden Animal Health Organisation, www.lundens.com

Data on broilers and turkeys: Swedish Poultry Meat Association, www.svenskfagel.se

Data on laying hens: Swedish Egg Association, www.svenskaagg.se

Data on reindeer populations: Sami Parliament of Sweden, www.sametinget.se

Data on populations of wild animals: Swedish Hunters Organisation, www.jagareforbundet.se

2. Susceptible animal populations

2.1. Sources of information and the date(s) (months, years) the information relates to

Information on the animal populations is mainly derived from JO 20 SM 1801, Agricultural Statistics (June 2018), published by the Board of Agriculture. In 2010, the criteria for inclusion of herds in the Yearbook of Agricultural Statistics were slightly modified. Some of the information on the number of slaughtered animals has been collected from the database of the Swedish Board of Agriculture and some also from the National Food Agency.

http://www.jordbruksverket.se/webdav/files/SJV/Amnesomraden/Statistik,%20fakta/Husdjur/JO20/JO20SM1801/JO20SM1801_ikortadrag.htm

http://statistik.sjv.se/PXWeb/pxweb/sv/Jordbruksverkets%20statistikdatabas/?rxid=5adf4929-f548-4f27-9bc9-78e127837625

The current poultry registry maintained by the Swedish Board of Agriculture is not up to date. Therefore, information on the numbers of poultry flocks is derived from the Swedish Poultry Meat Association and Swedish Egg Association as well as from the raw data on samples submitted for testing of *Salmonella*. Thus, the information on the numbers of poultry flocks is not accurate.

Statistics Sweden, report: Hundar, Katter och andra sällskapsdjur 2012 (available 2018-04-18 at: https://www.agria.se/globalassets/sv/pressrum/enkater-diagram-och-rapporter/se-press-scb-undersokning-hundar-katter-och-andra-sallskapsdjur-2012.pdf). The report is based on a questionnaire study performed among 20 000 persons in 2012.

SBA:s dog registry (available 2018-04-18 at: http://www.jordbruksverket.se/amnesomraden/djur/olikaslagsdjur/hundarochkatter/hundregistret/statistik.4.45fb0f14120a3316ad78000672.html)

The wild boar population in Sweden is increasing. Over the last five years, the wild boar population is estimated to have increased from 250,000 animals to approximately 300,000.

2.3. National changes of the numbers of susceptible population and trends

Cattle

The total number of cattle has been decreasing during several years. However, since 2016 the cattle population has been slightly increasing. Between the years 2015 and 2018 the number of cattle increased with 31,000 animals. The number of cattle farms is decreasing but the farms size is increasing. In 2018 cattle farms had approximately 92 animals whereas in 1995 the average farms size was 42 animals.

The number of dairy cows and heifers have been decreasing. In 2018 there were 3,477 farms with dairy cattle which is 80% fewer than in 1995, 38% fewer than in 2010 and about 4% fewer than in 2017. The decreasing trend can also be seen for holdings with calves (age under 1 year). In 2018 there were 61% fewer farms with calves than in 1995, about 24% fewer than in year 2010 and about 3% fewer than in 2017. In 2018, the number of calves in Sweden was approximately 474 800 which is an increase of 2,600 animals since 2017.

The number of beef cattle has been increasing although there have been years with increases and years with decreases in the numbers. Main part of the beef produced in Sweden comes from dairy breeds. Since 1995 the number of beef cattle has increased by 36%. The average herd size of a beef farm has increased by 124% since 1995.

Pigs

In general, the pig population has decreased. Since 1995 the number of pigs has decreased by 40%. However, in 2013 the number of pigs increased with 21 500 animals as well as in 2017 when there was an increase of 31 000 animals. Between 2017 and 2018 the number of pigs increased by 2%.

Since 2012, the number of fattening pigs has had a more flattened trend with smaller decreases and increases between years. The number of fattening pigs increased by 8% between 2017 and 2018. The number of pig farms has decreased. In 2010, there were 1 410 pig farms in Sweden whereas in 2018 the number of pig farms was 1,057. In 1995 the average number of fattening pigs per farm was 157. In 2010 the average number of pigs per holding was 664 animals, in 2015 it was 845 animals and in 2018 it was 852 animals per holding.

The number of breeding pigs has decreased despite of a small increase of about 700 animals between 2016 and 2017. In 1995 there were 46% more breeding pigs than in 2018. The number of breeding pig holdings has also decreased during the years.

Sheep

The sheep population decreased in the 1990's but has increased since that. In 1995 there were round 462 000 sheep, in 2000 there were 432 000 sheep and in year 2005 there were 471 000 sheep. Since then, the sheep population has been slightly decreasing. In 1995 the average number of animals in a sheep farm was 46, in 2005 it was 62 animals.

In 1995, each sheep farm had approximately 28 lambs. In 2018, the corresponding number was 39 lambs.

The number of sheep older than one year, was 195 400 in 1995 and 10 years later the number had increased by about 14%. Between 2015 and 2018 the number of sheep older than one year increased by 2,5%. The number of holdings with sheep over 1 year was 10 000 holdings in 2015, 7 595 holdings in 2005. The average herd size was 32 animals in 2018 whereas in 1995 the sheep had an average of 20 animals.

Poultry

Poultry production has been increasing in Sweden and is currently the animal production with the most intensive increase. The slaughter of chicken accounts for 94% of slaughtered poultry and increased by 3% in 2018.The egg production increased by 3% in 2018. The Swedish turkey, geese and duck production is small.

Horses

The number of horses in Sweden was estimated in 2016 to be 355 500 and the number of stablea to be 76 800. The number of horses per 1000 inhabitants was 36 for the whole country and 3/4 of all the horses are in the areas adjacent to cities.

Dogs

The dog population has been increasing in Sweden (784 00 (+- 128000)) as well as the number of households with at least one dog (572,000(+- 66000). There are no stray dogs in Sweden, but there may be stray cats. There were 903,443 registered dogs in Sweden.

Wild boars

The wild boar population has been increasing and moving north. Currently, wild boars can be found up to 62 latitude north. The highest density of the population is in the southern parts of the country and along the east coast up to 61 latitude north.

2.4. Geographical distribution and size distribution of the herds, flocks and holdings

Most farms are in the southern and central parts of Sweden and animal husbandry is the dominant line of production. In the northern part of Sweden there are mostly small farms. The reindeer raising are is in the northern part.

3. General evaluation: *Brucella*

3.1. History of the disease and/or infection in the country

The last case of bovine brucellosis in Sweden was reported in 1957. To our knowledge. no case of brucellosis has ever been diagnosed in any other food producing animal species. Sweden was declared officially brucellosis free in goats and sheep (OBmF) in 1995, in cattle (OBF) in1994. Sweden fulfils the requirements on control measures in OBF and OBmF for EU member states. Brucellosis in humans has been a notifiable disease in Sweden since 2004. For many years, no domestic cases were reported, and Sweden is therefore considered free from brucellosis. However, since 2010 there has been approximately one domestic case reported annually. Predominantly these cases have, or suspected to have, consumed unpasteurised milk products from endemic countries. During the period a congenital and a laboratory acquired *Brucella* infection were also reported respectively. In 2018, 11 human cases were reported, the most common country of infection were Iraq that represented more than half of the cases.

3.2. Evaluation of status, trends and relevance as a source for humans

The risk of obtaining brucellosis from domestic sources is negligible, as Sweden is declared free from OBF and ObmF.

The national situation remains stable. This is illustrated by the annual serological surveillance in the sheep and goat and regularly in the cattle and pig populations. The Swedish brucellosis status is also monitored with targeted surveillance performed on aborted foetuses from cattle, sheep, goats and pigs. Since the start of the serological surveillance in the mid-1990s, no positive sample has been detected. In a typical year there are a few clinical suspicions of *Brucella* infection in animals, mainly presenting as abortions or genital infections, all of which have been negative on further serological and/or bacteriological analyses. The situation regarding human cases of brucellosis remains stable.

An unknown number of stray dogs from countries where *Brucella canis* is endemic are brought into Sweden every year. It is important to be aware of the risk this group of dogs represents, for *Brucella* infection as well as for other diseases. Imported non-stray dogs, or dogs mated abroad are a risk factor for introduction of *Brucella canis* into Sweden as well. During the past seven years six dogs have tested positive for *B. canis* using bacterial culture and/or serology. All these dogs were imported or had close contact with imported dogs.

4. Description of Monitoring/Surveillance/Control programmes system: Brucella abortus in cattle

4.1. Monitoring/Surveillance/Control programmes system

The surveillance for *Brucella abortus* is multi layered. There is a passive surveillance executed by clinicians and official veterinarians in accordance with the Swedish Epizootic Act requiring all suspected cases of brucellosis in food producing animals to be reported and subsequently investigated. The active surveillance is done via a control programme including bulk milk samples from dairy herds and serum samples from beef cattle obtained at slaughter. There is an enhanced passive surveillance via *post mortem* examination and culture of aborted foetuses. Additional serological testing of cattle prior to import and export and at breeding centres is performed as well.

The active serological surveillance is conducted every third year and was latest performed in 2016. The control programme is coordinated with the control programmes for Bovine virus diarrhoea (BVD) and enzootic bovine leucosis (EBL). Samples for *Brucella abortus* have been obtained from a larger pool of samples retrieved in the other control programmes by convenience sampling (in other words not strictly random), evenly distributed throughout the sampling period. During 2018 no active surveillance was performed.

Serum or milk samples were taken for serology and organ samples for culture of the bacteria.

In the active surveillance control programme, bulk milk samples are collected from dairy cows. From beef cattle, serum samples are collected at slaughter. Clinical suspicions are investigated with examinations and relevant sampling in the herd. If applicable, organ samples for culture are collected at *post mortem* examination.

A positive case is defined as an animal from which *Brucella* spp. has been isolated, or an animal showing a significant antibody titre.

The diagnostic test used for analysing serum- and milk samples is an indirect ELISA. In case of positive reaction in ELISA, serum samples are confirmed with Complement Fixation Test (CFT). For positive bovine milk samples, serum samples are requested for re-testing with the ELISA. If relevant material is available culture is performed.

4.2. Measures in place

Vaccination is not permitted.

If brucellosis was diagnosed, eradication and control measures would be implemented in accordance with the Swedish Act of Epizootics.

4.3. Notification system in place to the national competent authority

Infection with *Brucella* spp. is notifiable in all food-producing animal species based on clinical suspicion.

4.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

During 2018 the active surveillance programme was not performed, but 27 bovine foetuses were examined within the enhanced passive surveillance of aborted foetuses. In addition, animals were tested at breeding centres and for import or export reasons. All these samples were negative. One clinical suspicion was reported. Infection was ruled out after investigation including serological testing of five affected individuals with negative results.

The last case of bovine brucellosis was reported in 1957. Brucellosis has never been diagnosed in any other food producing animal species in Sweden. The risk of contracting *Brucella* from Swedish domestic animals is considered negligible.

4.5. Additional information

Testing for *Brucella abortus* in Swedish cattle has been performed regularly since 1988. From 1997 until 2012, approximately 3000 samples (bulk milk and/or serum samples) have been tested each year for antibodies against *Brucella abortus*. This sampling is, since 2010, conducted every third year and thus was performed last time in 2016. None have been confirmed positive. In addition, several other animal species have been tested, mainly before breeding or at import/export with no positive results during 2018.

5. Description of Monitoring/Surveillance/Control programmes system: *Brucella melitensis* in small ruminants

5.1. Monitoring/Surveillance/Control programmes system

The surveillance for *Brucella melitensis* is multi layered. There is a passive surveillance executed by clinicians and official veterinarians in accordance with the Swedish Epizootic Act requiring all suspected cases of brucellosis in food producing animals to be reported and subsequently investigated.

The active surveillance, which has been conducted since 1995, is done via a control programme including serum samples from sheep and goats. Serum samples are tested for antibodies against *B. melitensis*. The

sheep serum samples are collected within the surveillance programme for Maedi/Visna and the goat serum samples are collected within the Caprine Arthritis Encephalitis programme. The samples were obtained from those samples by convenience sampling (in other words not strictly random). There is an enhanced passive surveillance via *post mortem* examination and culture of aborted foetuses. Additional serological testing of cattle prior to import and export and at breeding centres is performed as well.

The ovine and caprine surveillance of 2018 was designed with a between-herd design prevalence of 0.2%, a within-herd prevalence of 40% and a risk of introduction of 1 in 25 years. Sample size is calculated on a yearly basis to reach a probability of freedom of 95% at the end of the year. To reach this level of probability of freedom, 2000 samples over the year (5 samples per herd from 400 herds per year) is needed.

Serum samples were taken for serology and organ samples for culture of the bacteria.

In the active surveillance programme serum samples are taken from sheep and goats at the farm. Clinical suspicions are investigated with examinations and relevant sampling in the herd. If applicable, organ samples for culture are collected at *post mortem* examination.

A positive case is defined as an animal from which *Brucella* spp. has been isolated, or an animal showing a significant antibody titre.

The diagnostic test used for analysing serum samples is the Rose Bengal Test (RBT). In case of positive reactions in the RBT, serum samples are confirmed with Complement Fixation Test (CFT). If relevant material is available culture is performed.

Ongoing serological testing of all susceptible species prior to export, and in bulls and boars at semen collection centres, adds to the active disease surveillance of *Brucella* spp.

5.2. Measures in place

Vaccination is not permitted.

If brucellosis was diagnosed, eradication and control measures would be implemented in accordance with the Swedish Act of Epizootics.

5.3. Notification system in place to the national competent authority

Infection with *Brucella* spp. is notifiable in all food producing animal species on the basis of clinical suspicion.

5.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

During 2018, 1935 ovine and caprine serum samples from 397 individual holdings were analysed for *B. melitensis.* All samples were negative.

Within the surveillance of aborted foetuses 19 ovine and four caprine foetuses were examined for *Brucella* spp. All samples were negative.

6. Description of Monitoring/Surveillance/Control programmes system *Brucella suis* in pigs

6.1. Monitoring/Surveillance/Control programmes system

Sweden has a very stable epidemiological situation for brucellosis in pigs with no cases ever detected in the species despite frequent sampling. Other food producing animal species have also been free since 1957 (last case of bovine brucellosis). To monitor the situation, active as well as passive surveillance is carried out. Active surveillance for *Brucella suis* was carried out yearly between 1995 and 2012 with approximately

3,000 serum samples collected in coordination with the control programme for PRRS. Since 2013 the number of samples has been lower. Since 2009 serum samples have been tested every second year. Moreover, active surveillance is performed in the form of *post mortem* examinations of aborted foetuses, animals are tested before export or import, and all clinical suspicions are investigated and tested.

Serological surveillance for *Brucella suis* in pigs is conducted every second year, beginning in 2009, and therefore this sampling was not performed in 2018.

Serum samples are taken for serology and organ samples for culture of the bacteria.

All diagnostic testing is performed at the National Veterinary Institute. Porcine (serum) samples are tested with the Rose Bengal Test (RBT). In case of positive reactions in the RBT, serum samples are confirmed with Complement Fixation Test (CFT). If relevant material is available culture is performed.

Diagnostic tests for animals with clinical signs suggesting brucellosis or animals that are to be exported/imported will often be tested with the same diagnostic tests as used in the Swedish surveillance programme. Samples from animals (foetuses) included in the passive post-mortem surveillance programme are cultured.

A positive case is defined as an animal from which *Brucella* spp. has been isolated, or an animal with a confirmed positive serological reaction. The herd is the epidemiological unit.

6.2. Measures in place

Vaccination is not permitted,

If brucellosis was diagnosed, eradication measures would be implemented in accordance with the Swedish Act of Epizootics.

6.3. Notification system in place to the national competent authority

Infection with *Brucella* spp. is notifiable in all food producing animal species based on clinical suspicion.

6.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

During 2018, the serological surveillance in pigs was not performed. Ten foetuses were examined and cultured at *post mortem* within the enhanced passive surveillance of aborted foetuses. Pigs were also tested at breeding centres and for import or export reasons, all with negative results.

Brucellosis has never been diagnosed in Sweden in food producing animals in Sweden other than bovines (last case in 1957). As Sweden has been free from porcine brucellosis for many decades, the risk of contracting *Brucella* from Swedish domestic pigs is considered negligible.

6.5. Additional information

From 1995 until 2008, approximately 3 000 serum samples/year from pigs have been tested for antibodies against *Brucella suis*. Sample size is calculated on a yearly basis to reach a probability of freedom of 99 % at the end of the year. In 2017 the sample size needed was 750 (1 sample per herd from 750 herds per year). From 2009 an onwards active serological surveillance is conducted every second year. No samples have been confirmed positive for *Brucella suis*. In addition to the surveillance of *Brucella suis* in domestic pigs there is also an active surveillance of *Brucella suis* in wild boar. Testing for *Brucella suis* in wild boar is done every fifth year and was last performed in 2014.

7. General evaluation: *Campylobacter*

7.1. History of the disease and/or infection in the country

Most human infections on Sweden are caused by *C. jejuni*, followed by *C. coli* and a few by other *Campylobacter* species.

Birds are considered the principal reservoir although *Campylobacter* can colonise the intestinal tract of many other animal species. A seasonal peak in the summer months is observed in most European countries, Sweden included. Most human infections are considered sporadic, which makes identification of the source of infection difficult. Risk factors for infection include consumption or handling of undercooked contaminated meat products (especially poultry), consuming contaminated unpasteurised milk and other dairy products, drinking from contaminated water supplies, travelling abroad and contact with farm animals and pets.

Infection with *Campylobacter* in humans is notifiable according to the Communicable Disease Act (SFS 2004:168 with the amendments of SFS 2013:634).

Detection of *Campylobacter* in slaughtered poultry is notifiable according to SJVFS 2013:23.

During the last two decades, the incidence of human campylobacteriosis has varied between 67 and 110 cases per 100,000 inhabitants. Of these, approximately 20-60% have been reported as domestic. In recent years, the proportion of domestic cases has increased.

7.2. Evaluation of status, trends and relevance as a source for humans

During the last fifteen years, the number of reported human domestic cases of campylobacteriosis has increased. The domestic incidence of campylobacteriosis was lower in 2018 than in the previous years. The trend over a longer time period is, however, increasing. Although most campylobacteriosis cases are considered sporadic, large outbreaks linked to domestically produced chicken have occurred in Sweden.

Moreover, the large increase in human cases in the winter months during the last three years and its link to poultry shows that national outbreaks of campylobacteriosis occur. The exceptional increase in domestic cases in 2016-2017 was temporally associated with an increase in the prevalence of *Campylobacter* in broiler flocks from one slaughterhouse. This could, in turn, be explained by an incorrect installation of a new washing equipment for transport cages in combination with the practice of thinning as well as shorter empty periods between rounds of flocks. After the error with the washing equipment was discovered, it also took a long time to reduce the infection pressure at the broiler farms.

In 2017 and 2018, isolates of *Campylobacter jejuni* from domestic human cases, retail chicken and slaughter batches of chicken were genotyped using whole genome sequencing (WGS). During week 11 of 2017, more than 80% of the domestic human isolates belonged to one outbreak strain. This outbreak strain was still identified during week 34 of 2017 and in addition consisted of the largest cluster. In the survey of August 2018, 30% of the *Campylobacter jejuni* from domestically infected persons were genetically very closely related or indistinguishable to isolates from retail meat.

In the fall of 2018, an outbreak of *Campylobacter jejuni* with an unusual source within the chicken production was investigated. The outbreak started in the middle of November when the incidence in humans is usually low. Cases could be seen in the whole country. The increase in human cases coincided with an increase in the prevalence of *Campylobacter* in slaughter batches of chicken identified within the *Campylobacter* surveillance program at SVA. In addition, several employees working at slaughterhouses were reported with campylobacteriosis in October and November. Isolates from employees and from caecal samples of chicken from three different poultry abattoirs were analysed by whole genome sequencing (WGS). Same sequence types (ST-9198 and ST-148) were identified from human cases and chicken samples. The trace back investigation showed that farms delivering chicken to these three abattoirs received day-old chicks from the same hatchery. *Campylobacter jejuni* ST-148 was detected from parent flocks delivering eggs to the hatchery. Thus, an unusual pathway of *Campylobacter*

introduction was identified as the plausible source of the outbreak. This pathway has previously not been reported as a possible introduction of *Campylobacter* in the chicken production.

