European Food Safety Authority

ZOONOSES MONITORING

Iceland

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 2019

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 Iceland during the year 2019.

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.

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* 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

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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) - calves (under 1 year) - dairy calves	651	11,288		651
	Cattle (bovine animals) - calves (under 1 year) - for slaughter	671	10,929		671
	Cattle (bovine animals) - dairy cows - adult	577	26,217		577
	Cattle (bovine animals) - dairy cows - young cattle (1-2 years)	561	6,504		561
	Cattle (bovine animals) - meat production animals - suckler cows	128	2,891		128
	Cattle (bovine animals) - unspecified			22,728	
	Cattle (bovine animals) - young cattle (1-2 years)	736	23,066		736
Gallus gallus (fowl)	Gallus gallus (fowl) - broilers	28	788,549	5,725,649	87
	Gallus gallus (fowl) - laying hens - adult	12	294,662		38
	Gallus gallus (fowl) - laying hens - during rearing period	8	104,489		13
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - adult	4	61,582	32,300	18
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - during rearing period	6	52,717		14
	Gallus gallus (fowl) - parent breeding flocks for egg production line - adult	2	6,587		3
	Gallus gallus (fowl) - parent breeding flocks for egg production line - during rearing period	1	5,092		1
Goats	Goats	116	1,471	491	116
Pigs	Pigs - breeding animals - raised under controlled housing conditions - boars	11	44	3	11
	Pigs - breeding animals - raised under controlled housing conditions - sows	12	3,111	1,483	12
	Pigs - fattening pigs - raised under controlled housing conditions	23	26,225	77,547	23
	Pigs - fattening pigs - raised under controlled housing conditions - piglets	10	5,566		10
Sheep	Sheep - animals over 1 year	2,112	328,469	53,136	2,112
	Sheep - animals under 1 year (lambs)	1,934	76,738	506,345	1,934
Solipeds, domestic	Solipeds, domestic - horses		71,000	9,287	
Turkeys	Turkeys - meat production flocks	5	15,305	51,424	9
	Turkeys - parent breeding flocks - adult	1	830		4
	Turkeys - parent breeding flocks - during rearing period	2	1,447		3

DISEASE STATUS TABLES

Table Bovine brucellosis 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 herds
ICELAND	774	0	774

Table Ovine or Caprine brucellosis 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 herds
ICELAND	2,187	0	2,187

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 herds
ICELAND	774	0	774

PREVALENCE TABLES

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
Not Available	Gallus gallus (fowl) - broilers - before slaughter - Farm - Iceland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	N_A	Not Available	herd/flock	724	14	thermotolerant Campylobacter, unspecified	14
	Gallus gallus (fowl) - broilers - Slaughterhouse - Iceland - animal sample - caecum - Control and eradication programmes - Industry sampling - Selective sampling	Sampling only during high risk summer months	Not Available	slaughter animal batch	452	11	thermotolerant Campylobacter, unspecified	11
	Turkeys - meat production flocks - before slaughter - Farm - Iceland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	N_A	Not Available	herd/flock	34	2	thermotolerant Campylobacter, unspecified	2
	Turkeys - meat production flocks - Slaughterhouse - Iceland - animal sample - caecum - Control and eradication programmes - Industry sampling - Selective sampling	Sampling only during high risk summer months	Not Available	slaughter animal batch	41	4	Campylobacter	4

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
ICELAND	Meat from broilers (Gallus gallus) - fresh - frozen - Retail - Denmark - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	10	Gram	N_A	ISO 10272-2:2017 Campylobacter	39	0	Campylobacter	0
	Meat from broilers (Gallus gallus) - fresh - frozen - Retail - Denmark - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	10	Gram	N_A	ISO 10272-1:2017 Campylobacter	39	2	Campylobacter	2
	Meat from broilers (Gallus gallus) - fresh - frozen - Retail - Iceland - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	10	Gram	N_A	ISO 10272-2:2017 Campylobacter	76	0	Campylobacter	0
	Meat from broilers (Gallus gallus) - fresh - frozen - Retail - Iceland - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	10	Gram	N_A	ISO 10272-1:2017 Campylobacter	76	1	Campylobacter	1
	Meat from broilers (Gallus gallus) - fresh - frozen - Retail - Unknown - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	10	Gram	N_A	ISO 10272-2:2017 Campylobacter	8	0	Campylobacter	0
	Meat from broilers (Gallus gallus) - fresh - frozen - Retail - Unknown - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	10	Gram	N_A	ISO 10272-1:2017 Campylobacter	8	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) - dairy cows - adult - Farm - Iceland - animal sample - milk - Monitoring - Official sampling - Objective sampling	herd/flock	N_A	Enzyme-linked immunosorbent assay (ELISA)	70	0	0	Coxiella burnetii	0

Table Escherichia coli:ESCHERICHIA COLI 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	Pet food - final product - Border Control Posts - United States - Not Available - Surveillance - Official sampling - Objective sampling	batch (food/feed)	20	Gram	N_A	Not Available	5	0	Escherichia coli	0

