ZOONOSES MONITORING

United Kingdom (Northern Ireland)

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 2021

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 United Kingdom (Northern Ireland) during the year 2021.

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

Animal species	Category of animals	Population	
		animal	herd/flock
Cattle (bovine animals)	Cattle (bovine animals)	1,681,991	20,474
Gallus gallus (fowl)	Gallus gallus (fowl) - breeding flocks, unspecified - adult	2,090,221	268
	Gallus gallus (fowl) - broilers	15,946,721	7,571
	Gallus gallus (fowl) - laying hens	4,343,223	
	Gallus gallus (fowl) - laying hens - adult		711
	Gallus gallus (fowl) - unspecified	2,112,637	
Pigs	Pigs	716,696	
	Pigs - breeding animals	58,370	
	Pigs - fattening pigs	658,326	
Small ruminants	Goats	2,874	532
	Sheep	2,034,786	9,853
	Sheep and goats	2,037,660	
Solipeds, domestic	Solipeds, domestic - horses	6,177	
Turkeys	Turkeys	44,784	
	Turkeys - fattening flocks		55

DISEASE STATUS TABLES

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

Region	Zoonotic agent	Number of herds with status officially free	Number of infected herds	Total number of herds
NORTHERN IRELAND (NUTS level 1)	Brucella	22,952	0	22,957

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

Region	Zoonotic agent	Number of herds with status officially free	Number of infected herds	Total number of herds
NORTHERN IRELAND (NUTS level 1)	Brucella	9,966	0	9,966

DISEASE STATUS TABLES

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

Region	Zoonotic agent	Number of herds with status officially free	Number of infected herds	Total number of herds
NORTHERN IRELAND (NUTS level 1)	Mycobacterium bovis	19,456	2,599	22,957

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	Alpacas - farmed - Farm - United Kingdom - animal sample - blood - Monitoring - Industry sampling - Objective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	23	0	Brucella	0
	Giraffes - zoo animal - Zoo - United Kingdom - animal sample - blood - Monitoring - Industry sampling - Objective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	1	0	Brucella	0
	Pigs - breeding animals - Artificial insemination station - United Kingdom - animal sample - blood - Monitoring - Industry sampling - Objective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	771	0	Brucella	0
	Reindeers - Farm - United Kingdom - animal sample - blood - Monitoring - Industry sampling - Objective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	6	0	Brucella	0
	Seals - wild - Natural habitat - United Kingdom - animal sample - blood - Monitoring - Industry sampling - Objective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	1	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
Not Available	Cattle (bovine animals) - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	286	4	Campylobacter jejuni	4
	Cattle (bovine animals) - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	286	6	Campylobacter fetus subsp. fetus	4
							Campylobacter jejuni	2
	Cattle (bovine animals) - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	286	7	Campylobacter, unspecified sp.	7
	Gallus gallus (fowl) - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	35	5	Campylobacter jejuni	3
							Campylobacter, unspecified sp.	2
	Sheep - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	356	5	Campylobacter fetus subsp. fetus	2
							Campylobacter jejuni	2
							Campylobacter lari	1
	Sheep - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	356	9	Campylobacter coli	1
							Campylobacter jejuni	6
							Campylobacter, unspecified sp.	2

Table Escherichia coli:ESCHERICHIA COLI 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	Other animals - exotic pet animals - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	OIE method for E.coli O157 in animal faecal samples	animal	7	0	Shiga toxin-producing Escherichia coli (STEC)	0

Table Listeria:LISTERIA 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	Cattle (bovine animals) - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	325	8	Listeria monocytogenes	8
	Cattle (bovine animals) - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	325	5	Listeria monocytogenes	2
							Listeria spp., unspecified	3
	Sheep - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	412	16	Listeria monocytogenes	16
	Sheep - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	412	19	Listeria ivanovii	2
							Listeria monocytogenes	13
							Listeria spp., unspecified	4

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
Not Available	Alpacas - farmed - Farm - Not Available - Not Available - Control and eradication programmes - Not applicable - Not specified	N_A	Not Available	animal	5	3	Mycobacterium bovis	3
	Otter - Unspecified - Not Available - Not Available - Unspecified - Not applicable - Not specified	N_A	Not Available	animal	2	0	Mycobacterium	0
	Sheep - Unspecified - Not Available - Not Available - Unspecified - Not applicable - Not specified	N_A	Not Available	animal	2	1	Mycobacterium bovis	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	Cattle (bovine animals) - adult cattle over 2 years - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	2	2	Salmonella Dublin	1
									Salmonella Mbandaka	1
	Cattle (bovine animals) - calves (under 1 year) - Farm - Not Available - animal sample - faeces - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella Dublin	1
	Cattle (bovine animals) - calves (under 1 year) - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	9	9	Salmonella Dublin	8
									Salmonella enterica, subspecies diarizonae	1
	Cattle (bovine animals) - Farm - Not Available - animal sample - faeces - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	22	22	Salmonella Dublin	14
									Salmonella Mbandaka	2
									Salmonella spp., unspecified	5
									Salmonella Typhimurium	1
	Cattle (bovine animals) - Farm - Not Available - animal sample - foetus/stillbirth - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	28	28	Salmonella Dublin	26
									Salmonella Kottbus	1
									Salmonella Mbandaka	1
	Ducks - Farm - Not Available - environmental sample - boot swabs - Clinical investigations - Industry sampling - Suspect sampling	herd/flock		N_A	N_A	Not Available	1	1	Salmonella Brandenburg	1
	Gallus gallus (fowl) - breeding flocks for broiler production line - adult - Farm - Not Available - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock	267	N	N_A	Not Available	267	0	Salmonella	0
	Gallus gallus (fowl) - breeding flocks for broiler production line - adult - Farm - Not Available - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	267	Y	N_A	Not Available	267	0	Salmonella	0
	Gallus gallus (fowl) - breeding flocks for broiler production line - adult - Farm - Not Available - Not Available - Control and eradication programmes - Official sampling - Objective sampling	herd/flock	267	N	N_A	Not Available	267	0	Salmonella	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	7571	N	N_A	Not Available	7532	6	Salmonella Mbandaka	2
									Salmonella Muenster	3
									Salmonella Tennessee	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	7571	Y	N_A	Not Available	7571	6	Salmonella Mbandaka	2
									Salmonella Muenster	3
									Salmonella Tennessee	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Objective sampling	herd/flock	7571	N	N_A	Not Available	39	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - adult - Farm - Not Available - environmental sample - dust - Clinical investigations - Industry sampling - Suspect sampling	herd/flock		N_A	N_A	Not Available	2	2	Salmonella Bredeney	1
									Salmonella Enteritidis	1
	Gallus gallus (fowl) - laying hens - adult - Farm - Not Available - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock	711	N	N_A	Not Available	322	6	Salmonella Idikan	1
									Salmonella Newport	2
									Salmonella Oslo	1
									Salmonella Reading	1
									Salmonella Schwarzengrund	1
	Gallus gallus (fowl) - laying hens - adult - Farm - Not Available - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	711	Y	N_A	Not Available	711	8	Salmonella Idikan	1
									Salmonella Newport	2
									Salmonella Oslo	2
									Salmonella Reading	1
									Salmonella Schwarzengrund	1
									Salmonella Typhimurium	1
	Gallus gallus (fowl) - laying hens - adult - Farm - Not Available - Not Available - Control and eradication programmes - Official sampling - Objective sampling	herd/flock	711	N	N_A	Not Available	389	2	Salmonella Oslo	1
									Salmonella Typhimurium	1
	Gallus gallus (fowl) - laying hens - during rearing period - flocks under control programme - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	184	N	N_A	Not Available	184	1	Salmonella Bardo	1
	Gallus gallus (fowl) - laying hens - during rearing period - flocks under control programme - Farm - Not Available - environmental sample - dust - Clinical investigations - Industry sampling - Suspect sampling	herd/flock		N_A	N_A	Not Available	3	3	Salmonella Bardo	1
									Salmonella Newport	2
	Gallus gallus (fowl) - parent breeding flocks for egg production line - adult - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	1	Y	N_A	Not Available	1	0	Salmonella	0

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	Gallus gallus (fowl) - parent breeding flocks for egg production line - adult - Farm - Not Available - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock	1	N	N_A	Not Available	1	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - adult - Farm - Not Available - Not Available - Control and eradication programmes - Official sampling - Objective sampling	herd/flock	1	N	N_A	Not Available	1	0	Salmonella	0
	Pigs - unspecified - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	5	5	Salmonella spp., unspecified	1
									Salmonella Typhimurium	3
									Salmonella Typhimurium, monophasic	1
	Sheep - animals over 1 year - Farm - Not Available - animal sample - faeces - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella enterica, subspecies diarizonae	1
	Sheep - animals over 1 year - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	9	9	Salmonella enterica, subspecies diarizonae	5
									Salmonella Kottbus	1
									Salmonella spp., unspecified	3
	Sheep - animals under 1 year (lambs) - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	3	3	Salmonella Dublin	2
									Salmonella enterica, subspecies diarizonae	1
	Sheep - Farm - Not Available - animal sample - faeces - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	3	3	Salmonella enterica, subspecies diarizonae	2
									Salmonella Mbandaka	1
	Sheep - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella enterica, subspecies arizonae	1
	Turkeys - fattening flocks - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	55	N	N_A	Not Available	51	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	55	Y	N_A	Not Available	55	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Objective sampling	herd/flock	55	N	N_A	Not Available	4	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	Cheeses, made from unspecified milk or other animal milk - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Derby	1
	Meat from bovine animals - fresh - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	3	3	Salmonella Derby	1
									Salmonella Dublin	2
	Meat from bovine animals - fresh - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	9	9	Salmonella Typhimurium	3
									Salmonella Typhimurium, monophasic	6
	Meat from bovine animals - fresh - Slaughterhouse - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	6	6	Salmonella Montevideo	6
	Meat from bovine animals - meat products - fresh raw sausages - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	7	7	Salmonella Derby	1
									Salmonella Give	1
									Salmonella Lovelace	1
									Salmonella Rissen	1
									Salmonella spp., unspecified	1
									Salmonella Typhimurium	1
									Salmonella Weltevreden	1
	Meat from bovine animals - minced meat - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Dublin	1
	Meat from bovine animals - minced meat - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	15	15	Salmonella Dublin	4
									Salmonella Gallinarum biovar Pullorum	1
									Salmonella Infantis	7
									Salmonella Kedougou	1
									Salmonella Typhimurium	1
									Salmonella Virchow	1
	Meat from bovine animals - offal - liver - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Typhimurium	2
	Meat from broilers (Gallus gallus) - fresh - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	56	56	Salmonella Agona	1
									Salmonella Enteritidis	3
									Salmonella Infantis	30
									Salmonella Java	14
									Salmonella Newport	1
									Salmonella spp., unspecified	7
	Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	3	3	Salmonella Enteritidis	1
									Salmonella Infantis	1
									Salmonella Typhimurium, monophasic	1
	Meat from broilers (Gallus gallus) - offal - liver - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Typhimurium, monophasic	1
	Meat from duck - fresh - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Newport	1
	Meat from other animal species or not specified - minced meat - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Typhimurium	1
	Meat from other animal species or not specified - offal - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Derby	2

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 other animal species or not specified - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Infantis	1
	Meat from pig - carcase - Slaughterhouse - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	400	Square centimetre	N_A	Not Available	10	10	Salmonella Enterica, unspecified	1
									Salmonella Give	1
									Salmonella London	1
									Salmonella Reading	1
									Salmonella Typhimurium	4
									Salmonella Typhimurium, monophasic	2
	Meat from pig - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	4	4	Salmonella Typhimurium	4
	Meat from pig - fresh - Cutting plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Typhimurium, monophasic	1
	Meat from pig - meat products - fresh raw sausages - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	16	16	Salmonella Bovismorbificans	1
									Salmonella Derby	3
									Salmonella Manchester	1
									Salmonella spp., unspecified	1
									Salmonella Typhimurium	4
									Salmonella Typhimurium, monophasic	6
	Meat from pig - meat products - raw but intended to be eaten cooked - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Derby	1
									Salmonella Typhimurium	1
	Meat from pig - offal - liver - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	9	9	Salmonella Enterica, unspecified	4
									Salmonella Typhimurium	5
	Meat from pig - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella spp., unspecified	1
	Meat from sheep - offal - liver - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Enterica, unspecified	1
	Seeds, dried - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Newport	1
									Salmonella spp., unspecified	1

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	Compound feedingstuffs, not specified - process control - Feed mill - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	58	58	Salmonella Alachua	3
									Salmonella Anatum	1
									Salmonella enterica, subspecies arizonae	1
									Salmonella Enterica, unspecified	1
									Salmonella Enteritidis	1
									Salmonella Lexington	1
									Salmonella Lovelace	1
									Salmonella Mbandaka	13
									Salmonella Minnesota	1
									Salmonella Newport	2
									Salmonella Nottingham	1
									Salmonella Rissen	2
									Salmonella Senftenberg	20
									Salmonella spp., unspecified	3
									Salmonella Tennessee	4
									Salmonella Typhimurium	3
	Compound feedingstuffs, not specified - process control - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Livingstone	1
									Salmonella Schwarzengrund	1
	Feed material of cereal grain origin - barley derived - Feed mill - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Anatum	1
	Feed material of cereal grain origin - Feed mill - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	9	9	Salmonella Eimsbuettel	1
									Salmonella Enterica, unspecified	1
									Salmonella Kottbus	1
									Salmonella Livingstone	1
									Salmonella Newport	1
									Salmonella Sandiego	2
									Salmonella Senftenberg	1
									Salmonella Typhimurium, monophasic	1
	Feed material of land animal origin - animal fat - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	1	1	Salmonella Typhimurium	1
	Feed material of land animal origin - protein meal - Feed mill - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	2	2	Salmonella Enterica, unspecified	2
	Feed material of land animal origin - protein meal - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	41	41	Salmonella Cerro	4
									Salmonella Livingstone	14
									Salmonella Montevideo	5
									Salmonella Schwarzengrund	7
									Salmonella Senftenberg	11
	Pet food - process control - Processing plant - Not Available - Not Available - Unspecified - Industry sampling - Not specified	single (food/feed)	25	Gram	N_A	Not Available	4	4	Salmonella Anatum	1
									Salmonella Enterica, unspecified	2
									Salmonella Typhimurium, monophasic	1

Table Toxoplasma:TOXOPLASMA 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	Alpacas - farmed - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	3	2	Toxoplasma gondii	2
	Cattle (bovine animals) - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	6	4	Toxoplasma gondii	4
	Goats - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	6	2	Toxoplasma gondii	2
	Pigs - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	4	0	Toxoplasma gondii	0
	Sheep - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	243	119	Toxoplasma gondii	119

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	Foxes - Natural habitat - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Selective sampling	N_A	Magnetic stirrer method for pooled sample digestion	animal	396	0	Trichinella	0
	Pigs - mixed herds - raised under controlled housing conditions - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Selective sampling	N_A	Magnetic stirrer method for pooled sample digestion	animal	1282	0	Trichinella	0

Table Yersinia:YERSINIA 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	Alpacas - farmed - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	12	1	Yersinia pseudotuberculosis	1
	Alpacas - farmed - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	12	2	Yersinia pseudotuberculosis	2
	Cattle (bovine animals) - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	1105	92	Yersinia enterocolitica	49
							Yersinia pseudotuberculosis	27
							Yersinia, unspecified sp.	16
	Cattle (bovine animals) - Farm - Not Available - animal sample - milk - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	1105	1	Yersinia, unspecified sp.	1
	Cattle (bovine animals) - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	1105	6	Yersinia enterocolitica	1
							Yersinia pseudotuberculosis	3
							Yersinia, unspecified sp.	2
	Goats - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	5	2	Yersinia enterocolitica	2
	Penguin - zoo animals - Zoo - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	6	4	Yersinia enterocolitica	4
	Pigs - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	32	1	Yersinia enterocolitica	1
	Sheep - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	307	7	Yersinia enterocolitica	7
	Sheep - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	307	4	Yersinia pseudotuberculosis	3
							Yersinia, unspecified sp.	1

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	Weak			
Causative agent	**Food vehicle**		**N outbreaks**	**N human cases**	**N hospitalized**	**N deaths**
Listeria monocytogenes	Unknown		1	10	10	3
Salmonella Typhimurium	Unknown		1	7	4	0

Strong Foodborne Outbreaks: detailed data

No data returned for this view. This might be because the applied filter excludes all data.

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
Listeria monocytogenes	unk	Not Available	Not Available	Not Available	13884	General	Unknown	TB03A	Descriptive epidemiological evidence	Unknown	Unknown	Not Available	Not Available	N_A	1	10	10	3
Salmonella Typhimurium	unk	Not Available	Not Available	Not Available	23621	General	Unknown	TB03A	Descriptive epidemiological evidence	Unknown	Unknown	Not Available	Not Available	N_A	1	7	4	0

ANTIMICROBIAL RESISTANCE TABLES FOR CAMPYLOBACTER

Table Antimicrobial susceptibility testing of Campylobacter coli 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: United Kingdom (Northern Ireland)

Sampling details:

	AM substance	Chloramphenicol	Ciprofloxacin	Ertapenem	Erythromycin	Gentamicin	Tetracycline
	ECOFF	**16**	**0.5**	**0.5**	**8**	**2**	**2**
	Lowest limit	**2**	**0.125**	**0.125**	**1**	**0.25**	**0.5**
	Highest limit	**64**	**32**	**4**	**512**	**16**	**64**
	N of tested isolates						
MIC	**N of resistant isolates**						
<=0.125			17	23			
<=0.25						5	
<=0.5							4
0.5						19	
<=1					22		
<=2		24					
2				1			1
4			5				6
8			2				1
16							1
32							10
64							1
128					1		
256					1		

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

Table Antimicrobial susceptibility testing of Salmonella Derby 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: United Kingdom (Northern Ireland)

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**6**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								1								
<=0.03											2					
0.03								1								
<=0.25					2	1									2	
<=0.5										2						
0.5						1										2
<=1			2						2							
<=4		2										2				
8				2												
16							2									
>32														2		
128													2			

Table Antimicrobial susceptibility testing of Salmonella Kentucky 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: United Kingdom (Northern Ireland)

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
<=0.25					1											
<=0.5										1						
0.5						1										
<=1			1						1							
1								1							1	
<=4		1														
<=8							1									
8				1												
16												1				
>16																1
>32														1		
>512													1			

Table Antimicrobial susceptibility testing of Salmonella London 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: United Kingdom (Northern Ireland)

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**6**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
<=0.25					1	1									1	1
<=0.5										1						
0.5								1								
<=1			1						1							
<=2														1		
<=4	1															
<=8							1									
8				1												
32												1				
64													1			

Table Antimicrobial susceptibility testing of Salmonella Rissen 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: United Kingdom (Northern Ireland)

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.03											1					
0.03								1								
<=0.25					1											
<=0.5										1						
0.5						1									1	1
<=1			1						1							
<=4		1										1				
8				1												
16							1									
>32														1		
64													1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium 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: United Kingdom (Northern Ireland)

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								1								
<=0.03											1					
<=0.25					1	1									1	
<=0.5										1						
<=1									1							
<=2														1		
<=4		1										1				
8				1												
>16																1
>32			1													
64							1									
>512													1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium, monophasic 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: United Kingdom (Northern Ireland)

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**6** 8	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
<=0.015								2								
<=0.03											7					
0.03								8								
0.064											3					
<=0.25					10	5	3								5	6
<=0.5										6						
0.5						2									5	
<=1									10							
<=4		10										9				
4				4												
<=8							8									
8				5						1		1				
16				1						3						
>16																4
32														1		
>32			10											9		
64							1									
>64							1									
>512													10			

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: United Kingdom (Northern Ireland)

Sampling Details:

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	8	16	0.25	0.5	16	0.064	2	2	0.125	8	64	8	0.5	2
	Lowest limit	4	1	2	0.25	0.25	8	0.015	1	0.5	0.03	4	8	2	0.25	0.25
	Highest limit	128	32	64	4	6	64	8	16	16	16	64	512	32	8	16
	N of tested isolates															
MIC	N of resistant isolates															
<=0.015								61								
<=0.03											68					
0.03								4								
<=0.25					68	61									64	17
<=0.5										52						
0.5						7									4	18
<=1			2						67							
1										11						2
<=2				6										22		
2			18						1	5						
<=4		64										65				
4			17	22										1		
<=8							55						13			
8		3	3	35												
>8								3								
16		1	1	4			1						7			
>16																31
32			1				3						3	3		
>32			26											42		
64							4						1			
>64				1			5					3				

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**64**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**6**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
128													1			
512													1			
>512													42			

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: United Kingdom (Northern Ireland)

Sampling Details:

Ceftazidime synergy test	Cefotaxime synergy test	MIC	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
			ECOFF	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**16**
			Lowest limit	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.125**	**0.015**	**0.125**	**0.03**	**0.5**
			Highest limit	**32**	**4**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**128**
			N of tested isolates										
			N of resistant isolates										
Not Available	Not Available	<=0.015								41			
		<=0.03										43	
		0.03								2			
		<=0.064		2		34							
		<=0.125							13		38		
		0.125		2		6							
		<=0.25			1			2					
		0.25							26		5		
		0.5				1		3	1				
		1			1	1		10					
		2		9	2	1	5	16	2				3
		4		14			24	5	1				19
		>4			39								
		8		15			12	7					20
		16		1			1						1
		32					1						

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: United Kingdom (Northern Ireland)

Sampling Details:

AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
ECOFF	**8**	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**64**	**8**	**0.5**	**2**
Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
N of tested isolates															
N of resistant isolates															
MIC															
<=0.015							22								
<=0.03										42					
0.03							5								
0.064							1			1					
0.125							2								
<=0.25				1	2									33	6
0.25							4								
<=0.5									27						
0.5					3		3							10	10
<=1								42							
1					13				4						3
<=2			3										17		
2				3	13				1						
<=4	41										28				
4			6	4	4			1							
>4				35											
<=8						38						5			
8	2		30		8		1		2		2				
>8							5								
16			3			1			7		4	7			1
>16									2						23
32		1										1	3		
>32		42											23		
64						1					2	1			
>64			1			3					7				

	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**8**	**64**	**8**	**0.5**	**2**
	Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**128**	**32**	**64**	**4**	**8**	**64**	**8**	**16**	**16**	**16**	**64**	**512**	**32**	**8**	**16**
	N of tested isolates															
MIC	**N of resistant isolates**															
512													1			
>512													28			

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

No data returned for this view. This might be because the applied filter excludes all data.