7.3. Any recent specific action in the Member State or suggested for the European Union

Since 2017, the Public Health Agency of Sweden requests isolates from all domestic cases notified during week 11 and week 34 for whole genome sequencing (WGS). Simultaneously, all *Campylobacter* isolates collected in the monitoring programme for broilers in 2 periods of 2,5 weeks starting week 8 and week 31 were subjected to WGS. In addition, the *Campylobacter* isolates retrieved from the survey of *Campylobacter* in retail chicken meat performed by the National Food Agency were also typed using WGS. The periods for collection were chosen to reflect the diversity in different seasons.

A food safety criterion for *Campylobacter* should be established.

8. Description of Monitoring/Surveillance/Control programmes system: *Campylobacter* spp in broiler meat and products thereof

8.1. Monitoring/Surveillance/Control programmes system

No official surveillance programme exists for *Campylobacter* spp in food. In 2018, sampling of food was performed according to decisions by national and the local competent authorities. Sampling unit was single food. Sampling was taken place as part of official sampling. Sampling performed by the industry is not normally reported to the authorities.

In 2018, slaughterhouses were obliged to sample neck skins of broilers for enumeration of *Campylobacter* according to regulation (EG) 2073/2005 on microbiological criteria for foodstuffs. As Sweden has a surveillance programme of *Campylobacter* in chicken caecal samples, the National Food Agency allowed an exemption from the sampling. Thus, neck skin samples were taken during the summer period, only.

Methods of sampling were according to in-house control plans and decisions by the competent authorities.

The size of the samples was 25 g.

8.2. Measures in place

There is no food safety criterion for *Campylobacter* in food. Thus, *Campylobacter* contaminated food is not withdrawn from the market.

8.3. Notification system in place to the national competent authority

Detection of *Campylobacter* spp in food is not notifiable.

8.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In August 2018, a survey was performed by the National Food Agency in which 100 samples of fresh chicken meat were collected at retail and analysed for *Campylobacter*. In the survey, *Campylobacter* was detected in 61% of the 100 samples. In quantitative analyses, *Campylobacter* levels exceeded 10 cfu/g in 25% of the samples.

In addition, 35 samples were taken by national and local authorities from different types of food. Most of these were taken to investigate a complaint or a suspected food poisoning. Neither of them was positive.

The results of the neck skin sampling performed according to process hygiene criteria were unfortunately not collected by the National Food Agency.

8.5. Additional information

9. Description of Monitoring/Surveillance/Control programmes system: *Campylobacter* in poultry

9.1. Monitoring/Surveillance/Control programmes system

A monitoring programme for broiler chicken has been operated by the Swedish Poultry Meat Association since 1991. The programme is guided and co-financed by the Swedish Board of Agriculture (SJVFS 2015:17, K152). The goal of the programme is an overall annual *Campylobacter* prevalence of less than 10% of the batches of slaughter chicken. Prior to 2017, the goal was 5%. In 2017, the guidelines of the programme were reviewed.

The programme covers 99% of the broilers slaughtered in Sweden. Since 2006, sampling is performed by collecting intact caeca from 10 birds from a slaughter batch at the major abattoirs. When thinning is applied and the time interval between the slaughter batches is more than 4 days, samples are taken from both batches. The caeca are pooled into one composite sample per batch. Samples are analysed according to ISO 10272 part 1.

In 2017 and 2018, all *Campylobacter* isolates collected in the monitoring programme for chicken in 2 periods of 2,5 weeks starting week 8 and week 31 were subjected to whole genome sequencing. The time-frames were selected to precede the collection of human domestic isolates.

9.2. Measures in place

Holdings with more than two *Campylobacter* positive flocks per year will be visited by a veterinarian working for the broiler industry. An action plan is set up and followed up by the industry.

9.3. Notification system in place to the national competent authority

Findings of thermophilic *Campylobacter* spp. in meat production poultry are notifiable in Sweden, according to SJVFS 2012:24.

9.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In 2018, thermophilic *Campylobacter* spp. were detected in 401 (9.1%) of the 4,394 commercially produced broiler chicken batches tested at slaughter, which is less than the year before. However, the monthly prevalence of *Campylobacter* in chicken slaughter batches varied between 0.8% and 16.9% with the highest prevalence in August. *Campylobacter* prevalence varied between the abattoirs. In the autumn of 2018, an outbreak of campylobacteriosis in humans was associated with chicken meat from two Swedish chicken abattoirs.

Typing by whole genome sequencing was performed on all isolates collected in one period in late winter/early spring (n=7), and in one period in the summer (n=39). In addition, 22 chicken isolates were typed part of an outbreak investigation (explained above under Evaluation). During the first period, two ST types (ST-9198, ST-4776) were identified. Typing performed on isolates collected during the summer revealed a nine ST types. These ST- types were identified in approximately half of the human isolates of the corresponding time periods.

9.5. Additional information

In addition, *Campylobacter* foetus subsp. *venerealis*, which causes bovine genital campylobacteriosis, is notifiable.

10. General evaluation: *Cysticercus*

11. Description of Monitoring/Surveillance/Control programmes system: *Cysticercus*

11.1. Monitoring/Surveillance/Control programmes system

Bovine cysticercosis
Routine meat inspection of cattle includes incisions of the heart to search for cysticerci. In animals over six weeks of age the masseter muscles are also cut. Findings of *C. bovis* cysts (fresh or degenerated/calcified) should be reported. According to the instructions by the National Food Agency the cysts or lesions should be sent for confirmation by microscopic examination if the diagnosis is uncertain.

Porcine cysticercosis
Suspected cysts or lesions found in striated muscles at meat inspection should be sent for confirmation by microscopic examination.

11.2. Measures in place

Cattle

Carcasses in which cysticerci are found in several locations should be destroyed. If the infection is local, only, the affected parts are destroyed while other pars could be approved after freezing at -10°C, or lower, for at least 10 days.

Pigs

Infected carcasses should be destroyed. The source and spread of the infection should be investigated.

11.3. Notification system in place to the national competent authority

Cysticercus bovis and *Cysticercus cellulosae* are notifiable (SJVFS 2002:16

11.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Bovine cysticercosis
Only a few cases of *C. bovis* are annually reported. There is some inconsistency in the reports, most likely due to whether all cases or only verified cases are reported. For example, in 2018, there were no confirmed case while four cases were reported to the Swedish Board of Agriculture.
However, the sensitivity of routine meat inspection is low. Thus, the true prevalence is very likely to be higher than the notified, as the verified cases demonstrate that the infection is present in the country.

Porcine cysticercosis has not been reported in Sweden.

12. General evaluation *Echinococcus*

12.1. History of the disease and/or infection in the country

In Sweden, surveillance of echinococcosis, i.e. alveolar echinococcosis (AE) caused by *Echinococcus. multilocularis* and cystic echinococcosis (CE) caused by *E. granulosus* sensu lato, in humans is passive. Echinococcosis has been notifiable since 2004, before that surveillance relied on voluntary reporting by the laboratories. CE is not reported separately from AE in the official statistics. However, discrimination between

the two forms of the disease is performed by laboratory tests, clinical picture, medical imaging techniques, etc. Thus, information on the number of cases infected with each parasite species is given separately in the text.

Since echinococcosis became notifiable, around 8-30 human cases of CE have been reported per year and they have all been considered as imported cases.

Prior to 2012, *E. multilocularis* had never been reported in humans in Sweden. However, in 2012 two human cases of AE were diagnosed. Both cases had clinical symptoms and were considered to have acquired the infection abroad. During 2013-2015 there were no cases reported, but in 2016 one case was reported and in 2017 four cases.

Between 2001 and 2010, 300-400 foxes were annually shot, sampled and investigated within the frame of a screening programme for *E. multilocularis* and *E. granulosus*. Free-living wolves are routinely screened at necropsy, and occasionally also euthanized invasive raccoon dogs. In 2011, *E. multilocularis* was detected for the first time in Sweden. Due to this positive finding in a fox, an extended surveillance programme was implemented in 2011 and 2,985 foxes short by hunters from different parts of the country were examined. In addition, 119 faecal samples from hunting dogs collected in the region of the first positive finding were analysed. In the same area 236 rodents were trapped and autopsied. Three out of 2,985 foxes were found positive: one in Västra Götaland, one in Södermanland and one in Dalarna County. All dogs and rodents were negative for *E. multilocularis*. A second national screening was initiated in 2012 and continued in 2013 and 2014. A systematic stratified random sampling was performed with an increased sampling intensity in the southern parts of Sweden. In all, 2,779 fox scat samples were analysed, and three positive fox scats were found, one from Gnesta and one from Katrineholm (Södermanland County) and one from Västra Götaland County.

To gain more information on the distribution of the parasite in a known infected area, fox scats were collected within a radius of 25 km surrounding the known site of an EM-positive fox in Södermanland County. Samples were collected during 2011 and six out of 790 (0.8%) faecal samples tested positive.

To obtain parasites for molecular subtyping, hunters were requested to submit 30 foxes from each known infected area. Sampling was initiated in 2012 and finalized in 2016. In Västra Götaland two foxes were positive, in Södermanland three foxes from Katrineholm and one from Gnesta were positive, whereas no foxes from Dalarna or Kronoberg were positive.

Within an Emiro research project and FoMA Zoonoses monitoring programme (http://www.slu.se/en/environment) at the Swedish University of Agricultural Sciences (SLU) sampling of rodents and fox scats was performed and the parasite was found for the first time in an intermediate host, in voles caught in Södermanland County (Gnesta /Nyköping) in 2013. One out of 187 *Microtus agrestis* and eight out of 439 *Arvicola amphibius* were positive. Presence of protoscoleces were confirmed in the infected *Microtus agrestis* and in three out of eight *Arvicola amphibius.* No lesions were found in *Myodes glareolus* (*n*=655) or *Apodemus* spp. (*n*=285). In the analysis of fox scat samples, this project also identified a new infected area, the Växjö region in Kronoberg County in 2014.

General information about the parasite/infection have been given to the public and in order to prevent further introduction of *E. multilocularis*, dogs brought in from countries other than Finland, Ireland, Malta, Norway or UK are recommended to be treated with praziquantel.

13. Description of Monitoring/Surveillance/Control programmes system *Echinococcus granulosus*

13.1. Monitoring/Surveillance/Control programmes system

All livestock, including reindeer, are visually examined during routine meat inspection. On suspicion of echinococcosis, the cysts/lesions are examined by microscopy. If the suspicion is confirmed or remains, PCR analysis will follow for confirmation.

Presently, potential definitive hosts are not monitored for *E. granulosus*.

For dogs brought in from countries other than Finland, Norway, UK, Ireland and Malta treatment with praziquantel is recommended. Apart from offal from free-ranging wildlife and animals slaughtered for own consumption, feeding of offal to dogs and fur producing animals are only allowed after special permission from the Board of Agriculture.

13.2. Measures in place

If livestock is found infected with *Echinococcus* spp. carcases and offal will be destroyed.

13.3. Notification system in place to the national competent authority

Echinococcosis is notifiable on species level in all animals (SJVFS 2013:23).

13.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

E. granulosus was not detected in any animal in 2018. For reindeer the data are compiled by slaughter season and the statistics for the 2018-2019 season are not yet available.

Sporadic cases of *E. granulosus* infection have occurred in imported horses that most probably were infected abroad, presumably in England and Ireland. In reindeer, *E. granulosus* infection was prevalent in northern Sweden during the 1970's when around 2% of the reindeer were found infected at slaughter. Based on these findings, the routines at meat inspection of reindeer were revised and organs not approved for consumption were destroyed. During 1986-96 no cases were detected in reindeer, followed by three cases in 1996-97. There have been findings of *E. granulosus* in two mooses, one in the early 1980's in the southern part of Sweden and one in the late 1990's in the central part of the country.

The risk for humans to become infected with *E. granulosus* is negligible.

14. Description of Monitoring/Surveillance/Control programmes system *Echinococcus multilocularis* in animals

14.1. Monitoring/Surveillance/Control programmes system

No active monitoring of foxes has been done since 2015. Since 2016 all free-living wolves, as well as some other potential definitive hosts such as red foxes and racoon dogs, that are submitted for necropsy at the National Veterinary Institute has been tested.

Sample type: Canids: Whole carcasses/intestines/ faeces, Intermediate hosts: carcasses.

Faeces/intestinal contents are examined by magnetic capture probe-based DNA extraction and real-time PC (MC-PCR). Intestines may be examined with the segmental sedimentation and counting technique (SSCT) or sedimentation and counting technique (SCT) followed by PCR. Suspected lesions in organs are examined macroscopically (visually) and microscopically followed by PCR. In a definitive host, a case is defined as either an animal in which the parasite has been morphologically detected followed by PCR confirmation, or an animal with faeces/intestinal contents positive by MC-PCR. In an intermediate host, a case is defined as an animal with suspected macroscopic (visual) changes in organs followed by PCR confirmation.

Previously, dogs brought from countries other than Finland, Ireland, Malta, Norway and UK were required to be dewormed with praziquantel as a preventive measure. Since *E. multilocularis* was diagnosed in Sweden this was substituted by a voluntary recommendation in 2012. However, there is a need of increased public awareness on the recommendation to deworm dogs entering the country after visiting areas where *E. multilocularis* is common. There is also a need to increase the knowledge about the prevalence and

potential spread of the parasite in Sweden and to clarify the epidemiology including the role of intermediate hosts that are involved in its life cycle.

14.2. Measures in place

In case of findings in new areas information to the public will be given. Advice given to the public is mainly focused on deworming of dogs running free in areas/regions were the parasite has been diagnosed. Also, hunters and others handling dead foxed are advised to take precautions to avoid infection via fox faeces or contaminated fur. However, if the prevalence would increase the recommendations may be re-evaluated.

14.3. Notification system in place to the national competent authority

Echinococcosis is notifiable on species level in all animals (SJVFS 2013:23).

14.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

During 2018, 31 wolves (*Canis lupus lupus*) and one wolf /domestic dog hybrid, four raccoon dogs (*Nyctereutes procyonoides*) and four dogs were tested with the MC-PCR and all were negative. In addition, 13 fox scats were collected from an area (Gnesta, Södermanland county) where the parasite has previously been detected in foxes as well as in rodents. Six if the 13 samples were positive when tested by MC-PCR.

In 2018 two persons were diagnosed with AE. It cannot be ruled out that they had acquired the infection in Sweden, but they could also have been infected while traveling abroad.

National evaluation of the recent situation:

Extended investigations in foxes during 2011 and 2012-2014 have shown that the national prevalence is very low (approximately 0.1% in foxes). However, as the geographical distribution varies, the prevalence can be higher in certain areas as for example shown in the surveillance in Södermanland. Although two competent intermediate hosts have been identified it is not known which intermediate host(s) are most important for the life cycle of the parasite in Sweden.

Although it is not known how the parasite was introduced into Sweden, infected dogs brought into the country without proper deworming is a probable way. This is in line with results of a Swedish risk assessment conducted in 2006. It cannot be excluded that the parasite has been present in Sweden for a long time, however at a prevalence below the design prevalence of the surveillance. If the parasite was recently introduced, it cannot be excluded that the prevalence will increase. Repeated surveillance with for example five to ten years intervals is needed to detect any changes in prevalence.

Currently, the risk for humans of obtaining domestic echinococcosis is very small. The importance of food and drinking water for the transmission of human AE could not be assessed and the risk reducing effect of washing vegetables and berries is not documented. No specific restrictions are issued neither about interaction with pets nor about *E. multilocularis* and food. However, consumers are informed that good hygienic practices when handling food also apply regarding *E. multilocularis*. To consumers who do not accept any risk, information is given that boiling of food is the only effective way to inactivate the parasite during food preparation. To hunters and other persons coming into close contact with foxes, recommendations on hygienic practices are given.

14.5. Additional information

Treatment of dogs and cats prior to entering countries free from or having very low prevalence of *E. multilocularis* from countries where the prevalence of the parasite is high is necessary.

More knowledge is needed about risk factors for humans to become infected with *E. multilocularis* to be able to issue recommendations for preventing human infection. More knowledge is also needed on the epidemiology of the parasite to understand the emergence and spread of the parasite in Europe and increase the possibilities of control and eradication of the disease.

For countries that are free from or has a very low prevalence of echinococcosis, the infection should be notifiable in animals and notification should be done on the species level.

As *E. multilocularis* is ranked as the food-borne parasite with the third greatest global impact according to the 2014 report of the World Health Organization (WHO) and the United Nations Food and Agriculture Organization (FAO), echinococcosis in humans should be compulsory notifiable on species level, i.e. statistics should be available on cases of alveolar echinococcosis separated from cystic echinococcosis. In the EU zoonosis report this information is needed to enable presentation of meaningful statistics on these two separate diseases on EU-level.

15. General evaluation *Francisella tularensis*

15.1. History of the disease and/or infection in the country

The bacterium *Francisella tularensis* is the causative agent of tularaemia, a disease affecting many animal species, including humans. There are several subtypes of *F. tularensis* of variable virulence. *F. tularensis* subsp. *holarctica* (type B) is the main subspecies responsible for human and animal infection in Europe.

Humans become infected through a variety of mechanisms such as bites of infected insects or arthropods, handling infected or dead animals, ingesting contaminated food or water, and inhaling aerosols of bacteria. Clinical disease is variable and dependent on the route of transmission. The infection is more often reported in men than in women, which might be attributed to their leisure and professional activities. The age group of 40-79 years is the age group most affected in both sexes. Tularaemia may occur during the whole year, but it is most frequent during late summer and early autumn.

Sweden has reported cases of tularaemia in humans and animals since 1931. Ever since the first Swedish tularaemia case was reported, endemic areas have been identified in northern and central Sweden.

The mountain hare and the European brown hare are the animal species in which tularaemia has most frequently been identified. Diseased animals have been found in the traditionally endemic areas in northern and central Sweden, as well as in regions south of these areas.

The annual numbers of reported human cases range from a few cases to more than 2,700 cases in 1967.

15.2. Evaluation of status, trends and relevance as a source for humans

Tularaemia has been endemic in northern and central Sweden at least since the early 20th century with a marked annual variation. Years with high numbers of cases are often followed by periods when the disease is virtually absent. There is no obvious explanation for these fluctuations. The reservoir for the bacterium between outbreaks has not been clearly identified. During the last two decades, the epidemiology of tularaemia has changed and the number of reported cases in humans, infected south of the previous endemic region has increased.

16. Description of Monitoring/Surveillance/Control programmes system *Francisella tularensis* in animals

16.1. Monitoring/Surveillance/Control programmes system

Surveillance in animals is passive. Surveillance is based on voluntary submission of animals found dead or euthanized by hunters and the public. Detection is based on PCR or immunohistochemistry of the animal sample.

16.2. Measures in place

When there is an increase in the number of notified cases in humans or in animals, the authorities (National Veterinary Institute, the Public Health Agency of Sweden, the County Veterinary Officers and the County Medical Officers) inform the public on the increase and give specific advice on the websites of the authorities.

16.3. Notification system in place to the national competent authority

Findings of tularaemia in all animal species are notifiable (SJVFS 2013:23). The Swedish Board of Agriculture is notified.