Table HISTAMINE 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
Not Available	Fish - Fishery products from fish species associated with a high amount of histidine - not enzyme maturated - Border Control Posts - Thailand - Not Available - Surveillance - Official sampling - Objective sampling	batch (food/feed)	5	Gram	N_A	18	0	<= 100	Histamine	0	0
								>100 TO <= 200	Histamine	0	0
								>200	Histamine	0	0
	Fish - sauce produced by fermentation of fishery products - Border Control Posts - Thailand - Not Available - Surveillance - Official sampling - Objective sampling	batch (food/feed)	5	Gram	N_A	1	1	> 400	Histamine	0	0
								<=400	Histamine	0	1

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
Not Available	Roe - frozen - Border Control Posts - Peru - Not Available - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	5	0	detection	Listeria monocytogenes	5	0

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	Cattle (bovine animals) - dairy cows - adult - Farm - Iceland - animal sample - milk - Monitoring - Official sampling - Objective sampling	herd/flock		N_A	N_A	Enzyme-linked immunosorbent assay (ELISA)	70	0	Salmonella Dublin	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	735	Y	N_A	Not Available	735	9	Salmonella Agona	8
									Salmonella Infantis	1
	Gallus gallus (fowl) - laying hens - adult - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	51	Y	From some flocks, feces (animal samples) are taken	Not Available	51	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - day-old chicks - Farm - Iceland - environmental sample - delivery box liner - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	37	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - during rearing period - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	From some flocks, feces (animal samples) are taken	Not Available	28	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - adult - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	47	Y	From some flocks, boot swabs and dust samples are taken	Not Available	47	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - day-old chicks - Farm - Iceland - animal sample - eggshells - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	9	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - during rearing period - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	20	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - adult - Farm - Iceland - 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
	Gallus gallus (fowl) - parent breeding flocks for egg production line - day-old chicks - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	1	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - during rearing period - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	1	0	Salmonella	0
	Pigs - fattening pigs - raised under controlled housing conditions - Slaughterhouse - Iceland - animal sample - meat juice - Control and eradication programmes - Official sampling - Objective sampling	slaughter animal batch		N_A	N_A	Indirect ELISA (I-ELISA)	1077	167	Salmonella	167
	Turkeys - fattening flocks - before slaughter - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	33	Y	N_A	Not Available	33	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Iceland - environmental sample - boot swabs and dust - Control and eradication programmes - Official and industry sampling - Census	herd/flock	4	Y	N_A	Not Available	4	1	Salmonella Brandenburg	1
	Turkeys - parent breeding flocks - day-old chicks - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	2	0	Salmonella	0
	Turkeys - parent breeding flocks - during rearing period - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	N_A	Not Available	5	0	Salmonella	0

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	Crustaceans - shrimps - cooked - Border Control Posts - Canada - Not Available - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0
	Dairy products (excluding cheeses) - milk powder and whey powder - Border Control Posts - United States - Not Available - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0
	Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Iceland - food sample - neck skin - Control and eradication programmes - Industry sampling - Census	batch (food/feed)	25	Gram	N_A	Not Available	820	10	Salmonella Agona	8
									Salmonella Infantis	2
	Meat from pig - carcase - Slaughterhouse - Iceland - food sample - carcase swabs - Control and eradication programmes - Official sampling - Census	slaughter animal batch	400	Square centimetre	N_A	Not Available	1839	45	Salmonella Brandenburg	24
									Salmonella I 4,12:d:-	1
									Salmonella Infantis	4
									Salmonella Kedougou	13
									Salmonella spp., unspecified	3
	Meat from poultry, unspecified - meat products - cooked, ready-to-eat - Border Control Posts - Thailand - Not Available - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0
	Meat from poultry, unspecified - meat products - cooked, ready-to-eat - Border Control Posts - United States - Not Available - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0
	Meat from turkey - carcase - Slaughterhouse - Iceland - food sample - neck skin - Control and eradication programmes - Industry sampling - Census	batch (food/feed)	25	Gram	N_A	Not Available	75	0	Salmonella	0
ICELAND	Meat from bovine animals - fresh - chilled - Retail - Denmark - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	5	0	Salmonella	0
	Meat from bovine animals - fresh - chilled - Retail - Germany - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	6	0	Salmonella	0
	Meat from bovine animals - fresh - chilled - Retail - Iceland - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	114	0	Salmonella	0
	Meat from bovine animals - fresh - chilled - Retail - Ireland - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	4	0	Salmonella	0
	Meat from bovine animals - fresh - chilled - Retail - Poland - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Meat from bovine animals - fresh - chilled - Retail - Unknown - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	8	0	Salmonella	0
	Meat from broilers (Gallus gallus) - fresh - chilled - Retail - Iceland - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	131	0	Salmonella	0
	Meat from broilers (Gallus gallus) - fresh - chilled - Retail - Unknown - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	2	0	Salmonella	0
	Meat from broilers (Gallus gallus) - fresh - frozen - Retail - Denmark - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	39	0	Salmonella	0
	Meat from broilers (Gallus gallus) - fresh - frozen - Retail - Iceland - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	76	0	Salmonella	0
	Meat from broilers (Gallus gallus) - fresh - frozen - Retail - Unknown - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	8	0	Salmonella	0
	Meat from pig - fresh - chilled - Retail - Denmark - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (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
ICELAND	Meat from pig - fresh - chilled - Retail - Iceland - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	131	1	Salmonella	1
	Meat from pig - fresh - chilled - Retail - Spain - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	1	0	Salmonella	0
	Meat from pig - fresh - chilled - Retail - Unknown - food sample - meat - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	7	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	All feedingstuffs - Feed mill - Not Available - environmental sample - dust - Surveillance - Industry sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	350	5	Salmonella Cubana	1
									Salmonella Enteritidis	1
									Salmonella Mbandaka	1
									Salmonella Worthington	2
	All feedingstuffs - Feed mill - Not Available - environmental sample - dust - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	29	3	Salmonella Worthington	3
	Feed material of marine animal origin - fish meal - Feed mill - Not Available - environmental sample - dust - Surveillance - Industry sampling - Selective sampling	batch (food/feed)	25	Gram	N_A	Not Available	581	0	Salmonella	0
	Pet food - final product - Border Control Posts - United States - Not Available - Surveillance - Official sampling - Objective sampling	batch (food/feed)	25	Gram	N_A	Not Available	5	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
Not Available	Pigs - fattening pigs - raised under controlled housing conditions - Slaughterhouse - Iceland - animal sample - organ/tissue - Monitoring - Official sampling - Census	N_A	Not Available	animal	78625	0	Trichinella	0
	Solipeds, domestic - horses - Slaughterhouse - Iceland - animal sample - organ/tissue - Monitoring - Official sampling - Census	N_A	Not Available	animal	8202	0	Trichinella	0