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	13-Dec-2022
Animal Population	26-Jul-2022
Disease Status	26-Jul-2022
Food Borne Outbreaks	26-Jul-2022
Prevalence	26-Jul-2022

ZOONOSES MONITORING

Northern Ireland

TEXT FORMS FOR THE 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 2021

Table of contents

1. Institutions and Laboratories involved in zoonoses monitoring and reporting

The Official Laboratories (OLs) are divided into:

OLs for feed and food (Northern Ireland Competent Authorities are FSA NI and DAERA)

OLs for animal health and live animals (Northern Ireland Competent Authority is DAERA)

Institutions and Laboratories involved in zoonoses monitoring and reporting

Agri Food and Biosciences Institute

Agriculture, Food and Environmental Science Division, Food Microbiology Unit, Bacteriology Branch, Newforge Lane, Belfast, BT9 5PX
www.afbini.gov.uk

Agri Food and Biosciences Institute

Veterinary Sciences Division, Stoney Road, Stormont, Belfast, BT4 3SD

www.afbini.gov.uk

Department of Agriculture, Environment and Rural Affairs (Northern Ireland) (DAERA)

Ballykelly House, 111 Ballykelly Road, Ballykelly, Limavady, BT49 9HP

www.daera-ni.gov.uk

Department of Health (Northern Ireland)

Castle Buildings, Stormont, Belfast, BT4 3SQ

www.health-ni.gov.uk

Food Standards Agency Northen Ireland (FSA NI)

10c Clarendon Road, Belfast, BT1 3BG
www.food.gov.uk

Public Health Agency (Northern Ireland)

Linenhall Street Unit, 12-22 Linenhall Street, Belfast, BT2 8BS

www.publichealth.hscni.net/

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

2. Animal population

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

Agricultural Census in Northern Ireland is conducted in June of each year. Data is collected on livestock numbers.

Administrative data is used from the Animal and Public Health Information System (APHIS) cattle tracing system, the Northern Ireland Bird Register Update and the Annual Inventory of Pigs – all complete censuses.

- Agricultural Census in Northern Ireland 2021 - Detailed Report

No data/information for NI deer populations as not collected on APHIS nor reported on the Agricultural Census Report.

Chicken and turkey flock numbers have been calculated from data collected as part of the Northern Ireland *Salmonella* National Control Plan in 2021.

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

Poultry – The total number of poultry on farms remains relatively stable over time. However, within poultry categories we have seen a decrease in laying birds offset by the increase in broilers.
Pig - A small number of large, highly productive businesses drive most of the change in this sector in Northern Ireland. Recently figures have shown consistent annual increases.
Beef – Beef cow numbers in Northern Ireland have been relatively stable over the last 3 years following a consistent decline in numbers over the previous decade.
Dairy – Dairy cows continue to see small year on year increases. Primarily driven by increasing herd sizes amongst larger milk producers.
Sheep – The total number of sheep have increased recently but continue to experience year on year fluctuations in line with the volatile price of lamb.
Goats – Goat population in Northern Ireland continues to decline year on year and in 2021 is almost one third smaller than in 2017.

(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

3. General evaluation*: *Mycobacterium bovis*

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

M. bovis is a zoonotic organism which is the main causative organism of bovine tuberculosis (TB). It forms part of the *Mycobacterium tuberculosis* Complex (MTBC) which also includes a range of zoonotic mycobacteria including *M. tuberculosis. M. bovis* is the only member of the MTBC complex which has been confirmed in cattle in Northern Ireland in 2021.

***M. bovis* as a zoonotic agent**

M. tuberculosis is the main causative agent of TB in humans but human infection with *M. bovis* is clinically indistinguishable from disease caused by *M. tuberculosis*. Zoonotic transmission of bovine TB from cattle to humans can occur by aerosol transmission (via close contact with heavily infected cattle) or by ingestion of unpasteurised milk and dairy products.

The history of control of bovine TB in Northern Ireland

In 1949 a voluntary TB control scheme based on the use of intradermal testing was launched for cattle in Northern Ireland. This was later replaced by a compulsory eradication campaign in 1959. Initially progress was good and by the early 1980s, infection in cattle had been reduced to a very low level. In contrast, recent decades have seen a significant increase in disease levels in cattle. Incidence peaked in 2002 following an outbreak of Foot and Mouth Disease and has fluctuated since.

The current situation

Bovine TB is a notifiable disease in Northern Ireland and as such, all suspected or confirmed cases in any animal species must be reported to the Competent Authority. The Competent Authority in Northern Ireland is the Department of Agriculture, Environment and Rural Affairs (DAERA).

Cattle and badgers are the main maintenance hosts for *M. bovis* in Northern Ireland and it is currently considered to be endemic in both. Infection can occur and has also been reported in many other species but these are mainly regarded as spill-over or dead-end hosts. Sporadic cases are reported in non-bovines in Northern Ireland- mainly in alpacas and occasionally deer.

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

In the late 19th century tuberculosis in humans was widespread in Northern Ireland and was a major cause of mortality. It is thought to have been responsible for approximately 1 in 5 deaths at its peak.

Throughout the 20th century huge progress was made in controlling tuberculosis in humans. There were many reasons why TB control became one of the major public health successes of recent centuries. Societal changes and improvements in housing, nutrition and living standards played an important part, as did specific controls such as the implementation of universal free BCG vaccination of school age children. This was replaced in 2005 by more targeted use in high risk areas and individuals.

The gradual adoption of routine milk pasteurisation and the progress made in reducing disease levels in the cattle population between 1950 and 1980 contributed to the virtual elimination of zoonotic TB as a major human health issue. Although cattle disease levels remain stubbornly high, the controls in place throughout the food production chain mean that zoonotic transmission of *M. bovis* currently poses a very low risk to human health in Northern Ireland. These controls include statutory participation in the cattle eradication programme, statutory meat inspection and restrictions on the sale of unpasteurised milk.

The current situation

Preliminary data from the Public Health Agency (PHA) shows that in 2021 there were 55 human MTBC cases diagnosed in Northern Ireland. 7 of these cases were confirmed to be *M. bovis*. 2 of the confirmed *M. bovis* cases were linked to an unconfirmed suspect case in a domestic cat. In addition, 2 further suspected human cases which were not confirmed as *M. bovis* were linked to the same possible source. No human cases were attributed directly to food borne infection.

The recent trends for human cases

Northern Ireland is considered to be a low incidence region for MTBC in humans. The average annual case rate is consistently between 3 and 4 cases per 100,000 head of population. Since the annual case numbers are small, trends are generally evaluated on the basis of a three-year moving average. The most recent three year moving averages are:

2016-2018: 3.7 cases per 100,000
2017-2019: 3.4 cases per 100,000
2018-2020: 3.1 cases per 100,000

3.3 Any recent specific action in the Member State or suggested for the European Union [(b)]
Not applicable
3.4 Additional information
DAERA liaises with the PHA when there is a potential for zoonotic transmission of disease. When a TB outbreak occurs on a holding the herd keeper is provided with public health information aimed at reducing the risk of zoonotic transmission.
*** 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

4. Description of Monitoring/Surveillance/Control programmes system*: *Mycobacterium bovis*

4.1 Monitoring/Surveillance/Control programmes system [(a)]

Bovine TB is a notifiable disease in Northern Ireland and as such, all suspected or confirmed cases in any species must be reported to DAERA. DAERA will liaise with the PHA if there is considered to be a significant risk of spread between humans and animals.

There is a very comprehensive bovine TB eradication programme in place for cattle in Northern Ireland. This is backed up by additional controls on meat and milk. The key points are summarised below;

Tuberculosis Monitoring, Surveillance and Control in Cattle (see Section 44 for further details)

All cattle holdings in Northern Ireland must be registered with DAERA and there is full traceability at herd and individual animal level via the Animal and Public Health Information System (APHIS). This system underpins the eradication programme and facilitates application and enforcement of movement restrictions, and tracing to and from infected holdings.

The programme centres on the use of the Comparative Intradermal Tuberculin Test (CITT) on all herds at least annually. Testing frequency is increased in higher risk herds for example those contiguous to an infected herd.

The Interferon Gamma (IFNG) blood test is also used in some circumstances. This test is almost exclusively used in parallel with the CITT in selected herds where TB infection has been confirmed.

Mandatory routine meat inspection of all carcasses destined for human consumption also provides an important means of detecting TB cases.

There is a comprehensive system of management for all TB breakdown herds. All outbreaks are managed by a DAERA employed veterinarian. The aim of this is to eradicate infection, prevent further spread and identify possible sources. Tracing of animal movements is carried out for all herds with confirmed infection and herds with more than one skin reactor, and traced animals or herds are tested as necessary for source and spread risks. Detailed public health advice is also provided to herd keepers. Infected animals are removed from the herd, and the herd remains under restriction until legislative requirements for the restoration of Officially Tuberculosis Free (OTF) status to the establishment have been met.

Controls against food borne spread

- **Controls for milk and dairy products**

Strict controls are in place to minimise the risk of MTBC infection of humans by the ingestion of milk and dairy products. All holdings producing milk for human consumption must be registered with DAERA as milk producers. The vast majority of milk produced in Northern Ireland is collected directly from farms and then pasteurised at an approved processing plant. The pasteurising process is deemed adequate to eliminate any risk caused by TB infection in cattle. In addition, producers are not permitted to include milk from animals showing a positive reaction to a TB test in the bulk tank.

A very small number of milk producers are also registered to sell unpasteurised/raw drinking milk directly to the public. In the event that such a herd becomes restricted for TB, sale of raw drinking milk from this holding must cease immediately.

- **Controls for meat**

All bovine carcasses destined for human consumption undergo a prescribed meat inspection process undertaken by DAERA employed meat inspectors acting under the supervision of a

DAERA employed Official Veterinarian. This meat inspection process also provides an important means of surveillance.

4.2 Measures in place [(b)]

In cattle

There is no vaccine currently available or licensed for use in cattle against *M. bovis*. The Eradication Programme is therefore based on "test and slaughter" with a comprehensive system of movement restrictions and tracing. All confirmed outbreaks are subject to veterinary epidemiological investigation. No EU approved Eradication Plan was in place for Northern Ireland in 2021 but one is in place from 2022. (Further details of cattle controls are given in **Section 44.)**

In badgers

A passive surveillance programme is in place to monitor levels of *M. bovis* infection in badgers in Northern Ireland. No active badger intervention or vaccination took place in 2021. (See **Section 45** for further details)

In other non-bovine species

Currently DAERA have limited powers in relation to TB in non-bovines unless there are also bovine animals on the same holding, (See **Section 46** for further details)

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

Yes.

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

Summary of 2021 statistics for tuberculosis in cattle

At the end of 2021 the annual herd incidence in Northern Ireland was 8.85% and the annual animal incidence was 0.785 %. (see **44.4** for definitions)

Animals lesioned at routine slaughter

Excluding animals imported directly for slaughter, 2,387 animals with TB-like lesions at routine slaughter (LRS) were detected in Northern Ireland in 2021. Samples from all of these animals are subject to further investigation to confirm or negate TB infection.

This is equivalent to approximately 5.39 LRS animals per 1000 routinely slaughtered animals. This compares with a figure of 2,270 in 2020 and a figure of 2,096 in 2019. The 5 year trend for LRS animals continues to be upward. In 2021 LRS suspects resulted in 656 herds having tuberculosis restrictions imposed.

Longer term trends

Herd incidence fluctuates year on year. In the most recent 5-year period after a peak in 2017 both herd and animal incidence decreased during 2018 and 2019 before increasing again during 2020 and 2021. (See **44.4** for further detail.)

Animals as a source of infection for humans

In 2021 no cases of tuberculosis in humans were attributed to food borne infections. 4 linked cases, 2 of which were confirmed to be *M. bovis*, were attributed to close contact with a possibly infected domestic cat although it was not possible to confirm this.

4.5 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).

5. Description of Monitoring/Surveillance/Control programmes system*: *Mycobacterium bovis* in cattle

5.1 Monitoring/Surveillance/Control programmes system [(a)]

The key components of monitoring / surveillance and control are as follows:

Traceability

All cattle holdings in Northern Ireland must be registered with DAERA and there is full traceability at herd and individual animal level via the Animal and Public Health Information System (APHIS). This system underpins the eradication programme and facilitates application and enforcement of movement restrictions and movement tracing.

Test and slaughter

The cornerstone of the eradication programme in Northern Ireland is a statutory system of test and slaughter as no vaccination is currently available for use in cattle

Intradermal testing

The CITT (commonly known as the “skin test”) is the key component of the testing programme. All holdings in Northern Ireland are tested at least annually. Testing frequency is increased based on risk- for example holdings deemed at risk from a nearby confirmed outbreak are placed on a programme of 5 monthly testing.

Skin testing is carried out mainly by Approved Veterinary Surgeons (AVSs). AVSs are private sector veterinarians who supply testing services to DAERA under the terms of a tightly regulated Public Services Contract. Some testing is also carried out by veterinarians directly employed by DAERA.

IFNG Testing

The Interferon Gamma (IFNG) blood test is also used in some circumstances. This test is primarily exclusively used in parallel with the CITT in herds where TB infection has been confirmed. The aim of its use is to increase the detection of infected animals, particularly those in the earlier stages of infection. However in Spring 2021 policy was amended to permit the use of "standalone" IFNG testing in exceptional cases. This was intended to allow more rapid decision making in the case of explosive outbreaks when full or partial depopulation may warrant consideration.

The use of the IFNG test has to date been voluntary for herd keepers in Northern Ireland, but the removal of any IFNG positive animals is mandatory irrespective of the CITT results. Sampling for IFNG testing is carried out by DAERA staff.

Meat Inspection

All cattle slaughtered for human consumption undergo routine meat inspection. This inspection is carried out by DAERA employed Meat Inspectors under the immediate supervision of a DAERA employed Official Veterinarian (OV). This slaughterhouse surveillance provides an important additional means of detection of infection. When suspect lesions are detected at routine slaughter samples are taken for laboratory confirmation and the herd of origin is restricted pending the outcome of this further testing. If laboratory testing (either histology or culture) yields a positive result for *M. bovis* the case is regarded as confirmed.

Laboratory testing

All laboratory testing services (histology, bacteriology, IFNG testing and molecular strain typing) are carried out by the Agriculture, Food and Biosciences Institute (AFBI).

Case definitions

When one or more animals from a herd is classified as a reactor at a test or found to be lesioned at routine slaughter then the herd is declared a breakdown herd and movement restrictions are imposed. An animal is considered to be a confirmed TB case if it has had either:

- a positive test and either has TB like lesions at post mortem or is positive on subsequent laboratory testing

or

- has visible lesions at routine slaughter and is positive on subsequent laboratory testing.

When more than one skin reactor is found in a herd the herd is automatically treated as a confirmed breakdown.

5.2 Measures in place [(b)]

Vaccination of cattle against *M. bovis* is not available or permitted in Northern Ireland.

When infection is suspected there is a comprehensive set of measures put in place to minimise the risk of further spread. The precise measures for each outbreak can vary depending on risk assessment and confirmation status but the key elements of control measures include the following:

- Movement restrictions are imposed at herd level.
- Isolation notices are served requiring the immediate isolation of suspect cases.
- Animals that are classified as “reactors” or “negative in contacts” are valued and removed from the farm within a target of 15 working days.
- Backward and forward tracing is carried out to identify other herds which may be at risk and subject to veterinary risk assessment, these herds may be subjected to extra testing ± movement restrictions.
- A detailed epidemiological investigation is carried out in order to pinpoint the possible/ likely source of infection.
- Additional short interval skin testing is carried out until the herd fulfils the criteria for OTF restoration. The IFNG blood test is also used in certain pre-defined circumstances in order to improve the sensitivity of detection.
- Prior to restoration of herd status to OTF compulsory cleansing and disinfection must be carried out.
- Detailed biosecurity advice is given to keeper including guidance in relation to the handling and disposal of slurry and farmyard manure.
- Milk from animals showing a positive reaction to a test is not permitted to enter the bulk tank.
- Partial or whole herd depopulations are occasionally actioned subject to comprehensive veterinary risk assessment.
- Herd keepers are given public health advice to mitigate against the risk of human infection. If the risk is deemed to be particularly high DAERA will liaise with the PHA to protect human health.

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

Yes.

The Diseases of Animals Order (1981) (as amended) and the Tuberculosis Control Order (NI) 1999 (as amended) impose a statutory requirement to notify the competent authority (DAERA) of suspect cases of bovine tuberculosis.

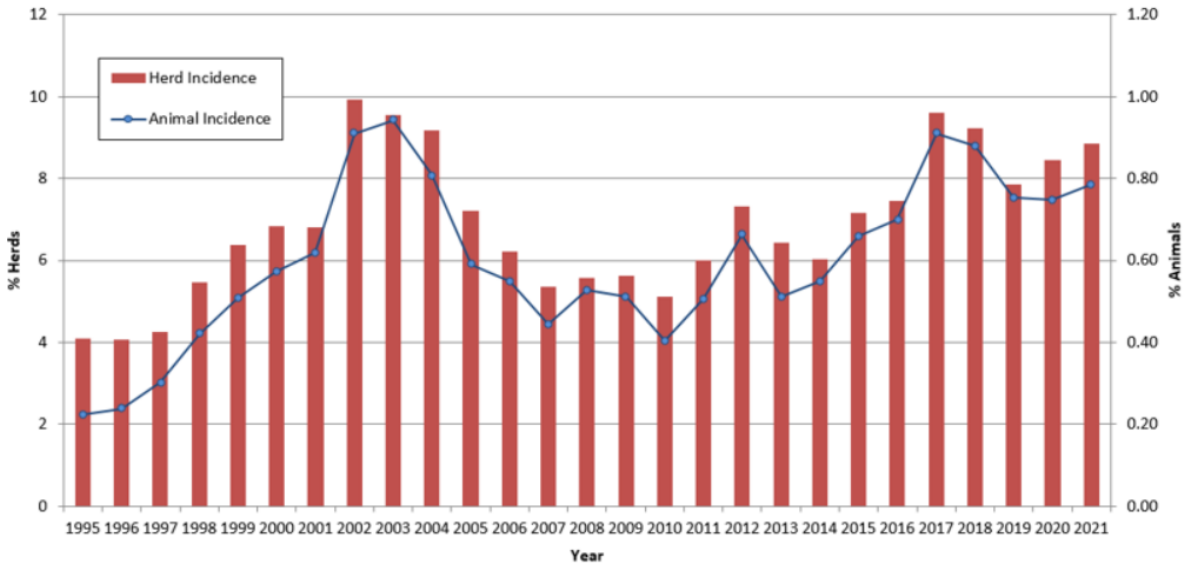
5.4 Results of investigations and national evaluation of the situation, the trends [(d)] and sources of infection [(e)]

Key statistics for 2021

Animal and Herd Incidence

The headline figures used in the TB Programme are the "annual herd incidence" and the "annual animal incidence". The annual herd Incidence is defined as the number of new reactor herds during the last 12 months as a proportion of cattle herds which have presented cattle for a TB skin test during the same time period. Annual animal incidence is defined as the number of reactor animals during the last 12 months as a proportion of cattle which have been presented for a skin test during the same period. At the end of 2021 the annual herd incidence in Northern Ireland was 8.85% and the annual animal incidence was 0.785 %. Both herd and animal incidence fluctuate year on year as can be seen from the graph below. In the most recent 5-year period after a peak in 2017 both herd and animal incidence decreased during 2018 and 2019 before increasing again during 2020 and 2021.