16.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In 2018, 26 European brown hares and six mountain hares were examined. *F. tularensis* subsp. *holarctica* was detected in five European brown hares and none of the mountain hares. Four of the five hares had died of an acute disease spread to several organs, and finally ending with sepsis. One hare had a slightly different presentation with fibrous pneumonia and pleuritis, but *F. tularensis* was only detected in the kidney pelvis and was not associated with the thoracic lesions. The tularaemic hares originated from Stockholm (one hare), from Östergötland (two hares), and from Västra Götaland (to hares). The number of cases in 2018 is approximately at the same level as other years without outbreaks, for example seven cases in 2017, six in 2016 and two in 2014. This could be compared to the outbreak year 2015 when tularaemia was diagnosed in 31 hares, the majority coming from the outbreak area.

During the last two decades, the epidemiology of tularaemia has changed and the number of reported cases in animals, mainly European brown hares, infected south of the previous endemic region has increased. In animals, outbreaks of tularaemia have in some countries been associated with rises in rodent and hare populations, but this has not been confirmed in Sweden. It is possible that the European brown hare has become an important carrier of *F. tularensis* in many areas, but its epidemiological role remains unclear.

17. General evaluation Listeria monocytogenes

17.1. History of the disease and/or infection in the country

In Sweden, during the last ten years approximately 50-120 human cases have been reported annually. During 2018, the incidence of listeriosis increased compared to the year before and the overall picture is an increasing trend of listeriosis since 1983. The same trend has been observed in other European countries. The reasons for the increase remain unclear but are most likely related to a combination of factors such as an ageing population, a widespread use of immunosuppression medications and consumer preference changes to more ready-to-eat foods.

Outbreaks have been associated with vacuum-packaged fish, with cheese made of unpasteurized goat's milk, cold cuts, frozen corn and with ready-to-eat foods. During 2017 the incidence of listeriosis slightly increased compared to the year before and the overall picture is an increasing trend of cases of listeriosis in Sweden.

17.2. Evaluation of status, trends and relevance as a source for humans

In 2018, 89 cases of listeriosis were reported (incidence 0.9 cases per 100000 inhabitants). This was a minor increase in the number of cases compared to the year before when 81 cases were notified. Most of the reported cases with listeriosis belong to the older age groups. In 2018, the median age was 71 years and 57% were people over 70 years. As previous years, the highest incidence was found in the age group

over 80 years (6.1 cases per 100000 inhabitants). Of the reported cases, 52% were women. In total 29% of the reported cases died within one month from diagnosis.

Listeriosis is most often a domestic infection. During 2018, 86 of the reported cases (97%) noted Sweden as country of infection.

In 2018 all but five (94%) of the human isolates were sent into the Public Health Agency of Sweden for typing. The most common molecular serotypes were IIa (68%), IVb (24%), IIb (7%) and IIc (1%). In addition to serotypes, sequence types (ST) are also identified through WGS. Different STs can belong to the same serotype and during 2018 the most common STs were ST-8 belonging to serotype IIa and ST-1 belonging to serotype IVb. Identical isolates within the same ST have been identified during several years. This might indicate that some of these strains have been established in production facilities and occasionally contaminate food products causing illness in patients. During 2018 a total of 13 cases had identical isolates belonging to three different ST-clusters identified since 2015 (8 cases within IIa-ST155, 3 cases within IIa-ST37, 2 cases within IIa-ST14).

During 2018, an outbreak of listeriosis was identified in the county of Västra Götaland. A total of seven cases with onset of disease between February and May had an identical serotype IVb ST-1 strain. The outbreak strain could be detected in ready-to-eat food from a local food producer and the products were recalled.

In addition to the outbreak, one case had an identical strain of serotype IVb ST-6 which was causing the European outbreak linked to frozen corn in 2015–2018.

17.3. Any recent specific action in the Member State or suggested for the European Union

Continued surveillance of *L. monocytogenes* in humans and in food and food processing environments will be essential for understanding the sources for human infection and providing tools to prevent infections. For identification of possible links between human cases and food products, subtyping of isolates is essential.

18. Description of Monitoring/Surveillance/Control programmes system: *Listeria monocytogenes* in food

18.1. Monitoring/Surveillance/Control programmes system

No official control programme exists. In 2018, sampling was performed according to each in-house control plans and decisions by the local, regional or national competent authorities. Sampling unit was single food. Sampling was taken by the competent authority as part of an official sampling. Sampling performed by the industry is not normally reported to the authorities. The size of the sample is 10g for enumeration method, while it is 25g for other methods.

18.2. Measures in place

The National Food Agency has provided guidelines for pregnant woman concerning the consumption of food with a high risk of contamination with *Listeria monocytogenes* is available in several languages including English. The guideline can be downloaded at:
https://www.livsmedelsverket.se/globalassets/english/food-habits-health-environment/dietary-guidelines/advice-about-food-for-you-who-are-pregnant.pdf.

Information in other languages is available on the website of the National Food Agency. A national guideline addressing other risk groups is published on the website of the National Food Agency. This guideline is so far only available in Swedish.

18.3. Notification system in place to the national competent authority

Detection of *Listeria monocytogenes* in food is not notifiable.

18.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In 2018, 410 samples from different types of food were taken by national and local authorities and analysed for presence of *L. monocytogenes* by a qualitative analysis. *L. monocytogenes* was detected in nine of these samples (6 were from prepared dishes, 2 from raw fish, and 1 from vegetables). Levels were quantified in seven of these samples and ranged from < 10 cfu/g to 50 cfu/g.

19. Description of Monitoring/Surveillance/Control programmes system: *Listeria monocytogenes* in animals

19.1. Monitoring/Surveillance/Control programmes system

Surveillance in animals is passive. Notifications are based on clinical cases and laboratory analyses. The diagnosis can be based on histological findings at necropsy or by detection of the organism by cultivation methods using enrichment in selective broth followed by culture on selective and non-selective agar. Identification is made by biochemical methods.

19.2. Measures in place

The Swedish Board of Agriculture can decide on epidemiological investigations if needed.

19.3. Notification system in place to the national competent authority

Listeriosis is a notifiable disease in animals according to SJVFS 2013:23.

19.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In 2018, listeriosis was reported in 16 sheep, five cattle, two goats, two horses, one hedgehog and in one monkey. No information on the numbers of animals tested.

20. General evaluation: *Mycobacterium*

20.1. History of the disease and/or infection in the country

Sweden was declared free from bovine tuberculosis in 1958. Until 1978, sporadic cases occurred in cattle. Compulsory tuberculin testing of all cattle was discontinued in 1970 and the national bovine TB control in cattle was based on meat inspection. When Sweden joined the EU in 1995, the status of Officially Tuberculosis Free (OTF) was obtained. Sweden fulfils the requirements for control measures in OTF member states (Council Directive 64/432/EEC, Annex A).

No cases have been reported in wildlife for more than 60 years in Sweden. *M. bovis* was diagnosed in farmed deer in 1991. A trace-back investigation revealed that the infection was introduced by imported deer in 1987. In 1994, a voluntary control programme was introduced which became mandatory in 2003. In total, 13 deer herds have tested positive and all have been depopulated. The programme is near completion and most deer herds are officially free. No case of TB has been detected in farmed deer since 1997

A voluntary control programme in alpacas was launched by Farm and Animal Health in 2015. All adult animals in a herd are serologically tested and all animal purchases and contacts with other herds are recorded.

Between 2001 and 2005, *M. tuberculosis* was diagnosed in elephants and giraffes at a zoo in eastern part of Sweden, and in one elephant at a zoo in the western part of the country. The animals were euthanised and a thorough investigation was performed (See *M. tuberculosis* in Zoo animals). No human infections have been associated with these cases.

The rapid decline of tuberculosis in humans in the 1940's coincided with the eradication of tuberculosis in cattle and started before the introduction of effective treatment in the 1950's. A much larger part of the human population lived in close contact with domestic animals and animals likely played a role in the changing TB incidence in humans. Nowadays, less than 10 cases of *M. bovis* are annually notified in Sweden.

Currently, the yearly incidence in humans is 7.3/100,000 inhabitants, which is among the lowest in the world. Around 90% of the cases are born outside Sweden and a clear majority of the cases are immigrants originating from countries with a high incidence of tuberculosis. The yearly incidence among people born in Sweden is 1/100,000 inhabitants. Three cases of *M. bovis* were reported in humans in 2017; all three cases with extrapulmonary TB, one with peripheral lymphadenitis and two with skeletal involvement. The case with lymphadenitis was a young woman from Eritrea most likely infected in her country of origin and the cases with skeletal TB were both born in Sweden in the 1930´s and probably infected in their childhood.

20.2. Evaluation of status, trends and relevance as a source for humans

The national situation remains favourable. As Sweden is OTF, the risk of contracting domestic TB from livestock and other animals is negligible. The risk for animal keepers to contract infection with M. tuberculosis from zoo animals is small but cannot be ruled out as elephants and other zoo animals, might carry subclinical infection.

The last case of tuberculosis in farmed deer was identified in 1997. It can be considered that the risk of contracting human TB from a farmed deer is negligible.

20.3. Any recent specific action in the Member State or suggested for the European Union

Suggestion for the European Union: Apply rules for TB control on all domestic animal species and not in cattle solely.

21. Description of Monitoring/Surveillance/Control programmes system *Mycobacterium bovis* - cattle

21.1. Monitoring/Surveillance/Control programmes system

Monitoring is performed by meat inspections at slaughter of food producing animals. The inspection is performed by staff employed by the National Food Administration. If TB is suspected, samples from organs/tissues with suspected lesions and adjacent lymph nodes are collected and analysed at the National Veterinary Institute (SVA).

Sampling is also performed in case of clinical suspicion. Both fresh and formalin fixed samples are collected.

Samples are also collected at necropsy from clinical suspicions or from animals with a positive tuberculin test.

From suspect animal cases, samples from organs with macroscopic lesions and adjacent lymph nodes are collected. In case of positive tuberculin test, reactor samples from organs with macroscopic lesions and lymph nodes from five different areas (retropharyngeal, submandibular, mediastinal, mesenteric and inguinal) are collected. Histology and direct smears are performed on all materials. If TB cannot be ruled out by histology or if direct smears are positive, culture is performed. Cultures are performed on solid media (Löwenstein-Jensen and Stonebrink's) according to the method at the National Veterinary Institute and cultured for up to twelve weeks. Suspected colonies are tested with PCR and if necessary,

with sequencing of a specific gene. Isolates suspected to belong to the *M. tuberculosis*-complex or where the *M. tuberculosis*-complex cannot be ruled out are sent for confirmation to the EU reference laboratory or the Public Health Agency of Sweden. Positive isolates are further subtyped with whole genome sequencing.

Furthermore, tuberculin tests are performed at semen collection centres and at export/import of animals as required according to EU legislation (Council Directive 64/432/EEC). Skin fold tuberculin tests are performed according to EC 1226/2002 (amending annex B of EC 64/432) and SJVFS 2003:33, K62. The comparative intradermal test is used, mostly at the neck site. In case of a positive tuberculin test, the animal is culled and sampled as stated above. Culture is performed on all samples. If TB is suspected after a positive tuberculin test, several lymph nodes are collected for histopathology, acid-fast staining of direct smears and mycobacterial culture. Any organ with gross lesions is also sampled. Lymph nodes are pooled for culture, whereas organs or lymph nodes with pathological changes are cultured separately.

A positive case is defined as an animal from which *M. bovis*, *M. tuberculosis*, or any other mycobacteria in the *M. tuberculosis*-complex has been isolated.

Sweden is OTF and fulfils the requirements on control measures in OTF member states (see The entire country free).

21.2. Measures in place

Vaccination is not allowed.

If tuberculosis is diagnosed in a food producing animal eradication measures are implemented, including depopulation of the whole herd, in accordance with the Swedish Act of Epizootics.

21.3. Notification system in place to the national competent authority

Infection with *M. bovis*, *M. tuberculosis*, or other mycobacteria in the *M. tuberculosis*-complex, is compulsory notifiable in all animal species based on suspicion (e.g. clinical- or *post mortem* suspicion).

21.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In total, four cattle were investigated for *M. bovis* in 2018.

Animals other than cattle: Apart from the tested cattle mentioned above, other animals were also tested for *M. bovis* in 2018. See the results in the prevalence file.

21.5. Additional information

During 2012 a decision was taken to abolish the intra-dermal test in alpacas because of demonstrated low sensitivity in this species. The test has been replaced with serological test. During 2017, 53 alpacas, 2 llamas and 18 wisents were tested serologically before export or import. Two of the alpacas had positive results, and they were since then isolated and due to further sampling. All other animals tested negatively. Within the voluntary control programme 514 alpacas and 7 llamas were tested, all with negative results.

22. Description of Monitoring/Surveillance/Control programmes system: *Mycobacterium bovis* - deer

22.1. Monitoring/Surveillance/Control programmes system

In 1994, a voluntary control programme was implemented. In June 2003, the control programme became compulsory. In the programme, until October 2012, tuberculin tests or whole herd slaughter were performed in all herds to obtain free status and any herd found positive for TB was depopulated. Furthermore, all deer were inspected at slaughter. All animals >1 year that were found dead or euthanized were subjected to

necropsy. Sampling was also performed in case of clinical suspicion. Since October 2012, the programme has turned into a new phase. Tuberculin tests are no longer performed in TB-free herds, but inspection at slaughter and necropsy of animals found dead or euthanized is still required, as is sampling in case of clinical suspicion. The small number of herds that are not TB-free today practice slaughtering of 20% of the herd yearly with meat inspections and necropsies for 15 years to obtain free status.

Monitoring is performed by meat inspections at slaughter of food producing animals. The inspection is performed by staff employed by the National Food Administration. If TB is suspected, samples from organs/tissues with suspected lesions and adjacent lymph nodes are collected and analysed at the National Veterinary Institute (SVA). Sampling is performed after any other suspicion of TB, for example if there is a clinical suspicion, or if there is a positive tuberculin test. Until October 2012 sampling in the control programme briefly were that a herd obtained Bovine TB-free status ('A' status) after three consecutive whole herd tuberculin tests, of all deer older than one year, with negative results. Only herds with 'A' status were allowed to sell live deer and to maintain the 'A' status all female deer had to be tested after three years without reactors. A secondary whole herd test was performed after another 5 years. Herds with 'A' status must have all animals ear-tagged and individually identified. Bovine TB free status could also be obtained by slaughter of the whole herd and repopulation with deer from TB free herds ('A' status).

Samples from organs/tissues with suspected lesions and adjacent lymph nodes are collected. Both fresh and formalin fixed samples are collected.

If TB is suspected after a positive tuberculin test, several lymph nodes are collected for histopathology, acid-fast staining of direct smears and mycobacterial culture. Any organ with gross lesions is also sampled. Lymph nodes are pooled for culture, whereas organs or lymph nodes with pathological changes are cultured separately.

A positive case is defined as an animal from which *M. bovis*, *M. tuberculosis*, or other mycobacteria in the *M. tuberculosis* complex, have been isolated.

From suspected cases in animals, samples from organs with macroscopic lesions and adjacent lymph nodes are collected. In case of positive tuberculin test reactor samples from organs with macroscopic lesions and lymph nodes from five different areas (retropharyngeal, submandibular, mediastinal, mesenteric and inguinal) are collected. Histology and direct smears are performed on all materials. If TB cannot be ruled out by histology or if direct smears are positive, culture is performed. Cultures are performed on solid media (Löwenstein-Jensen and Stonebrink's) according to the method at the National Veterinary Institute and cultured for up to twelve weeks. Suspected colonies are tested with PCR and if necessary, with sequencing of a specific gene. Strains suspected to belong to the *M. tuberculosis*-complex or where the *M. tuberculosis*-complex cannot be ruled out are sent for confirmation to the Norwegian Veterinary Institute or the Public Health Agency of Sweden. Positive isolates are further subtyped.

22.2. Measures in place

See 21.1. The official TB control programme in farmed deer is compulsory for all herds. The control programme has changed so that herds having tested negative four times do not need to continue testing. However, it is still required to inspect all slaughtered, euthanized or dead deer for TB.

Vaccination is not allowed.

If tuberculosis is diagnosed in farmed deer eradication measures will be implemented, including depopulation of the whole herd, in accordance with the Swedish Act of Epizootics.

22.3. Notification system in place to the national competent authority

Infection with *M. bovis*, *M. tuberculosis*, or other mycobacteria in the *M. tuberculosis* complex, is notifiable in all animal species based on suspicion (e.g. clinical or *post mortem* suspicion).

22.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

The situation remains favourable and Sweden is close to declaring the country free from tuberculosis in farmed deer. It can be considered that the risk of contracting human TB from a farmed deer is negligible.

The voluntary control programme became compulsory in 2003. Since the inception of the programme it has become evident that, on certain large extensive deer farms, it is difficult to collect all animals in the herd and virtually impossible to establish that no deer are present outside the collection pen. An alternative control was needed in these herds. The national legislation was amended so that owners of farms larger than 100 hectares and where there are no imported deer in the herd or any epidemiological links to imports, may apply to the Swedish Board of Agriculture for the alternative control for bovine TB, based on slaughter and meat inspection. In these herds, at least 20% of the herd (equally distributed over sex and age classes) shall be slaughtered annually for at least 15 years and the carcasses submitted for meat inspection. Furthermore, all other deer that are killed or die due to other reasons shall be meat inspected or necropsied.

In 2018, no deer were investigated due to suspicions or lesions found at necropsy.

23. General evaluation: *C. burnetii*

23.1. History of the disease and/or infection in the country

The presence of *C. burnetii* in domestic animal populations in Sweden has been known since the early 1990's. The bacterium was first isolated from a sheep placenta in a herd on the isle of Gotland. In 2008/2009, a national survey of dairy cattle herds showed that 8% of the herds were antibody positive in bulk milk. There were large regional differences with the highest prevalence on the isles of Gotland and Öland (59% and 35%, respectively). In 2010, national surveys of sheep and dairy goat herds showed a very low prevalence of antibodies; 0.6% (n=518 herds) and 1.7% (n=58 herds), respectively. In addition, goat bulk milk was also analysed for detection of the agent and *C. burnetii* was not detected. In 2011, 80 sheep farms were investigated for the presence of the agent by analysing vaginal swab samples from sheep taken in conjunction with lambing without detecting the agent in any of the samples. The results support that *C. burnetii* is a rare pathogen in the Swedish sheep and goat populations. In a survey of 99 Swedish moose during 2008-2010 no positive samples were found, indicating that *C. burnetii* is rare also in this wild species.

In humans, only two domestic cases were reported in the 1980's and 1990's. During the same period, a serological survey in humans identified 28% of sheep farmers and 13% of veterinarians to be antibody positive, indicating a larger extent of the exposure. However, a prospective study on cases of endocarditis showed that only one of 329 patients had antibodies to *C. burnetii* indicating that chronic Q fever endocarditis is rare. Since Q fever became notifiable in humans in 2004, one to three cases have been reported annually until 2008, when an increase was observed. Only one case was classified as domestic during the period from 2004-2009. In 2010, the situation changed as eight of the totally 11 reported cases claimed to have been infected in Sweden. All these domestic cases were linked to a farm in southern Sweden, which was included in a national survey on dairy herds and where the bulk milk from the cows was shown to be antibody positive for *C. burnetii*. No active surveillance has been conducted after 2011.

23.2. Evaluation of status, trends and relevance as a source for humans

After four years (2008-2011) of active surveillance for Q fever, as well as other related studies, the present surveillance in animals has been passive. It is notable that awareness and concern with Q fever as a differential diagnosis has decreased.

24. Description of Monitoring/Surveillance/Control programmes system: Q fever

24.1. Monitoring/Surveillance/Control programmes system

Surveillance for Q fever in animals and humans is passive. For laboratory verification of the infection, serology and PCR are used.

24.2. Measures in place

24.3. Notification system in place to the national competent authority

Q fever is a notifiable disease (SJVFS 2013:23). Notification of a primary case of Q fever in animals is based on detection of the agent *C. burnetii* or increased antibody levels in paired samples.

Q fever in humans has been notifiable according to the Communicable Disease Act since 2004 (SFS 2004:168) with the amendments of SFS 2013:634.