FOODBORNE OUTBREAKS TABLES

Foodborne Outbreaks: summarized data

when numbers referring to cases, hospitalized people and deaths are reported as unknown, they will be not included in the sum calculation

		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
Aeromonas veronii	Unknown						1	9	2	0
Clostridium perfringens	Meat and meat products		1	15	2	0				
VTEC O26	Dairy products (other than cheeses)		1	24	4	0				

Strong Foodborne Outbreaks: detailed data

Causative agent	H	AG	VT	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
Clostridium perfringens	unk	Not Available	Not Available	Not Available	N_A	General	Meat and meat products	N_A	Descriptive epidemiological evidence	Canteen or workplace catering	Canteen or workplace catering	Iceland	Inadequate chilling	The infective agent was detected in large quantities in the meat but did not grow in culture samples examined from two persons from the group that got infected.	1	15	2	0
VTEC O26	unk	eae positive	VT2a	Not Available	N_A	General	Dairy products (other than cheeses)	Icecream produced on farm	Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans	Farm	Farm	Iceland	Cross-contamination	Age range of infected individuals 5 months to 41 years. Nine children were brought to the Childrens hospital out patients department, 4 of them were admitted to the hospital. Seven children developed HUS. Causative agent found in cattle and environment on the farm. Causative agent not found in the ice production area or in the ice-cream samples that were available on site during epidemiological investigation.	1	24	4	0

Weak Foodborne Outbreaks: detailed data

Causative agent	H	AG	VT	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
Aeromonas veronii	unk	Not Available	Not Available	Not Available	N_A	Unknown	Unknown	N_A	Descriptive environmental evidence	Unknown	Unknown	Iceland	Unknown	Age range of infected individuals 50 to 94 years. Extensive interviews on food consumption and activities have not revealed common issues in identifying infectious agents	1	9	2	0

ANTIMICROBIAL RESISTANCE TABLES FOR CAMPYLOBACTER

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

Table Antimicrobial susceptibility testing of Salmonella Brandenburg in Meat from pig - carcase

Sampling Stage: Slaughterhouse

Sampling Type: food sample - carcase swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: Iceland

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**	**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	**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**	**1**	**0**	**0**	**1**
<=0.015							2								
<=0.03										2					
<=0.25				2										2	1
<=0.5					2				2						
<=1		2						2							
<=2													2		
<=4											2				
4			2												
<=8						2									
32															1
128												1			
1024												1			

Table Antimicrobial susceptibility testing of Salmonella I 4,12:d:- in Meat from pig - carcase

Sampling Stage: Slaughterhouse

Sampling Type: food sample - carcase swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: Iceland

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**	**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	**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											
<=0.5					1				1						
0.5														1	1
<=1		1						1							
<=2			1												
4													1		
<=8						1									
8											1				
64												1			

Table Antimicrobial susceptibility testing of Salmonella Infantis in Meat from pig - carcase

Sampling Stage: Slaughterhouse

Sampling Type: food sample - carcase swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: Iceland

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**	**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	**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**
<=0.03										1					
0.03							1								
<=0.25				1											
<=0.5					1				1						
0.5														1	
<=1		1						1							
1															1
<=2			1										1		
<=4											1				
<=8						1									
64												1			

Table Antimicrobial susceptibility testing of Salmonella Kedougou in Meat from pig - carcase