- **Graph showing trends in NI herd and animal incidence over time**



Other summary statistics for 2021

22,249 herds carried out at least one tuberculin skin test with 1,827,749 animals tested on at least one occasion.
A total of 3,470,931 animal skin tests were carried out in NI in 2021.
14,355 animals were identified as skin test reactors and a further 794 animals were removed as negative in contacts.
During 2021 21,821 IFNG blood tests were carried out of which 1,488 skin test negative animals yielded a positive IFNG result. Of these 1,313 were removed on the basis of a positive IFNG result only. From 21/04/2021 removal of IFNG positive animals became compulsory. Prior to this date surrender of these animals for removal was voluntary. Of the animals removed solely on the basis of positive IFNG results, 8.53 % (112 animals) had visible lesions detected at slaughter.
2,387 animals were found to have suspect lesions at routine slaughter (LRS). (These figures exclude animals imported into NI for direct slaughter). This equates to approx. 5.39 LRS animals per 1,000 animals slaughtered. The laboratory confirmation rate of these LRS animals was 61.37%. (387 herds). Of the herds initially restricted due to an LRS, 167 had at least one skin reactor in follow up herd testing. This underlines the importance of routine meat inspection as a form of surveillance.

A more detailed summary of the Northern Ireland disease trends and statistics can be found online via the following link:
https://www.daera-ni.gov.uk/publications/tuberculosis-disease-statistics-northern-ireland-2021

Animals as a source of infection for human cases

In 2021 no cases of *M. bovis* in humans were attributed to spread from infected cattle either directly or by ingestion of meat or dairy products.

5.5 Additional information

Since the restoration of the devolved institutions in January 2020 and the appointment of Edwin Poots MLA as Minister of Agriculture, Environment and Rural Affairs, significant progress has taken place on the development of a new Bovine TB Eradication Strategy for Northern Ireland. The Strategy has been the product of several years' work and builds on the 2016 recommendations of the TB Strategic Partnership Group and subsequent public consultation on the Department's response. Parts of the proposed strategy were subject to a further public consultation in summer 2021, with over 3,300 responses received. The Strategy was subsequently launched by Minister Poots in a statement to the Northern Ireland Assembly on 24 March 2022.

*** 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).

6. Description of Monitoring/Surveillance/Control programmes system*: *Mycobacterium bovis* in badgers

6.1 Monitoring/Surveillance/Control programmes system [(a)]

M. bovis is widely acknowledged to be endemic in badgers in Northern Ireland. Since 1998 there has been a passive surveillance programme in place for badgers killed in road traffic collisions. When roadkill badgers are reported DAERA staff collect the carcase and it is subjected to detailed post mortem and laboratory testing at the Agri-Food and Biosciences Institute (AFBI). When tuberculosis infection is confirmed then molecular strain typing is carried out and this provides a useful comparison with strain types in cattle in the area. Results of testing are reported to DAERA epidemiologists.

The results of this survey provide an indication of levels of infection in badgers in Northern Ireland over time.

6.2 Measures in place [(b)]

No badger intervention (culling or vaccination) was carried out in Northern Ireland in 2021.

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

Yes.

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

In 2021 421 badger carcases were collected at the roadside. Some carcases were too badly damaged or decomposed to be suitable for testing. In 2021 373 badger carcases were suitable for testing. Of the results available to date, 292 badgers were negative and 49 were positive.

For the last 5-year period for which full data is available (2016-2020 inclusive) 16.7% of collected badgers were confirmed with *M. bovis*. There has been fluctuation from year to year with confirmation levels remaining consistently between 13% and 20%.

6.5 Additional information

*** 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).

7. Description of Monitoring/Surveillance/Control programmes system*: *Mycobacterium bovis* in non-bovines (excluding badgers)

7.1 Monitoring/Surveillance/Control programmes system [(a)]

M. bovis is seen sporadically in Northern Ireland in non-bovines, most commonly in alpacas, and occasionally in deer, domestic cats and other species.

Keepers of alpacas and deer are required to register with DAERA and are issued with a holding number but currently there is no specific legislation in place to allow DAERA to impose restrictions

and compulsory testing on non-bovines unless there is also a bovine herd on the holding. When cases are found they are notified by the AFBI laboratory to DAERA. Advice is given to the holding on disease control and public health.

When there are bovine animals present on the same holding DAERA has the power to enforce testing of the bovine and non-bovine animals.

There is currently no commercial deer abbatoir in Northern Ireland so deer are exported to England for slaughter. When suspect lesions are detected at slaughter this information is relayed to DAERA for follow up investigation.

7.2 Measures in place [(b)]

Where infection is revealed in non-bovines on a cattle establishment, follow-up investigation and testing will be undertaken on the establishment. Cattle herds at risk will have their Officially Tuberculosis Free status withdrawn.

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

Yes.

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

In 2021 there were 5 cases of suspected *M. bovis* reported by AFBI in alpacas submitted for post mortem for a variety of reasons. Reasons for case submissions included sudden death, weight loss and non-treatment responsive pneumonia. *M. bovis* was subsequently confirmed in 4 alpacas from 3 different holdings. A further alpaca was confirmed to have an infection with an unidentified Mycobacteria and cultured negative for *M. bovis*. Public health advice has been given to the alpaca owners and no related human cases have been reported.

Unusually in 2021 a case of *M. bovis* was also confirmed by AFBI in one of 2 rams that were submitted for euthanasia and post mortem for investigation for weight loss and ill thrift. Subsequent strain typing demonstrated the presence of the same strain type recognised to be endemic in the area amongst cattle herds. Although the sheep had common ownership with a small cattle herd, they were grazed and housed separately. Officially Tuberculosis Free status was withdrawn from the cattle herd and further testing has not revealed any evidence of infection in the cattle. On

investigation DAERA veterinary staff found that the area grazed by the sheep flock showed a very high level of badger activity so the source was assumed to be badger related. Following laboratory confirmation of *M. bovis* DAERA carried out further skin tests on the infected flock during 2022. To date 6 further sheep have been removed and the outbreak is still ongoing. Public health advice has been given to the owner and no related human cases have been reported.

During 2021 there was also a family cluster of 4 cases of suspected *M. bovis* in humans which were suspected to be linked to close contact with an infected domestic cat. 2 of the human cases confirmed as *M. bovis* on culture but no culture was available for the other 2. Unfortunately, no testing could be carried out on the suspect cat/s to prove the causation so this cannot be reported as a confirmed case of zoonotic infection. Aside from these cases no human cases of MTBC were attributed to likely animal sources by PHA during 2021.

No LRS reports were received by DAERA for deer in 2021.

7.5 Additional information

*** 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).

8. General evaluation*: Brucellosis

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

Humans: In Northern Ireland (NI) cases of brucellosis in humans usually occur as a result of infection acquired outside the UK although historically in humans it had been recorded in those whose work may have brought them into close contact with infected cattle.
Animals: Northern Ireland was granted Officially Free status for *Brucella abortus* on 6th October 2015 (Commission Implementing Decision (EU) 2015/1784). *Brucella melitensis, B. ovis* and *B. suis* have never been recorded in NI.

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

During the year 2021, there were no cases of brucellosis in cattle in NI, which has retained its Officially Brucellosis Free Status. No sheep or goat herds were confirmed positive for *Brucella melitensis* during the annual sheep and goat survey in 2021. No cases of *B. ovis* and *B. suis* were detected during 2021.

*** 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

9. Description of Monitoring/Surveillance/Control programmes system*: Bovine brucellosis

9.1 Monitoring/Surveillance/Control programmes system [(a)]

In Northern Ireland the Department of Agriculture, Environment and Rural Affairs (DAERA) carried out a programme of blood testing of all herds containing breeding stock (and milk testing of all dairy herds). Routine brucellosis blood sampling was carried out on beef cattle herds in Northern Ireland on an annual basis until June 2015, when testing frequency was changed to a triennial basis. Dairy herds were routinely blood sampled on a biennial basis until November 2015, when the frequency of testing was decreased to once every five years. Blood samples were also collected from animals presented for slaughter with a priority being given to older cull cows and all non-negative results

are followed up as appropriate. Monthly bulk milk ELISA testing continued with non-negative results investigated. In accordance with Annex A of EU Council Directive 64/432 routine blood sampling of animals on-farm as part of disease surveillance ceased from 06/10/2020. Disease surveillance continues with monthly bulk milk ELISA testing as well as blood sampling of cull cows at point of slaughter with all non-negative results investigated and followed up. Additionally, all females and bulls over one year old imported from continental Europe are blood sampled post-import. Reporting of abortions is also a legislative requirement with follow up in all cases.

If a suspected *Brucella* organism has been cultured in NI it must be reported to the Competent Authority and sent for identification to the Brucella National Reference Laboratory under the requirements of the Zoonoses Order (Northern Ireland) 1991.

9.2 Measures in place [(b)]

Northern Ireland had used the Serum Agglutination Test (SAT) until 20/04/2021 in accordance with Annex C of Directive 64/432/EEC as a screening test for low-risk tests with the Complement Fixation Test (CFT) and ELISA Test used for confirmation (if any SAT reading greater than or equal to 30iu is detected at this test). Parallel testing with SAT and ELISA was carried out in all high-risk tests: if any SAT results were greater than or equal to 30iu or any iELISA results are non-negative, CFT testing was carried out.
From 21/04/2021 iELISA has been used to test blood samples to comply with EU Regulation 2016/429 and Annex III of EU delegated Regulation 2020/689. The Complement Fixation and Rose Bengal tests are used as confirmatory tests.
Bovine brucellosis is a notifiable disease in NI. Vaccination of animals is not allowed. A suspect clinical case or a non-negative result identified via the various surveillance programmes will be investigated immediately. Blood, milk, placental material and/ or swabs will be collected and tested as appropriate using serological and bacteriological methods. All methods are conducted in accordance with the requirements of the OIE Manual of Diagnostic Tests and Annex III EU Regulation 2020/689. The suspect animal or herd will be placed under official restrictions until the case is resolved. Herds giving non-negative results to the milk ELISA test are subjected to movement restrictions, herd blood testing and epidemiological investigations to negate or confirm disease presence. Cattle sera are tested by serology (indirect ELISA) and non-negative samples are then tested by confirmatory Complement Fixation Test (CFT). . Herd movement restrictions stop the movement of animals off the premises, except under the authority of a movement license issued by DAERA., Non-negative serology animals identified are also individually restricted, required to be kept in isolation and retested (by indirect ELISA and CFT) until resolved. .

Restrictions are lifted when all tests become negative and there are no epidemiological indicators of infection.
Abortions are required to be notified and a restriction notice is issued for these animals, prohibiting their movement off the premises and requiring them to be isolated. The animals are tested using iELISA tests until a negative test result at 21 days post-abortion is obtained.

Where positive serology persists and an animal(s) is classified as a reactor(s) herd, restrictions are imposed and OBF status suspended. The reactor(s) is required to be kept in isolation until slaughtered. Where the presence of *Brucella abortus* is confirmed by culture of selected tissue samples taken at point of slaughter either:

- all breeding and potential breeding animals (reactors, infected and contact) are valued and slaughtered, or;
- The breeding animals in the herd are subject to a blood testing schedule.

The OBF status of the herd is not restored until at least two clear herd tests have been completed, the last test being at least 21 days after any animals pregnant at the time of the outbreak have calved. In practice, this may mean the restriction and testing of all breeding cattle in a herd through an entire calving cycle. Whenever the Officially Brucellosis Free (OBF) status of a dairy herd is suspended, the Environmental Health Department of the Local Authority is informed so that a heat treatment order may be served to ensure all milk is heat treated before human consumption.
Compensation is paid to a limit of 75% of the average market value subject to a ceiling based on market returns. When an animal is intended to be slaughtered, the amount of compensation is based on the market value of the animal. The market value is an amount agreed between the competent authority and the owner of the animal. Where agreement cannot be reached the owner has the option to nominate an independent valuer to value the animal. Where either the competent authority or the owner is dissatisfied with the determination of market value they may submit an appeal to an independent panel.
Investigations into contact with contiguous herds are undertaken to assess the risk of spread of infection. Herds of origin, transit herds or other herds considered to be at risk are tested. Forward tracing is carried out and animals which have left the infected herd since the last negative herd test are tested. Contiguous herds are tested as well as herds with cattle movements to and from the affected herd. Before restrictions can be lifted, the premises have to be cleansed and disinfected with an approved disinfectant and subjected to veterinary inspection.

Where the presence of *Brucella spp.* is not confirmed by culture the herd remains restricted until two clear serological herd tests have been completed at 30 and 90 days post slaughter of the reactor.

9.3 Notification system in place to the national competent authority (c)

Yes: Bovine brucellosis a notifiable disease and cases of premature calving's and abortions must be notified to the Competent Authority. In addition, if a suspected *Brucella* organism has been cultured by a NI laboratory, it must be reported to the Competent Authority and sent for identification to the Brucella National Reference Laboratory under the requirements of the Zoonoses Order 1989 and Zoonoses Order (Northern Ireland) 1991.

9.4 Results of investigations and national evaluation of the situation, the trends (d) and sources of infection (e)

No cases of bovine brucellosis were identified in animals in 2021. In Northern Ireland, which attained OBF status on 06/10/2015, there have been no confirmed breakdowns since February 2012. Human cases of brucellosis that are diagnosed nowadays in NI are associated with infection contracted during travel. Historically in Northern Ireland cases of *Brucella abortus* were occasionally acquired by those whose work brought them into close contact with infected cattle. The most likely source of any future bovine infection is an imported animal – all breeding animal imports > 1 year old from outside the British Isles are blood sampled post arrival.

9.5 Additional information

*** 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).

10. Description of Monitoring/Surveillance/Control programmes system*: Brucellosis in sheep and goats

10.1 Monitoring/Surveillance/Control programmes system [(a)]

Brucellosis is a notifiable disease in sheep and goats and there is a statutory surveillance programme for the disease in NI. NI is officially free of ovine and caprine brucellosis. Neither *Brucella melitensis* nor *Brucella ovis* have ever been recorded in NI.

10.2 Measures in place [(b)]

Brucellosis in sheep and goats is a notifiable disease under national legislation. Ovine epididymitis caused by *Brucella ovis* is also notifiable. Isolation of the *Brucella* organism in a laboratory must also be reported to the Competent Authority under the Zoonoses Order 1989 and Zoonoses Order (Northern Ireland) 1991. A sample of flocks and herds is serologically checked each year using Complement Fixation Tests in the annual Sheep and Goat survey. No sheep or goat herds were identified as infected for *Brucella melitensis* during the annual sheep and goat survey in 2021. In addition, all investigations into sheep and goat abortions from which samples were submitted to Government laboratories for investigation were negative on testing for brucellosis.

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

Yes: Brucellosis is notifiable in sheep and goats and suspect cases of disease must be notified to the Competent Authority. This should mean that disease caused by any *Brucella* spp. in these species in NI will be notified or reported. In addition, if a suspected *Brucella* organism has been cultured by NI laboratory, it must be reported to the Competent Authority and sent for identification to the Brucella National Reference Laboratory under the requirements of the Zoonoses Order 1989 and Zoonoses Order (Northern Ireland) 1991.

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

No cases of *Brucella melitensis* or *Brucella ovis* were identified in animals in 2021. Human cases of brucellosis that are diagnosed nowadays in NI are associated with infection contracted during travel.

10.5 Additional information

*** 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).

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

11.1 Monitoring/Surveillance/Control programmes system [(a)]

Brucellosis is a notifiable disease in Northern Ireland. NI is officially free of *Brucella suis*: no cases have ever been recorded here.

11.2 Measures in place [(b)]

In Northern Ireland, *Brucella* in pigs is a notifiable disease under national legislation. Investigations are undertaken by official vets if clinical disease is suspected or following non-negative serological test results. Serological testing is carried out for boars intended for use as donors for artificial insemination and for pigs for export according to the importer's requirements. Isolation of the organism in a laboratory must also be reported to the Competent Authority under the Zoonoses Order 1989 and the Zoonoses Order (Northern Ireland) 1991.

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

Yes: It is a notifiable disease in Northern Ireland, and suspect cases of disease must be notified to the Competent Authority. In addition, if a suspected *Brucella* organism has been cultured by a NI

laboratory, it must be reported to the Competent Authority and sent for identification to the Brucella National Reference Laboratory under the requirements of the Zoonoses Order 1989 and Zoonoses Order (Northern Ireland) 1991.

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

No cases of *Brucella suis* were identified in pigs in 2021. Human cases of brucellosis that are diagnosed nowadays in NI are associated with infection contracted during travel.

11.5 Additional information

*** 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).

12. General evaluation*: Echinococcus

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

Echinococcus granulosus is present in Northern Ireland.

E. multilocularis has not been found in the indigenous NI animal population. NI has official disease-free status in accordance with Commission Delegated Regulation (EU) No 2018/772.

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

Animals: In Northern Ireland, Veterinary Service staff are situated in all meat plants and carry out post-mortem inspection of all carcases, including inspection for evidence of hydatid cysts.

E. multilocularis has not been found in indigenous animals in NI. NI has official disease-free status in accordance with Commission Delegated Regulation (EU) No 2018/772.

*** 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

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

13.1 Monitoring/Surveillance/Control programmes system [(a)]

Carcases are inspected in slaughterhouses in line with official controls legislation (Regulation 625/2017).

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

Hydatid disease in animals is not notifiable in NI and the identification of the parasite in animal tissues is not reportable.

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

As part of an annual, continuous monitoring programme in wild definitive hosts to demonstrate disease freedom in the UK, faecal samples are collected from red foxes (*Vulpes vulpes)* and tested for the presence of *E. multilocularis* and *E. granulosus*. In total in 2021, 355 were collected and tested in Northern Ireland. Of the total 355 foxes tested in NI during the year, all tested negative for *E. multilocularis* and *E. granulosus*. These results are supported by previous surveys and give 95% confidence that *E. multilocularis* is not present in the NI red fox population at a prevalence of 1% or greater.

13.4 Additional information

*** 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).

14. Description of Monitoring/Surveillance/Control programmes system*: Echinococcus granulosus in meat

14.1 Monitoring/Surveillance/Control programmes system [(a)]

The identification of cysts that are reported as the finding of hydatid disease at post-mortem inspection of livestock slaughtered for human consumption at licensed abattoirs in NI occurs regularly. However, these cysts are not subject to further investigation and so their identification does not give a definite overview of hydatid prevalence. Therefore, this data appears in the data tables as 'Echinococcus, unspecified sp.'. The impact of the disease on the health of the individual animal is negligible. There are only marginal economic losses to the individual farmer from condemnation of affected organs, principally the liver.

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

Hydatid disease in animals is not notifiable in NI and the identification of the parasite in animal tissues is not reportable.

*** 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).

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

15.1 Monitoring/Surveillance/Control programmes system [(a)]

Under EU Commission Delegated Regulation (EU) no 2018/772 of 21 November 2017 surveillance of the wild definitive hosts (red foxes, *Vulpes vulpes*) is required to demonstrate disease freedom to justify continued preventive health measures to control *E. multilocularis* infection in dogs and prevent further geographical spread of the parasite to free areas within the EU. That surveillance requires the testing each year of a specified number of foxes randomly sampled from across Northern Ireland.