24.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Limited testing was done in 2018 on cattle and sheep mainly for export reasons. Blood samples from nine cattle and 18 sheep were analysed for the presence of antibodies by complement fixation test or ELISA. Animals from five herds were tested for Q fever in bulk milk by PCR.

Bulk milk from one cattle herd tested positive for Q fever with PCR. All other samples that were submitted for testing were negative.

Since the 1980's, few domestically acquired human cases of Q fever have been reported apart from the cluster in 2010. Most reported cases have been infected in Mediterranean countries. In 2018, seven cases of Q fever were reported with a median age of 60, five of the cases were male and two females. All cases were reported to be infected abroad and predominantly in Spain.

During the period when Q fever has been a notifiable disease, only about 20% of the reported cases have been women. A similar difference in gender distribution has been described from other countries, but the cause of it is not clear.

25. General evaluation: Rabies

25.1. History of the disease and/or infection in the country

Sweden has been free from classical animal rabies since 1886. EBLV has never been isolated from bats in Sweden, but antibodies to EBLV 2 have been detected in specimens from live bats suggesting that EBLV 2 is present in Sweden.

25.2. Evaluation of status, trends and relevance as a source for humans

The last human to be hospitalized for rabies in Sweden was in 2000, when a woman fell ill after a visit to Thailand. She was most probably infected by rabid dogs there.

Since Sweden is free from classical rabies, the risk of acquiring the disease from Swedish animals is negligible.

Recent investigations suggest that EBLV 2 is present in Sweden, but with a very low incidence.

25.3. Any recent specific action in the Member State or suggested for the European Union

Information campaigns about travelling rules and risks usually are launched before vacation periods (i.e. early summer) to prevent illegally introduced pets.

There is a national working group with representatives from veterinary as well as public health authorities to discuss different subjects in relation to rabies, such as home isolation of illegally introduced pets and the consequences thereof.

26. Description of Monitoring/Surveillance/Control programmes system: Rabies in animals

26.1. Monitoring/Surveillance/Control programmes system

Passive surveillance: animals of all species with clinical signs where rabies cannot be excluded, are tested on suspicion after decision by SBA (official sampling). The diagnostic method used is based on antigen detection on brain tissue by use of fluorescent antibody test.

Active surveillance: illegally imported pets, from countries with endemic rabies, that are detected in Sweden and euthanized after decision by the SBA (official sampling) are examined for rabies to exclude the possible spread of rabies in Sweden. Brain tissue from the animals are analysed by real time PCR.

26.2. Measures in place

To prevent the introduction of rabies, dogs and cats must be rabies vaccinated before entering Sweden. In addition, depending on the country of origin, some must have their antibody titre tested. The rules are set in SJVFS 2011:49 (with amendments of SJVFS 2014:47) and in the EU Regulation 576/2013.

26.3. Notification system in place to the national competent authority

Rabies is included in the Swedish Act of Epizootic diseases (SFS 1999:657 with amendments) and is notifiable on suspicion.

26.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

The absence of positive results in both the passive surveillance and the active support that Sweden still is free from classical rabies.

27. General evaluation: *Salmonella*

27.1. History of the disease and/or infection in the country

A severe domestic outbreak of S. Typhimurium in 1953 with more than 9,000 cases prompted the need for a control programme for *Salmonella*. Since then, the control strategy has been to prevent *Salmonella* in all parts of the production chain, from feed to food of animal origin. When Sweden joined the European Union in 1995, the Swedish *Salmonella* control programme was accepted. Sweden obtained additional guarantees that food products of animal origin (cattle, pork, poultry) from countries with a non-equivalent *Salmonella* status should be tested for the presence of *Salmonella* before being placed on the Swedish market. These additional guarantees constitute an important safeguard to Swedish public health.

In the past ten years, an average of 3,000 human cases of salmonellosis have been annually reported to the Public Health Agency of Sweden. A majority (70-80%) of these cases have been infected abroad. During this period, the total incidence has decreased. This is due to a decrease in cases infected abroad, whereas the domestic incidence remains constant. The low proportion of domestic infections is unique to Sweden compared to many other countries. A few larger outbreaks have been reported. The source, when identified, is often imported food. The contribution to the human disease burden from domestic animals is low.

During the 1980s' the number of cattle farms infected with *Salmonella* declined rapidly. Since the end of the 1990's the number of farms with new infections varied from 1 to 13 per year.

27.2. Evaluation of status, trends and relevance as a source for humans

The low proportion of domestic human infections is unique to Sweden, Norway and Finland when compared to most European countries. To trace and further control the sources of infection it is important to notify both the total incidence and the domestic incidence in humans. The total notified incidence in 2018, 19.95 cases per 100,000 inhabitants, is considerably higher than the domestic incidence of 7.9 cases per 100,000 inhabitants. The Swedish situation with few domestic human cases reflects the low *Salmonella* burden in domestic animals and food.

The number of notified domestic human cases of *Salmonella* vary from year to year depending on the number of outbreaks. The largest decrease over the past ten years was seen for the travel-associated cases, especially from European countries. This decrease in Salmonella cases has been seen in countries throughout the EU and is the result of the successful implementation of harmonised Salmonella control programmes in poultry across the union.

It is still necessary to inform travellers about the risks of contracting *Salmonella* and other infectious diseases in order to further decrease the incidence. Also, information on how to prevent secondary transmission to other persons, to the environment and to animals when returning to Sweden is crucial.

To present a context for the history of *Salmonella* Dublin in Sweden, data was obtained for the period 1958-1967. This indicates that *Salmonella* Dublin did not become dominant in Sweden until a dramatic rise in the proportion of positive herds in 1963, when 102 cattle herds were detected with this serotype that still today is a challenge for the industry.

In the feed sector, data from 2018 showed that several different serovars were isolated in the weekly surveillance of feed mills where S. Typhimurium was the most common (n=10). All the findings were in the feed material intake area in several different feed mills and the trend of findings is on the same level as the last years (approx. 0.20 %). This illustrates the importance to handle feed materials in a proper way even if the feed materials have been tested negative for *Salmonella* contamination.

In 2014, a new laboratory was chosen to perform *Salmonella* analyses within the part of the control programme that pertains to testing of samples from abattoirs and cutting plants. This laboratory was accredited for *Salmonella* but had only a limited experience with the bacterium. In 2014, *Salmonella* was not detected in any of the samples taken at the abattoirs or cutting plants. The National Reference Laboratory (NRL) for *Salmonella* and the National Food Agency of Sweden inspected the laboratory and found that the analytical methods and laboratory routines needed improvement. Thus, the results from the control programme from 2014 and 2015 are not fully reliable. Since May 2016, another laboratory is in charge of the analyses.

Routine MLVA typing and comparison of *S*. Typhimurium isolates from humans, animals, food, feed and the environment has proved to be a useful tool to detect clusters and outbreaks.

The Swedish *Salmonella* control programme has been in place for decades and resulted in a very low *Salmonella* burden in domestic animals. However, the programme is costly and could be modernised.

28. Description of Monitoring/Surveillance/Control programmes system: Salmonellosis in cattle

28.1. Monitoring/Surveillance/Control programmes system

Sampling strategies are described in the Swedish *Salmonella* control programme (95/50/EC). The programme is supervised by the Swedish Board of Agriculture and the National Food Administration. All sampling for the *Salmonella* programme is supervised by official veterinarians at the competent authority. Sampling can be divided into routine sampling and targeted sampling.

Routine sampling

Within the programme, lymph nodes are systematically collected from cattle at slaughter to ensure that the samples are representative of the population of slaughtered cattle at each abattoir. Sampling of lymph nodes in the programme is described here, whereas sampling of carcass swabs is described under "*Salmonella* spp. in bovine meat and meat products". At each abattoir, one sample consists of lymph nodes from the ileocaecal region. At larger abattoirs, sampling is performed daily. The sample size is calculated to detect a prevalence of least 5% *Salmonella* infected animals with a 95% Confidence Interval (CI) in the number of animals slaughtered annually. At these abattoirs, samples are collected evenly distributed over the day and if slaughter is performed on separate lines, each line will be sampled separately. From smaller abattoirs, enough samples to detect a prevalence of 1% with 90% CI will be taken. Sampling is spread out over the slaughter days to avoid periodical sampling. Animals that are bought to a farm under certain defined criteria are also sampled.

Targeted sampling

Sampling at farms is performed whenever there is a clinical suspicion. Calves up to six months are sampled at necropsy, other animals are sampled when considered necessary

Frequency of the sampling - Animals at farm:

1) lymph nodes: Larger abattoirs: daily, Smaller abattoirs: spread out evenly over the year, 2) sampling at suspicion/outbreak

Frequency of the sampling - Animals at slaughter (herd-based approach):

see lymph nodes at "Animals at farms"

Type of specimen taken - Animals at farm:

Faeces, sock and dust samples Milk or blood samples

Type of specimen taken - Animals at slaughter (herd-based approach):

lymph nodes

Methods of sampling (description of sampling techniques) - Animals at farm:

Faecal samples: Sampling procedure: For individual sampling, at least 10 g faeces from each animal is collected. From pens with calves/young stock pooled faecal samples of at least 50g (10g from each of at least 5 animals/pen) is collected. All samples should be analysed within 24-48 h after collection. Bacteriological examination: From individual samples, 5 g faeces is examined while the remaining part is stored at 4°C until examination is completed. Material is pooled from no more than 5 animals. If *Salmonella* is isolated from a pooled sample, each of the individually stored samples can be examined separately.

Environmental samples: Sock samples are taken from the barn: from the manure channels and drains and boxes with animals. The sampler walks around with small steps and uses one pair of socks for every part of the system. In stables with boxes socks are used while collecting faecal samples in the boxes. A pair of socks is taken per 50 animals.

Serological samples: Milk or blood samples. A milk sample is taken from the tank milk.

Lymph nodes at slaughter: The lymph nodes are aseptically removed and put in a plastic bag. The samples are kept refrigerated until sent to the laboratory. At the laboratory all lymph nodes from one sample are

divided into two equal parts. One half is placed in a mortar and the other part is kept at 4°C. In the mortar lymph nodes from 10 animals at most are pooled and homogenized. If *Salmonella* is isolated from a pooled sample of lymph nodes each of the individually stored samples will be separately analysed.

Methods of sampling (description of sampling techniques) - Animals at slaughter (herd-based approach):

For information about lymph nodes, see "Animals at farm". For information about carcass swabs and cutting plants, see "*Salmonella* spp. in bovine meat and products thereof".

Case definition - Animals at farm and at slaughter:

If *Salmonella* is isolated from a bovine animal or from the environmental samples, the whole herd is considered infected. The herd is the epidemiological unit. If only a positive serological response is obtained the herd is not considered infected, but the finding leads to repeated sampling.

Analytical methods used - Animals at farm:

Bacteriological method: ISO 6579:2002

Diagnostic/analytical methods used - Animals at slaughter (herd-based approach):

Bacteriological method: NMKL No 71:1999

Vaccination is not used.

Other preventive measures than vaccination in place:

Control of *Salmonella* in feed and in feed production (HACCP based approach) is integrated in the control programme. Since 2002, a voluntary hygiene programme has been run by the industry aiming at decreasing the risk of *Salmonella*. The programme is supervised by the Swedish Board of Agriculture. In this programme, certain rules of hygiene and standardized preventive measures must be implemented. Holdings affiliated to the programme get higher compensation in case of *Salmonella*. Most of all breeding holdings and many of the large dairy herds are affiliated to the programme. In addition, affiliated holdings can apply for a commercial *Salmonella* insurance.

The control programme/strategies in place

Control strategies follow the Swedish *Salmonella* control programme, approved by the EU in 1995 (95/50/EC). The control programme is nationwide; thus, it covers all herds in Sweden, also those that may export. The *Salmonella* control programme is officially supervised and includes:1. Compulsory notification of all findings of *Salmonella* in all animals, food, feed (environmental sampling included) and humans as well as suspicions of *Salmonella*, regardless of serotype2. Compulsory action if *Salmonella* is isolated, see "Measures in case of positive findings"3. Examination for *Salmonella* in animals slaughtered under special conditions (e.g. diseased animals or when *Salmonella* is suspected)4. Control programme at abattoir and clinical surveillance in herds

AMR

Salmonellosis in animals is a notifiable disease in Sweden and one isolate from each notified incident must be confirmed at SVA. These isolates are also tested for antimicrobial resistance within the framework of the Swedish Veterinary Antimicrobial Resistance Monitoring programme (SVARM). Isolates included are from both active and passive *Salmonella* monitoring programmes and from both clinical and non-clinical cases. From each notified incident, one isolate of each serovar, and when appropriate from each phage-type, are included.

Antimicrobial susceptibility is tested by determination of MIC using microdilution according to the provisions of Commission Implementing Decision 2013/652/EC. ECOFFs issued by EUCAST are used for interpretation of MICs.

28.2. Measures in place

Vaccination is not used.

1. *Salmonella* isolates must be sent to the SVA for confirmation, typing and testing of antimicrobial resistance.

2. When *Salmonella* is confirmed on a farm, the holding is put under restrictive measures and an epidemiological investigation is always performed and a plan to eradicate *Salmonella* from the holding is designed. Animal movements to and from the holding are forbidden. In cattle, a combination of stamping out of groups of animals and hygienic measures controlled by repeated sampling is usually employed. Hygienic measures can include reducing the number of animals, control of animal, feed and manure movements on the farm and reduction of *Salmonella* in the environment by cleaning and disinfection. No *Salmonella* positive animals should enter the cleaned and disinfected parts of the stable. Negatively tested animals, when considered at low risk of being infected, may be slaughtered under certain conditions with extra hygienic measures and sampling of each carcass. The restrictions are lifted when the cleaning and disinfection have been completed and *Salmonella* cannot be detected from two whole-herd samplings for culture, performed four weeks apart. Trace-back and trace-forward investigations are also performed. Also, the feed supplier is investigated.

3. If *Salmonella* is isolated from a lymph node the farm of origin is always sampled except for cases when *Salmonella* is only isolated from the pooled sample but cannot be traced to an individual animal.

4. 4. If *Salmonella* is isolated from other animals, humans or feed and connections can be made to cattle, investigation is always performed.

28.3. Notification system in place to the national competent authority

All findings and suspicions of *Salmonella* are compulsory notifiable. All suspected index isolates of *Salmonella* from non-human sources are sent to the National Veterinary Institute for confirmation, serotyping, resistance testing, and further typing. Index isolates of serovars *S.* Typhimurium and Enteritidis are typed by MLVA (multi-locus variable number tandem repeat analysis).

28.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In summary, *Salmonella* was detected in four new herds in 2018.

Salmonella was isolated from three (0.15%) of 3,242 mesenterial lymph nodes from cattle at slaughter.

The Swedish *Salmonella* control programme has been in place for decades. It is extensive, and the continuous work has resulted in a very favourable *Salmonella* situation in domestic animals. However, the programme is costly and could be modernised.

The risk of contracting *Salmonella* from Swedish produced food of cattle origin is negligible as the number of Swedish cattle infected with *Salmonella* has been low. However, *Salmonella* in cattle might be increasing. *Salmonella* infected farms may contaminate the environment which may increase a risk of transmission to humans and other animal species. Also, human sewage might contaminate water sources and thus lead to infections in animal herds and further infect humans

28.5. Additional information

As *Salmonella* often causes clinical disease in cattle, a control programme based on testing of clinically healthy cattle at slaughter reveals only some infected herds.

29. Description of Monitoring/Surveillance/Control programmes system: *Salmonella* in pigs

29.1. Monitoring/Surveillance/Control programmes system

The programme includes a compulsory and a voluntary part.

The compulsory part consists of annual faecal sampling from breeding pig herds and gilt-producing herds and twice-a-year sampling from sow pools. *Salmonella* is also tested for in conjunction with post-mortem investigations if an infection is suspected by macroscopic findings. All imported animals are tested. On clinical suspicion, herds or single animals should be tested for *Salmonella*.

The voluntary programme is a preventive hygienic programme aiming at decreasing the risk of *Salmonella*. Holdings affiliated to the programme receive higher compensation in case of positive findings. Most of all breeding herds are affiliated to the programme. In addition, affiliated holdings are entitled to apply for a commercial *Salmonella* insurance.

29.2. Measures in place

See the text on *Salmonella* in cattle.

29.3. Notification system in place to the national competent authority

All findings and suspicions of *Salmonella* are compulsory notifiable. All suspected index isolates of *Salmonella* from non-human sources are sent to the National Veterinary Institute for confirmation, serotyping, resistance testing, and further typing. Index isolates of serovars *S.* Typhimurium and Enteritidis are typed by MLVA (multi-locus variable number tandem repeat analysis).

29.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In 2018, *Salmonella* was not detected in one pig herd. This is consistent with the low incidence of *Salmonella* in pigs in previous years. However, the decrease in the number of pig herds in Sweden during the last few years may also play a role in the low incidence.

Salmonella was detected from two (0.07%) of 2, 930 lymph node samples taken from adult pigs and from three (0.10%) of 3,003 lymph node samples from fattening pigs.

30. Description of Monitoring/Surveillance/Control programmes system: *Salmonella* in *Gallus gallus* – egg production line

30.1. Monitoring/Surveillance/Control programs system

The aim of the programme is that animals sent for slaughter and animal products should be free from *Salmonella*. The *Salmonella* control programme is governed by the Swedish Act on Zoonoses (SFS 1999:658) and its regulations.

30.1.1 Surveillance

The *Salmonella* control programme comprises a compulsory part and a voluntary part. All poultry species are included in the compulsory part, which sets the rules for mandatory sampling.

Compulsory programme - poultry

All breeding flocks with more than 250 birds are tested. Parents of *Gallus gallus* layers are imported as day-old chicks.

Sampling scheme:

Breeders in rearing: 1 d, 4 weeks, 2 weeks prior to rearing or moving

Breeders in production: every 2nd week and 1-2 weeks prior to slaughter

Pullets: 2 weeks prior to moving to a layer house

Layers: Every 15th week (start time at 22-26 weeks) and 14 d prior to slaughter

Samples consist of sock samples or faecal samples taken from all parts of the building or the department where the bird flock is kept. From rearing breeding flocks of meat production line, two pairs of sock samples are taken and pooled into one whereas five pairs pooled to two are taken from production flocks of breeders. From layer flocks and flocks with pullets, two pairs of sock samples are taken and pooled into one sample.

All holdings selling eggs for consumption are sampled. All poultry flocks having more than 500 birds, irrespective of species, are tested before slaughter. In practice, all poultry flocks are tested prior to slaughter. The results must be available before slaughter.

The producers pay the costs for laboratory analyses and the visits to the farms. Only accredited laboratories are allowed to perform the analyses. The laboratory sends the test results to the County Veterinary Officer on a quarterly basis. According to regulations, the County Veterinary Officer must send a report on the test results of all poultry holdings to the Swedish Board of Agriculture once a year. County Veterinary Officers exercise supervision of the poultry control programme.

Voluntary programme - poultry

The voluntary preventive programme includes all-in all-out production, hygienic measures and a high standard for poultry houses, such as hygienic barriers between the clean and unclean parts. Purchases of animals may only occur from holdings affiliated to the voluntary programme and only heat-treated feed is allowed. The poultry houses must be cleaned and disinfected before introduction of a new flock. The producer must apply to be accepted into the voluntary programme. An official veterinarian inspects the holding at least once a year. The producers affiliated to the voluntary programme receive higher compensation in case of *Salmonella*. Within the voluntary programme, an annual sample of the feed is taken at the holding within the voluntary programme.

30.2. Measures in place

If *Salmonella* is suspected in an animal, a veterinarian is obligated to take samples and implement measures to prevent further transmission. When *Salmonella* is detected the laboratory must notify the Swedish Board of Agriculture and the County Veterinary Officer. When detected in a food-producing animal, the County Veterinary Officer informs the official veterinarian at the abattoir involved. When relevant, other persons are informed before confirmation.