Sampling Stage: Slaughterhouse

Sampling Type: food sample - carcase swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: Iceland

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**	**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	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
MIC	**N of resistant isolates**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**4**	**0**	**4**
<=0.015							4								
<=0.03										5					
0.03							1								
<=0.25				5										4	
<=0.5					5				5						
0.5														1	1
<=1		1						5							
<=2			3										1		
<=4											4				
4			2												1
<=8						2									
8											1				
16						3									
32															3
64		4										2	4		
1024												3			

Table Antimicrobial susceptibility testing of Salmonella Kedougou in Meat from pig - fresh

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method:

Country of Origin: Iceland

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**	**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	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**
<=0.015							1								
<=0.03										1					
<=0.25				1										1	
<=0.5					1				1						
<=1								1							
<=2			1										1		
<=4											1				
<=8						1									
32															1
64		1													
1024												1			

Table Antimicrobial susceptibility testing of Salmonella spp., unspecified in Meat from pig - carcase

Sampling Stage: Slaughterhouse

Sampling Type: food sample - carcase swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method:

Country of Origin: Iceland

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**	**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	**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	1
<=0.5					1				1						
<=1		1						1							
<=2			1												
4													1		
<=8						1									
8											1				
64												1			

ANTIMICROBIAL RESISTANCE TABLES FOR INDICATOR ESCHERICHIA COLI

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Pigs - fattening pigs

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: Iceland

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	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**	**14**
MIC	**N of resistant isolates**	**3**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**4**	**0**	**4**
<=0.015							14								
<=0.03										14					
<=0.25				14										13	3
<=0.5					14				14						
0.5														1	6
<=1		1						14							
1															1
<=2			10										9		
2		3													
<=4											13				
4		6	4										1		
<=8						13						3			
8		1									1				
16												4			
32						1						4	1		4
64		3											3		
1024												3			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Pigs - fattening pigs

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: Iceland

Sampling Details:

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	2	8	16	64
	N of tested isolates	17	17	17	17	17	17	17	17	17	17	17
MIC	N of resistant isolates	2	17	16	16	16	16	16	0	0	0	0
<=0.015									6			
<=0.03											17	
0.03									10			
<=0.064		3			1							
0.064									1			
<=0.12								1		1		
0.12		12										
0.25		1								10		
0.5							1			6		
1			3	1	5			1				
2		1	3		8		1	5				
4			10		2	1	5	5				2
8							9	5				13
16			1			8	1					2

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	**Not Available**	**Not Available**	**Positive/Present**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	Ceftazidime synergy test	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	ECOFF	**0.125**	**0.25**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.064**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**64**	**128**	**128**	**2**	**8**	**16**	**64**
	N of tested isolates	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**
MIC	**N of resistant isolates**	**2**	**17**	**16**	**16**	**16**	**16**	**16**	**0**	**0**	**0**	**0**
32						5						
64						3						

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Pigs - fattening pigs

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: Iceland

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	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**	**17**
MIC	**N of resistant isolates**	**17**	**0**	**17**	**16**	**2**	**1**	**0**	**0**	**0**	**1**	**5**	**8**	**0**	**6**
<=0.015							16								
<=0.03										17					
0.12							1								
<=0.25														12	2
<=0.5					1				16						
0.5														5	7
<=1								17							
1				4											2
<=2			11										5		
2				10	5				1						
<=4											16				
4			6	3	6								4		
<=8						15									
8					5										
16												9			
32						2						3	1		6
64		17											7		
128											1				
1024												5			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from bovine animals - fresh - chilled

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: European Union

Sampling Details:

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	**Not Available**	**Not Available**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	Ceftazidime synergy test	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	ECOFF	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**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**	**8**	**16**	**64**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
<=0.03										1	
0.064								1			
0.12				1							
0.25							1		1		
8					1						
16											1
32		1				1					
64			1								

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from bovine animals - fresh - chilled

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: European Union

Sampling Details:

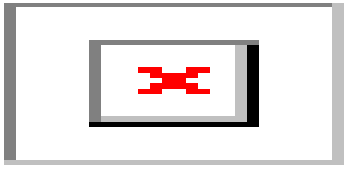
	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest 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	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**1**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
<=0.03										1					
<=0.25														1	
<=0.5									1						
0.5							1								1
<=1								1							
<=2			1												
4				1											
<=8						1									
8					1										
16											1				
64		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
ESBL MON	Meat from pig - fresh - chilled	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Retail	N_A	Monitoring	Official sampling	food sample - meat	batch (food/feed)	Denmark	N_A	5	0
										Iceland	N_A	135	0
										Spain	N_A	1	0
										Unknown	N_A	7	0
OTHER ESBL MON	Gallus gallus (fowl) - broilers	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Slaughterhouse	N_A	Monitoring	Official sampling	animal sample - caecum	herd/flock	Iceland	N_A	150	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	12-Dec-2020
Esbl	23-Jul-2020
Animal Population	23-Jul-2020
Disease Status	23-Jul-2020
Food Borne Outbreaks	23-Jul-2020
Prevalence	23-Jul-2020

Institutions and Laboratories involved in zoonoses monitoring and reporting

The Icelandic Food and Veterinary Authority MAST is the competent authority for the official control of food safety and animal health and operates under the auspices of the Ministry of Industry and Innovation. Its role is to promote the health and welfare of animals, plant health and the safety and quality of food by enforcing legislation and providing education and services to the fisheries and agricultural sectors, businesses and consumers.