15.2 Measures in place [(b)]

NI has official *E. multilocularis* free status. A survey is carried out each year of the definitive wildlife host, the European red fox, *Vulpes vulpes,* to verify that NI remains free of *E. multilocularis.* In addition to keep NI free of *E. multilocularis* all dogs entering NI (except for those coming from other countries with official disease-free status in accordance with Commission Delegated Regulation (EU) No 2018/772) must be treated with praziquantal before entering NI. This treatment must have been given no less than 24 hours and no more than 120 hours (5 days) before the dog enters NI. If a dog is not treated it will be refused entry or put into quarantine.

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

There is a statutory requirement to report if an animal or carcass is known or suspected to be infected by *Echinococcus multilocularis,* under the Zoonoses Order 1989 (as amended). The finding of *E. multilocularis* in the wild definitive host, the European red fox, must be notified immediately to the EU.

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

As part of an annual, continuous monitoring programme in wild definitive hosts to demonstrate disease freedom in NI, faecal samples are collected from red foxes (*Vulpes vulpes)* and tested for the presence of *E. multilocularis* and *E. granulosus*. In total in 2021, 355 were collected and tested in Northern Ireland. Of the total 355 foxes tested in NI during the year, all tested negative for *E. multilocularis* and *E. granulosus*. These results are supported by previous surveys and give 95%

confidence that *E. multilocularis* is not present in the NI red fox population at a prevalence of 1% or greater.

15.5 Additional information

*** 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).

16. General evaluation*: Listeriosis

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

Listeria monocytogenes is widely distributed in the environment, including in soil, decaying vegetation and fodder such as silage in which the bacteria can multiply. In humans the disease most commonly occurs in pregnant women, neonates, elderly people and those with a range of underlying medical conditions including cancer and diabetes. Consumption of foods contaminated with *L. monocytogenes* is the main route of transmission to humans. Zoonotic infection acquired directly from animals is also possible, although cases reporting animal contact are rare. In animals, listeriosis is chiefly a disease of farmed ruminants, with cattle and sheep considered the most frequently clinically infected species. Infection is opportunistic, and may occur through umbilical infection in the neonatal period, or more commonly though the ingestion of soil or soil-contaminated feed, notably poor quality silage.

Listeriosis is a rare disease in Northern Ireland.

The potential link, if any, between listeriosis infection in animals and infection in humans still remains unclear. In animals in Northern Ireland the majority of cases occur between January and

April when animals are housed. This peak in cases is linked to the feeding of poorly fermented soil-contaminated silage.

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

In animals, numbers of diagnoses of listeriosis vary between years, and are influenced by submission rates but also by climatic factors which may influence silage quality or soil exposure for grazing animals.

Relevance of animal findings to human cases:
It is believed that consumption of contaminated foods is the main transmission route for both people and animals. Human infection acquired directly from animals is possible, but apart from a few cases it is not clear what, if any, connection there is between human listeriosis and animal listeriosis.

16.3 Additional information

*** 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

17. Description of Monitoring/Surveillance/Control programmes system*: Listeria spp

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

Animals: During 2021, there were 48 incidents of listeriosis confirmed in animals in Northern Ireland, with diagnoses achieved via the submission of clinical material by private veterinarians for diagnostic investigation at the Agri-food and Biosciences Institute.

There were 13 incidents reported in cattle (includes 8 that involved diagnosis in foetal samples) and 35 incidents (includes 16 that involved diagnosis in foetal samples) in sheep. There were no incidents reported in pigs or goats. This compared with three incidents reported in cattle and 16 reported in sheep in 2020. There were six incidents reported in cattle and 26 reported in sheep in 2019.

*** 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).

18. General evaluation*: Shiga toxin-producing *Escherichia coli* (STEC)

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

Shiga toxin-producing *Escherichia coli* (STEC), formerly known as Vero cytotoxin-producing *Escherichia coli* (VTEC), are a group of bacteria that may cause infectious gastroenteritis.

Ruminants, particularly cattle, are thought to be the main reservoirs for *E. coli* O157 in Northern Ireland although they display no obvious signs of disease. STEC is not notifiable in animals in

Northern Ireland and is not subject to any monitoring. No STEC positive animals were identified in Northern Ireland in 2021 in samples submitted for routine diagnostic tests.

*** 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

19. Description of Monitoring/Surveillance/Control programmes system*: STEC in ruminants

19.1 Monitoring/Surveillance/Control programmes system [(a)]

Shiga toxin-producing *Escherichia coli* (STEC), formerly known as Vero cytotoxin-producing *Escherichia coli* (VTEC) may be identified in Northern Ireland by Government veterinary laboratories.

Cattle are the main reservoir of STEC O157 in Northern Ireland, but the organism is also commonly found in other ruminants, especially sheep, and has been isolated from a wide range of other livestock and wildlife species.

19.2 Measures in place [(b)]

Available controls for STEC, including STEC O157 in animals, rely on the application of good husbandry and hygiene measures particularly at the point of provision of food production. These principally require the hygienic production and pasteurisation of milk, the provision of clean animals to slaughter, the use of clean water for the irrigation of crops (particularly those that are ready to eat) and the application of hygiene practices in the processing of these animals and the products derived from them.

In addition, controls to minimise the risk of zoonotic spread on farms require the application of appropriate risk management procedures based upon those suggested for open farms. Visitors to livestock farms, including those open to the general public, ramblers and workers on commercial livestock farms are all at risk of exposure, and should ensure good hand hygiene is observed. Risk of foodborne human illness can be reduced by thoroughly cooking meat and meat products, and by avoiding cross-contamination of work surfaces and ready-to-eat foods. At abattoirs, Food Business Operators are required to check the hide or skins of livestock presented for slaughter for faecal

contamination and take the necessary steps to avoid contamination of the meat during slaughter and processing.

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

No: there is no requirement to notify a suspicion of STEC infection in animals in Northern Ireland, or for a private veterinary laboratory to notify the Government should STEC be identified in samples derived from animals.

*** 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.

20. General evaluation*: Toxoplasmosis

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

Although the clinical signs of Toxoplasma infection are usually mild, infection can be associated with serious sequelae including eye disease and disability. People who are immunocompromised and pregnant women newly infected with Toxoplasma are particularly vulnerable; in the latter, miscarriage, stillbirth and deformities of the child can occur.

In animals in Northern Ireland, toxoplasmosis is not notifiable or reportable. In animals, surveillance relates to examination of samples received for diagnostic or monitoring reasons at the Agri-food and biosciences institute. Isolates from private laboratories are not reported. Toxoplasmosis is endemic in the Northern Ireland sheep population and cases are regularly diagnosed in goats and on occasion in other species. Vaccination is carried out in some sheep flocks and goat herds.

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

Toxoplasmosis is generally one of the more common causes of ovine abortion in Northern Ireland, but previous data suggests a cyclical aspect to annual case numbers, possibly associated with waning levels of flock immunity.

*** 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

21. Description of Monitoring/Surveillance/Control programmes system*: *Toxoplasma gondii* in animals

21.1 Monitoring/Surveillance/Control programmes system [(a)]

Some cases of toxoplasmosis are identified in Northern Ireland each year by Government laboratories as part of scanning surveillance of material submitted from clinically affected animals. No official control programme for toxoplasmosis in animals is pursued in Northern Ireland. Vaccination is permitted and pursued by some shepherds

21.2 Measures in place [(b)]

No specific control measures are in place in Northern Ireland with respect to *Toxoplasma gondii*. Some cases are identified in animals each year via scanning surveillance (mostly in sheep but a few incidents in goats are generally identified too) but this is not a structured survey and so makes comparing annual diagnosis numbers challenging given the changes in submission numbers year on year

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

No: there is no requirement to notify a suspicion of *Toxoplasma gondii* infection in animals Northern Ireland or for a private veterinary laboratory to notify the Government should *T. gondii* be identified in samples derived from animals.

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

Toxoplasmosis is generally one of the more common causes of ovine abortion in Northern Ireland. The relative contribution of the foodborne route of transmission to the overall human disease burden in Northern Ireland as well as the contribution of different food vehicles, is also unknown.

During 2021, a total of 262 sera were received (243 from sheep, 6 from cattle, 6 from goats, 4 from pigs and 3 from alpacas). 119 sheep samples were positive (49%) and 4 cattle samples were

positive, two goat samples were positive and two alpaca samples were positive. There were 33 diagnoses of toxoplasmosis (including fetopathy) made by AFBI in Northern Ireland all in sheep.

21.5 Additional information

*** 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).

22. General evaluation*: Yersiniosis

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

In 2021, the number of animal cases found via clinical surveillance in Northern Ireland was 120 from clinical diagnostic samples submitted by private veterinarians to the Agri-food and Biosciences Institute (AFBI). The annual number of diagnoses is generally low and it is therefore difficult to comment on trends. In 2020, the number of animal cases found via clinical surveillance in NI was 102. In 2019, the number of animal cases found via clinical surveillance in in Northern Ireland was 131.During 2018, there were 92 cases of yersiniosis reported in Northern Ireland and in 2017, 131 cases of yersiniosis were diagnosed in animals in Northern Ireland.

22.2 Additional information

Pigs are considered to be the primary reservoir of human pathogenic *Y. enterocolitica* strains, mainly because of the high prevalence of such strains in pigs and the high genetic similarity between human and porcine isolates. Yersinia was identified in the EFSA opinion on meat inspection in pigs as one of the four major public health hazards.

*** 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

23. Description of Monitoring/Surveillance/Control programmes system*: *Yersinia spp.* in animals

23.1 Monitoring/Surveillance/Control programmes system [(a)]

Cases of Yersinia are identified in Northern Ireland each year by the Agri-food and Biosciences Institute as part of scanning surveillance of material submitted from clinically affected animals. No official control programme of Yersinia spp. in animals is pursued in Northern Ireland

23.2 Measures in place [(b)]

No specific control measures are in place in Northern Ireland with respect to Yersinia spp. Some cases are identified in animals each year via scanning surveillance, but this is not a structured survey and so makes comparing annual diagnosis numbers challenging given the changes in submission numbers year on year

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

There is no requirement to notify a suspicion of Yersinia infection in animals in Northern Ireland, or for a private veterinary laboratory to notify the Government should Yersinia be identified in samples derived from animals.

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

In 2021, the number of animal cases found via clinical surveillance in Northern Ireland was 120 from clinical diagnostic samples submitted by private veterinarians to the Agri-food and Biosciences Institute (AFBI).

The annual number of diagnoses is generally low and it is therefore difficult to comment on trends. In 2020, the number of animal cases found via clinical surveillance in Northern Ireland was 102.

In 2019, the number of animal cases found via clinical surveillance in Northern Ireland was 131 In 2018, 92 cases of yersiniosis were diagnosed in animals in Northern Ireland.
Pigs are considered to be the primary reservoir of human pathogenic *Y. enterocolitica* strains, mainly because of the high prevalence of such strains in pigs and the high genetic similarity between human and porcine isolates. Yersinia was identified in the EFSA opinion on meat inspection in pigs as one of the four major public health hazards.

23.5 Additional information

*** 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).

24. General evaluation*: Trichinella

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

Trichinosis is a food-borne parasitic disease that is spread primarily by the consumption of raw or undercooked meat products containing nematode larvae of the Trichinella spp. Symptoms are associated first with the gastrointestinal tract and later with the muscles as the worm penetrates and develops there. The main source of human infection is raw or undercooked meat products from pigs or wild boar, but meat products from other animals may also be a source (e.g. horse, bear and walrus). There is no evidence to indicate that Trichinella exists in pigs or wild boar in the UK, as shown by the negative results from carcasses and wildlife that are tested annually.

Humans: There have been no known cases of human trichinosis acquired from infected meat from animals reared in the United Kingdom either in the UK or in other countries that have received meat and meat products from the UK since 1975. Overall, there were no laboratory-confirmed cases of

Trichinellosis between 1987 and 1999 in the UK. Eleven cases of trichinellosis were diagnosed in England and Wales between 2000 and 2014, which included an outbreak of eight cases in 2000 associated with the consumption of imported pork salami. The remaining three cases were travel-related: one in England and Wales in 2001, one in Scotland in 2010 (in a person who had eaten partially cooked meat in France), and the other in Scotland in 2014 (which had been acquired in the Czech Republic).

Animals: The last positive diagnosis in pigs in Great Britain was in 1978. In Northern Ireland, the last confirmed case of trichinellosis in pig meat was in 1979. This case was linked to suspected illegally imported meat.

There is no evidence to indicate that Trichinella exists in pigs or wild boar in the UK, as shown by the negative results from carcasses and wildlife that are tested annually.

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

In NI in 2021 1282 muscle samples from domestic were examined for Trichinella spp, all were negative. A survey of Trichinella in wildlife is carried out for the Food Standards Agency (FSA) in Northern Ireland. In total, 378 fox samples were examined during 2020 and all were negative for Trichinella spp.

*** 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

25. Description of Monitoring/Surveillance/Control programmes system*: *Trichinella spp.* in pigs

25.1 Monitoring/Surveillance/Control programmes system [(a)]

From January 2006, enhanced testing for Trichinella, by the EU pepsin digest method, was extended to the domestic slaughter of all boars, sows and farmed wild boar that are processed in a slaughterhouse and feral wild boar processed in an Approved Game Handling Establishment. In 2008, a voluntary programme for testing feral wild boar hunted for own consumption or direct supply was also introduced. Testing of samples is undertaken by laboratories in the

slaughterhouse, accredited contract laboratories or at the accredited contract laboratory appointed by government. All laboratories take part in a laboratory quality assurance programme organised by the National Reference Laboratory.

Surveillance system: Regulation (EC) No. 2015/1375 lays down specific rules on official controls for Trichinella in meat. It also lays down the methods of detection to be used and requires carcases of domestic swine to be sampled in slaughterhouses and tested for the presence of Trichinella as part of the post-mortem inspection. Carcasses of horses, wild boar and other farmed and wild animal species susceptible to Trichinella infection are also required to be sampled in slaughterhouses or game handling establishments. Carcasses of domestic swine kept solely for fattening and slaughter can be exempt from testing if they come from a holding or category of holding that has been officially recognised by the Competent Authority as operating under controlled housing conditions in accordance with the criteria specified in Regulation (EU) No. 2015/1375. Systematic testing of pigs from a holding or a compartment officially recognised as applying controlled housing conditions may also be reduced if the holding or compartment can demonstrate that no autochthonous Trichinella infestations in domestic swine have been detected in the Member State in the past three years and that prevalence of Trichinella does not exceed one per million in that population.

As per the legislation for the abattoir testing of sows, boars and wild boar together with a proportion of finishing pigs. Sample size 1 gram for domesticated pigs, 2 grams for breeding animals and 5 grams for farmed/ wild boar for the detection of Trichinella spp. larvae. From January 2006, testing for *Trichinella spiralis* has been by the EU muscle digest method as per legislation. Other equivalent methods allowed in the legislation are not currently used in the UK.

In the UK in 2020, 5,954,152 muscle samples from domestic pigs were examined for Trichinella. All samples yielded negative results. For wild boar – farmed and feral: Farmed wild boars - UK: 264 tested, 0 positive. Feral wild boars - UK: 697 tested, 0 positive.

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

The UK has a notification system in place as per the legislation for the abattoir testing of domestic pigs. However, since 1979, no domestic pig has been found to have Trichinella.

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

Since January 2006 all boars, sows, farmed wild boar processed in a slaughterhouse and feral wild boar processed through an Approved Game Handling Establishment together with a proportion of finishing pigs are routinely monitored for the presence of Trichinella. There was no evidence to indicate that trichinellosis existed in the UK domesticated pig population or the farmed/wild boar population in 2020. The last positive diagnosis in pigs in Great Britain was in 1978. In Northern Ireland, the last confirmed case of Trichinellosis in pig meat was in 1979. This case was linked to suspected illegally imported meat.

In humans, European outbreaks of trichinellosis are regularly reported and are mainly linked to the consumption of raw or undercooked meat from wild boar, back yard pigs or horses. In contrast, there have been no human cases acquired from meat produced in the UK for over 40 years. Eleven cases of trichinellosis were diagnosed in the UK between 2000 and 2014, including an outbreak of eight cases in England and Wales in 2000 associated with the consumption of imported meat products. The remaining three cases were travel related: one in England and Wales in 2001, one in Scotland in 2010 in a person who had eaten partially cooked meat in France, and the other in Scotland in 2014 which had been acquired in the Czech Republic.

*** 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).

26. Description of Monitoring/Surveillance/Control programmes system*: *Trichinella spp.* in horses

26.1 Monitoring/Surveillance/Control programmes system [(a)]

Surveillance system: Regulation (EC) No. 2015/1375 lays down specific rules on official controls for Trichinella in meat. It also lays down the methods of detection to be used and requires carcases of horses to be sampled in slaughterhouses and tested for the presence of Trichinella as part of the

post-mortem inspection. Carcasses of pigs, wild boar and other farmed and wild animal species susceptible to Trichinella infection are also required to be sampled in slaughterhouses or game handling establishments.
For domestic pig, wild boar, farmed wild boar and solipeds all testing in the UK is performed by the Reference Method of detection set out in Regulation (EU) 2015/1375.

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

Positive test results are notified to the Food Standards Agency (FSA) or Food Standards Scotland (FSS) and Department of Environment, Food and Rural Affairs (Defra) in Great Britain/ Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland.

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

Horses are routinely monitored for the presence of Trichinella at the slaughterhouse. Muscle samples from 1,312 horses were examined. There was no evidence to indicate that trichinellosis existed in the UK horse population in 2020.

*** 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).

27. General evaluation*: Campylobacter

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

Human campylobacteriosis due to thermophilic *Campylobacter* is a major cause of food poisoning, although non-thermophilic strains (such as *C. fetus*) can also (rarely) cause severe zoonotic illness. The route of transmission to humans in many sporadically occurring cases remains obscure. *Campylobacter* are commonly found in clinically healthy animals. Poultry have long been considered as a potential source of infection. Multi-locus Sequence Typing (MLST) studies support this view, identifying poultry meat as an important source of *Campylobacter* infections in humans. (http://cid.oxfordjournals.org/content/48/8/1072.full.pdf+html Sheppard et al., 2009; http://www.plosgenetics.org/article/fetchArticle.action?articleURI=info:doi/10.1371/journal.pgen.1000203)

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

Campylobacter is commonly found in the intestinal tract of animals where it is regarded as commensal bacteria. Clinical disease is rare, and most frequently associated with abortion in ruminants. Consequently, most isolations of *Campylobacter* in animals are from ruminant abortion investigation cases (*Campylobacter* fetopathy), with *Campylobacter fetus* being the most common isolate. Ruminant abortion material is not considered a major source for human infection.

*** 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

28. Description of Monitoring/Surveillance/Control programmes system*: Campylobacter in animals

28.1 Monitoring/Surveillance/Control programmes system [(a)]

During 2021, there were 38 reports of Campylobacter isolated in livestock in Northern Ireland, with diagnoses achieved via the submission of clinical material by private veterinarians for diagnostic investigation at the Agri-food and Biosciences Institute.

In Northern Ireland Campylobacter was diagnosed as the primary cause of abortion in four ovine cases and one bovine case of abortion in 2021.

28.2 Measures in place [(b)]

The FSA has been running a UK Campylobacter Risk Management Strategy since 2014 which secured commitment from industry to reduce Campylobacter spp. contamination in raw chicken. A target was set to reduce the prevalence of the most contaminated chickens (those with more than 1000 cfu per gram chicken neck skin) to below 10% at the end of the slaughter process (equivalent to 7% at retail sale). This target was achieved in 2016. The Campylobacter strategy was then adjusted to business as usual with the top nine retailers committing to continuing to submit their raw data to the FSA (anonymously) but also agreeing to each publish their data on their own websites.

[ARCHIVED CONTENT] Latest figures reveal decline in cases of campylobacter | Food Standards Agency (nationalarchives.gov.uk)

The FSA's focus then shifted to smaller retailers with the Retail Survey exclusively sampling from small retailers; the last year of the report has now been published and can be found at https://www.food.gov.uk/research/antimicrobial-resistance/a-microbiological-survey-of-campylobacter-contamination-in-fresh-whole-uk-produced-chilled-chickens-at-retail-sale-y6.This includes data for NI.

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

Notification is not mandatory in animals.