When *Salmonella* is confirmed on a farm, the holding is put under restrictions, an epidemiological investigation is performed and a plan to eradicate *Salmonella* from the holding is defined. Animal movements to and from the holding are stopped.

All *Salmonella* positive food producing poultry flocks are euthanised irrespective of serovar. The house involved, and all possible contaminated areas are thoroughly cleaned and disinfected. Before introduction of new birds, all environmental samples must be negative for *Salmonella*.

Vaccination is not used in Sweden.

30.3. Notification system in place to the national competent authority

Findings of *Salmonella* in all animal species are notifiable to the Swedish Board of Agriculture.

All suspected index isolates of *Salmonella* from non-human sources are sent to the National Veterinary Institute for confirmation, serotyping, resistance testing, and further typing. Index isolates of serovars *S.* Typhimurium and Enteritidis are typed by MLVA (multi-locus variable number tandem repeat analysis).

30.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Salmonella was not detected in four flocks of laying flocks, but not in any of the pullet flocks tested nor in any breeding flocks.

30.5. Additional information

The poultry registries maintained by the Swedish Board of Agriculture are not sufficiently updated which complicates supervision of the control as well as outbreak investigations. In addition, this leads to uncertain estimates of the poultry population. Thus, the Swedish figures on the number of flocks within the programme can only be considered as estimates. Approximately 20% of the poultry flocks lack an annual veterinary inspection. To exercise supervision of *Salmonella* control in poultry some County Veterinary Officers have created their own poultry databases.

31. Description of Monitoring/Surveillance/Control programmes system: *Salmonella* in *Gallus gallus* – meat production line

31.1. Monitoring/Surveillance/Control programmes system

The aim of the programme is that animals sent for slaughter and animal products should be free from *Salmonella*. The *Salmonella* control programme is governed by the Swedish Act on Zoonoses (SFS 1999:658) and its regulations.

31.1.1 Surveillance

The *Salmonella* control programme comprises a compulsory part and a voluntary part. All poultry species are included in the compulsory part, which sets the rules for mandatory sampling.

Compulsory programme - poultry

All breeding flocks with more than 250 birds are tested. Grandparents of *Gallus gallus* broilers are imported as day-old chicks.

Sampling scheme:

Breeders in rearing: 1 d, 4 weeks, 2 weeks prior to rearing or moving

Breeders in production: every 2nd week and 1-2 weeks prior to slaughter

Broilers: 14 d prior to slaughter

Samples consist of sock samples taken from all parts of the building or the department where the bird flock is kept. From rearing breeding flocks of meat production line, two pairs of sock samples are taken and pooled into one whereas five pairs pooled to two are taken from production flocks of breeders. From broiler flocks, two pairs of sock samples are taken and pooled into one sample.

All poultry flocks having more than 500 birds, irrespective of species, are tested before slaughter. In practice, all poultry flocks are tested prior to slaughter. The results must be available before slaughter.

The producers pay the costs for laboratory analyses and the visits to the farms. Only accredited laboratories are allowed to perform the analyses. The laboratory sends the test results to the County Veterinary Officer on a quarterly basis. According to regulations, the County Veterinary Officer must send a report on the test

results of all poultry holdings to the Swedish Board of Agriculture once a year. County Veterinary Officers exercise supervision of the poultry control programme.

Voluntary programme - poultry

The voluntary preventive programme includes all-in all-out production, hygienic measures and a high standard for poultry houses, such as hygienic barriers between the clean and unclean parts. Purchases of animals may only occur from holdings affiliated to the voluntary programme and only heat-treated feed is allowed. The poultry houses must be cleaned and disinfected before introduction of a new flock. The broiler producer must apply to be accepted into the voluntary programme. An official veterinarian inspects the holding at least once a year. The producers affiliated to the voluntary programme receive higher compensation in case of *Salmonella*. All broiler producers belonging to the Swedish Poultry Association are affiliated to the voluntary programme (approximately 99% of the slaughtered broilers). The voluntary programme has been in place for more than 40 years. Within the voluntary programme, an annual sample of the feed is taken at the holding within the voluntary programme.

31.2. Measures in place

If *Salmonella* is suspected in an animal, a veterinarian is obligated to take samples and implement measures to prevent further transmission. When *Salmonella* is detected the laboratory must notify the Swedish Board of Agriculture and the County Veterinary Officer. When detected in a food-producing animal, the County Veterinary Officer informs the official veterinarian at the abattoir involved. When relevant, other persons are informed before confirmation.

When *Salmonella* is confirmed on a farm, the holding is put under restrictions, an epidemiological investigation is performed and a plan to eradicate *Salmonella* from the holding is defined. Animal movements to and from the holding are stopped.

All *Salmonella* positive food producing poultry flocks are euthanised irrespective of serovar. The poultry house involved, and all possible contaminated areas are thoroughly cleaned and disinfected. Before introduction of new birds, all environmental samples must be negative for *Salmonella*.

Vaccination is not used in Sweden.

31.3. Notification system in place to the national competent authority

Findings of *Salmonella* in all animal species are notifiable to the Swedish Board of Agriculture.

All suspected index isolates of *Salmonella* from non-human sources are sent to the National Veterinary Institute for confirmation, serotyping, resistance testing, and further typing. Index isolates of serovars *S.* Typhimurium and Enteritidis are typed by MLVA (multi-locus variable number tandem repeat analysis).

31.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Salmonella Typhimurium was detected in three broiler flocks tested in routine sampling before slaughter. *Salmonella* was not detected in any breeding flocks.

31.5. Additional information

The poultry registries maintained by the Swedish Board of Agriculture are not sufficiently updated which complicates supervision of the control as well as outbreak investigations. In addition, this leads to uncertain estimates of the poultry population. Thus, the Swedish figures on the number of flocks within the programme can only be considered as estimates. Approximately 20% of the poultry flocks lack an annual veterinary inspection. To exercise supervision of *Salmonella* control in poultry some County Veterinary Officers have created their own poultry databases.

32. Description of Monitoring/Surveillance/Control programmes system: *Salmonella* in turkeys

32.1. Monitoring/Surveillance/Control programmes system

The aim of the programme is that animals sent for slaughter and animal products should be free from *Salmonella*. The *Salmonella* control programme is governed by the Swedish Act on Zoonoses (SFS 1999:658) and its regulations.

32.1.1 Surveillance

The *Salmonella* control programme comprises a compulsory part and a voluntary part. All poultry species are included in the compulsory part, which sets the rules for mandatory sampling.

Compulsory programme - poultry

All breeding flocks with more than 250 birds are tested. Parents of production flocks of turkeys are imported as day-old chicks.

Sampling scheme:

Breeders in rearing: 1 d, 4 weeks, 2 weeks prior to rearing or moving

Breeders in production: every 2nd week and 1-2 weeks prior to slaughter

Turkeys: 14 d prior to slaughter

Samples consist of sock samples taken from all parts of the building or the department where the bird flock is kept. From rearing breeding flocks of meat production line, two pairs of sock samples are taken and pooled into one whereas five pairs pooled to two are taken from production flocks of breeders. From broiler flocks, two pairs of sock samples are taken and pooled into one sample.

All poultry flocks having more than 500 birds, irrespective of species, are tested before slaughter. In practice, all poultry flocks are tested prior to slaughter. The results must be available before slaughter.

The producers pay the costs for laboratory analyses and the visits to the farms. Only accredited laboratories are allowed to perform the analyses. The laboratory sends the test results to the County Veterinary Officer on a quarterly basis. According to regulations, the County Veterinary Officer must send a report on the test results of all poultry holdings to the Swedish Board of Agriculture once a year. County Veterinary Officers exercise supervision of the poultry control programme.

Voluntary programme - poultry

The voluntary preventive programme includes all-in all-out production, hygienic measures and a high standard for poultry houses, such as hygienic barriers between the clean and unclean parts. Purchases of animals may only occur from holdings affiliated to the voluntary programme and only heat-treated feed is allowed. The poultry houses must be cleaned and disinfected before introduction of a new flock. The broiler producer must apply to be accepted into the voluntary programme. An official veterinarian inspects the holding at least once a year. The producers affiliated to the voluntary programme receive higher compensation in case of *Salmonella*. All turkey producers belonging to the Swedish Poultry Association are affiliated to the voluntary programme. The voluntary programme has been in place for more than 40 years. Within the voluntary programme, an annual sample of the feed is taken at the holding within the voluntary programme.

32.2. Measures in place

See the text on *Salmonella* in *Gallus gallus*.

32.3. Notification system in place to the national competent authority

See the text on *Salmonella* in *Gallus gallus*.

32.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Salmonella was not detected in turkey flocks. Thus, the data for 2018 corroborates a favourable situation with few incidents of *Salmonella* in turkeys.

33. Description of Monitoring/Surveillance/Control programmes system *Salmonella* in other poultry species than *Gallus gallus* and turkeys

33.1. Monitoring/Surveillance/Control programmes system

The aim of the programme is that animals sent for slaughter and animal products should be free from *Salmonella*. The *Salmonella* control programme is governed by the Swedish Act on Zoonoses (SFS 1999:658) and its regulations.

33.1.1 Surveillance

The *Salmonella* control programme comprises a compulsory part. All poultry species are included in the compulsory part, which sets the rules for mandatory sampling.

All breeding flocks with more than 250 birds are tested. Sampling scheme:

Breeders in rearing: 1 d, 4 weeks, 2 weeks prior to rearing or moving

Breeders in production: every 2nd week and 1-2 weeks prior to slaughter

Production flocks: 14 d prior to slaughter

Samples consist of sock samples taken from all parts of the building or the department where the bird flock is kept. From rearing breeding flocks of meat production line, two pairs of sock samples are taken and pooled into one whereas five pairs pooled to two are taken from production flocks of breeders. From broiler flocks, two pairs of sock samples are taken and pooled into one sample.

All poultry flocks having more than 500 birds, irrespective of species, are tested before slaughter. In practice, all poultry flocks are tested prior to slaughter. The results must be available before slaughter.

The producers pay the costs for laboratory analyses and the visits to the farms. Only accredited laboratories are allowed to perform the analyses. The laboratory sends the test results to the County Veterinary Officer on a quarterly basis. According to regulations, the County Veterinary Officer must send a report on the test results of all poultry holdings to the Swedish Board of Agriculture once a year. County Veterinary Officers exercise supervision of the poultry control programme.

33.2. Measures in place

See text on *Gallus gallus*.

33.3. Notification system in place to the national competent authority

See the text on *Salmonella* in *Gallus gallus*.

33.4. Results of investigations and national evaluation of the situation, the trends andsources of infection

Salmonella was not detected in any of the flocks of other poultry species.

34. Description of Monitoring/Surveillance/Control programmes system: *Salmonella* in other animal species

34.1. Monitoring/Surveillance/Control programmes system

Animals are tested for *Salmonella* at suspicion or as part of trace-back investigations. Wild animals necropsied at the National Veterinary Institute are tested for *Salmonella* at suspicion.

All samples from animals (poultry, cattle and pigs and other animals) are analysed using the MSRV (EN-ISO 6579:2002/A1: 2007: Amendment 1: Annex D) method.

Salmonellosis in animals is a notifiable disease in Sweden and one isolate from each notified incident must be confirmed at SVA. These isolates are also tested for antimicrobial resistance within the framework of the Swedish Veterinary Antimicrobial Resistance Monitoring programme (SVARM). Isolates included are from both active and passive *Salmonella* monitoring programmes and from both clinical and non-clinical cases. From each notified incident, one isolate of each serovar, and when appropriate from each phage-type, are included.

Antimicrobial susceptibility is tested by determination of MIC using microdilution according to the provisions of Commission Implementing Decision 2013/652/EC. ECOFFs issued by EUCAST are used for interpretation of MICs.

34.2. Measures in place

If *Salmonella* is detected in companion animals, advice is given to the owners. If *Salmonella* is detected in horses, the stables and/or the paddocks at risk are put under restrictions and follow up investigations are performed on the positive horse(s).

If *Salmonella* is detected in other food-producing animals than cattle, pigs and poultry, the measures applied for *Salmonella* in cattle and pigs are applied.

34.3. Notification system in place to the national competent authority

Findings of *Salmonella* in all animal species are notifiable to the Swedish Board of Agriculture.

All suspected index isolates of *Salmonella* from non-human sources are sent to the National Veterinary Institute for confirmation, serotyping, resistance testing, and further typing. Index isolates of serovars *S.* Typhimurium and Enteritidis are typed by MLVA (multi-locus variable number tandem repeat analysis).

34.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In 2018, *Salmonella* was detected in one stable with horses.

In 2018, *Salmonella* was detected in 1185 (74,9%) cats of 1760 tested, which was more than previously notified. Of the 308 fully serotyped cat isolates 305 belonged to the serovar Typhimurium.

Also, *Salmonella* was detected in 17 dogs, 26 wild birds (mainly passerine), one hedgehog and one wild boar.

34.5. Additional information

Serovars of *Salmonella* occur in a wide spectrum of hosts ranging from host generalists to host specialists where the later preferentially only infect a single species. A specific type of *Salmonella* Typhimurium

(MLVA profiles 2-[11-15]-[3-4]-NA-212) is a host specialist that cause outbreaks of septicaemia and mortality in wild birds in e.g. Sweden, Norway and the United Kingdom. These outbreaks tend to occur in late winter or early spring, and most commonly among certain passerine species. The infected birds are easy prey for cats which in turn can get infected. Cats and birds can transfer the infection to humans. In the early months of 2018, a large outbreak of *Salmonella* Typhimurium occurred among cats in Sweden. In total, *Salmonella* was detected in 1185 of 1760 samples from cats which was the highest number ever recorded. Infected cats were notified in all regions in Sweden. Simultaneously, *S*. Typhimurium with the specific MLVA profiles were detected from 26 passerine birds, 10 dogs as well as in 16 humans. To protect public health, communication efforts to raise awareness and to recommend good hand hygiene when handling infected cats and bird feeders were put in place. Numbers of cases of this type of *S*. Typhimurium vary between years. The reasons for these variations are not fully understood but seem to be related to variations in the population sizes and migrations of passerine birds.

35. Description of Monitoring/Surveillance/Control programmes system: *Salmonella* spp in bovine meat and products thereof

35.1. Monitoring/Surveillance/Control programmes system

At abattoirs and cutting plants sampling strategies are described in the Swedish Salmonella control programme (95/50/EC). The Swedish Board of Agriculture and the National Food Agency supervise the programme. All sampling within the Salmonella programme is performed or supervised by competent authorities. Swab samples are taken from cattle carcasses at slaughter, the sampling plan is designed to ensure a representative of the population of slaughtered cattle at each abattoir. Sampling of carcass swabs in the programme is described here, whereas sampling of lymph nodes is described under "Salmonella spp. in bovine animals - Monitoring system - Sampling strategy "

At larger slaughterhouses, sampling is performed daily. Samples are collected evenly distributed over the day and if slaughter is performed on separate lines, each line will be separately sampled.

From smaller abattoirs, sampling is spread out over the slaughter days to avoid periodical sampling.

Cutting plants: Samples are taken from crushed meat on equipment etc. or from trimmings

National Food Agency sets annually by special decision the number of samples to be taken at each slaughterhouse.

Frequency of sampling for meat scrapings at cutting plants is:

- Once/day in plants producing >100 tons/week,
- Once/week in plants producing >20 tons/week,
- Once/month in plants producing >5 tons/week,
- Twice/year in plants producing <5 tons/week.

See also LIVSFS 2005:21 4-7 available at www.slv.se.

Methods of sampling (description of sampling techniques) at slaughterhouse:

Carcass swabs: The upper inner part of the hind legs including the pelvic entrance will be tested. A total of 30 cm x 20-25 cm will be swabbed. The cut surface area of the abdomen and the chest including approximately 5 cm of the skin surface will be tested. Approx. 70-80 cm x 8-10 cm will be swabbed. In total approximately 1400 cm2 will be swabbed. Two sterile swabs moistened with PBS are used. The

swabs from one carcass will be placed in a plastic bag. Samples are kept refrigerated until they are sent to the laboratory.

One drop of a pre-enrichment broth from each of 10 animals at most is pooled in RV broth and examined according to NMKL. Each pre-enrichment broth is stored at 4 C° until results are ready. In case of a positive result, each broth will be analysed separately.

Methods of sampling (description of sampling techniques) at cutting plants:

Crushed meat: A sample of at least 25 g is analysed according to NMKL. However, a minor part of the samples taken at cutting plant are analysed with another method.

NMKL 71 is used as diagnostic/analytical method. Definition of positive finding is a confirmed positive sample. All positive findings are followed by corrective actions directed against (if possible) product and process.

At meat processing plant sampling is according to an in-house control of the plant and decisions by the local or regional competent authority. NMKL 71 or any other methods validated against the method specified in COMMISSION REGULATION (EC) No 1688/2005 are allowed. All positive findings are followed by corrective actions directed against (if possible) product and process.

Sampling at retail level is performed according to an in-house control plan and decisions by the local competent authorities. NMKL 71 or any other methods validated against the method specified in COMMISSION REGULATION (EC) No 1688/2005 are allowed. All positive findings are followed by corrective actions directed against (if possible) product and process.

35.2. Measures in place

Definition of positive finding is a confirmed positive sample. All positive findings are followed by corrective actions directed against (if possible) product and process according to *Salmonella* control programme. See also §§ 30 a, 30 b LIVSFS 2005:20.

35.3. Notification system in place to the national competent authority

Any positive finding must be reported to the competent authority. See also §§ 37-38 Food decree (2006:813) and 17 § LIVSFS 2005:21.

35.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Salmonella prevalence in animal products of Swedish origin is low. *Salmonella* was not detected in any of the 3,272 carcass swabs analysed. From cutting plants 5173 samples from both cattle and pigs were collected, all were negative.

As the prevalence of *Salmonella* from Swedish red and poultry meat and eggs is low, the risk of contracting salmonella from domestically produced food is very small.

35.5. Additional information

Between 2014 and 2018, 25.875 samples from both cattle and pigs were collected at cutting plants, all samples were negative.

36. Description of Monitoring/Surveillance/Control programmes system: *Salmonella* spp in broiler meat and products thereof

36.1. Monitoring/Surveillance/Control programmes system

Sampling strategies are described in the Swedish Salmonella control programme (95/50/EC). The Swedish Board of Agriculture and the National Food Agency supervise the programme. All sampling within the *Salmonella* control programme is performed or supervised by the competent authorities. Within the programme, neck skin samples are collected at slaughter. Samples from neck skin include all poultry, not only broilers.

Sampling is done using systematic random sampling and samples are collected daily at larger abattoirs and evenly spread over the slaughtering days at smaller abattoirs.

Cutting plants: Samples are taken from crushed meat on equipment etc. Samples from crushed meat include all poultry, not only broilers.

The control programme is based on production hygiene.

National Food Agency sets annually by special decision the number of samples to be taken at each slaughterhouse.

Frequency of the sampling from neck skins at cutting plants is:

- Once/day in plants producing >100 tons/week,
- Once/week in plants producing >20 tons/week,
- Once/month in plants producing >5 tons/week,
- Twice/year in plants producing <5 tons/week.

See also LIVSFS 2005:21 8-9 available at www.slv.se.

Type of specimen taken at slaughterhouse is Neck skin: Approx. 10 gram/carcass. While type of specimen taken at cutting plants is 25 g from crushed meat.

Methods of sampling (description of sampling techniques) at slaughterhouse are from each carcass at least 2 pieces, each about 10 g, approx. 3 x 3 cm, of neck skin is cut off. At the laboratory, each neck skin sample is divided into two equal parts.

One part is pooled. The other part is separately stored until the examination is completed. The pooled sample is mixed well, pre-enriched in buffered peptone water, and examined for salmonella according to NMKL.

If Salmonella is isolated from a pooled sample each individually stored neck skin is examined.

At cutting plants, each sample of 25 g of crushed meat from equipment etc or from trimmings is analysed according to NMKL.