The Institute for Experimental Pathology, Keldur conducts research and supplies research based advisory support to the Icelandic authorities concerning animal health. They provide diagnostic and analytical services and cover all disciplines relating to infectious diseases in animals: Pathology, bacteriology, virology, parasitology, immunology vaccinology, serology and AMR. Keldur has been nominated as a national reference laboratory for Campylobacter, Trichinella, TSE and AMR.

Matís is an independent research institute on food and Biotechnology. Matís serves as a testing laboratory for food and feed. Matís has been nominated as a national reference laboratory in 14 fields, including the zoonotic agents Salmonella and Listeria.

Sýni Laboratory Service Ltd. is a privately owned company with a testing laboratory for food and feed.

ProMat Laboratory service Ltd is a privately owned testing laboratory for food and feed.

Stjörnugrís Starlab is a privately owned laboratory run within the slaughterhouse Stjörnugrís. They run Trichinella testing on swine.

On the Icelandic Food and Veterinary Authorities website information can be found on designation of these official laboratories for testing of different zoonotic agents in different matrixes.

Short description of the institutions and laboratories involved in data collection and reporting

Animal population

1. Sources of information and the date(s) (months, years) the information relates to[(a)]

Information on farm animal population are from the livestock database BUSTOFN, collected through annual reporting from the livestock owners to MAST according to law. The Ministry of Industry and Innovation is responsible for the database. The information for reporting season 2019 represent the animal population in December 2019.

Information regarding slaughtered animals is based on data from the slaughterhouses. The Ministry of Industry and Innovation is responsible for the database.

2. Definitions used for different types of animals, herds, flocks and holdings as well as the production types covered

The number of poultry flocks is given by the number of rearing houses. The number of holdings and herds are the same for cattle, pigs, horses, sheep and goats.

3. National changes of the numbers of susceptible population and trends
None
4. Geographical distribution and size distribution of the herds, flocks and holdings[(b)]
All existing animal groups in Iceland are relatively evenly spread around the agricultural lowland areas. There are no herds or holdings in the highlands, which cover over 80 % of the island. In the summer, from June to September, the herds of sheep and of horses are grazing in the highlands.
5. Additional information
None
(a): National identification and registration system(s), source of reported statistics (Eurostat, others) (b): Link to website with density maps if available, tables with number of herds and flocks according to geographical area

General evaluation*: Salmonella

1. History of the disease and/or infection in the country[(a)]

The largest outbreaks of human Salmonella infections in Iceland were in 1996 with S. Enteritidis in cream bakery from domestic production and in 2000 with S. Typhimurium DT204b in imported iceberg salat.

For the last ten years the incidence has been relatively steady or less than 20 cases per 100.000 inhabitants. The majority of human cases have been linked to travelling abroad.

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

Because of strict control programmes for reducing salmonella in the pig and poultry production and low numbers of human cases of salmonellosis, domestic food products of their origin are considered to represent a small risk to the consumer regarding Salmonella. This assumption is supported by the experience in 2009 and 2010 where the prevalence of Salmonella in pig and poultry meat production rose significantly but where the prevalence of human cases of salmonellosis did not alter in the same direction. Instead the opposite development was observed.

In the last decade, there has been no evidence on domestically produced eggs, poultry meat or pig meat to be the cause of foodborne outbreaks with Salmonella.

In 2019, epidemiological investigations with WGS of all pig and human isolates of the same serotype from the years 2014-2018 did not show any correlation between Salmonella in pigs and human salmonellosis.

3. Any recent specific action in the Member State or suggested for the European Union[(b)]

None

4. Additional information

None

*** For each zoonotic agent**

(a): Epidemiological evaluation (trends and sources) over time until recent/current situation for the different relevant matrixes (food, feed, animal). If relevant: the official "disease status" to be specified for the whole country and/or specific regions within the country

(b): If applicable

Description of Monitoring/Surveillance/Control programmes system*: Pigs - Salmonella

1. Monitoring/Surveillance/Control programmes system[(a)]

The objective of the National control programme for Salmonella in pigs is to reduce the risk of Salmonella contamination in pig meat on the market by monitoring Salmonella in slaughter pig herds and therefore to be able to take risk reducing actions on carcases before distribution. The surveillance programme was implemented in October 2006.

Surveillance of all slaughter pig herds is carried out at the slaughterhouses by continuous serologic testing of meat juice from all herds. The sampling is objective and random meat samples are collected from carcasses after cooling. Number of samples per year depend on the herd size. Sixty, seventy-five or one hundred samples shall be taken from herds slaughtering for less than 2000 pigs pr. year, 2001 – 5000 pigs pr. year and over 5001 pigs pr. year respectively.