*** 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.

29. Description of Monitoring/Surveillance/Control programmes system*: Campylobacter in food

29.1 Monitoring/Surveillance/Control programmes system [(a)]

Food: Microbiological surveys of *Campylobacter* contamination in chickens at retail sale have continued as part of the Food Standards Agency's Strategic Plan to reduce *Campylobacter* contamination in whole raw chicken. To help monitor progress, a series of UK-wide surveys have been undertaken to determine the levels of campylobacter spp. on whole UK-produced, fresh chicken from non-major retailer stores in the UK. The latest survey represents year 6 of sampling, carried out from August 2019 to October 2020 https://www.food.gov.uk/research/antimicrobial-resistance/a-microbiological-survey-of-campylobacter-contamination-in-fresh-whole-uk-produced-chilled-chickens-at-retail-sale-y6.

In the Year 6 survey, a total of 1008 whole fresh raw chickens from non-major retailer stores were collected from August 2019 to October 2020. The proportion of chickens with Campylobacter spp. levels at more than 1000 cfu per g chicken skin ranged from 6.3% to 15.2% across all types of stores. No significant difference was found in the percentage of samples with counts above 1000 cfu of campylobacters per g chicken skin between samples from survey Year 5 (August 2018 to July 2019; https://www.food.gov.uk/research/foodborne-disease/a-microbiological-survey-of-campylobacter-contamination-in-fresh-whole-uk-produced-chilled-chickens-at-retail-sale-y5) and survey Year 6 (August 2019 to October 2020); the average percentage for both years was 11.8%. Overall, the percentage of fresh whole chicken on retail sale in non-major retailer stores in the UK

contaminated with the highest level of more than 1000 cfu of Campylobacter spp. per gram has decreased since 2014 and has decreased further between 2017 and 2020.

29.2 Measures in place [(b)]

A *Campylobacter* Risk Management Strategy has been developed to reduce levels of *Campylobacter* in chicken. The programme encompasses a range of projects targeted at different points across the food chain, from farm to fork. The Food Standards Agency (FSA) has been working in partnership with the industry and DAERA as part of the Acting on *Campylobacter* Together (ACT) campaign.

The FSA has identified the need for further research to better understand how colonisation of flocks on farms may be reduced, including determining any role of supply from breeders.

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

Reporting of *Campylobacter* when isolated from human clinical diagnostic samples is mandatory. Notification is not mandatory in food.

*** 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.

30. General evaluation: Salmonella

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

Most human non-typhoidal salmonellosis in Northern Ireland is acquired via the foodborne route. However, it can be difficult to trace the definite original source for sporadic cases. *Salmonella* Typhi and *S*. Paratyphi (typhoidal *Salmonella*) are adapted to humans and are thus not considered to be zoonotic.

The majority of *Salmonella* isolations in farm livestock in Northern Ireland are detected as a result of testing diagnostic samples from clinically diseased cattle, or as a result of statutory surveillance under legislative programmes to control salmonella in flocks of domestic fowl and turkeys. The poultry *Salmonella* National Control Programmes (NCPs) are required under EU regulation. All NCPs focus on reducing the prevalence of the most important serovars of *Salmonella* that can affect human health and, as such, specific reduction targets are set for *S.* Enteritidis and *S.* Typhimurium (including monophasic strains). In the NCP for breeding chicken flocks, *S.* Hadar, *S.* Infantis and *S.* Virchow are also included in the reduction target. *Salmonella* NCPs have been implemented in the breeding chicken, laying chicken, broiler chicken and turkey breeding and turkey fattening industry sectors.

For poultry populations (chickens and turkeys) subject to *Salmonella* NCPs, results are reported as the number of positive flocks detected under the programmes. Trends in the number of *Salmonella* reports in animal species not subject to a NCP also need to be treated with caution in view of the inherent biases associated with the data, e.g. the level of diagnostic and surveillance testing carried out.

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

Together *S*. Enteritidis and *S*. Typhimurium constitute approximately 44% of all non-typhoidal *Salmonellae* reported in people in Northern Ireland in 2021. In addition to these, *S*. Newport, *S*. Infantis, *S*. Braenderup, *S*. Panama, S. Anatum were the only serovars with one more than one report. It should be noted that reported cases of salmonellosis were substantially lower in both 2020 and 2021 likely due to measures in place due to COVID 19 including travel restrictions.

Reporting of *Salmonella* spp. in people shows a consistent seasonal pattern with a distinct peak of infection observed in the third quarter of the year.

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

None

30.4. **Additional information**

The majority of incidents reported are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. Therefore, the sample submission rate and the number of *Salmonella* incidents recorded on an annual basis is subject to external influencing factors which can impact on observed trends (such as clinical presentation of disease, economic influences, awareness of a disease etc).

Units tested are not known because the laboratories do not report negative results unless as part of an official control programme or survey.

31. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/animals/ birds

31.1. Monitoring/Surveillance/Control programmes system

Monitoring for *Salmonella* in most animal and bird species may be carried out (on a voluntary basis) by the food business operator. The exceptions are for chicken and turkey flocks which are subject to sampling as required by the respective *Salmonella* National Control Programme (NCP). Therefore

(except for these NCPs) reports of *Salmonella* usually arise from samples sent by a private veterinarian for diagnostic purposes. Government funded scanning surveillance programmes are delivered by the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons.
The samples submitted are usually either environmental samples or faeces or whole carcases or organs collected at post mortem. Reports of *Salmonella* isolates under the Zoonoses Order are classed as positive.

31.2. Measures in place

Specific domestic legislation covering *Salmonella* in animals exists in Northern Ireland. In Northern Ireland the Zoonoses Order 1991 lists any mammal except man; any four-footed beast which is not a mammal; snakes and all species of birds as species for which salmonella isolations must be reported. The Zoonoses Order and other domestic legislation also give powers to investigate a suspicion that *Salmonella* is present on a premises and also disease control powers. However the control powers (such as officially restricting the movement of positive animals or flocks) are rarely used to control salmonella when it is identified in animals or birds apart from in relation to the *Salmonella* National Control Programmes (NCPs) if a regulated serovar is identified

31.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the *Salmonella* legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

Results from *Salmonella* NCP testing undertaken in Northern Ireland are reported annually.
In Northern Ireland there were 105 isolations of *Salmonella* in 2021 from animals and poultry (as covered by statutory reporting requirements in Northern Ireland) which represents an increase of 20.7% compared with 2020 (87 isolations). These were 20 isolations from chickens, 1 from a duck, 62 from cattle, 5 from pigs and 17 from sheep.
Relative to 2020, there were more isolations from cattle (62 vs. 44 isolations), pigs (5 vs. 4 isolations) and sheep (17 vs. 4 isolations); there was also one isolation from ducks compared with none during 2020. In contrast, there were fewer isolations from chickens (20 vs. 32 isolations); there were no

isolations from turkeys, compared with one during 2020, there were no isolations from swans, compared with one during 2020 and there were no isolations from rats, compared with one during 2020. There were no isolations from quail, geese, partridges, pheasants, guinea fowl, deer, goats or rabbits, which is not unusual compared to previous years.

Trends were also variable across serovars; for example, compared to 2020 there were five times as many isolations of *S*. enterica, subspecies diarizonae (10 vs. 2 isolations) and twice as many of *S*. Newport (4 vs. 2 isolations). Isolations of *S.* Mbandaka also increased (7 vs. 4 isolations) and there were more isolations of *S*. Dublin (52 vs. 42 isolations). In contrast, there were fewer isolations of *S*. Muenster (3 vs. 7 isolations) and fewer isolations of both *S*. Typhimurium, monophasic and *S*. Enteritidis (4 vs. 1 isolations). In addition, there were 0 isolations of *S*.infantis in 2021 compared to 2 in 2020.

31.5. Additional information

The majority of incidents reported are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. Therefore, the sample submission rate and the number of *Salmonella* incidents recorded on an annual basis is subject to external influencing factors which can impact on observed trends (such as clinical presentation of disease, economic influences, awareness of a disease etc). However**,** the *Salmonella* National Control Programme (NCP) apply to *Gallus gallus* and turkeys. In these species the vast majority of isolations are made as a result of NCP testing.

32. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/cattle

32.1. Monitoring/Surveillance/Control programmes system

Government funded scanning surveillance programmes are delivered by the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons. The majority of *Salmonella* isolates derived from cattle annually are from samples taken for diagnostic purposes and submitted for testing under this programme. The samples are usually faeces, or from organs collected at post mortem, and are voluntary samples usually sent by a private veterinarian for diagnostic purposes.

32.2. Measures in place

Vaccination against *Salmonella* Dublin and *Salmonella* Typhimurium may be used on a voluntary basis. There is no restriction on using any authorised *Salmonella* vaccine.

There is no statutory national control programme for *Salmonella in* cattle. All *Salmonellae* isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the Salmonella is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of Salmonella from cattle. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the farm.

32.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

There is no routine *Salmonella* monitoring of cattle in Northern Ireland, therefore the majority of isolates come from cattle with clinical disease. The number of reports is dependent on the total cattle population and the number of diagnostic submissions to veterinary laboratories. As in previous years, the majority of *Salmonella* reports in cattle were from samples taken for clinical diagnostic purposes and came from cattle on farms.

Salmonella Dublin remained the most commonly isolated serovar. (*Salmonella* Dublin is the most common serovar associated with abortion in cattle). *Salmonella* Dublin is seldom isolated in samples from humans.

33. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/deer

33.1. Monitoring/Surveillance/Control programmes system

Government funded scanning surveillance programmes are delivered by the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons.

Voluntary samples usually sent by a private veterinarian for diagnostic purposes, which are usually faeces, or from organs collected at post mortem.

33.2. Measures in place

Vaccination of deer is rare, but may be used, on a voluntary basis. There is no restriction on using any authorised *Salmonella* vaccine.

There is no statutory national control programme for *Salmonella* in deer. All *Salmonellae* isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made for cases identified in farmed deer, particularly if the *Salmonella* is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of *Salmonella* from deer. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the farm.

33.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the *Salmonella* legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

There is no routine *Salmonella* monitoring of deer in Northern Ireland, therefore isolates come from farmed animals with clinical disease. The number of reports is dependent on the total population and the number of diagnostic submissions to veterinary laboratories. The majority of laboratory submissions in deer will be from samples taken for clinical diagnostic purposes. No positives were identified in 2021.

34. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/ducks

34.1. Monitoring/Surveillance/Control programmes system

Monitoring for *Salmonella* in duck breeding, fattening and commercial egg laying flocks is carried out on a voluntary basis by the food business operator, according to the food business operator's own protocol. Samples include faeces, boot swabs, hatchery debris, cull birds, hatcher tray liners, organs at post mortem etc. Voluntary environmental samples are usually sent by the operator to a private testing laboratory/ government testing laboratory to monitor *Salmonella* status of the flock. Post mortem samples are submitted by the private veterinarian for diagnostic purposes.

34.2. Measures in place

There are no restrictions on the use of *Salmonella* vaccines which have a Marketing Authorisation. Operators are encouraged to monitor in the same way as done for *Gallus gallus* under Regulation (EC) No. 2160/2003, but there is no statutory national *Salmonella* control programme in the duck industry sector in Northern Ireland. All *Salmonellae* isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the *Salmonella* is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of *Salmonella* from ducks. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the farm. An Industry Assurance Scheme, similar to those already in place for the broiler, turkey and layer chicken sectors has been developed by representatives of the duck industry since 2011. The Duck Assurance Scheme is owned and managed by Red Tractor Assurance and their standards are managed by their Technical Advisory Committee. It covers all areas relating to quality and welfare in duck production: breeding, hatching, rearing, catching, transport, slaughter, free-range and table eggs, and includes guidance on control of *Salmonella* by means of biosecurity, farm hygiene and vaccination.

Advice is given on control of *Salmonella* and farm visits may be made by the veterinary and public health authorities. Restrictions may be placed on the premises under the powers available in national legislation.

34.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

Voluntary monitoring for *Salmonella* is carried out by the duck industry, but because this is done on a voluntary basis, the number of submissions for *Salmonella* testing from Northern Ireland duck flocks can vary from year to year. One isolation of *Salmonella* from ducks was reported in Northern Ireland in 2021. This isolation was *Salmonella* Brandenburg.

35. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/ *Gallus gallus* – breeding flocks

35.1. Monitoring/Surveillance/Control programmes system

Sampling is carried out as specified in EU legislation (Regulation (EC) No. 2160/2003 and Regulation (EC) No. 200/2010) and the Northern Ireland *Salmonella* National Control Programme (NCP) for breeding hens (*Gallus gallus*).

All consignments of day old chicks are sampled on arrival at the holding. According to the requirements of the *Salmonella* NCP, mandatory sampling is required on the day of arrival – samples must be taken from each flock within 72 hours of hatching, comprising of at least the following from each hatchery supplying the chicks:

- Hatcher tray liners or chick box liners: one liner for each 500 chicks delivered, up to a maximum of 10 liners.
- All chicks dead on arrival, up to a maximum of 60.

Operator voluntary monitoring may also be undertaken and can include hatchery debris, dust, fluff, meconium samples etc.

The rearing flocks are sampled according to the requirements of the *Salmonella* NCP. Mandatory sampling is required at 4 weeks old and then 2 weeks before moving to the laying phase or laying unit as follows:

- A minimum of 2 pairs of boot swabs, or
- A composite faeces sample made up of at least 60 samples each of which weighs not less than 1 gram and each of which is taken from a site selected at random to represent the flock from which it is take.

Other operator voluntary monitoring can include rodent droppings, dust samples, swabs taken from empty houses, transport vehicles etc.

Breeding flocks in their production period are sampled according to the requirements of the *Salmonella* NCP. Mandatory sampling is required every 2 to 3 weeks during the laying/ production period. The approach depends on how the flock are kept.

For floor-reared birds:

- A minimum of 5 pairs of boot swabs, or
- One pair of boot swabs and one dust sample

For cage-kept birds:

- Two composite faeces samples of 150g each, or

One composite faeces sample and one dust sample

Other operator voluntary monitoring can include hatcher debris, fluff, additional boot swabs/faeces samples, dust samples, rodent droppings, swabs taken from empty houses, transport vehicles etc. Additional voluntary operator samples are usually taken as part of hatchery hygiene monitoring programmes.
In addition to the sampling above, Official Control Samples are collected from each adult breeding flock on two occasions which are sufficiently distant in time from each other during the production cycle (usually within 4 weeks of moving to the laying accommodation and again within the last 8 weeks of production). These replace the operator samples due at these times.
Case definition: Culture and isolation of *Salmonella* (field strain) from taken from the flock, or directly associated with its environment. Reports of *Salmonella* isolates under the relevant legislation are classed as positive. A flock is counted as positive once only during the year, regardless of the number of tests carried out/ isolates obtained. 'Flock' is defined as poultry of the same health status kept on the same holding and in the same enclosure and constituting a single epidemiological unit and, in the case of housed poultry, includes all birds sharing the same airspace. Testing is done in accordance with ISO 6579-1: 2017 - Microbiology of the food chain -- Horizontal method for the detection, enumeration and serotyping of *Salmonella* -- Part 1: Detection of *Salmonella spp*. (MRSV method for primary production samples).

35.2. Measures in place

Regulation (EC) No. 2160/2003 lays down harmonised rules for the monitoring and control of *Salmonella* in breeding flocks of domestic fowl. The legislation sets out enhanced monitoring and controls for *Salmonella* which have been implemented in the Northern Ireland *Salmonella* National Control Programme (NCP) for breeding chicken flocks. The requirements of the Programme are enforced through The Control of *Salmonella* in Poultry Scheme Order (Northern Ireland) 2008 in order to meet the target for reduction in *Salmonella* prevalence set out in EU legislation. Regulation (EC) No. 200/2010 sets a target for the breeding flock sector to ensure that no more than 1% of adult breeding flocks with more than 250 birds remain positive for the regulated *Salmonella* serovars annually. The EU target for breeding flocks is based on the 5 serovars considered of greatest public health significance at the time of drafting of the legislation (the 5 most frequent serovars in human cases): *S*. Enteritidis, *S*. Typhimurium, *S*. Virchow, *S*. Hadar and *S*. Infantis. Regulation (EU) No. 517/2011 amends Regulation (EC) No. 200/2010 to include the monophasic *Salmonella* Typhimurium variants S. 1,4,[5],12:i:- as regulated/ target *Salmonella* ssp. within the requirements of the *Salmonella* National Control Programmes. Any breeding flock found to be infected with a regulated *Salmonella* serovar according to the protocol outlined above is placed under official control and the requirements of Regulation (EC) No. 2160/2003 are implemented. Regulation (EC) No 200/2010 allows for an extension in the frequency of operator sampling at the holding from every two weeks to every three weeks, at the discretion of the Competent Authority. A reduction in the number of routine official samples required in each flock from three to two per year is also allowed. This revised testing protocol

is applicable to Member States that have met the *Salmonella* reduction target as specified in the legislation for at least two consecutive calendar years. As the Northern Ireland breeding chicken sector again achieved the reduction target for 2019 and 2020, this extended testing interval (at the discretion of the Competent Authority) and the reduced official sampling frequency have been applied in Northern Ireland in 2021. However, some breeding chicken companies have chosen to still sample at a two weekly frequency.

Any breeding flock found to be infected with *S*. Typhimurium or *S*. Enteritidis is compulsorily slaughtered with compensation. If *Salmonella* Enteritidis or *Salmonella* Typhimurium (including monophasic strains) is suspected in a breeding flock, the flock is placed under official control. An investigation is carried out on all the flocks on the site. Following compulsory slaughter of the positive flock(s), the flock(s) remains under official control until cleaning and disinfection has been carried out and shown to be satisfactory by microbiological culture of samples taken from the empty house. Eggs from the positive flock are removed from the hatchery and destroyed. Eggs may be used for human consumption if they are treated in a manner that guarantees elimination of *S*. Typhimurium and *S*. Enteritidis. In the case of detection of *S*. Hadar, *S*. Infantis or *S*. Virchow, a control plan for eradication of infection is put in place, in collaboration with government experts on *Salmonella* control and the operator's private veterinary surgeon. Public health authorities are advised of the isolation of *Salmonella*. Visits may be made to the farm by government officials to carry out an epidemiological investigation and provide advice to the food business operator on the control of *Salmonella* if the *Salmonella* isolated is considered to be of public health significance.

According to Commission Regulation (EC) No. 1177/2006, the administration of antimicrobials to any bird of the species *Gallus gallus* as a specific method to control *Salmonella* is prohibited.

There are no restrictions on the use of *Salmonella* vaccines which have a marketing authorisation. Vaccine is not used in the layer breeder sector but may occasionally be used in the broiler breeder sector (parental level.) Codes of Practice for the Control of *Salmonella* in poultry flocks, for rodent control on poultry farms and for the production, handling and transport of feed have been published in collaboration with the industry.

35.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the *Salmonella* legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

The main provisions of the Zoonoses Order are:

- A requirement to report to a veterinary inspector of the Department of Agriculture, Environment and Rural Affairs the results of tests which identify the presence of a *Salmonella* from an animal

or bird or its surroundings, or from any carcase, product or feeding stuff. A culture must be provided to the official laboratory.

- Samples (including live birds) may be taken for diagnosis.
- Movement restrictions and isolation requirements may be imposed.
- Compulsory cleansing and disinfection of premises and vehicles.

The main provisions of the Control of *Salmonella* in Poultry Order relevant to the breeding chicken control programme are:

- Owners of poultry breeding flocks (of more than 250 birds) must be registered within three months of the establishment of the holding. Information supplied should include the name and address of the holding, the number (and species) of breeding flocks on the holding, the number of poultry in each breeding flock, their status in the breeding pyramid (e.g. Parent, Grandparent etc.) and whether layer breeders or meat (broiler) breeders.
- Flock owners are required to record the movements of birds, chicks or eggs onto and off the premises, including dates of movements, numbers of poultry, chicks or eggs moved, their ages, building/ flock identity and the addresses of source or destination premises. This information must be made available for inspection on request by a government authorised official. Owners must also inform officials with two weeks' notice of the expected date of movements to the laying phase or laying unit and the date on which the flock is expected to reach the end of the production cycle. This is done to facilitate the collection of official samples.

The owner/ operator is required to maintain records of the dates of sampling, type of samples collected, the identity of building, flock or holding sampled and the age of each flock sampled. Owners should also keep a record of the test result and name of laboratory used.

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

No isolations of *Salmonella* were isolated from breeding chicken flocks in Northern Ireland in 2021. Therefore, Northern Ireland continued to achieve the breeding chicken target as set in EU Regulation.

35.5. Additional information

The majority of *Salmonella* incidents reported in most animal and bird species in Northern Ireland are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. However the *Salmonella* National Control Programmes (NCPs) apply to *Gallus gallus* and turkeys. In these species the vast majority of isolations are made as a result of NCP testing.

36. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/ *Gallus gallus* – broilers

36.1. Monitoring/Surveillance/Control programmes system

Sampling is carried out as specified in EU legislation (Regulation (EC) No. 2160/2003 and Regulation (EU) No. 200/2012) and in the Northern Ireland *Salmonella* National Control Programme (NCP) for chickens producing meat for human consumption (broilers). According to the requirements of the *Salmonella* National Control Programme, mandatory sampling is required within 3 weeks of the birds being sent to slaughter. Routine Official Control Samples are collected once annually from 10% of holdings with more than 5,000 birds.

The NCP sample must consist of a minimum of 2 pairs of boot swabs taken so it is representative of the whole area in the house to which the birds have access. In flocks of less than 100 broilers, where it is not possible to take boot swabs, hand drag swabs may be used. Other operator voluntary monitoring can include additional boot swabs, litter samples, dust samples, rodent droppings, swabs taken from empty houses, transport vehicles etc.

Case definition: Culture and isolation of *Salmonella* (field strain) from samples taken from the flock, or directly associated with its environment. Reports of *Salmonella* isolates under the relevant legislation are classed as positive. A flock is counted as positive once only during the year, regardless of the number of tests carried out/isolates obtained. A flock is defined as poultry of the same health status kept on the same holding and in the same enclosure and constituting a single epidemiological unit and, in the case of housed poultry, includes all birds sharing the same airspace. The laboratory testing method is ISO 6579-1: 2017 - Microbiology of the food chain – Horizontal method for the detection, enumeration and serotyping of *Salmonella* – Part 1: Detection of *Salmonella* spp. (MRSV method for primary production samples.)

36.2. Measures in place

Regulation (EC) No. 2160/2003 and Regulation (EU) No. 200/2012 lay down harmonised rules for the monitoring and control of *Salmonella* in broiler flocks, which have been implemented in the Northern Ireland *Salmonella* National Control Programme (NCP). The NCP is enforced by the Control of *Salmonella* in Broiler Flocks Scheme Order (Northern Ireland) 2009. This national legislation enforces the requirements of the NCP required to meet the target for reduction in *Salmonella* prevalence set out in EU legislation. The NCP applies to all operators, except where the operator produces small quantities of product provided direct to the consumer or via local retailers which only supply the final consumer or where all production is for private domestic use only. Regulation (EU) No. 200/2012 sets a target for the broiler sector to ensure that no more than 1% of broiler flocks are detected positive for *Salmonella* of greatest human health significance annually. The EU target is based on the two most common serovars in human cases which are *S*. Enteritidis and *S*. Typhimurium (including monophasic

strains). According to Commission Regulation (EC) No. 1177/2006, the administration of antimicrobials to any bird of the species *Gallus gallus* as a specific method to control *Salmonella* is prohibited. The same legislation also prohibits the administration of any live *Salmonella* vaccine to any bird of the species *Gallus gallus* where the manufacturer does not provide an appropriate method to distinguish bacteriologically wild-type strains of *Salmonella* from vaccine strains.

If *S.* Enteritidis or *S.* Typhimurium (including monophasic strains) is detected in an operator or official sample, the flock is placed under official control. It is the responsibility of the food business operator to notify the Official Veterinarian at the slaughterhouse of the *Salmonella* status of the flock prior to slaughter so that suitable precautions can be put in place to prevent the possibility of cross-contamination and to minimise the risk to public health. In Northern Ireland, the majority of flocks are culled on farm and disposed of as Animal By-Product. Following depopulation of the positive flock(s), the house(s) remains under official control until cleaning and disinfection has been carried out and shown to be satisfactory by microbiological culture of samples taken from the empty house. The Competent Authority collects official samples from the next crop in the affected house as well as from all other flocks on the holding. If any of these samples are positive, a restriction notice is served on the flock(s), requiring supervised cleansing and disinfection and further sampling. Visits are made to the farm by Government officials. They may carry out an epidemiological investigation and provide advice to the food business operator on the control of *Salmonella* if the *Salmonella* isolated is considered to be of public health significance.

The *Salmonella* monitoring results for all eligible broiler flocks must be included as part of the Food Chain Information documentation, accompanying each batch to the slaughterhouse (Annex II of Regulation (EC) No. 853/2004).

There are no restrictions on the use of *Salmonella* vaccines which have a Marketing Authorisation. However, vaccination is not generally used in broiler flocks in Northern Ireland. Codes of Good Practice in the control of *Salmonella* on broiler farms and in the production, handling and transport of feed, as well as advice on rodent control, have been published in collaboration with the poultry industry.,

36.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

The main provisions of the Control of *Salmonella* in Poultry Order relevant to broiler flocks control programme are:

- Owners of broiler flocks must be registered within three months of the establishment of the holding. Information supplied should include the name and address of the holding, the number flocks on the holding, the number of chickens in each flock and where there is more than one flock on the holding, the identification of each flock.

Flock owners are required to record the movements of chickens onto and off the premises, including dates of movements, numbers of chickens moved, their ages, building/ flock identity and the addresses of source or destination premises including slaughterhouses. This information must be made available for inspection on request by a government authorised official.

The owner/operation is required to maintain records of the dates of sampling, type of samples collected, the identity of building, flock or holding sampled and the age of each flock sampled. Owners should also keep a record of the test result and name of laboratory used..

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

Salmonella Muenster was the most frequently isolated *Salmonella* from broiler chicken flocks in 2021. No regulated serovars were identified from Northern Ireland broiler chicken flocks sampled under the *Salmonella* NCP during 2021. Therefore, Northern Ireland continued to achieve the broiler chicken target as set in EU Regulation.

36.5. Additional information

The majority of *Salmonella* incidents reported in most animal and bird species in Northern Ireland are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. However, the *Salmonella* National Control Programmes (NCPs) apply to *Gallus gallus* and turkeys. In these species the vast majority of isolations are made as a result of NCP testing.

37. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/ *Gallus gallus* – laying hens

37.1. Monitoring/Surveillance/Control programmes system

Sampling is carried out as specified in EU legislation (Regulation (EC) No. 2160/2003 and Regulation (EC) No. 517/2011) and in the Northern Ireland *Salmonella* National Control Programme (NCP) for laying hens (*Gallus gallus*).

All consignments of day-old chicks are sampled on arrival. This sample is taken in accord with the requirements of the *Salmonella* commercial laying hen NCP. Mandatory sampling is required on the day of arrival – samples must be taken from each flock within 72 hours of hatching, comprising of at least the following from each hatchery supplying the chicks:

- Hatcher tray liners or chick box liners: one liner for each 500 chicks delivered, up to a maximum of 10 liners.
- All chicks' dead on arrival, up to a maximum of 60.

Operator voluntary monitoring can include hatchery debris, dust, fluff, meconium samples etc.

Rearing period samples are taken two weeks before moving to laying phase/ laying unit. This sample is taken in accord with the requirements of the *Salmonella* commercial laying hen NCP. Mandatory sampling is required 2 weeks before moving to the laying phase or laying unit as follows:

- A minimum of 2 pairs of boot swabs, or
- A composite faeces sample made up of at least 60 samples each of which weighs not less than 1 gram and each of which is taken from a site selected at random to represent the flock from which it is take.

Other operator voluntary monitoring can include rodent droppings, dust samples, swabs taken from empty houses, transport vehicles etc.

Laying flocks are sampled between 22-26 weeks of age, and then every 15 weeks during the production period. This sample is taken in accordance with the requirements of the *Salmonella* commercial laying hen NCP. Mandatory sampling is required, but sampling approach depends on how the birds are kept as follows:

For barn-kept and free-range flocks:

- A minimum of 2 pairs of boot swabs, or
- One pair of boot swabs and one or more hand-held faecal swabs (when kept in a multi-tier system

For cage-kept birds:

- Two composite pooled faeces (each of 150g) for each house with scrapers or belt cleaners, or
- One or more fabric swabs for houses without scrapers or belt cleaners

Other operator voluntary monitoring can include, additional boot swabs/ faeces samples, dust samples, rodent droppings, swabs taken from empty houses, transport vehicles etc.

In addition to the sampling above, Official Control Samples are collected annually for one flock on all holdings with more than 1,000 birds.

Case definition: Culture and isolation of *Salmonella* (field strain) from samples taken from the flock, or directly associated with its environment. Reports of *Salmonella* isolates listed under the relevant legislation are classed as positive. A flock is counted as positive once only during the year, regardless of the number of tests carried out/ isolates obtained. 'Flock' is defined as poultry of the same health

status kept on the same holding and in the same enclosure and constituting a single epidemiological unit and, in the case of housed poultry, includes all birds sharing the same airspace.
Bacteriological method: ISO 6579-1:2017 – Microbiology of the food chain – Horizontal method for the detection, enumeration and serotyping of *Salmonella* – Part 1: Detection of *Salmonella* spp. (MRSV method for primary production samples.)

37.2. Measures in place

Regulation (EC) No. 2160/2003 lays down harmonised rules for the monitoring and control of *Salmonella* in laying flocks of domestic fowl. The legislation sets out enhanced monitoring and controls for *Salmonella* which have been implemented in Northern Ireland *Salmonella* National Control Programme (NCP) for laying chicken flocks. The requirements of the Programme are enforced through the Control of *Salmonella* in Poultry Scheme Order (Northern Ireland) 2008 in order to meet the target for reduction in *Salmonella* prevalence set out in EU legislation. Regulation (EC) No. 517/2011 sets a target for the laying flock sector to ensure that no more than 2% of adult breeding flocks with more than 350 birds remain positive for the regulated *Salmonella* serovars annually. The EU target for laying flocks is based on the serovars considered of greatest public health significance at the time of drafting of the legislation (the most frequent serovars in human cases): *S*. Enteritidis and *S*. Typhimurium including the monophasic variants (Regulation (EU) No. 517/2011 added the monophasic *Salmonella* Typhimurium variants S. 1,4,[5],12:i:- as regulated/target *Salmonella* ssp. within the requirements of the *Salmonella* National Control Programmes). The eggs from any laying flock found to be infected with a regulated *Salmonella* serovar according to the protocol outlined above are placed under official control and the requirements of Regulation (EC) No. 2160/2003 are implemented. Therefore if a laying flock is found to be infected with *S*. Enteritidis or *S*. Typhimurium including the monophasic variants, the flock is placed under official control. The eggs from that flock are placed under restriction and can only be sold for heat treatment. The operator can request additional testing of the flock at their own cost as per Regulation (EC) No.1237/2007. As well as collecting the operator's choice of sampling matrix as set out in this legislation, officials may also collect five bird carcases for antimicrobial residues testing. If this test is negative the restrictions are lifted, but additional inspections may be scheduled on a risk basis. If the optional additional sampling permitted under Regulation (EC) No. 1237/2007 is positive, or is not undertaken, all other flocks on the premises are sampled, and any which are found to be positive will also be restricted and have their eggs restricted. The operator may request additional testing of those flock(s) at their own cost as per Regulation (EC) No.1237/2007. The eggs from positive flocks remain under restrictions and can only be sold for heat treatment for the life of the flock. The flock following on after the infected flock has an official NCP sample taken at 22-26 weeks of age. In all cases visits are made to the farm by government officials. They may carry out an epidemiological investigation and provide advice to the food business operator on the control of *Salmonella*.

According to Commission Regulation (EC) No. 1177/2006, the administration of antimicrobials to any bird of the species *Gallus gallus* as a specific method to control *Salmonella* is prohibited.
Live vaccines are not authorised for use in birds during the laying period. Otherwise, there are no restrictions on the use of *Salmonella* vaccines which have a marketing authorisation. Codes of Good Practice in the control of *Salmonella* on poultry farms and in the production, handling and transport of feed, as well as advice on rodent control, have been published in collaboration with the poultry industry.

37.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.
The main provisions of the Control of *Salmonella* in Poultry Order relevant to the laying chicken control programme are:

- Owners of poultry flocks (of more than 250 birds) must be registered. Information supplied should include the name and address of the holding, the number (and species) of laying flocks on the holding and the number of poultry in each laying flock.

- Flock owners are required to record the movements of birds, chicks or eggs onto and off the premises, including dates of movements, numbers of poultry, chicks or eggs moved, their ages, building/ flock identity and the addresses of source or destination premises. This information must be made available for inspection on request by a government authorised official. Owners must also inform officials with two weeks' notice of the expected date of movements to the laying phase or laying unit and also the date on which the flock is expected to reach the end of the production cycle. This is done to facilitate the collection of the necessary official samples.

- The owner/operator is required to maintain records of the dates of sampling, type of samples collected, the identity of the building, flock or holding sampled, and the age of each flock sampled. Owners should also keep a record of the test result and name of laboratory used

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

Two regulated serovars (one *S*. Enteritidis and one *S.* Typhimurium) were identified from Northern Ireland laying chicken flocks sampled under the *Salmonella* NCP during 2021. Therefore**,** Northern Ireland continued to achieve the laying chicken target as set in EU Regulation.

37.5 Additional Information

The majority of *Salmonella* incidents reported in most animal and bird species in Northern Ireland are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. However the *Salmonella* National Control Programmes (NCPs) apply to *Gallus gallus* and turkeys. In these species the vast majority of isolations are made as a result of NCP testing.

38. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/geese

38.1. Monitoring/Surveillance/Control programmes system

Monitoring for *Salmonella* in geese is carried out on a voluntary basis by the food business operator. Reports of *Salmonella* in geese usually arise from samples sent by a private veterinarian for diagnostic purposes. There is no official National Control Programme for the control of *Salmonella* in the geese industry sectors. Government funded scanning surveillance programmes are delivered by the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons. The samples submitted are usually faeces or from organs collected at post mortem.
Culture and isolation of *Salmonella* from samples taken from the bird/ flock or associated with its environment. Reports of *Salmonella* isolates under the Zoonoses Order are classed as positive.

38.2. Measures in place

There are no restrictions on the use of *Salmonella* vaccines which have a Marketing Authorisation. Operators are encouraged to monitor in the same way as for *Gallus gallus* under Regulation (EC) No. 2160/2003, but there is no statutory *Salmonella* National Control Programme in the goose industry sector in Northern Ireland. All *Salmonella*e isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the *Salmonella* is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of *Salmonella* from geese. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the farm.

Restrictions may be placed on the premises under the domestic legislation.

38.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

Submission of samples from geese is most likely to be for diagnostic purposes. No isolations of *Salmonella* in geese were recorded in Northern Ireland in 2021 and none during 2020.

39. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/partridges

39.1. Monitoring/Surveillance/Control programmes system

Monitoring for *Salmonella* in partridges may be carried out (on a voluntary basis) by the food business operator. Reports of *Salmonella* in partridges usually arise from samples sent by a private veterinarian for diagnostic purposes. There is no official National Control Programme for the control of *Salmonella* in this poultry industry sector. Government funded scanning surveillance programmes are delivered by the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons.

The samples submitted are usually whole birds or organs collected at post mortem.

Culture and isolation of *Salmonella* from samples taken from the bird/ flock or associated with its environment. Reports of *Salmonella* isolates under the Zoonoses Order are classed as positive.

39.2. Measures in place

There are no restrictions on the use of *Salmonella* vaccines which have a Marketing Authorisation.

All *Salmonellae* isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the *Salmonella* isolated is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of *Salmonella* from partridges. Assistance is given to the public health authorities with on-

farm investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the farm. Restrictions may be placed on the premises under the domestic legislation.

39.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

There is no routine *Salmonella* monitoring of partridges in Northern Ireland, therefore isolates mostly come from clinically affected birds in rear. The number of reports is dependent on the total population and the number of diagnostic submissions to veterinary laboratories. No isolations of *Salmonella* were recorded from partridges in Northern Ireland in 2021.

40. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/pheasants

40.1. Monitoring/Surveillance/Control programmes system

Monitoring for *Salmonella* in pheasants may be carried out (on a voluntary basis) by the food business operator. Reports of *Salmonella* in pheasants usually arise from samples sent by a private veterinarian for diagnostic purposes. There is no official National Control Programme for the control of *Salmonella* in this poultry industry sector. Government funded scanning surveillance programmes are delivered by the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons.

The samples submitted are usually whole birds or organs collected at post mortem.

Culture and isolation of *Salmonella* from samples taken from the bird/ flock or associated with its environment. Reports of *Salmonella* isolates under the Zoonoses Order are classed as positive.

40.2. Measures in place

There are no restrictions on the use of *Salmonella* vaccines which have a Marketing Authorisation.

All *Salmonellae* isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the *Salmonella* isolated is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed

of isolations of *Salmonella* from pheasants. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the farm. Restrictions may be placed on the premises under the domestic legislation.

40.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

There is no routine *Salmonella* monitoring of pheasants in Northern Ireland, therefore isolates mostly come from clinically affected birds in rear. The number of reports is dependent on the total population and the number of diagnostic submissions to veterinary laboratories. No isolations of *Salmonella* were recorded from pheasants in Northern Ireland in 2021.

41. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/pigeons

41.1. Monitoring/Surveillance/Control programmes system

Monitoring for *Salmonella* in pigeons may be carried out (on a voluntary basis) by the food business operator. Reports of *Salmonella* in pigeons usually arise from samples sent by a private veterinarian for diagnostic purposes. There is no official National Control Programme for the control of *Salmonella* in pigeons. Government funded scanning surveillance programmes are delivered by the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons.
The samples submitted are usually whole birds or organs collected at post mortem.
Culture and isolation of *Salmonella* from samples taken from the bird/ flock or associated with its environment. Reports of *Salmonella* isolates under the Zoonoses Order are classed as positive.

41.2. Measures in place

All *Salmonellae* isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given to the individual submitting the positive sample(s) and visits to the site by Government officials may be made, particularly if the *Salmonella* isolated is considered to be of public health significance. The public health authorities are informed of isolations of *Salmonella* from pigeons. Assistance is given to the public health authorities

with on-site investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the establishment or area. Restrictions may be placed on the specific premises affected under the domestic legislation.

41.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

There were no isolations of *Salmonella* in pigeons from Northern Ireland in 2021.

42. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/pigs

42.1. Monitoring/Surveillance/Control programmes system

Government funded scanning surveillance programmes are delivered by the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons. On average, approximately 90% of incidents are from the isolation of *Salmonella* in samples taken for diagnostic purposes (clinical samples) and submitted for testing under this programme. Samples usually consist of faeces, or organs collected at post mortem. These are voluntary samples usually sent by a private veterinarian for diagnostic purposes.

42.2. Measures in place

There are no restrictions on the use of *Salmonella* vaccines which have a Marketing Authorisation. Codes of Good Practice in the control of *Salmonella* on pig farms and in the production, handling and transport of feed, as well as advice on rodent control, have been published in collaboration with the pig industry.

There is no statutory national control programme for *Salmonella* in pigs. All *Salmonellae* isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the *Salmonella* is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of *Salmonella* from

pigs. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the farm. The control of *Salmonella* in pig herds is complex and needs a multi-factorial approach to reduce contamination throughout the food chain. There is a continued reliance on procedures aimed at reducing the risk of cross-contamination within abattoirs and the need remains to reduce the likelihood of introduction of *Salmonella* into the processing line in the first place through the carriage of *Salmonella* in pigs being supplied to the abattoir.

42.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

There is no statutory routine *Salmonella* monitoring of pigs in Northern Ireland. Therefore the majority of isolates come from pigs with clinical disease. The number of reports is dependent on the total pig population and the number of diagnostic submissions to veterinary laboratories. The majority of *Salmonella* reports in pigs were from samples taken for clinical diagnostic purposes and came from pigs on farms.
Salmonella Typhimurium was the most commonly isolated serovar from pigs in Northern Ireland in 2021.

42.5. Additional information

43. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/quail

43.1. Monitoring/Surveillance/Control programmes system

Monitoring for *Salmonella* in quail may be carried out (on a voluntary basis) by the food business operator. Reports of *Salmonella* in quail usually arise from samples sent by a private veterinarian for diagnostic purposes. There is no official National Control Programme for the control of *Salmonella* in quail. Government funded scanning surveillance programmes are delivered by the Agri-food and

Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons.
The samples submitted are usually whole birds or organs collected at post mortem.
Culture and isolation of *Salmonella* from samples taken from the bird/ flock or associated with its environment. Reports of *Salmonella* isolates under the Zoonoses Order are classed as positive.