NMKL 71 is used as a detection method or for a minor part of the samples from cutting plants and VIDAS SLM which is validated against ISO 6579 is also used. Definition of positive finding is a confirmed positive sample. All positive findings are followed by corrective actions directed against (if possible) product and process.

At meat processing plants sampling is according to the in-house control and decisions by the local or regional competent authority. NMKL 71 or any other methods validated against ISO 6579 are used. All positive findings are followed by corrective actions directed against (if possible) product and process.

At retail sampling is performed according to the in-house control and decisions by the local competent authorities.

36.2. Measures in place

Definition of positive finding is a confirmed positive sample. All positive findings are followed by corrective actions directed against (if possible) product and process according to *Salmonella* control programme. All findings need to be confirmed at the National Veterinary Institute which is the NRL of *Salmonella* for feed, food and animals. See also §§ 30 a, 30 b LIVSFS 2005:20.

36.3. Notification system in place to the national competent authority

Any positive finding must be reported to the competent authority. See also §§ 37-38 Food decree (2006:813) and 17 § LIVSFS 2005:21

36.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Salmonella prevalence in animal products of Swedish origin is low.

In the surveillance programme, 1490 neck skins were analysed in 2018. At cutting plants, 630 samples were taken. *Salmonella* was not detected in any of these samples.

36.5. Additional information

Between 2014 and 2018, 4,880 samples of meat from poultry at cutting plants, and 20,128 samples at slaughterhouses were collected, all samples were negative.

37. Description of Monitoring/Surveillance/Control programmes system: *Salmonell*a spp in pig meat and products thereof

37.1. Monitoring/Surveillance/Control programmes system

Sampling strategies are described in the Swedish Salmonella control programme (95/50/EC). The Swedish Board of Agriculture and the National Food Agency supervise the programs. All sampling within the *Salmonella* control programme is performed or supervised by the competent authorities.

Within the programme, swabs are systematically collected from fattening and adult pigs at slaughter, ensuring that the samples are representative of the population of slaughtered pigs at each abattoir.

At each abattoir, a sufficient number of samples of carcass swabs is collected.

At larger slaughterhouses, sampling is performed daily. Samples are collected evenly distributed over the day and if slaughter is performed on separate lines, each line will be sampled separately.

At smaller abattoirs sampling is spread out over the slaughter days to avoid periodical sampling.

Sampling at cutting plants are taken from crushed meat on equipment etc. or from trimmings.

NFA sets annually by special decision the number of samples to be taken at each slaughterhouse.

Frequency of sampling for meat scrapings in cutting plants is:

- Once/day in plants producing >100 tons/week,
- Once/week in plants producing >20 tons/week,
- Once/month in plants producing >5 tons/week,

- Twice/year in plants producing <5 tons/week.

See also LIVSFS 2005:21 4-7 available at www.slv.se.

Methods of sampling (description of sampling techniques) at slaughterhouse:

Carcass swabs: The upper inner part of the hind legs including the pelvic entrance will be tested. A total of 30 cm x 20-25 cm will be swabbed. The cut surface area of the abdomen and the chest including approximately 5 cm of the skin surface will be tested. Approx. 70-80 cm x 8-10 cm will be swabbed. In total approximately 1400 cm2 will be swabbed. Two sterile swabs moistened with PBS are used. The swabs from one carcass will be placed in a plastic bag. Samples are kept refrigerated until they are sent to the laboratory.

One drop of pre-enrichment broth from each of 10 animals at most is pooled in RV broth and examined according to NMKL. Each pre-enrichment broth is stored at 4 C° until results are ready. In case of a positive result each broth will be analysed separately.

Methods of sampling (description of sampling techniques) at cutting plants:

Crushed meat: 5 subsamples of 5 g are pooled to 25 g and analysed according to NMKL. However, a minor part of the samples taken at cutting plant were analysed with another method.

NMKL 71 is used as detection method. Definition of positive finding is a confirmed positive sample. All positive findings need to be confirmed at the National veterinary Institute. Findings are followed by corrective actions directed against (if possible) product and process.

At meat processing plant sampling is according to the in-house control and decisions by the local or regional competent authority. At retail, sampling is according to the in-house control and decisions by the local competent authorities. NMKL 71 or any other methods validated against it are used as detection. Definition of positive finding is a confirmed positive sample. All positive findings are followed by corrective actions directed against (if possible) product and process.

37.2. Measures in place

Definition of positive finding is a confirmed positive sample. All positive findings are followed by corrective actions directed against (if possible) product and process according to *Salmonella* control programme. See also §§ 30 a, 30 b LIVSFS 2005:20.

37.3. Notification system in place to the national competent authority

Finding of *Salmonella* must be reported to the competent authority. See also §§ 37-38 Food decree (2006:813) and 17 § LIVSFS 2005:21

37.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Salmonella prevalence in animal products of Swedish origin is low. 5,879 carcass swabs from pigs (2926 from breeding pigs and 2953 from fattening pigs) were analysed. Salmonella was detected in one carcass of a breeding pig. From cutting plants 5173 samples from both cattle and pigs were collected. All samples were negative.

37.5. Additional information

Between 2014 and 2018, 25875 samples from both cattle and pigs were collected at cutting plants, all samples were negative

38. Description of Monitoring/Surveillance/Control programmes system: *Salmonella* spp in turkey meat and products thereof

38.1. Monitoring/Surveillance/Control programmes system

Turkey production is included in the Swedish *Salmonella* control programme and the same applies for turkeys as for broilers. However, the turkey production in Sweden is small. All information about Control programmes system for turkey meat available in the text “Salmonella spp in broiler meat and products thereof”.

38.2. Measures in place

Definition of positive finding is a confirmed positive sample. All positive findings are followed by corrective actions directed against (if possible) product and process according to *Salmonella* control programme. See also §§ 30 a, 30 b LIVSFS 2005:20.

38.3. Notification system in place to the national competent authority

Any positive finding has to be reported to the competent authority. See also §§ 37-38 Food decree (2006:813) and 17 § LIVSFS 2005:21

38.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

Salmonella prevalence in animal products of Swedish origin is low.

In the surveillance program, 81 neck skins were analysed in 2018. At cutting plants, 57 samples were taken. *Salmonella* was not detected in any of these samples.

38.5. Additional information

Surveillance of Salmonella in duck and geese meat is performed as of turkey meat.

39. Description of Monitoring/Surveillance/Control programmes system: *Salmonella* spp in eggs and egg products

39.1. Monitoring/Surveillance/Control programmes system

There is no official control programme at packing centres or for eggs at retail. Egg packing centres have in-house control programmes that sometimes includes sampling for *Salmonella*. Egg product producing businesses also usually include *Salmonella* in their in-house sampling plans. See also, "Salmonella spp. in Gallus Gallus - flocks of laying hens - Monitoring system - Sampling strategy - Laying hens flocks". A confirmed positive sample is the definition of positive finding on all stages.

39.2. Measures in place

A positive layer flock can only send eggs for production of heated-treated egg products. Positive products are considered unfit for human consumption regardless of serotype and will be destroyed.

39.3. Notification system in place to the national competent authority

Any positive finding has to be reported to the competent authority. See also §§ 37-38 Food decree (2006:813) and 17 § LIVSFS 2005:21.

39.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

See prevalence tables.

40. Description of Monitoring/Surveillance/Control programmes system *Salmonella* spp. in feed

40.1. Monitoring/Surveillance/Control programmes system

Surveillance of feed raw materials

Raw materials are the most important risk factor in feed production.

Domestic feed material of plant and animal origin

In premises where products are derived from industrial processing the samples are taken using aseptic technique in the processing line/environment as dust samples/scrapings.

Official sampling (according to Regulation (EC) No 882/2004) is normally carried out on the feed material in the flow. If this is not possible, the samples are taken from the storage of the feed material. Several subsamples are collected and pooled into analytical samples to make it representative for the batch. Official sampling of the production line and in the environment in the premises is carried out at places where there is a theoretical risk for *Salmonella* growth.

Imported feed material of plant origin and fish meal

In the domestic legislation, feed materials are classified according to the empirical risk of being contaminated, and high-risk feed materials must be negatively tested for *Salmonella* contamination before being used for feed production. All consignments of intra-community traded or imported feed materials classified as a risk, have to be sampled for *Salmonella*. The surveillance of feed ingredients is based on a sampling procedure which takes into consideration an uneven distribution of *Salmonella* contamination and is designed to detect a *Salmonella* contamination in 5% of the batch with 95% probability.

The size of the analytical sample is 25 g, each consisting of 10 pooled subsamples of 2.5 gram. The number of analysed samples depends on the imported feed material and the size of the consignment (according to national legislation).

Besides the surveillance above, official controls according to Regulation (EC) No 882/2004 are also carried out.

Surveillance of feed mills

The purpose of the surveillance is to ensure the absence of *Salmonella* in the production lines as well as in the feed mill environment. A safety management system is applied in the processing line according to HACCP (Hazard Analysis and Critical Control Points). According to national legislation the following five control points in the processing line in feed mills that manufacture compound-feed for food-producing animals are sampled with an aseptic technique:

1. Top of bin for final feed (compound feed).
2. Room for pellet coolers.
3. Top of pellet cooler.
4. Dust from the aspiration system (filter).
5. Intake pit/bottom part of elevator for feed materials.

At these critical control points dust samples or scrapings are collected.

When poultry feed is produced, a minimum of one environmental sample has to be taken at each of the above five control points on a weekly basis and checked for the absence of *Salmonella*. When only non-poultry feed is produced the corresponding requirement is limited to control points 1 and 5. These samples are taken by the operator and all samples have to be sent to the National Veterinary Institute (SVA) for analysis and to control that the number of samples is in accordance with the legislation. However, most operators normally take additional environmental samples. Besides the surveillance above, an official sampling of the production line and in the environment in the feed mills are also carried out.

Compound feeding stuffs

For compound feeding stuffs that are traded into Sweden destined for feeding of cattle, pigs, poultry or reindeer, the surveillance is based on a sampling procedure which takes into consideration an uneven distribution of *Salmonella* contamination and is designed to detect a contamination in 5% of the batch with 95% probability. The size of the analytical sample is 25 g, each consisting of 10 pooled subsamples of 2.5 g. The number of analysed samples depends on the size of the consignment (according to national legislation).

40.2. Measures in place

Measures are always taken when *Salmonella* is detected in feed samples. *Salmonella* positive feed materials are usually treated with organic acids, such as formic acid. After acid treatment the feed material must be re-tested negative before use in feed production. Feed materials that have been treated with acid are only allowed to be used in feed that is supposed to be heat treated.

Finished feed containing *Salmonella* must be withdrawn from the market. Extended sampling and cleaning are done in the production line if *Salmonella* is detected in the weekly surveillance. If *Salmonella* is found before heat treatment the contaminated part of the production line is thoroughly cleaned and disinfected, usually by dry cleaning, followed by disinfection. If *Salmonella* is found after heat treatment, the feed mill has to be thoroughly cleaned and disinfected. Environmental sampling must show negative results before production is resumed.

Compound feed containing *Salmonella* has to be withdrawn from the market and handled according to Regulation (EC)No 178/2002.

40.3. Notification system in place to the national competent authority

Findings of *Salmonella* in feed materials and compound feed after heat treatment must be reported directly to the National Board of Agriculture. If no heat treatment exists in the production line a notification must be made to the National Board of Agriculture. Findings of *Salmonella* in feed materials and compound feeds are reported in the Rapid Alert System for Food and Feed (RASFF).

40.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

40.5. Additional information

Feed is considered the most important source of *Salmonella* for animals and the most important risk factor in feed production is feed materials. According to previous experience, feed materials of animal origin as well as some of vegetable origin are considered hazardous. However, due to restrictions on the use of feed materials of animal origin, certain feed materials of vegetable origin are presently the most important risk factor. If the risk of *Salmonella* contaminated feed materials is minimized it is possible to reduce the cases in animals and humans. However, an epidemiological link between findings in feed and animals and humans is difficult to verify.

41. General evaluation: Trichinella

41.1. History of the disease and/or infection in the country

In Sweden, *Trichinella* has been monitored at slaughter in domestic pigs since the 20th century. During 1970-1990 sporadic cases were detected in domestic pigs, but since 1994 there have been no cases. The parasite is endemic in Swedish wildlife.

The disease is extremely rare in Sweden and detected human cases are usually infected abroad. Since 2004, only seven human cases with confirmed infection with *Trichinella* have been reported, and all except one (in 2013) were infected abroad.

41.2. Evaluation of status, trends and relevance as a source for humans

Trichinellosis is extremely rare in Swedish food-producing animals and the majority of the few human cases detected during the last decades were infected abroad. The *Trichinella* situation in Swedish animal population seems to be stable. *Trichinella* occurs in wild carnivores and wild boars but the risk of getting *Trichinella* from domestic pigs and horses is negligible. The prevalence of *Trichinella* spp in wildlife that might be eaten (wild boars, bears, etc.) is low to very low, while it is higher in carnivorous wildlife such as foxes, lynxes, wolves and wolverines.

42. Description of Monitoring/Surveillance/Control programmes system: *Trichinella* in animals

42.1. Monitoring/Surveillance/Control programmes system

Pig production sites that are officially applying controlled housing conditions are obliged to test all carcasses of breeding sows and boars sent for slaughter according to the regulation EU 2015/1375. Production sites without controlled housing conditions should test all their slaughtered pigs. Also, all pigs kept outdoors should be tested. Thus, fattening pigs originating from holdings officially recognized as applying controlled housing conditions are not obliged to test for *Trichinella*, if kept indoors.

All slaughtered horses, and hunted wild boars and bears delivered to game handling establishments, are tested for *Trichinella.* Also, most hunters test wild boars and bears consumed in private households. In addition, several species of wild animals are tested for *Trichinella*, including foxes, lynxes, wolves, wolverines, badgers and birds. The testing of *Trichinella* in animals was performed by five laboratories during 2018.

42.2. Measures in place

If an animal is found infected with *Trichinella*, the carcass will be destroyed, Alternatively, carcases of domestic pigs could be subjected to freezing treatments according to regulation EU 2015/1375. The competent authority will also investigate the source and possible spread of infection.

42.3. Notification system in place to the national competent authority

Trichinella in animals is notifiable according to SJVFS 2013:23.

Trichinellosis in humans is notifiable according to the Communicable Disease Act (SFS 2004:168 with the amendments of SFS 2013:634).

42.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In 2018, all slaughtered horses (2,324) were tested. The number of tested pigs from controlled housing conditions were 25,981 breeding sows, 392 boars and 1,494,474 fattening pigs. In addition, 580,203

slaughtered pigs (all categories) from uncontrolled housing conditions were tested. *Trichinella* was not detected in domestic pigs or horses.

Trichinella spp. was detected in 9 out of a total of 106,055 (0.008%) wild boar samples and also in 6 lynx, 1 raccoon dog and 3 wolves. These figures are based on results from five laboratories testing *Trichinella* and include samples from animals submitted to wild game establishments (14,558 wild boars and 116 bears) as well as samples taken by private hunters.

The digestion method is the only method applied in testing for *Trichinella*.

No human case of trichinellosis was reported in 2018.

Trichinellosis is extremely rare in Swedish food-producing animals and the majority of the few human cases detected during the last decades were infected abroad. The *Trichinella* situation in the Swedish animal population seems to be stable. *Trichinella* occurs in wild carnivores and wild boars but the risk of getting *Trichinella* from domestic pigs and horses is negligible.

43. General evaluation: VTEC

43.1. History of the disease and/or infection in the country

VTEC was only sporadically detected in Sweden before 1995, when 114 human cases of EHEC O157:H7 were notified. In 1996, VTEC O157 was isolated in Swedish cattle for the first time and human EHEC O157 infection was traced to a cattle herd. In 2002, an outbreak of EHEC O157:H7 in the county of Skåne affecting 30 persons was caused by consumption of cold smoked fermented sausage. The largest Swedish outbreak so far occurred in the summer of 2005 when 135 reported cases, including 11 (8%) HUS (haemolytic uraemic syndrome) cases, were infected with O157:H7 after eating contaminated fresh lettuce. The lettuce had been irrigated with water from a local stream positive for verocytotoxin 2 at the time of harvest. Indistinguishable isolates from humans and cattle faeces from a farm upstream confirmed the implicated source, and control measures that lead to the termination of the outbreak were implemented.

Between 250-550 cases (3-6 cases per 100000 inhabitants) of EHEC infections have been reported in Sweden annually, of which 50%-60% are domestically acquired. Most of the domestic cases are reported during the period July to September.

43.2. Evaluation of status, trends and relevance as a source for humans

See 4.4. below.

44. Description of Monitoring/Surveillance/Control programmes system: VTEC in cattle

44.1. Monitoring/Surveillance/Control programmes system

Surveillance in humans is passive. Isolates from human cases are sent to the Public Health Agency of Sweden for typing using whole genome sequencing (WGS) to verify molecular serotype and for cluster detection. As a conventional nomenclature tool, not only the serotype but also the Multi Locus Sequence Typing (MLST) type, i.e. ST-type, is defined by WGS. Surveillance of VTEC in animals is active and consists of traceback investigations from human EHEC cases and prevalence studies of VTEC in abattoirs. During 2017, 16 cattle farms were investigated as suspected sources for human infection. An epidemiological

association was established in four cases of VTEC O157:H7, one case of VTEC O26 and finally, one case of VTEC O121.

44.2. Measures in place

If a County Medical Officer in a Swedish county suspects that a human VTEC infection has been associated with a farm, the County Veterinary Officer will be informed, who will make a request to the Swedish Board of Agriculture for sampling of animals at the relevant farm.

Prevalence studies will be conducted approximately every 3rd year. The last study was conducted 2017/18. In these surveys, 1500-2000 fecal samples were collected randomly throughout the year from cattle at slaughter. Samples were collected under the supervision of veterinarians at the abattoirs.

44.3. Notification system in place to the national competent authority

Since 1999, VTEC O157 findings in animals are notifiable when associated with human VTEC infection (SJVFS 2013:23).

44.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In 1996, VTEC O157 was isolated in Swedish cattle for the first time and human E. coli O157 infection was traced back to presence of VTEC O157 in a cattle herd. Restrictions were initiated at the herd and surveillance was initiated. In the same year, VTEC O157 in cattle became notifiable. However, since 1999, VTEC O157 findings are only notifiable when associated with human VTEC infection. Between 1996 and 2017, about 1 to 16 farms, primarily cattle farms, have been investigated annually as suspected sources of human infection. Of these, 1-4 farms per year have been confirmed as sources of infection. VTEC O157 is the most common serotype, but other serotypes have also been found, for example, O8, O26, O121 and O103.

In a abattoir survey performed in 2017-2018, 46 (3.5%) of the 1164 tested cattle faecal samples were positive for VTEC O157.

44.5. Additional information

Between 1997 and 2002, annual prevalence studies of VTEC in cattle at abattoirs were conducted. Since 2002, prevalence studies have been performed every third year. In the studies conducted during 2011-2012 and 2014-2015, all positive VTEC O157:H7 were also examined for a variant of VTEC O157:H7, called clade 8. This variant is often isolated from cattle farms associated with human cases. A baseline study on cattle carcasses was done in 2006-2007 and a prevalence study in sheep was done at nine abattoirs in 2007-2008. VTEC O157 was detected in nine (1.8%) of 492 faecal and 2 (1.9%) of 105 ear samples from sheep in a survey performed in 2007-2008. In cattle, surveys during 1997-2002 showed a prevalence of approximately 1%. In the study done in 2005-2006, VTEC O157 was detected in 3.4% of faecal samples. In the abattoir survey conducted in 2008-2009 VTEC O157 was detected in 3.3% of 1993 faecal and 8.2% of 500 ear samples in cattle. In the study conducted during 2011-2012, VTEC O157 was detected in 73 of 2376 faecal samples (3.1%) from cattle. Clade 8 was detected in 15 of the 73 positive samples. In the study conducted during 2014-2015, VTEC O157 was detected in 33 of 1492 faecal samples (2.2%) from cattle. Clade 8 was detected in 5 of the 33 positive samples. In these studies, VTEC O157:H7 has predominantly been isolated from cattle in southern Sweden but rarely from the northern two thirds of the country. The collected samples during 2011-2012 were also analysed for VTEC O26 and VTEC O103. VTEC O26 was detected in 8 of 1308 faecal samples (0.6%) and in 15 of 336 cattle ear samples (4.5%). VTEC O103 was detected in three of 1000 faecal samples (0.3%) and in three of 500 ear samples (0.6%).