A Salmonella index is calculated for each herd based on the weighted average of positive meat juice samples from the previous thirteen weeks, where the results of the last five weeks weigh three times as much as the results from the weeks before. Approximately twice a month finisher herds are classified into levels 1-3 according to their Salmonella index.

From herds with level 2 and 3 swab samples are taken during slaughter from all carcases and tested in pools of 5 samples and the carcases are stored separately until results are available. Carcases from pooled samples with positive results are heat treated before further processing.

From herds with level 1 swab samples are taken during slaughter from 10 randomly selected carcases for each 40 carcases and pooled together into 1 sample, up to 3 pooled samples per slaughter batch.

Salmonella is isolated from positive swab samples for serotyping and AMR testing. If it is not possible to isolate Salmonella the sample is still considered positive, that is actions are still to be taken.

2. Measures in place[(b)]

Depending on Salmonella index and/or results from swab samples from previous slaughter days from the same herd, carcases can be kept separately after slaughter until test results are available. Carcases from pools with positive results can be heat treated before distribution.

3. Notification system in place to the national competent authority[(c)]

Salmonella is a notifiable disease, according to national legislation on animal diseases No. 25/1993. The Competent Authority MAST receives all results for samples taken according to the Salmonella National control programme in pigs from the respective laboratories (including serotyping and antimicrobial resistance).

4. Results of investigations and national evaluation of the situation, the trends [(d)] and sources of infection[(e)]

None

5. Additional information

None

* **For all combinations of zoonotic agents and matrix (Food, Feed and Animals) for 'Prevalence' and 'Disease Status': one text form reported per each combination of matrix/zoonoses or zoonotic agent**

(a): Sampling scheme (sampling strategy, frequency of the sampling, type of specimen taken, methods of sampling (description of sampling techniques) + testing scheme (case definition, diagnostic/analytical methods used, diagnostic flow (parallel testing, serial testing) to assign and define cases. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.

(b): The control program/strategies in place, including vaccination if relevant. If applicable a description of how eradication measures are/were implemented, measures in case of the positive findings or single cases; any specific action decided in the Member State or suggested for the European Union as a whole on the basis of the recent/current situation, if applicable. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.

(c): Mandatory: Yes/No.

(d): Minimum five years.

(e): Relevance of the findings in animals to findings in foodstuffs and for human cases (as a source of infection).

Description of Monitoring/Surveillance/Control programmes system*: Poultry breeder flocks of Gallus gallus,turkey breeder flocks - Salmonella

1. Monitoring/Surveillance/Control programmes system[(a)]

The aim of the National control programme (NCP) in poultry and poultry products is to keep the annual prevalence of all serovars of Salmonella under 1 % in flocks of breeder for broilers, laying hens and turkeys, in flocks of laying hens and in broilers and turkeys.

The sampling programme in poultry breeder flocks is in accordance with reg. (EC) no. 2130/2003, reg. (EU) No 200/2010 and reg. (EU) No 1190/2012.

Sampling takes place both during rearing and in adult flocks. Boot swab samples and/or boot swab and dust samples are taken by the food business operator (FBO) and by the competent authority (CA).

Every adult breeding flock of Gallus gallus consisting of 250 animals or more is sampled at farm level every three weeks.

Every adult turkey breeding flock consisting of 250 animals or more is sampled at farm level every four week.

Vaccination against Salmonella in poultry production is not allowed.

2. Measures in place[(b)]

MAST prohibits all transport of birds, eggs and waste from the positive flock except for destruction. However, eggs may be transported and used for human consumption if they are treated in a way that ensures the elimination of Salmonella according to laws on food safety.

MAST assesses the potential spread of infection in a hatchery and can prohibit the distribution of day-old chicks to prevent further spread of the infection. MAST takes samples from all other flocks of adult breeders on the farm.

MAST prohibits the use of poultry houses where Salmonella has been detected. The ban on the use of the poultry house is lifted once the minimum requirements have been met regarding biosecurity, cleaning and disinfection and if no Salmonella is detected in the samples that have been taken.

3. Notification system in place to the national competent authority[(c)]

Salmonella is a notifiable disease, according to national legislation on animal diseases No. 25/1993. The Competent Authority MAST receives all results for samples taken according to the NCP from the official laboratories (including serotyping and antimicrobial resistance).

4. Results of investigations and national evaluation of the situation, the trends [(d)] and sources of infection[(e)]

In 2019, *S.* Brandenburg was detected in one flock of breeding turkeys. However, the detection could

never be confirmed in repeated sampling, and restrictions were lifted. For calculation of prevalence, in line with the NCP, the flock was considered positive.

Besides this detection, *Salmonella* had only once been confirmed in poultry breeding flocks since 2000, where *S.* Agona was found in one flock of broiler breeders in 2013.

5. Additional information

None

* **For all combinations of zoonotic agents and matrix (Food, Feed and Animals) for 'Prevalence' and 'Disease Status': one text form reported per each combination of matrix/zoonoses or zoonotic agent**

(a): Sampling scheme (sampling strategy, frequency of the sampling, type of specimen taken, methods of sampling (description of sampling techniques) + testing scheme (case definition, diagnostic/analytical methods used, diagnostic flow (parallel testing, serial testing) to assign and define cases. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.