43.2. Measures in place

All *Salmonellae* isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given to the individual submitting the positive sample(s) and visits to the site by Government officials may be made, particularly if the *Salmonella* isolated is considered to be of public health significance. The public health authorities are informed of isolations of *Salmonella* from quail. Assistance is given to the public health authorities with on-site investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the establishment or area. Restrictions may be placed on the specific premises affected under the domestic legislation.

43.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

No isolations were made from quail in 2021.

44. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/sheep

44.1. Monitoring/Surveillance/Control programmes system

Government funded scanning surveillance programmes are delivered by the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons. Over majority of the *Salmonella* isolates derived from sheep annually are from voluntary samples taken by private veterinary surgeons for diagnostic purposes and submitted for testing under this programme. These samples are usually faeces, or from organs at post mortem.

Case definition: Culture and isolation of *Salmonella* from samples taken from the animal. Reports of *Salmonella* isolates under the Zoonoses Order are classed as positive.

44.2. Measures in place

Vaccination of sheep is rare but may be used, on a voluntary basis. There is no restriction on using any authorised *Salmonella* vaccine.

There is no statutory national control programme for *Salmonella* in sheep. All *Salmonellae* isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the farm by Government officials may be made, particularly if the *Salmonella* is considered to be of public health significance or there is direct sale of products to the public. Premises may be placed under movement restrictions. The public health authorities are informed of isolations of *Salmonella* from sheep. Assistance is given to the public health authorities with on-farm investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the farm.

44.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

There is no routine *Salmonella* monitoring of sheep in Northern Ireland, therefore the majority of isolates come from animals with clinical disease. The number of reports is dependent on the total population and the number of diagnostic submissions to veterinary laboratories. *Salmonella* enterica, subspecies diarizonae was the most commonly isolated serovar from sheep in Northern Ireland in 2021**.**

45. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/solipeds (horses)

45.1. Monitoring/Surveillance/Control programmes system

Government funded scanning surveillance programmes are delivered by the Agri-food and Biosciences Institute (AFBI). These programmes are built upon the subsidised diagnosis and disease investigation service offered to livestock farmers through their private veterinary surgeons. These diagnostic

samples are usually faeces, or from organs collected at post mortem. Most samples are submitted by private veterinarians for diagnostic purposes.
Case definition: Culture and isolation of *Salmonella* from samples taken from the animal. Reports of *Salmonella* isolates under the Zoonoses Order are classed as positive.

45.2. Measures in place

There is no statutory national control programme for *Salmonella* in horses. All *Salmonellae* isolated must be reported to the Competent Authority under the requirements of national legislation. Advice on disease control measures is given and visits to the premises by Government officials may be made, particularly if the *Salmonella* is considered to be of public health significance or there is direct sale of products to the public. The public health authorities are informed of isolations of *Salmonella* from horses. Assistance is given to the public health authorities with on-premises investigations and epidemiological studies if there is an outbreak of salmonellosis in humans associated with the premises.

45.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

There is no routine *Salmonella* monitoring of horses in Northern Ireland therefore the majority of isolates come from horses with clinical disease. The number of reports is dependent on the total horse population and the number of diagnostic submissions to veterinary laboratories. No isolations of *Salmonella* in horses were reported in Northern Ireland in 2021.

46. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/ turkeys (breeding)

46.1. Monitoring/Surveillance/Control programmes system

There were no adult breeding turkey flocks in Northern Ireland in 2021.
Sampling is carried out as specified in EU legislation (Regulation (EC) No. 2160/2003 and Regulation (EU) No. 1190/2012) and in the Northern Ireland *Salmonella* National Control Programme (NCP) for breeding turkey flocks. Day old poults are sampled according to the requirements of the NCP, which

requires mandatory sampling on the day of arrival, comprising at least the following from each hatchery delivery:
Ten poult box liners for every batch of poults delivered.
All poults' dead on arrival or culled on arrival from each hatchery delivery.

Rearing flocks are sampled according to the requirements of the NCP. Mandatory sampling is required at four weeks of age and two weeks before moving to the laying phase or laying unit as follows:
A minimum of five pairs of boot swabs to be representative of the whole area in the house to which the birds have access: or
one pair of boot swabs and one 900 square cm dust swab; or
four hand-held 900 square cm dust swabs if less than 100 turkeys present.

Other operator voluntary monitoring can include rodent droppings, dust samples, swabs from transport vehicles etc.
Flocks which are in production are then sampled according to the requirements of the NCP, which requires mandatory sampling every three weeks during the laying/production period of the flock and within three weeks before the birds are moved to the slaughterhouse (or six weeks if moved to slaughter at more than 100 days of age). Sampling can be carried out at the holding or at the hatchery. If at the holding and provided the holding has had no positive results in at least the previous two calendar years and the national target has been achieved, sampling can be at 4-week intervals.Holding sampling:
A minimum of five pairs of boot swabs to be representative of the whole area in the house to which the birds have access: or
one pair of boot swabs and one 900 square cm dust swab; or
four hand-held 900 square cm dust swabs if less than 100 turkeys present.
Hatchery sampling:
Visibly soiled liners from five hatcher baskets covering one square metre area; or
900 square cm swabs from five places in hatcher or hatcher baskets; or
10 grams broken eggshells from each of 25 hatcher baskets.
Operator voluntary monitoring can include rodent faeces and other environmental samples, dust samples, swabs taken from empty houses, transport vehicles, meconium samples etc.
One routine Official Control Sample is collected annually from all flocks of adult breeding turkeys between 30 and 45 weeks of age.

46.2. Measures in place

There are no restrictions on the use of *Salmonella* vaccines which have a Marketing Authorisation.
Regulation (EC) No. 2160/2003 lays down harmonised rules for the monitoring and control of *Salmonella* in turkey flocks which have been implemented in the Northern Ireland *Salmonella* National

Control Programme (NCP). The Regulation is enforced through Control of *Salmonella* in Turkey Flocks Scheme Order (Northern Ireland) 2010. This national legislation enforces the requirements of the NCP required to meet the target for reduction in *Salmonella* prevalence set out in EU legislation. Regulation (EU) No. 1190/2012 sets a target for the turkey sector to ensure that no more than 1% of breeding turkey flocks (and no more than 1% of fattening turkey flocks) are detected positive for *Salmonella* of human health significance annually. The EU target is based on the two most common serovars in human cases which are *S*. Enteritidis and *S*. Typhimurium (including monophasic strains).
The NCP for breeding turkeys applies to all operators who keep 250 or more breeding turkeys over a calendar year.
Any breeding flock found to be infected with *S*. Typhimurium or *S*. Enteritidis is compulsorily slaughtered with compensation. When *Salmonella* Enteritidis or *Salmonella* Typhimurium (including monophasic strains) is suspected in a breeding flock, the flock is placed under official control. An investigation is carried out on all the flocks on the site. Following compulsory slaughter of the positive flock(s), the flock(s) remains under official control until cleaning and disinfection has been carried out and shown to be satisfactory by microbiological culture of samples taken from the empty house. Eggs from the positive flock are removed from the hatchery and destroyed. Eggs may be used for human consumption if they are treated in a manner that guarantees elimination of *S*. Typhimurium and *S*. Enteritidis.
The Control of *Salmonella* in Turkey Flocks Orders state that no person may administer any antimicrobial to turkeys as a specific method to control *Salmonella*.Codes of Good Practice in the control of *Salmonella* on turkey farms and in the production, handling and transport of feed, as well as advice on rodent control have been published in collaboration with the poultry industry.

46.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority. **4. Results of investigations and national evaluation of the situation, the trends and sources of infection**

There were no adult breeding turkey flocks in Northern Ireland in 2021.

46.5. Additional information

The majority of *Salmonella* incidents reported in most animal and bird species in Northern Ireland are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. However the *Salmonella* National Control Programmes (NCPs) apply to

Gallus gallus and turkeys. In these species the vast majority of isolations are made as a result of NCP testing.

47. Description of Monitoring/Surveillance/Control programmes system: *Salmonella spp.*/ turkeys (fattening)

47.1. Monitoring/Surveillance/Control programmes system

Sampling is carried out as specified in EU legislation (Regulation (EC) No. 2160/2003 and Regulation (EU) No. 1190/2012) and in Northern Ireland *Salmonella* National Control Programme (NCP) for fattening turkey flocks producing meat for human consumption. According to the requirements of the *Salmonella* National Control Programme, mandatory sampling is required within 3 weeks of the birds being sent to slaughter, unless due to be slaughtered at more than 100 days of age or for organically reared birds produced according to Commission Regulation (EC) 889/2008 when sampling is required within 6 weeks of slaughter. The NCP sample must consist of a minimum of two pairs of boot swabs or one pair of boot swabs and one 900 square cm dust swab taken so as to be representative of the whole area in the house to which the birds have access. In flocks of less than 100 turkeys, where it is not possible to take boot swabs, four hand-held 900 square cm dust swabs may be used.
Other operator voluntary monitoring can include additional boot swabs, litter samples, dust samples, rodent droppings, swabs taken from empty houses, transport vehicles etc.
Routine Official Control Samples are collected once annually from 10% of holdings with more than 500 birds.
Bacteriological method: ISO 6579-1: 2017 - Microbiology of the food chain -- Horizontal method for the detection, enumeration and serotyping of *Salmonella* -- Part 1: Detection of *Salmonella spp*. (MRSV method for primary production samples).

47.2. Measures in place

There are no restrictions on the use of *Salmonella* vaccines which have a Marketing Authorisation.
Regulation (EC) No. 2160/2003 lays down harmonised rules for the monitoring and control of *Salmonella* in turkey flocks which have been implemented in the Northern Ireland *Salmonella* National Control Programme (NCP). The Regulation is enforced through the Control of *Salmonella* in Turkey Flocks Scheme Order (Northern Ireland) 2010. This national legislation enforces the requirements of the NCP required to meet the target for reduction in *Salmonella* prevalence set out in EU legislation.
Regulation (EU) No. 1190/2012 sets a target for the turkey sector to ensure that no more than 1% of fattening turkey flocks are detected positive for *Salmonella* of human health significance annually. The EU target is based on the two most common serovars in human cases which are S. Enteritidis and S.

Typhimurium (including monophasic strains). The Control of *Salmonella* in Turkey Flocks Order states that no person may administer any antimicrobial to turkeys as a specific method to control *Salmonella*. The NCP for fattening turkeys applies to all operators, except where the operator produces small quantities of product provided direct to the consumer or via local retailers which only supply the final consumer or where all production is for private domestic use only.

If *S.* Enteritidis or *S.* Typhimurium (including monophasic strains) is detected in an operator or official sample, the flock is placed under official control. It is the responsibility of the food business operator to notify the Official Veterinarian at the slaughterhouse of the *Salmonella* status of the flock prior to slaughter so that suitable precautions can be put in place to prevent the possibility of cross-contamination and to minimise the risk to public health. Following depopulation of the positive flock(s), the house(s) remains under official control until cleaning and disinfection has been carried out and shown to be satisfactory by microbiological culture of samples taken from the empty house. The Competent Authority collects official samples from the next crop in the affected house as well as from all other flocks on the holding. If any of these samples are positive, a restriction notice is served on the flock(s), requiring supervised cleansing and disinfection and further sampling.

Codes of Good Practice in the control of *Salmonella* on turkey farms and in the production, handling and transport of feed, as well as advice on rodent control have been published in collaboration with the poultry industry.

47.3. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs. Government-approved private laboratories testing under the Salmonella legislation are required to provide monthly returns on tests conducted under this legislation to the Competent Authority.

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

No regulated serovars were identified from Northern Ireland fattening turkey flocks sampled under the *Salmonella* NCP during 2021. Therefore, Northern Ireland continues to achieve the fattening turkey target as set in EU Regulation.

47.5. Additional Information

The majority of *Salmonella* incidents reported in most animal and bird species in Northern Ireland are from samples taken for diagnostic purposes, and not from samples from healthy animals or taken during a structured survey. However the *Salmonella* National Control Programmes (NCPs) apply to

Gallus gallus and turkeys. In these species the vast majority of isolations are made as a result of NCP testing.

48. Description of Monitoring/Surveillance/Control programmes system: *Salmonella* in food

48.1. Monitoring/Surveillance/Control programmes system

Microbiological sampling is carried out in food businesses in compliance with Regulation (EC) 2073/2005 on the micro criteria of foodstuffs. Food businesses collect samples according to frequencies laid down in Annex 1 of Regulation (EC) 2073/2005. Samples are analysed in accredited laboratories and results are acted upon by food business operators according to procedures documented in a food safety management system agreed with the Competent Authority. Food safety management systems are verified and audited by the Competent Authority at a risk-based frequency. Returns from food authorities on official food enforcement activities in line with Regulation (EU) No. 2017/625 on official controls performed to ensure the verification of compliance with feed and food law, and animal health and animal welfare rules, are collated. The results of this food testing, which is done locally, are returned to the European Commission annually as required by the Regulation and therefore have not been included in this report.

48.2. Notification system in place to the national competent authority

The Zoonoses Order (Northern Ireland) 1991 specifies that all isolations of *Salmonella* in a sample taken from an animal or bird or its surroundings, or from any carcase, product or feeding stuff must be reported to a veterinary inspector and a culture supplied to a lab nominated by the Department of Agriculture, Environment and Rural Affairs.

49. Description of Monitoring/Surveillance/Control programmes system: *Salmonella* in feed

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

Although *Salmonellas* are found in feed materials, the processes involved in animal feed production should normally eliminate them. Animal feed may become contaminated on farm if poorly stored and not kept vermin free. There is the potential, if *Salmonella* serovars contaminate feed during the

manufacturing process, for the serovar to infect a large number of animals. It is most important that the principles of HACCP are applied to manage this risk.
Salmonella Senftenberg was the most commonly isolated serovar in Northern Ireland in 2021.

50. Food-borne Outbreaks

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

Mandatory reporting of any incidents of suspected food poisoning reported to the Public Health Agency Northern Ireland (PHA) together with laboratory reporting of all positive results for the main gastrointestinal diseases. This data is reviewed regularly to identify possible clusters either temporally or geographically.

In addition, certain organisms (E. coli 0157, Salmonella sp and Listeria sp) are submitted to the national reference laboratory in England for whole genome sequencing which helps identify possible outbreaks. In the event of a suspected outbreak in other organisms these may also be sent to the reference laboratory for further testing and whole genome sequencing.

Probable or confirmed cases of the main bacterial organisms responsible for food outbreaks (with the exception of Campylobacter due to the much higher volume of this organism relative to the other bacterial organisms) are followed up with an interview by one of the local council environmental health officer (EHO) to complete a standard food poisoning questionnaire which are reviewed by health protection staff and details added to a case management system. Any suspected vehicles/venues are entered and an automated system will identify multiple occurrences of the same vehicle/venue which will be investigated and contact made with the local council EHO to review the venue and identify any causes for concern as well as possibly taking food and environmental samples for biological testing.

If a particular food has been identified as a possible source after epidemiological investigation this is brought to the attention of the Food Standards Agency (FSA) in N. Ireland who may investigate the producer/supplier to identify any concerns and also take samples for testing where appropriate.

Conversely if the FSA had identified microbiological contamination of a food during routing samples the PHA will be notified so they can ascertain whether any of their current cases may be related.

Local council EHOs will also report, to the PHA, any venues which have been brought to their attention by members of the public e.g. group attending restaurant reporting several of the party becoming ill. Suspected cases are followed up by either EHOs or the PHA to obtain samples for testing. Depending on the results further investigation may follow.

If there is a suspected outbreak an incident management team may be established to investigate further which will normally involve health protection staff, EHOs, laboratory staff and the FSA. An outbreak report will be drawn up at the conclusion of the outbreak. This is shared with all members of the incident team.

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

In 2021 there were only two suspected food related outbreaks in N. Ireland one involving Listeria Monocytogenes and the other involving Salmonella sp. Unfortunately, in neither case was it possible to identify the source but given the organisms involved it is highly likely that the original source was related to food.

There were cases related to national outbreaks but this would be covered by the report completed by UK Health Security Agency as these outbreaks were managed by them.

50.3 National evaluation of the reported outbreaks in the country[(a)]

Very limited numbers of probable or confirmed food related outbreaks identified within N. Ireland prevents analysis of any trends though there has been no evidence of increases in outbreaks related to food in recent years.

(a): Trends in numbers of outbreaks and numbers of human cases involved, relevance of the different causative agents, food categories and the agent/food category combinations, relevance of the different type of places of food production and preparation in outbreaks, evaluation of the severity of the human cases.

51. Institutions and laboratories involved in antimicrobial resistance monitoring and reporting

Food Standard Agency- Northern Ireland (FSA-NI) are responsible for sampling fresh retail meat.

Department of Agriculture, Environment and Rural Affairs (DAERA) is the competent authority for AMR in animals and responsible for the programme of abattoir sampling of animals in 2021;

DAERA and FSA are partnering on the delivery of surveillance sampling at BCP's

The Agri-food and Biosciences Institute (AFBI) is employed to carry out testing on abattoir samples submitted by DAERA NI

The Department of Agriculture, Food and the Marine (DAFM), Republic of Ireland has been designated as the NI National Reference Laboratory for AMR.

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

52. General Antimicrobial Resistance Evaluation

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

The Northern Ireland Protocol (NIP) states that National Reference Laboratories (NRLs) and Official Laboratories (OLs) , as set out in (EU) 2017/625, cannot be fulfilled by the existing NRLs or OLs located in the UK. The FSA in NI has recently completed a challenging procurement process for the designation of food and feed NRLs for NI within EU Member States in order to comply with (EU) 2017/625. The designation of OLs within NI and EU Member States continues. EFSA have been kept informed of this, and the impact this has had on sampling on zoonoses data this year.

Prior to 2021, Northern Ireland reported AMR sampling results as part of the harmonised UK data set which used National Reference Laboratories or Official Laboratories located in the UK. The UK data has been submitted voluntarily last year which includes NI and the FSA intend to do the same again.

2021 is the first year that NI data has been reported separately as a Member State. The epidemiological evolution, over time, of CIAs will not be available until subsequent year's data becomes available for NI.

Summary of 2021 Results

- Campylobacter coli, 8/24 (33%) were resistance to fluoroquinolones (ciprofloxacin); 2/24 (8%) isolates were resistant to macrolides (erythromycin), 1/24 (4%) isolate was resistant to Ertapenem.
- Salmonella spp., 2/68 (3%) isolates were resistant to fluoroquinolones (ciprofloxacin) (S. Kentucky and S. London). None of the isolates was resistant to 3rd and 4th generation cephalosporins (cefotaxime) and colistin (polymyxin) or ceftazidime and meropenem.
- E. coli indicator - a total of 3/68 (4%) isolates were resistant to fluoroquinolones (ciprofloxacin). No isolates were resistant to 3rd and 4th generation cephalosporins (cefotaxime) and colistin (polymyxin).
- **A total of 43/68 (63%) E. coli were CTX resistant. Of those 39/43 (91%) isolates were consistent with ESBL resistance and 3/43 (7%) were consistent with AmpC resistance.**

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

AMR monitoring (based on CID (EU) 2020/1729) in the NI shows that there is a low level of resistance in food-borne pathogens to most of the HP-CIAs, except for resistance to fluoroquinolones in *Campylobacter coli* isolated in pigs in 2021.
All the major livestock sectors have committed to only using HP-CIAs as a last resort, where no alternatives are available and, wherever possible, guided by culture and sensitivity.

DAERA, FSA-NI and AFBI are members of the DEFRA Antimicrobial Resistance Coordination Group (DARC). Every quarter any priority AMR detections, of importance for public health and animal health, detected in Northern Ireland are reported to DARC. These include MDR Salmonella spp, ESBLs and MRSA detections.

DAERA, AFBI and FSA-NI are also reporting members of the Res-Alert system.- This is an informal, confidential and secure platform among different stakeholders across the UK. for discussing and sharing information where a new or emerging type of AMR is detected. Res-Alert functions as an alarm system.

52.3 Recent actions taken to control AMR in food producing animals and food

NI has an AMR action plan entitled 'Changing the Culture 2019-2024: One Health" which provides NI specific actions in conjunction with the UK 20 year vision and the UK 5 year National Action Plan (NAP), to bring the spread of antimicrobial resistance under control with a One Health approach. This includes monitoring and preventive actions against AMR in humans, animals and the environment.

AFBI on behalf of DAERA provides annual data on trends and sources of AMR in animal diagnostic submissions to the UK-VARSS report.