45. Description of Monitoring/Surveillance/Control programmes system VTEC in food

45.1. Monitoring/Surveillance/Control programmes system

No official control programme exists for VETC. In 2018 sampling scheme and frequency was according to decisions by national and the local competent authorities. Sampling unit was single food. Sampling was taken place as part of an official sampling. Sampling performed by the industry is not normally reported to the authorities.

Methods of sampling were according to in-house control plans and decisions by the competent authority.

In 2018 the methods of analysis were in-house real time PCR methods based on ISO/TS 13136:2012

ISO 16654:2001 or NMKL 164:2005 or DIN 10167.

45.2. Measures in place

45.3. Notification system in place to the national competent authority

Detection of VTEC in food is not notifiable.

45.4. Results of investigations and national evaluation of the situation, the trends andsources of infection

From autumn 2017 through spring 2018, a survey was performed by the National Food Agency in which 300 samples of lamb meat were collected at retail and analysed for STEC. In the survey, STEC was detected in 35% of the 300 samples by qualitative analyses. The prevalence of STEC differed depending on country of origin. Among the three major countries of origin, STEC was most common in lamb meat from Ireland (64%), followed by Sweden (43%) and New Zeeland (19%). The most common serotype was STEC O91:H14. According to the FAO and WHO's risk classification model, all but three of the 123 STEC isolates belonged to the lowest risk classification level associated with milder symptoms such as diarrhoea and stomach cramps in humans.

In addition, 121 samples were taken by national and local authorities from different types of food and analysed for STEC (11 of these only for STEC O157). The majority, 100 samples, were taken of beef meat in border control. The rest of the samples were mainly taken of different types of food to investigate a complaint or a suspected food poisoning. Neither of the 121 samples was positive for STEC.

45.5. Additional information

46. General evaluation: *Yersinia*

46.1. History of the disease and/or infection in the country

Yersiniosis is one of the zoonoses with the highest number of reported domestic human cases in Sweden. However, since 2004, the number of reported cases has decreased not only in Sweden but also in entire EU. This decrease has occurred without any active interventions in the food chain.

In 2012, the case definition for laboratory criteria for yersiniosis was revised. The new case definition is thought to have had marginal effect on the decrease in the number of reported cases.

Yersiniosis in humans is considered foodborne. Outbreaks are rare, and most infections seem to be sporadic but under-reporting may be considerable. Approximately 75% of the infected cases are domestic. Case-control studies suggest that consumption of pork products is a risk factor. Thus, good slaughter hygiene and good manufacturing practices in food processing are essential for control of *Yersinia*.

In 2013, a national 5-year strategy plan for human pathogenic *Y. enterocolitica* was published to identify measures that should be prioritised to decrease human incidence of yersiniosis. The strategy was developed in co-operation between the Swedish Board of Agriculture, National Food Agency, the Public Health Agency of Sweden, the National Board of Health and Welfare and the National Veterinary Institute.

46.2. Evaluation of status, trends and relevance as a source for humans

Yersiniosis is mainly an infection of domestic origin. Of the 280 cases reported in 2017, 77% were infected in Sweden. For the cases infected abroad, Spain, Greece and Cuba were the most frequent countries.

The domestic incidence of yersiniosis was higher in 2018 compared to the previous years but seen over a longer time period there is a statistically significantly decreasing trend in the incidence. Similar to previous years, the incidence was highest among children younger than five years. The incidence was 4.3 (cases per 100000 inhabitants) for infants and 8.0 for children 1-4 years old, compared to 2.7 for all cases.
Yersinia has previously had a clear seasonal variation with the highest number of cases infected in Sweden during the summer. However, for the past five-year period, there was no statistically significant difference between the summer months and the rest of the year.
The majority of yersiniosis cases are considered sporadic. However, *Yersinia* spp. is not part of the national microbial surveillance program in Sweden. Therefore, there is no national monitoring of circulating subtypes and a limited ability to capture cross-regional outbreaks.
In 2018, a ham positive for *Yersinia enterocolitica* was suspected to have caused an outbreak in a restaurant. Six people fell ill but no isolates from the human cases were available and therefore the source of infection could not be confirmed.

Yersiniosis is notifiable according to the Communicable Disease Act (SFS 2004:168 with the amendments of SFS 2013:634). However, a serological response is not notifiable.

Findings of *Y. enterocolitica* and *Y. pseudotuberculosis* are not notifiable in animals or food.

47. Description of Monitoring/Surveillance/Control programmes system *Yersinia* in food

47.1. Monitoring/Surveillance/Control programmes system

No official control or monitoring programme exists for enteropathogenic *Yersinia*.

Sampling is according to in-house control and decisions by the competent authority. Sampling performed by the industry is not normally reported to the authorities. Sampling unit was single food. The size of the samples is 25 g. There is no indication of where the samples were taken and no information about the storage of samples.

47.2. Measures in place

No compulsory measures are routinely taken.

47.3. Notification system in place to the national competent authority

Detection of *Yersinia* spp. in food is not notifiable.

47.4. Results of investigations and national evaluation of the situation, the trends and sources of infection

In 2018, two samples were taken by national and local authorities. Both samples were taken from meat from air dried ham to investigate a complaint or a suspected food poisoning. One sample was positive for Yersinia enterocolitica.

48. Institutions and laboratories involved in antimicrobial resistance and reporting

The National Veterinary Institute, SVA, is a Swedish national authority that strives for good animal and human health, a good environment and sustainable food production. Good Animal Health Promotes Public Health. SVA is national reference laboratory for antimicrobial resistance in the veterinary sector and responsible for the national monitoring of antimicrobial resistance in animals and food.

49. General Antimicrobial Resistance Evaluation

49.1. Situation and epidemiological evolution (trends and sources) regarding AMR to critically important antimicrobials[(a)] (CIAs) over time until recent situation

The situation in Sweden regarding antibiotic resistance in bacteria from humans and animals is still favourable from an international perspective. This confirms that our strategies to promote the rational use of antibiotics and to limit the spread of antibiotic resistance are effective. In the last decades the consumption of antibiotics in Sweden has decreased in both humans and in veterinary medicine. Despite this, most of the monitored types of antibiotic resistance in bacteria from humans have continued to increase since national surveillance began in the late 1990s. This is, in some cases, also true for bacteria from animals.

In the veterinary sector, MRSA is rare in both farm and companion animals in Sweden. ESBL/pAmpC-producing Enterobacteriaceae are, except for broilers, rare among animals in Sweden. The occurrence of ESBL/pAmpC-producing Enterobacteriaceae among broilers has however decreased significantly compared to previous years. Carbapenem resistant Enterobacteriaceae or transmissible colistin resistance has, up until and including 2018, not been reported.

a): The CIAs depends on the bacterial species considered and the harmonised set of substances tested within the framework of the harmonised monitoring:

- For *Campylobacter* spp., macrolides (erythromycin) and fluoroquinolones (ciprofloxacin);
- For *Salmonella* and *E. coli*, 3rd and 4th generation cephalosporins (cefotaxime) and fluoroquinolones (ciprofloxacin) and colistin (polymyxin);

49.2. Public health relevance of the findings on food-borne AMR in animals and foodstuffs

The data on resistance in food animals and food do not indicate that these are important reservoirs of resistant bacteria for humans in Sweden.

49.3. Recent actions taken to control AMR in food producing animals and food

No recent actions have been taken but the favourable situation in Sweden is the result of several actions taken and upheld over a long period of time.

49.4. Any specific action decided in the Member State or suggestions to the European Union for actions to be taken against food-borne AMR threat

- Restriction on use of fluoroquinolones and 3rd-generation cephalosporins for use in animals. In Sweden these antimicrobials cannot be used unless there are laboratory results showing that there is no other therapeutic alternative.

- Legislation on management of cases of methicillin resistant coagulase positive staphylococci in animals. In Sweden such resistance in animals is notifiable and there is legislation for the management of cases in companion animals and horses aiming to hinder spread to other animals and to humans.

- Legislation on management of cases of carbapeneme resistant *Enterobacteriaceae*. Such legislation is however not in place in Sweden neither.

- Infection control plans in animal health care. In Sweden all providers of veterinary health care are obliged to have infection control plans aiming to hinder spread of infections in animal health care.

49.5. Additional information

Data regarding antimicrobial consumption for animals and antimicrobial resistance in bacteria from animals and food are presented in a yearly national report, Swedres-Svarm, which can be accessed at www.sva.se/swedres-svarm/.

50. General Description of Antimicrobial Resistance Monitoring*; Campylobacter in broilers

50.1. General description of sampling design and strategy[(a)]

Campylobacter jejuni were isolated from caecal contents from healthy broilers sampled at slaughter within the Swedish Campylobacter programme in which intact caeca from ten birds are collected from each batch of broilers slaughtered. The programme is financed by the Swedish Board of Agriculture and the Poultry Meat Association. Each sample is from a unique slaughter batch. By these measures, bacterial isolates included were from randomly selected healthy broilers of Swedish flocks.

In 2018, 401 flocks out of 4394 were positive for *C. jejuni*. From these, 174 isolates of *C. jejuni*, each representing one flock was randomly selected for susceptibility testing. The isolates were stored in -70°C until tested.

50.2 Stratification procedure per animal population and food category

See point 1 above

50.3 Randomisation procedure per animal population and food category

See point 1 above

50.4 Analytical method used for detection and confirmation[(b)]

Samples were cultured according to ISO 10272-1:2017 for detection of thermophilic *Campylobacter* by direct culture on mCCDA and incubation at 42°C for 48 h at a microaerophilic atmosphere. Confirmation was based on colony morphology, microscopic appearance including motility. All isolates were species identified by MALDI-TOF MS.

50.5 Laboratory methodology used for detection of antimicrobial resistance[(C)]

Isolates identified as *C. jejuni* were tested for antimicrobial susceptibility by determination of MIC to six antimicrobials (ciprofloxacin, nalidixic acid, erythromycin, tetracycline, streptomycin, gentamicin) according to the CLSI standard M45-3rd ed. for fastidious bacteria (CLSI, 2015).

These procedures and the subsequent interpretation MICs were performed according to the provisions of the Commission Implementing Decision 2013/652/EC.

50.6 Results of investigation

Of the 174 isolates of *C. jejuni* obtained, 75% were susceptible to all the six tested antibiotics. There was no resistance recorded against gentamicin or erythromycin. The level of quinolone resistance (24%) was higher than in the latest years. Four isolates were resistant to tetracycline.

50.7 Additional information

A national regulation has been restricting prescription of fluoroquinolones as well as 3rd and 4th generation cephalosporins to animals in Sweden since 2013.

Furthermore, use of antibiotics to broilers in Sweden is very limited with only a few flocks per year being treated.

51. General Description of Antimicrobial Resistance Monitoring*; Salmonella in broilers and in broiler meat and products thereof

51.1. General description of sampling design and strategy[(a)]

For a detailed description of the Swedish Salmonella monitoring/surveillance/control programme please see information in “Description of Monitoring/Surveillance/Control programmes system: Salmonellosis in *Gallus gallus*” in the text file related to the Zoonosis monitoring.

The aim of the programme in *Gallus gallus* is that animals sent for slaughter and animal products should be free from Salmonella. The *Salmonella* control programme is governed by the Swedish Act on Zoonoses (SFS 1999:658) and its regulations.

The *Salmonella* control programme in poultry comprises a compulsory part and a voluntary part. All poultry species are included in the compulsory part, which sets the rules for mandatory sampling.

Compulsory programme - poultry

All breeding flocks with more than 250 birds are tested. Grandparents of *Gallus gallus* broilers are imported as day-old chicks. Sampling scheme: Breeders in rearing: 1 d, 4 weeks, 2 weeks prior to rearing or moving. Breeders in production: every 2nd week and 1-2 weeks prior to slaughter. Broilers: 14 d prior to slaughter.

Samples consist of sock samples taken from all parts of the building or the department where the bird flock is kept. From rearing breeding flocks of meat production line, two pairs of sock samples are taken and pooled into one whereas five pairs pooled to two are taken from production flocks of breeders. From broiler flocks, two pairs of sock samples are taken and pooled into one sample.

All poultry flocks having more than 500 birds, irrespective of species, are tested before slaughter. In practice, all poultry flocks are tested prior to slaughter. The results must be available before slaughter.

The producers pay the costs for laboratory analyses and the visits to the farms. Only accredited laboratories are allowed to perform the analyses. The laboratory sends the test results to the County Veterinary Officer on a quarterly basis. According to regulations, the County Veterinary Officer must send a report on the test results of all poultry holdings to the Swedish Board of Agriculture once a year. County Veterinary Officers exercise supervision of the poultry control programme.

Salmonellosis in animals is a notifiable disease in Sweden and one isolate from each notified incident must be confirmed at SVA. These isolates are also tested for antimicrobial resistance within the framework of the Swedish Veterinary Antimicrobial Resistance Monitoring programme (Svarm). Isolates included are from both active and passive Salmonella monitoring programmes and from both clinical and non-clinical cases. From each notified incident, one isolate of each serovar is included.

51.2 Stratification procedure per animal population and food category

One isolate from each notified incident must be confirmed at SVA. These isolates are also tested for antimicrobial resistance within the framework of the Swedish Veterinary Antimicrobial Resistance Monitoring programme (Svarm). Isolates included are from both active and passive *Salmonella* monitoring programmes and from both clinical and non-clinical cases. From each notified incident, one isolate of each serovar, and when appropriate from each phage-type, are included.

51.3 Randomisation procedure per animal population and food category

The number of *Salmonella* isolates each year is lower than the stipulated number of isolates to be tested. Therefore, all isolates are included.

51.4 Analytical method used for detection and confirmation[(b)]

Animals at farm: Bacteriological method: ISO 6579:2002

Animals at slaughter (herd-based approach): Bacteriological method: NMKL No 71:1999

51.5 Laboratory methodology used for detection of antimicrobial resistance[(C)]

Antimicrobial susceptibility is tested by determination of MIC using microdilution according to the provisions of Commission Implementing Decision 2013/652/EC. ECOFFs issued by EUCAST are used for interpretation of MICs.

51.6 Results of investigation

Broilers: *Salmonella* prevalence in broilers in Sweden is low. *Salmonella* was detected in 3 (0.06%) out of 4955 sampled flocks in 2018.

Laying hens: *Salmonella* prevalence in laying hens in Sweden is low. *Salmonella* was detected in 4 (0.6%) out of 678 sampled flocks in 2018.

51.7 Additional information

The data on AMR for broilers and laying hens in, 2018 corroborates a favourable situation with few incidents of *Salmonella* in in this animal species and a rare occurrence of resistance in serovars involved.

52. General Description of Antimicrobial Resistance Monitoring*; Salmonella in cattle and in bovine meat and products thereof

52.1. General description of sampling design and strategy[(a)]

For a detailed description of the Swedish Salmonella monitoring/surveillance/control programme please see information in “Description of Monitoring/Surveillance/Control programmes system: Salmonellosis in cattle” and “Salmonella spp bovine meat and products thereof” in the text files related to the Zoonosis monitoring.

Sampling in cattle can be divided into routine sampling and targeted sampling.

Routine sampling

Within the programme, lymph nodes are systematically collected from cattle at slaughter to ensure that the samples are representative of the population of slaughtered cattle at each abattoir. Sampling of lymph nodes in the programme is described here, whereas sampling of carcass swabs is described under "Salmonella spp. in bovine meat and meat products". At each abattoir, a sufficient number of samples of lymph nodes from the ileocaecal region are collected. At larger abattoirs, sampling is performed daily. The sample size is calculated to detect a prevalence of least 5% Salmonella infected animals with a 95% Confidence Interval (CI) in the number of animals slaughtered annually. At these abattoirs, samples are collected evenly distributed over the day and if slaughter is performed on separate lines, each line will be sampled separately. From smaller abattoirs, enough samples to detect a prevalence of 1% with 90% CI will be taken. Sampling is spread out over the slaughter days to avoid periodical sampling. Animals that are bought to a farm under certain defined criteria are also sampled.

Targeted sampling

Sampling at farms is performed whenever there is a clinical suspicion. Calves up to six months are sampled at necropsy, other animals are sampled when considered necessary.

Sampling in bovine meat and products thereof is in accordance with National *Salmonella* Control Programme (Comm. Decision 95/50). At slaughterhouses and cutting plants sampling strategies are described in the Swedish *Salmonella* control programme (95/50/EC). The programmes are supervised by the Swedish Board of Agriculture and the National Food Agency. All sampling for the *Salmonella* programme is performed or supervised by the competent authority. Within the programme swabs are systematically collected from cattle at slaughter, ensuring that the samples are representative of the population of slaughtered cattle at each abattoir.

Salmonellosis in animals is a notifiable disease in Sweden and one isolate from each notified incident must be confirmed at SVA. These isolates are also tested for antimicrobial resistance within the framework of the Swedish Veterinary Antimicrobial Resistance Monitoring programme (Svarm). Isolates included are from both active and passive Salmonella monitoring programmes and from both clinical and non-clinical cases. From each notified incident, one isolate of each serovar, and when appropriate from each phage-type, are included.

52.2 Stratification procedure per animal population and food category

See point 1

52.3 Randomisation procedure per animal population and food category

See point 1

52.4 Analytical method used for detection and confirmation[(b)]

Animals at farm: Bacteriological method: ISO 6579:2002

Animals at slaughter (herd-based approach): Bacteriological method: NMKL No 71:1999

52.5 Laboratory methodology used for detection of antimicrobial resistance[(C)]

Antimicrobial susceptibility is tested by determination of MIC using microdilution according to the provisions of Commission Implementing Decision 2013/652/EC. ECOFFs issued by EUCAST are used for interpretation of MICs.

52.6 Results of investigation

No antimicrobial resistance data are reported for 2018.

However, existing data on AMR for 2018 corroborates a favourable situation with few incidents of *Salmonella* in cattle and a rare occurrence of resistance in serovars involved.

53. General Description of Antimicrobial Resistance Monitoring*; Salmonella in pigs

53.1. General description of sampling design and strategy[(a)]

For a detailed description of the Swedish Salmonella monitoring/surveillance/control programme please see information in “Description of Monitoring/Surveillance/Control programmes system: Salmonellosis in pigs” in the text file related to the Zoonosis monitoring.

The programme in pigs includes a compulsory and a voluntary part. The compulsory part consists of annual faecal sampling from breeding pig herds and gilt-producing herds and twice-a-year sampling from sow pools. Salmonella is also tested for in conjunction with post-mortem investigations if an infection is suspected by macroscopic findings. All imported animals are tested. On clinical suspicion, herds or single animals should be tested for Salmonella.

The voluntary programme is a preventive hygienic programme aiming at decreasing the risk of Salmonella. Holdings affiliated to the programme receive higher compensation in case of positive findings. Most of all breeding herds are affiliated to the programme. In addition, affiliated holdings are entitled to apply for a commercial Salmonella insurance.

Salmonellosis in animals is a notifiable disease in Sweden and one isolate from each notified incident must be confirmed at SVA. These isolates are also tested for antimicrobial resistance within the

framework of the Swedish Veterinary Antimicrobial Resistance Monitoring programme (SVARM). Isolates included are from both active and passive Salmonella monitoring programmes and from both clinical and non-clinical cases. From each notified incident, one isolate of each serovar, and when appropriate from each phage-type, are included.