(b): The control program/strategies in place, including vaccination if relevant. If applicable a description of how eradication measures are/were implemented, measures in case of the positive findings or single cases; any specific action decided in the Member State or suggested for the European Union as a whole on the basis of the recent/current situation, if applicable. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.

(c): Mandatory: Yes/No.

(d): Minimum five years.

(e): Relevance of the findings in animals to findings in foodstuffs and for human cases (as a source of infection).

Description of Monitoring/Surveillance/Control programmes system*: Laying hens - Salmonella

1. Monitoring/Surveillance/Control programmes system[(a)]

The aim of the National control programme (NCP) in poultry and poultry products is to keep the annual prevalence of all serovars of Salmonella under 1 % in flocks of breeder for broilers, laying hens and turkeys, in flocks of laying hens and in broilers and turkeys.

The sampling programme in laying hens is in accordance with reg. (EC) no. 2130/2003 and reg. (EU) No 517/2011.

Sampling takes place both during rearing and in adult flocks that requires authorisation for primary production of eggs. Boot swab samples and/or boot swab and dust samples are taken by the food business operator (FBO) and by the competent authority (CA).

Every adult flock of laying hens is sampled every fifteen weeks. In flocks with less than 100 hens, samples are taken once a year.

Vaccination against Salmonella in poultry production is not allowed.

2. Measures in place[(b)]

MAST prohibits all transport of birds, eggs and waste from the positive flock except for destruction. However, eggs may be transported and used for human consumption if they are treated in a way that ensures the elimination of Salmonella according to laws on food safety.

MAST takes samples from all other flocks on the farm.

MAST prohibits the use of poultry houses where Salmonella has been detected. The ban on the use of the poultry house is lifted once the minimum requirements have been met regarding biosecurity, cleaning and disinfection and if no Salmonella is detected in the samples that have been taken.

3. Notification system in place to the national competent authority[(c)]

Salmonella is a notifiable disease, according to national legislation on animal diseases No. 25/1993. The Competent Authority MAST receives all results for samples taken according to the NCP from the official laboratories (including serotyping and antimicrobial resistance).

4. Results of investigations and national evaluation of the situation, the trends [(d)] and sources of infection[(e)]

After the implementation of the national control programme in 2008, *Salmonella* has only been detected twice in laying hens. In 2010, *S.* Rissen was found in an official dust sample on a commercial laying hen farm and the flock was culled. In 2011, *S.* Worthingon was found in a fecal sample from hens taken by the FBO in a mixed backyard flock, but the detection could never be confirmed in official samples and the

flock was considered to be negative.

Salmonella had never been detected in flocks of laying hens before 2008.

5. Additional information

None

* **For all combinations of zoonotic agents and matrix (Food, Feed and Animals) for 'Prevalence' and 'Disease Status': one text form reported per each combination of matrix/zoonoses or zoonotic agent**

(a): Sampling scheme (sampling strategy, frequency of the sampling, type of specimen taken, methods of sampling (description of sampling techniques) + testing scheme (case definition, diagnostic/analytical methods used, diagnostic flow (parallel testing, serial testing) to assign and define cases. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.

(b): The control program/strategies in place, including vaccination if relevant. If applicable a description of how eradication measures are/were implemented, measures in case of the positive findings or single cases; any specific action decided in the Member State or suggested for the European Union as a whole on the basis of the recent/current situation, if applicable. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.

(c): Mandatory: Yes/No.

(d): Minimum five years.

(e): Relevance of the findings in animals to findings in foodstuffs and for human cases (as a source of infection).

Description of Monitoring/Surveillance/Control programmes system*: Broilers and fattening turkeys - Salmonella

1. Monitoring/Surveillance/Control programmes system[(a)]

The aim of the National control programme (NCP) in poultry and poultry products is to keep the annual prevalence of all serovars of Salmonella under 1 % in flocks of breeder for broilers, laying hens and turkeys, in flocks of laying hens and in broilers and turkeys.

The sampling programme in broilers and fattening turkeys is in accordance with reg. (EC) no. 2130/2003, reg. (EU) No 200/2012 and reg. (EU) No 1190/2012.

Sampling takes place in rearing flocks within three weeks before slaughter. Boot swab samples and/or boot swab and dust samples are taken by the food business operator (FBO) and by the competent authority (CA).

2. Measures in place[(b)]

MAST prohibits all transport of birds and waste from the positive flock except for destruction. Therefore, positive rearing flocks are killed on the farm.

However, MAST can allow slaughter and placing of products on the market from a rearing flock with an initial positive sample if three additional samples taken during rearing are negative. Two of these samples shall be taken by the FBO and the third by the CA.

MAST prohibits the use of poultry houses where Salmonella has been detected. The ban on the use of the poultry house is lifted once the minimum requirements have been met regarding biosecurity, cleaning and disinfection and if no Salmonella is detected in the samples that have been taken.