Within NI, as part of the UK, most of the major animal production sectors voluntarily share usage data for inclusion in the UK-VARSS report (see below), demonstrating their commitment to transparency and reduction of antibiotic usage and resistance. NI is working to improve the accuracy, availability and coverage of antibiotic use data in the main livestock sectors, with a key priority being the electronic collation of data for ruminant species. This transparency also provides insight into the different challenges faced by each of the animal production sectors, enabling them to implement tailored measures to achieve their sector-specific targets for reducing, replacing and refining antibiotic use in food-producing animals.

There is a need, however, to fill knowledge gaps on risk pathways related to the food-borne AMR threat. This would enable the focusing of resource and effort on the antibiotic usages that are of highest risk and the targeting of interventions to those areas where they will have maximum impact in reducing development and spread of AMR.

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

NI contributes to the annual UK-VARSS report produced by Veterinary Medicines Directive, collating UK-wide data on overall antibiotic sales for veterinary use, antibiotic usage by livestock species and antibiotic resistance in livestock. The most recent report is available at: https://www.gov.uk/government/publications/veterinary-antimicrobial-resistance-and-sales-surveillance-2020

The UK's 20-year Vision and five-year National Action Plan for antimicrobial resistance can be found at UK 20-year vision for antimicrobial resistance - GOV.UK (www.gov.uk)

The NI AMR Action Plan entitled 'Changing the Culture 2019-2024: One Health" can be found at Five-year action plan for tackling antimicrobial resistance | Department of Health (health-ni.gov.uk).

(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);

53. General Description of Antimicrobial Resistance Monitoring*; Caeca of pigs, indicator E. coli

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

Caecal contents from individual healthy fattening pigs at one slaughterhouse were sampled for indicator *Escherichia coli* in accordance with Decision 2020/1729/EU.

The sampling design was based on a randomised monthly production day sampling schedule with sampling spread evenly throughout the 12-month period. The sampling plan aimed to take one caecal sample from a single randomised slaughter batch on the nominated day by meat inspection staff.

Due to the delay in the confirmation of NI AMR reporting obligations until end of the second quarter of 2021, only 68 pig caecal samples were collected and tested during 2021. The lack of additional laboratory testing capacity in 2021 prevented NI upscaling the sampling mid-year to achieve the 300 samples and 170 isolates required and extending the sampling to additional slaughter plants to achieve 60% coverage of throughput. DAERA decided to maintain an evenly spread sampling regime over 2021, thus avoiding any seasonal bias to isolates and put in place robust measures to meet sampling levels in 2022.

Sampling of bovines under a year old was not required as NI domestic production was less than 10,000 tonnes in the previous year.

53.2Stratification procedure per animal population and food category

Stratification was performed in accordance with Commission Implementing Decision (EU) 2020/1729 and EFSA guidelines. Samples were collected from a NI pig slaughter plant processing 54% of NI domestic throughput in the previous year.

53.3 Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Commission Implementing Decision (EU) 2020/1729 and EFSA guidelines. 68 isolates were recovered from 68 caeca. In accordance with EFSA's guidelines, each eligible pig slaughter batch (the "epidemiological unit") was eligible to contribute one randomly selected *E. coli* isolate and thereby avoid clustering.

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

Indicator *E. coli* were isolated from caecal contents using MacConkey agar. An isolate was randomly selected and sub-cultured for further testing. Standard biochemical tests were used to identify *E. coli*.

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

L Broth microdilution (MIC determination) was performed in accordance with Decision 2020/1729/EU. The following antimicrobials were tested as specified in Table 2 (the ECOFF applied is stated in brackets): amikacin (>8) ampicillin (>8), azithromycin (NA), cefotaxime (>0.25), ceftazidime (>0.5), chloramphenicol (>16), ciprofloxacin (>0.06), colistin (>2), gentamicin (>2), meropenem (>0.125), nalidixic acid (>8), sulfamethoxazole (>64), tetracycline (>8), tigecycline (>0.5), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (in accordance with Table 5 in Decision 2020/1729/EU) was then performed on isolates resistant to cefotaxime or ceftazidime or meropenem using cefepime (>0.125), cefotaxime (>0.25), cefotaxime + clavulanate (>0.25), cefoxitin (>8), ceftazidime (>0.5), ceftazidime plus clavulanate (>0.5), ertapenem (NA), imipenem (>0.5), meropenem (>0.125) and temocillin (>16).

53.6 **Results of investigation**

E.coli was detected in each pig caeca tested (n=68). Microbiological resistance to colistin and gentamicin was not detected. None of the 68 isolates were resistant to cefotaxime or ceftazidime or meropenem. A total of 3/68 (4%) isolates were resistant to ciprofloxacin and 43/68 (43%) isolates were resistant to tetracycline.

*** to be filled in per combination of bacterial species/matrix**

(a): Method of sampling (description of sampling technique: stage of sampling, type of sample, sampler), Frequency of sampling, Procedure of selection of isolates for susceptibility testing, Method used for collecting data.

(b): Analytical method used for detection and confirmation: according to the legislation, the protocols developed by the EURL-AR should be used and reported here. In the case of the voluntary specific monitoring on Carbapenemase-producers, the selective media used (commercial plates, 'in house' media) should be also reported here. In general, any variation with regard to the EURL-AR protocols should be stated here, number of isolates isolated per sample, in particular for *Campylobacter* spp..

(c): Antimicrobials included, Cut-off values

54. General Description of Antimicrobial Resistance Monitoring*; Caeca of pigs, indicator ESBLs , AmpC and CP-producing E. coli

54.1 General description of sampling design and strategy[a]

Caecal contents from individual healthy fattening pigs at one slaughterhouse were sampled for ESBL/ AmpC/ carbapenemase –producing Escherichia coli in accordance with the specific monitoring described in Decision 2020/1729/EU and the guidance and protocols produced by the EU Reference Laboratory for AMR in Denmark. The voluntary monitoring using selective agars for carbapenemase-producing E. coli and OXA-carbapenemase producing E. coli was also performed.

The sampling design was based on a randomised monthly production day sampling schedule with sampling spread evenly throughout the 12-month period. The sampling plan aimed to take one caecal sample from a single randomised slaughter batch on the nominated day by meat inspection staff.

Caecal contents from individual healthy fattening pigs at one slaughterhouse were sampled for indicator Salmonella spp in accordance with Decision 2020/1729/EU.

The sampling design was based on a randomised monthly production day sampling schedule with sampling spread evenly throughout the 12-month period. The sampling plan aimed to take one caecal sample from a single randomised slaughter batch on the nominated day by meat inspection staff.

Due to the delay in the confirmation of NI AMR reporting obligations until end of the second quarter of 2021, only 68 pig caecal samples were collected and tested during 2021. The lack of additional laboratory testing capacity in 2021 prevented NI upscaling the sampling mid-year to achieve the 300 samples and 170 isolates required and extending the sampling to additional slaughter plants to achieve 60% coverage of throughput. DAERA decided to maintain an evenly spread sampling regime over 2021, thus avoiding any seasonal bias to isolates and put in place robust measures to meet sampling levels in 2022.

Sampling of bovines under a year old was not required as NI domestic production was less than 10,000 tonnes in the previous year.

54.2 Stratification procedure per animal population and food category

Stratification was performed in accordance with Commission Implementing Decision (EU) 2020/1729 and EFSA guidelines. Samples were collected from a NI pig slaughter plant processing 54% of NI domestic throughput in the previous year.

54.3 Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Decision 2020/1729/EU and EFSA guidelines. A total of 43 isolates were recovered from 68 caecal samples. In accordance with EFSA's guidelines, each eligible pig slaughter batch (the "epidemiological unit") was eligible to contribute one randomly selected *E. coli* isolate and thereby avoid clustering.

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

The protocol issued by the EU Reference Laboratory in Denmark was used for the specific monitoring of ESBL/ AmpC/ carbapenemase-producing *E. coli*. In addition, two selective agar for the detection of carbapenemase producing *E. coli* were used, chromID® CARBA and chromID® OXA-48. These agars for selective culture of carbapenemase-producing *E. coli* were used according to the protocol issued by the EU Reference Laboratory.

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

Broth microdilution (MIC determination) was performed in accordance with Decision 2020/1729/EU. The following antimicrobials were tested as specified in Table 2 (the ECOFF applied is stated in brackets): amikacin (>8) ampicillin (>8), azithromycin (NA), cefotaxime (>0.25), ceftazidime (>0.5), chloramphenicol (>16), ciprofloxacin (>0.06), colistin (>2), gentamicin (>2), meropenem (>0.125), nalidixic acid (>8), sulfamethoxazole (>64), tetracycline (>8), tigecycline (>0.5), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (in accordance with Table 5 in Decision 2020/1729/EU) was then performed on isolates resistant to cefotaxime or ceftazidime or meropenem using cefepime (>0.125), cefotaxime (>0.25), cefotaxime + clavulanate (>0.25), cefoxitin (>8), ceftazidime (>0.5), ceftazidime plus clavulanate (>0.5), ertapenem (NA), imipenem (>0.5), meropenem (>0.125) and temocillin (>16).

54.6 Library preparation used

Not applicable

54.7 Version of the predictive tool

Not applicable

54.8 Results of investigation

None of the caecal samples (0/68) yielded growth of *E. coli* on the two agars selective for carbapenemase-producing organisms. However, we did isolate 43 organisms that were CTX resistant. All of the isolates were resistant to ampicillin, as expected. Also, all 43 isolates were meropenem sensitive. 39/43 (91%) isolates were consistent with ESBL resistance**,** 3/43 (7%) were consistent with AmpC resistance and one (1/43),(2%) was sensitive to cefotaxime and ceftazidime in list panels Tables 2 and 5.

54.9 Additional information

*** to be filled in per combination of bacterial species/matrix**

(a): Method of sampling (description of sampling technique: stage of sampling, type of sample, sampler), Frequency of sampling, Procedure of selection of isolates for susceptibility testing, Method used for collecting data.

(b): Analytical method used for detection and confirmation: according to the legislation, the protocols developed by the EURL-AR should be used and reported here. In the case of the voluntary specific monitoring on Carbapenemase-producers, the selective media used (commercial plates, 'in house' media) should be also reported here. In general, any variation with regard to the EURL-AR protocols should be stated here, number of isolates isolated per sample, in particular for *Campylobacter* spp..

(c): Antimicrobials included, Cut-off values

55. General Description of Antimicrobial Resistance Monitoring*; Caeca of pigs, Salmonella spp

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

Caecal contents from individual healthy fattening pigs at one slaughterhouse were sampled for indicator *Salmonella* spp in accordance with Decision 2020/1729/EU.
The sampling design was based on a randomised monthly production day sampling schedule with sampling spread evenly throughout the 12-month period. The sampling plan aimed to take one caecal sample from a single randomised slaughter batch on the nominated day by meat inspection staff.
Due to the delay in the confirmation of NI AMR reporting obligations until end of the second quarter of 2021, only 68 pig caecal samples were collected and tested during 2021. The lack of additional laboratory testing capacity in 2021 prevented NI upscaling the sampling mid-year to achieve the 300 samples and 170 isolates required and extending the sampling to additional slaughter plants to achieve 60% coverage of throughput. DAERA decided to maintain an evenly spread sampling regime over 2021, thus avoiding any seasonal bias to isolates and put in place robust measures to meet sampling levels in 2022.
Sampling of bovines under a year old was not required as NI domestic production was less than 10,000 tonnes in the previous year.

55.2 Stratification procedure per animal population and food category

Stratification was performed in accordance with Commission Implementing Decision (EU) 2020/1729 and EFSA guidelines. Samples were collected from a NI pig slaughter plant processing 54% of NI domestic throughput in the previous year.

55.3 Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Decision 2020/1729/EU and EFSA guidelines. 16 isolates were recovered from 68 caeca. In accordance with EFSA's guidelines, each eligible pig slaughter batch (the "epidemiological unit") was eligible.

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

Salmonella isolates were examined biochemically and serologically to confirm identification to genus level. Isolates were serotyped using micro, tube and / or slide agglutination tests, to investigate the presence of the recognised somatic and flagellar antigens, using specific antisera. Additional biochemical tests were performed where required for certain serovars. Serovars were determined according to the Kauffman-White-Le Minor scheme.

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

Broth microdilution (MIC determination) was performed in accordance with Decision 2020/1729/EU. The following antimicrobials were tested as specified in Table 2 (the ECOFF applied is stated in brackets): amikacin (>4) ampicillin (>8), azithromycin (NA), cefotaxime (>0.5), ceftazidime (>2), chloramphenicol (>16), ciprofloxacin (>0.06), colistin (NA), gentamicin (>2), meropenem (>0.125), nalidixic acid (>8), sulfamethoxazole (NA), tetracycline (>8), tigecycline (NA), trimethoprim (>2). Further testing of the supplementary panel of antimicrobials (in accordance with Table 5 in Decision 2020/1729/EU) was then performed on isolates resistant to cefotaxime or ceftazidime or meropenem using cefepime (NA), cefotaxime (>0.5), cefotaxime + clavulanate (NA), cefoxitin (>8), ceftazidime (>02), ceftazidime plus clavulanate (NA), ertapenem (NA), imipenem (>1), meropenem (>0.125) and temocillin (NA).

55.6 Library preparation used

Not applicable

55.7 Version of the predictive tool

Not applicable

55.8 Results of investigation

The number of Salmonella isolates detected from the caeca were 16/68**.** The Salmonella serovars identified were as follows: ten Monophasic Typimurium, two Derby and one Typhimurium, Kentucky Rissen and London. A total of 14 isolates were resistant to tetracycline (88%).

2/68 (3%) isolates were resistant to ciprofloxacine (S. Kentucky and S. London)

None of the isolates were resistant to cefotaxime, ceftazidime, meropenem or colistin.

55.9 Additional information

*** to be filled in per combination of bacterial species/matrix**

(a): Method of sampling (description of sampling technique: stage of sampling, type of sample, sampler), Frequency of sampling, Procedure of selection of isolates for susceptibility testing, Method used for collecting data.

(b): Analytical method used for detection and confirmation: according to the legislation, the protocols developed by the EURL-AR should be used and reported here. In the case of the voluntary specific monitoring on Carbapenemase-producers, the selective media used (commercial plates, 'in house' media) should be also reported here. In general, any variation with regard to the EURL-AR protocols should be stated here, number of isolates isolated per sample, in particular for *Campylobacter* spp..

(c): Antimicrobials included, Cut-off values

56.General Description of Antimicrobial Resistance Monitoring*; Caeca of pigs, Campylobacter jejuni

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

Caecal contents from individual healthy fattening pigs at one slaughterhouse were sampled for indicator *Campylobacter jejuni* in accordance with Decision 2020/1729/EU.
The sampling design was based on a randomised monthly production day sampling schedule with sampling spread evenly throughout the 12-month period. The sampling plan aimed to take one caecal sample from a single randomised slaughter batch on the nominated day by meat inspection staff.
Due to the delay in the confirmation of NI AMR reporting obligations until end of the second quarter of 2021, only 68 pig caecal samples were collected and tested during 2021. The lack of additional laboratory testing capacity in 2021 prevented NI upscaling the sampling mid-year to achieve the 300 samples and 170 isolates required and extending the sampling to additional slaughter plants to achieve 60% coverage of throughput. DAERA decided to maintain an evenly spread sampling regime over 2021, thus avoiding any seasonal bias to isolates and put in place robust measures to meet sampling levels in 2022.
Sampling of bovines under a year old was not required as NI domestic production was less than 10,000 tonnes in the previous year.

56.2 Stratification procedure per animal population and food category

Stratification was performed in accordance with Commission Implementing Decision (EU) 2020/1729 and EFSA guidelines. Samples were collected from a NI pig slaughter plant processing 54% of NI domestic throughput in the previous year.

56.3 Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Decision 2020/1729/EU and EFSA guidelines. A total of 27 *Campylobacter* spp isolates were recovered, of those none were identified as *C. jejuni,* from caeca. In accordance with EFSA's guidelines, each eligible pig slaughter batch (the "epidemiological unit") was eligible.

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

MCCDA agar was used for isolation of *Campylobacter* spp without pre-enrichment. Validated PCR by EURL-AR was used to confirm identification at the species level**.**

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

Broth microdilution (MIC determination) was performed in accordance with Decision 2020/1729/EU. The following antimicrobials were tested as specified in Table 3 of Decision 2020/1729/EU (the ECOFF applied is stated in brackets): erythromycin (>4), ertapenem (NA), ciprofloxacin (>0.5), chloramphenicol (>16), gentamicin (>2), tetracycline (>1).

56.6 Library preparation used

56.7 Version of the predictive tool

56.8 Results of investigation

None detected in 2021.

56.9 Additional information

*** to be filled in per combination of bacterial species/matrix**

(a): Method of sampling (description of sampling technique: stage of sampling, type of sample, sampler), Frequency of sampling, Procedure of selection of isolates for susceptibility testing, Method used for collecting data.

(b): Analytical method used for detection and confirmation: according to the legislation, the protocols developed by the EURL-AR should be used and reported here. In the case of the voluntary specific monitoring on Carbapenemase-producers, the selective media used (commercial plates, 'in house' media) should be also reported here. In general, any variation with regard to the EURL-AR protocols should be stated here, number of isolates isolated per sample, in particular for *Campylobacter* spp..

(c): Antimicrobials included, Cut-off values

57. General Description of Antimicrobial Resistance Monitoring*; Caeca of pigs, Campylobacter coli

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

Caecal contents from individual healthy fattening pigs at one slaughterhouse were sampled for indicator *Campylobacter jejuni* in accordance with Decision 2020/1729/EU.

The sampling design was based on a randomised monthly production day sampling schedule with sampling spread evenly throughout the 12-month period. The sampling plan aimed to take one caecal sample from a single randomised slaughter batch on the nominated day by meat inspection staff.

Due to the delay in the confirmation of NI AMR reporting obligations until end of the second quarter of 2021, only 68 pig caecal samples were collected and tested during 2021. The lack of additional laboratory testing capacity in 2021 prevented NI upscaling the sampling mid-year to achieve the 300 samples and 170 isolates required and extending the sampling to additional slaughter plants to achieve 60% coverage of throughput. DAERA decided to maintain an evenly spread sampling regime over 2021, thus avoiding any seasonal bias to isolates and put in place robust measures to meet sampling levels in 2022.

Sampling of bovines under a year old was not required as NI domestic production was less than 10,000 tonnes in the previous year.

57.2 Stratification procedure per animal population and food category

Stratification was performed in accordance with Commission Implementing Decision (EU) 2020/1729 and EFSA guidelines. Samples were collected from a NI pig slaughter plant processing 54% of NI domestic throughput in the previous year.

57.3 Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Decision 2020/1729/EU and EFSA guidelines. Xxx 27 *Campylobacter* spp isolates were recovered, of those 24 were identified as *C. coli* from 68 caeca. In accordance with EFSA's guidelines, each eligible pig slaughter batch (the "epidemiological unit") was eligible.

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

MCCDA agar was used for isolation of *Campylobacter* spp without pre-enrichment. Validated PCR by EURL-AR was used to confirm identification at the species level**.**

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

Broth microdilution (MIC determination) was performed in accordance with Decision 2020/1729/EU. The following antimicrobials were tested as specified in Table 3 of Decision 2020/1729/EU (the ECOFF applied is stated in brackets): erythromycin (>8), ertapenem (NA), ciprofloxacin (>0.5), chloramphenicol (>16), gentamicin (>2), tetracycline (>2).

57.6 Library preparation used

Not applicable

57.7 Version of the predictive tool

Not applicable

57.8 Results of investigation

Tetracycline resistance was observed in 19/24 (79%) isolates, 8/24 **(33%) were** resistance to Ciprofloxacin. 2/24 (8%) isolates were resistant to Erythromycin. One of the isolates 1/24 (4%) was resistant to Ertapenem.

57.9 Additional information

*** to be filled in per combination of bacterial species/matrix**

(a): Method of sampling (description of sampling technique: stage of sampling, type of sample, sampler), Frequency of sampling, Procedure of selection of isolates for susceptibility testing, Method used for collecting data.

(b): Analytical method used for detection and confirmation: according to the legislation, the protocols developed by the EURL-AR should be used and reported here. In the case of the voluntary specific monitoring on Carbapenemase-producers, the selective media used (commercial plates, 'in house' media) should be also reported here. In general, any variation with regard to the EURL-AR protocols should be stated here, number of isolates isolated per sample, in particular for *Campylobacter* spp..

(c): Antimicrobials included, Cut-off values