53.2 Stratification procedure per animal population and food category

See point 1

53.3 Randomisation procedure per animal population and food category

See point 1

53.4 Analytical method used for detection and confirmation[(b)]

Animals at farm: Bacteriological method: ISO 6579:2002

Animals at slaughter (herd-based approach): Bacteriological method: NMKL No 71:1999

53.5 Laboratory methodology used for detection of antimicrobial resistance[(C)]

Antimicrobial susceptibility is tested by determination of MIC using microdilution according to the provisions of Commission Implementing Decision 2013/652/EC. ECOFFs issued by EUCAST are used for interpretation of MICs.

53.6 Results of investigation

No antimicrobial resistance data are reported for 2018.

However, existing data on AMR for 2018 corroborates a favourable situation with few incidents of *Salmonella* in pigs and a rare occurrence of resistance in serovars involved.

54. General Description of Antimicrobial Resistance Monitoring*; Salmonella in turkeys

54.1. General description of sampling design and strategy[(a)]

See description of the Salmonella control programme.

54.2 Stratification procedure per animal population and food category

See point 1

54.3 Randomisation procedure per animal population and food category

See point 1

54.4 Analytical method used for detection and confirmation[(b)]

Animals at farm: Bacteriological method: ISO 6579:2002

54.5 Laboratory methodology used for detection of antimicrobial resistance[(C)]

Antimicrobial susceptibility of potential isolates is tested by determination of MIC using microdilution according to the provisions of Commission Implementing Decision 2013/652/EC. ECOFFs issued by EUCAST are used for interpretation of MICs.

54.6 Results of investigation

Turkeys: *Salmonella* prevalence in turkeys in Sweden is low. *Salmonella* was not detected in any of 166 sampled flocks in 2018.

54.7 Additional information

The data on AMR for turkeys in 2018 corroborates a favourable situation with few incidents of *Salmonella* in in this animal species and a rare occurrence of resistance in serovars involved.

55. General Description of Antimicrobial Resistance Monitoring*; Salmonella in other animals

55.1. General description of sampling design and strategy[(a)]

Animals are tested for *Salmonella* at suspicion or as part of trace-back investigations. Wild animals necropsied at the National Veterinary Institute are tested for *Salmonella* at suspicion.

Salmonellosis in animals is a notifiable disease in Sweden and one isolate from each notified incident must be confirmed at SVA. These isolates are also tested for antimicrobial resistance within the framework of the Swedish Veterinary Antimicrobial Resistance Monitoring programme (Svarm). Isolates included are from both active and passive Salmonella monitoring programmes and from both clinical and non-clinical cases. From each notified incident, one isolate of each serovar, and when appropriate from each phage-type, are included.

55.2 Stratification procedure per animal population and food category

All available isolates except for cats and wild birds are tested for antimicrobial susceptibility so there is no stratification.

55.3 Randomisation procedure per animal population and food category

All available isolates except for cats and wild birds are tested for antimicrobial susceptibility so there is no randomisation.

55.4 Analytical method used for detection and confirmation[(b)]

All samples from animals (poultry, cattle and pigs and other animals) are analysed using the MSRV (EN-ISO 6579:2002/A1: 2007: Amendment 1: Annex D) method.

55.5 Laboratory methodology used for detection of antimicrobial resistance[(C)]

Antimicrobial susceptibility is tested by determination of MIC using microdilution according to the provisions of Commission Implementing Decision 2013/652/EC. ECOFFs issued by EUCAST are used for interpretation of MICs.

55.6 Results of investigation

No antimicrobial resistance data are reported for 2018.

However, existing data on AMR for 2018 corroborates a favourable situation with few incidents of *Salmonella* in animals in Sweden and a rare occurrence of resistance in serovars involved.

56. General Description of Antimicrobial Resistance Monitoring*; indicator E. coli, broilers

56.1. General description of sampling design and strategy[(a)]

Isolation of indicator *Escherichia coli* from broilers was performed on caecal content of samples from healthy broilers. In 2018, samples from 179 broilers were collected at slaughter under the supervision of the National Food Agency (SLV) at seven abattoirs that together processed more than 98% of the total number of broilers slaughtered in Sweden 2018. Samples were sent to SVA for culture within one day of collection and in the meantime kept refrigerated. The number of samples collected at each abattoir was proportional to the annual volume of broilers slaughtered at an abattoir and each sample represented a unique flock. By these measures, bacterial isolates included were from randomly selected healthy broilers of Swedish flocks.

Caecal content was cultivated for indicator *E. coli* by diluting one gram of caecum content in 9 ml buffered peptone water (BPW). 10 µL of the suspension was extracted and spread on a plate of MacConkey agar and incubated overnight at 44°C. Isolates obtained with morphology typical of *E. coli* was sub-cultured onto horse-blood agar (5% v/v), after which the isolate was tested for production of tryptophanase (indole). Up to three colonies were tested and only lactose and indol positive isolates with typical morphology were selected for susceptibility tests.

56.2 Stratification procedure per animal population and food category

See point 1 above.

56.3 Randomisation procedure per animal population and food category

See point 1 above.

56.4 Analytical method used for detection and confirmation[(b)]

According to legislation.

56.5 Laboratory methodology used for detection of antimicrobial resistance[(C)]

Antimicrobial susceptibility was tested using dilution methods in cation adjusted Mueller Hinton broth (CAMBH). The tests were performed following the standards for microdilution of the National Committee of Clinical Laboratory Standards (CLSI, 2018). For *E. coli* Sensititre panels (Panel 1 and 2) produced by Trek Diagnostics LTD were used. Antimicrobials tested are those advised by EFSA. These procedures and the subsequent interpretation of MICs were performed according to the provisions of the Commission Implementing Decision 2013/652/EC.

Molecular methods (Whole genome sequencing) were used to confirm the genotype of certain resistance phenotypes (i.e ESBL/AmpC resistance).

56.6 Results of investigation

Indicator *E. coli* was isolated from 178 of the 179 investigated samples.

Levels of resistance in *E. coli* from broilers are low in an international perspective. Of the 178 isolates, 123 (69%) were susceptible to all the fourteen tested antibiotics. Resistance to ampicillin (16%), sulphonamides (15%), tetracycline (13%), and trimethoprim (11%) were the most common traits. These levels are higher than in previous years.

Among the 178 isolates, 12 (7%) were resistant to ciprofloxacin and nalidixic acid, 1 (<1%) was resistant to cefotaxime, but none was resistant to meropenem.

Nineteen isolates (11%) were resistant to three or more antibiotics. All but one had resistance to sulphonamides in their phenotype and all but three also had resistance to ampicillin and trimethoprim in their phenotype.

56.7 Additional information

A national regulation has been restricting prescription of fluoroquinolones as well as 3rd and 4th generation cephalosporins to animals in Sweden since 2013.

Furthermore, use of antibiotics to broilers in Sweden is very limited with only a few flocks per year being treated.

57. General Description of Antimicrobial Resistance Monitoring*; Screening for ESBL/AmpC/carbapenemase producing *E. coli*, *Gallus gallus* and turkeys

57.1. General description of sampling design and strategy[(a)]

Screening for ESBL/AmpC and carbapenemase producing *Escherichia coli* from fattening broilers and turkeys was performed according to the provisions of the Commission Implementing Decision 2013/652/EC.

In total, 300 intestinal samples from broilers and 72 intestinal samples from turkeys were analysed.

Caecal content of samples from healthy broilers were collected at slaughter under the supervision of the National Food Agency (SLV) at seven abattoirs that together processed more than 98% of the total number of broilers slaughtered in Sweden 2018. Samples were sent to SVA for culture within one day of collection and in the meantime kept refrigerated. The number of samples collected at each abattoir was proportional to the annual volume of broilers slaughtered at an abattoir and each sample represented a unique flock. By these measures, bacterial isolates included were from randomly selected healthy broilers of Swedish flocks.

Caecal content of samples from healthy turkeys were collected at two abattoirs that in 2018 accounted for approximately 98% of the total volume of broilers slaughtered. Each sample was from a unique flock but not always from a unique production site. Samples were sent to SVA for culture within one day of collection and in the meantime kept refrigerated. By these measures, bacterial isolates included were from randomly selected healthy turkeys of Swedish flocks.

57.2 Stratification procedure per animal population and food category

See point 1 above.

57.3 Randomisation procedure per animal population and food category

See point 1 above.

57.4 Analytical method used for detection and confirmation[(b)]

According to legislation.

One gram of caecum content was diluted in 9 ml buffered peptone water (BPW). The suspension was incubated at 37°C overnight. From the BPW solution 10 µL was spread each on a plate of MacConkey agar with cefotaxime (1 mg/L), CHROMID CARBA agar and CHROMID OXA 48 agar. The plates were incubated overnight at 44°C (MacConkey agar) or 37°C (Chromagar). Up to three lactose positive colony with morphology typical of *E. coli* was sub-cultured onto MacConkey agar with cefotaxime (1 mg/L) and then on horse-blood agar (5% v/v), after which the isolate was tested for production of tryptophanase (indole). Only lactose and indole positive isolates with typical morphology were selected for susceptibility tests and further tested for ESBL/AmpC production.

57.5 Laboratory methodology used for detection of antimicrobial resistance[(C)]

Antimicrobial susceptibility was tested using dilution methods in cation adjusted Mueller Hinton broth (CAMBH). The tests were performed following the standards for microdilution of the National Committee of Clinical Laboratory Standards (CLSI, 2018). For *E. coli* Sensititre panels (Panel 1 and 2) produced by Trek Diagnostics LTD were used. Antimicrobials tested are those advised by EFSA. These procedures and the subsequent interpretation of MICs were performed according to the provisions of the Commission Implementing Decision 2013/652/EC.

Molecular methods (Whole genome sequencing) were used to confirm the genotype of certain resistance phenotypes (i.e ESBL/AmpC resistance).

57.6 Results of investigation

ESBL/AmpC producing *E. coli* was isolated from 42 (14%) of the samples of intestinal contents from broilers. However, in only 38 (13%) was a transferable gene coding for ESBL/AmpC resistance detected. Fourteen of these were ESBL and carried the genes blaCTX-M-1, (n=13), or blaSHV-12 (n=1). The remaining 24 were pAmpC and carried the gene blaCMY-2.

No isolates of *E. coli* with resistance to carbapenems were detected in any of the samples from healthy broilers.

ESBL/AmpC producing *E. coli* was not isolated from any of the 72 samples of intestinal contents from turkeys. Nor was *E. coli* with resistance to carbapenems detected in any of the samples from healthy turkeys.

57.7 Additional information

None.

58. General Description of Antimicrobial Resistance Monitoring*; Screening for ESBL/AmpC/carbapenemase producing *E. coli*, *broiler meat*

58.1. General description of sampling design and strategy[(a)]

Screening for ESBL/AmpC and carbapenemase producing *Escherichia coli* from fattening broilers and turkeys was performed according to the provisions of the Commission Implementing Decision 2013/652/EC.

In total, 288 samples of fresh broiler meat (242 of Swedish origin, and 46 of EU-origin) were analysed.

Samples of fresh broiler meat were collected throughout the year at retail stores by municipal environmental departments in twelve different cities in Sweden. In each city, a proportional number of samples in relation to the human population was collected. Samples were sent to SVA for culture on the same day as sampling was performed.

58.2 Stratification procedure per animal population and food category

See point 1 above.

58.3 Randomisation procedure per animal population and food category

See point 1 above.

58.4 Analytical method used for detection and confirmation[(b)]

According to legislation.

A sample of 25 g of surface meat was homogenized in 225 ml BPW and incubated at 37°C overnight. From the BPW homogenate 10 µL per agar plate was spread on MacConkey agar with cefotaxime (1 mg/L), CHROMID CARBA agar and CHROMID OXA 48 agar and incubated overnight at 44°C for MacConkey agar and 37°C for the Chromagar. Up to three lactose positive colony with morphology typical for *E. coli* was sub-cultured on MacConkey agar with cefotaxime and then sub-cultured again on horse-blood agar (5% v/v), after which the isolate was tested for production of tryptophanase (indole). Only lactose and indole positive isolates with typical morphology were selected for susceptibility tests and further tested for ESBL/AmpC production.

58.5 Laboratory methodology used for detection of antimicrobial resistance(C)

Antimicrobial susceptibility was tested using dilution methods in cation adjusted Mueller Hinton broth (CAMBH). The tests were performed following the standards for microdilution of the National Committee of Clinical Laboratory Standards (CLSI, 2018). For *E. coli* Sensititre panels (Panel 1 and 2) produced by Trek Diagnostics LTD were used. Antimicrobials tested are those advised by EFSA. These procedures and the subsequent interpretation of MICs were performed according to the provisions of the Commission Implementing Decision 2013/652/EC.

Molecular methods (Whole genome sequencing) were used to confirm the genotype of certain resistance phenotypes (i.e ESBL/AmpC resistance).

58.6 Results of investigation

ESBL/AmpC producing *E. coli* was isolated from 43 (15%) of the samples of chicken meat and a transferable gene coding for ESBL/AmpC was detected in 36 isolates, i.e. 13% of the chicken meat samples

No *E. coli* with resistance to carbapenems was detected.

58.7 Additional information

None.

59. General Description of Antimicrobial Resistance Monitoring*; MRSA

59.1. General description of sampling design and strategy(a)

No specific monitoring of MRSA in animals was performed in 2018. In Sweden MRSA in all types of animals is notifiable and isolates from index cases are to be confirmed by molecular methods at the National Veterinary Institute.

No data are reported for 2018.

59.2 Stratification procedure per animal population and food category

No stratification was used since all notified isolates were included.

59.3 Randomisation procedure per animal population and food category

No randomisation was used since all notified isolates were included.

59.4 Analytical method used for detection and confirmation[(b)]

Isolates are from different laboratories and likely isolated using a variety of methods. However, all isolates were confirmed as MRSA at the National Veterinary Institute where Maldi-TOF was used for species identification of isolates and PCR for detection of *mec*-genes.

59.5 Laboratory methodology used for detection of antimicrobial resistance[(C)]

Isolates were tested for antimicrobial susceptibility by micro-dilution at the National Veterinary Institute. Antimicrobials tested: ciprofloxacin, penicillin, oxacillin, cephalothin, chloramphenicol, erythromycin, tetracycline, gentamicin, fusidic acid, trimethoprim, kanamycin, cefoxitin, clindamycin. EUCAST ECOFFs were used for interpretation of MICs.

59.6 Results of investigation

No data are reported for 2018.

59.7 Additional information

There are reasons to believe that the situation regarding *mecA*-MRSA in Sweden is favourable since few cases in animals are notified each year. As for *mecC*-MRSA this variant is increasingly found in animals and appears to be common in wild hedgehogs in Sweden. Findings of *mecC*-MRSA at a high prevalence in two goat herds is puzzling. Still, the total number of *mecC*-MRSA cases in animals and humans is low but the epidemiology of this variant is unclear and deserves further study. Thus, the few findings of MRSA in animals indicates that MRSA in animals is not likely to have an important impact on the general situation in humans**.**

60. Food-borne outbreaks

60.1. System in place for identification, epidemiological investigations and reporting of food-borne outbreaks

The municipal authorities and public health authorities (regional and national) are responsible for detection and investigation of food and waterborne disease outbreaks. The Public Health Agency of Sweden is responsible for outbreak investigations at a national level. The municipal authorities are required to report the results of outbreak investigations to the Swedish National Food Agency (NFA). Based on the reports received and completed with information from The Public Health Agency of Sweden, the Swedish National Food Agency NFA prepares a yearly report of food-borne outbreaks. Since 2015, the reporting system has been mainly web-based.

60.2. Description of the types of outbreaks covered by the reporting

The reporting system covers both general and household outbreaks, and outbreaks caused by toxins. The system also includes chemicals, but if such agents are identified they are removed from the dataset which is used for the report to EFSA.

60.3. National evaluation of the reported outbreaks in the country

It is difficult to identify any significant trends due to difficulties in obtaining comparable data from all local authorities. During the last five years, the National Food Agency has planned to prepare and launch a new web-based template for food outbreak reporting. The new template will be released and able to use in 2020.

A national report is prepared later during this year. For reports from earlier years, please see link: http://www.livsmedelsverket.se/sok/?q=matf%c3%b6rgiftning

60.4. Additional information

In the fall of 2018, an outbreak of *Campylobacter jejuni* with an unusual source within the chicken production was investigated. The outbreak started in the middle of November when the incidence in humans is usually low. Cases could be seen in the whole country. The increase in human cases coincided with an increase in the prevalence of *Campylobacter* in slaughter batches of chicken identified within the *Campylobacter* surveillance program at SVA. In addition, several employees working at slaughterhouses were reported with campylobacteriosis in October and November. Isolates from employees and from caecal samples of chicken from three different poultry abattoirs were analysed by whole genome sequencing (WGS). Same sequence types (ST-9198 and ST-148) were identified from human cases and chicken samples. The trace back investigation showed that farms delivering chicken to these three abattoirs received day-old chicks from the same hatchery. *Campylobacter jejuni* ST-148 was detected from parent flocks delivering eggs to the hatchery. Thus, an unusual pathway of *Campylobacter* introduction was identified as the plausible source of the outbreak. This pathway has previously not been reported as a possible introduction of *Campylobacter* in the chicken production.

In 2018, *Salmonella* Typhimurium, MLVA profile 3 -10 -10-NA-211, was implicated in an outbreak with a salami being the confirmed source of infection. In total, 18 cases were laboratory confirmed and the majority reported having eaten a specific type of truffles salami from Italy. Two opened packages were analysed and found positive with the outbreak strain. The find was notified in RASFF. Salami has been implicated in several national *Salmonella* outbreaks in Sweden during the last three years. In total, five outbreaks with 156 cases have been investigated on national level. In four of the investigations, the outbreak strain could be isolated from suspected salami sausages. In 2017 there was a large outbreak with *S*. Typhimurium, MLVA profile 3-19-11-N-311, with 72 confirmed cases. A Spanish Fuet salami was early suspected and several sausages showed to be positive with the outbreak strain. In 2016 there were three national outbreak investigations concerning salami sausages. Salami sticks positive for monophasic *S*. Typhimurium, MLVA-profile 3-12-8-NA-211, caused an outbreak with 42 verified cases. Furthermore, eleven cases were infected with monophasic *S*. Typhimurium, MLVA profile 3-14-9-NA-211, where a salami Cacciatore was positive with the outbreak strain. Finally, the same serotype but with the MLVA profile 3-13-9-NA-211 caused an outbreak with 13 cases in 2016 where all cases answering a questionnaire (7/13) had eaten salami, however there was no suspected food item to be sampled and analysed.

In the summer of 2018 Sweden experienced one of the largest STEC outbreaks in the country. The outbreak was serious, especially because of the strain implicated. It was a subtype of O157:H7 called clade 8, known for its potential to cause severe disease such as HUS. It carries the shigatoxin gene stx2a, or more often stx2a in combination with stx2c and is today one of the most common subtypes to cause domestically acquired HUS. The strain was first established in the 1990s in the county of Halland and has further spread over the southern parts of the country. In recent years, clade 8 has mainly been found in Skåne, Blekinge, Småland and on the islands Öland and Gotland. In 2005 it caused, what still holds to be the largest EHEC outbreak in Sweden with 135 cases. Lettuce that had been irrigated with contaminated water was the probable source. During the outbreak of 2005 and the outbreak in 2018, 8 and 12% of the cases developed HUS, which is significantly higher than as yearly reported (2-4%). In two minor outbreaks in 2002 and 2017 involving this strain, 11 and 38% of the reported cases developed HUS. The pathogenic potential shown by this strain has led to joint efforts by Swedish authorities to map and monitor the occurrence and molecular epidemiology of clade 8 among Swedish animals and humans. Efforts have been made to reduce the risk of infection through, for example, advice to animal owners and food producers. At present, there is no effective method for combating EHEC among animals, but in the long term the hope is that the occurrence can be reduced by e.g. vaccination.