3. Notification system in place to the national competent authority[(c)]

Salmonella is a notifiable disease, according to national legislation on animal diseases No. 25/1993. The Competent Authority MAST receives all results for samples taken according to the NCP from the official laboratories (including serotyping and antimicrobial resistance).

4. Results of investigations and national evaluation of the situation, the trends [(d)] and sources of infection[(e)]

In 2019, the aim of keeping the *Salmonella* prevalence in broiler flocks under 1% could not be reached, where 9 out of 735 broiler flocks were positive (1,2%). All detections were on two farms that have been contaminated for years with their specific serovar *S.* Agona and *S.* Infantis respectively. It is unclear why the contamination spread to more flocks on these farms in 2019 than in the previous years.

5. Additional information

None

* **For all combinations of zoonotic agents and matrix (Food, Feed and Animals) for 'Prevalence' and 'Disease Status': one text form reported per each combination of matrix/zoonoses or zoonotic agent** (a): Sampling scheme (sampling strategy, frequency of the sampling, type of specimen taken, methods of sampling (description of sampling techniques) + testing scheme (case definition, diagnostic/analytical methods used, diagnostic flow (parallel testing, serial testing) to assign and define cases. If programme approved by the EC, please provide link to the specific programme in the Commission`s website. (b): The control program/strategies in place, including vaccination if relevant. If applicable a description of how eradication measures are/were implemented, measures in case of the positive findings or single cases; any specific action decided in the Member State or suggested for the European Union as a whole on the basis of the recent/current situation, if applicable. If programme approved by the EC, please provide link to the specific programme in the Commission`s website. (c): Mandatory: Yes/No. (d): Minimum five years. (e): Relevance of the findings in animals to findings in foodstuffs and for human cases (as a source of infection).

General evaluation*: Campylobacter

1. History of the disease and/or infection in the country[(a)]

1998-2000 Human Campylobacter epidemic:

- Characterized as a ”sporadic case”-epidemic
- Specific seasonal distribution (flat curve)
- Prompt decree se when interventions in broiler production put in place (Feb. 2000)
- Domestic origin due to consumption of unfrozen chickens

2000: all broiler flocks are tested for Campylobacter at farm level and at processing

2000 – 2004: Campy-On-Ice project: The epidemiology of human campylobacteriosis in Iceland

2002: Freezing policy implemented. All poultry meat products must be frozen from flocks positive for Camp. in samples taken within 5 days before slaughter.

A decrease of human campylobacteriosis was observed after improvements of biosecurity on poultry farms and after implementation of freezing policy in spite of increase of consumption of unfrozen unheattred poultry meat.

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

2000 – 2004: Campy-On-Ice project: The epidemiology of human campylobacteriosis in Iceland.

- Domestic origin due to consumption of unfrozen chickens
- Prompt decrease when interventions in broiler production put in place

3. Any recent specific action in the Member State or suggested for the European Union[(b)]

None

4. Additional information

None

* **For each zoonotic agent**
(a): Epidemiological evaluation (trends and sources) over time until recent/current situation for the different relevant matrixes (food, feed, animal). If relevant: the official “disease status” to be specified for the whole country and/or specific regions within the country
(b): If applicable

Description of Monitoring/Surveillance/Control programmes system*: Poultry - Campylobacter

1. Monitoring/Surveillance/Control programmes system[(a)]

According to the Icelandic Campylobacter National Surveillance Programme every poultry flock for meat production is sampled at the farm 2 to 5 days prior to slaughter, if it is intended to distribute meat from the flock unfrozen and unheattreated (fresh). Samples are taken by the food business operator (FBO).

For surveillance, caecal samples are also taken by the FBO from poultry flock at slaughter from april 1 to october 31, where meat from the flock is intended to be distributed unfrozen and unheattreated (fresh).

2. Measures in place[(b)]

Carcasses from flocks that test positive for thermophilic Campylobacter sp. in the pre-slaughter sampling are either subjected to freezing for at least 14 days or to heat-treatment.

3. Notification system in place to the national competent authority[(c)]

The official laboratories report all results from samples taken from broiler flocks as a part of the surveillance programme directly to MAST.

4. Results of investigations and national evaluation of the situation, the trends [(d)] and sources of infection[(e)]

The prevalence of Campylobacter sp. in broiler flocks has been very low in the past decade, due to the development of a high level of biosecurity on broiler farms. In 2019, annual flock prevalence before slaughter was only 1,9%. Slaughter flock prevalence during the high-risk months was as low as 2,4%.

5. Additional information

Write text here please

*** For all combinations of zoonotic agents and matrix (Food, Feed and Animals) for 'Prevalence' and 'Disease Status': one text form reported per each combination of matrix/zoonoses or zoonotic agent**

(a): Sampling scheme (sampling strategy, frequency of the sampling, type of specimen taken, methods of sampling (description of sampling techniques) + testing scheme (case definition, diagnostic/analytical methods used, diagnostic flow (parallel testing, serial testing) to assign and define cases. If programme approved by the EC, please provide link to the specific programme in the Commission`s website.

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(c): Mandatory: Yes/No.

(d): Minimum five years.

(e): Relevance of the findings in animals to findings in foodstuffs and for human cases (as a source of infection).