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 2022

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 2022.

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)	1,686,999	20,518
Deer	Deer - farmed	1,877	19
Gallus gallus (fowl)	Gallus gallus (fowl) - breeding flocks, unspecified - adult	1,870,737	279
	Gallus gallus (fowl) - broilers	11,900,591	6,404
	Gallus gallus (fowl) - laying hens	1,484,295	
	Gallus gallus (fowl) - laying hens - adult	5,289,959	788
Pigs	Pigs	738,540	406
	Pigs - breeding animals	58,130	287
	Pigs - fattening pigs	680,410	359
Poultry, unspecified	Poultry, unspecified	79,274	147
Small ruminants	Goats	2,819	358
	Sheep	2,100,886	10,003
	Sheep and goats	41,237	254
Solipeds, domestic	Solipeds, domestic - horses	7,015	1,513
Turkeys	Turkeys	18,217	

DISEASE STATUS TABLES

TABLE NAME	REGION	Zoonotic Agent	DISEASE STATUS UNIT	Number of herds with status officially free	Number of infected herds	Total number of herds
Bovine brucellosis in countries and regions that do not receive Community co-financing for eradication programme	NORTHERN IRELAND (NUTS level 1)	Brucella		22,866	0	22,866

TABLE NAME	REGION	Zoonotic Agent	DISEASE STATUS UNIT	Number of herds with status officially free	Number of infected herds	Total number of herds
Ovine or Caprine brucellosis in countries and regions that do not receive Community co-financing for eradication programme	NORTHERN IRELAND (NUTS level 1)	Brucella		11,607	0	11,607

DISEASE STATUS TABLES

TABLE NAME	REGION	Zoonotic Agent	DISEASE STATUS UNIT	Number of herds with status officially free	Number of infected herds	Total number of herds
Bovine tuberculosis in countries and regions that do not receive Community co-financing for eradication programme	NORTHERN IRELAND (NUTS level 1)	Mycobacterium bovis		21,005	2,785	22,866

TABLE NAME	REGION	Zoonotic Agent	DISEASE STATUS UNIT	Number of infected herds	Total number of herds
Tuberculosis in farmed deer	NORTHERN IRELAND (NUTS level 1)	Mycobacterium bovis		2	19

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 units positive
Not Available	Alpacas - farmed - Farm - Not Available - Not Available - Monitoring - Industry sampling - Objective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	4	0	Brucella	0
	Antelopes - zoo animal - Zoo - Not Available - Not Available - Unspecified - Industry sampling - Objective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	1	0	Brucella	0
	Pigs - breeding animals - Farm - Not Available - Not Available - Monitoring - Industry sampling - Objective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	871	0	Brucella	0
	Reindeers - farmed - Farm - Not Available - Not Available - Monitoring - Industry sampling - Objective sampling	N_A	Rose Bengal plate test (RBT)/Buffered Brucella antigen test (BBAT)	animal	3	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 units positive
Not Available	Cattle (bovine animals) - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	257	1	Campylobacter jejuni	1
	Cattle (bovine animals) - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	257	2	Campylobacter, unspecified sp.	2
	Cattle (bovine animals) - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	257	19	Campylobacter jejuni	1
							Campylobacter, unspecified sp.	18
	Gallus gallus (fowl) - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	47	1	Campylobacter jejuni	1
	Pigs - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	56	1	Campylobacter, unspecified sp.	1
	Sheep - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	320	1	Campylobacter jejuni	1
	Sheep - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	320	12	Campylobacter fetus subsp. fetus	1
							Campylobacter jejuni	7
							Campylobacter lari	1
							Campylobacter, unspecified sp.	3
	Sheep - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	320	8	Campylobacter jejuni	4
							Campylobacter lari	1
							Campylobacter, unspecified sp.	3

Table CAMPYLOBACTER:Campylobacter in food

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	total units tested	total units positive	Zoonoses	N units positive
Not Available	Meat from broilers (Gallus gallus) - carcase - chilled - Slaughterhouse - Not Available - food sample - neck skin - Surveillance - based on Regulation 2073 - Official, based on Regulation 2019/627 - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 10272-2:2017 Campylobacter	550	41	Campylobacter, unspecified sp.	41

Table ECHINOCOCCUS:Echinococcus in animal

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling Details	Method	Sampling unit	total units tested	total units positive	Zoonoses	N units positive
UNITED KINGDOM	Foxes - wild - red fox - Hunting - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	367	0	Echinococcus multilocularis	0
	Foxes - wild - red fox - Road transport - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	17	0	Echinococcus multilocularis	0
Belfast (NUTS 2016)	Foxes - wild - red fox - Road transport - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	3	0	Echinococcus multilocularis	0
Armagh City, Banbridge and Craigavon (NUTS 2016)	Foxes - wild - red fox - Hunting - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	38	0	Echinococcus multilocularis	0
	Foxes - wild - red fox - Road transport - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	6	0	Echinococcus multilocularis	0
Newry, Mourne and Down (NUTS 2016)	Foxes - wild - red fox - Hunting - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	52	0	Echinococcus multilocularis	0
Ards and North Down (NUTS 2016)	Foxes - wild - red fox - Hunting - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	94	0	Echinococcus multilocularis	0
	Foxes - wild - red fox - Road transport - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	2	0	Echinococcus multilocularis	0
Derry City and Strabane	Foxes - wild - red fox - Hunting - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	1	0	Echinococcus multilocularis	0
Mid Ulster (NUTS 2021)	Foxes - wild - red fox - Hunting - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	34	0	Echinococcus multilocularis	0
	Foxes - wild - red fox - Road transport - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	2	0	Echinococcus multilocularis	0
Causeway Coast and Glens (NUTS 2021)	Foxes - wild - red fox - Hunting - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	104	0	Echinococcus multilocularis	0
	Foxes - wild - red fox - Road transport - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	1	0	Echinococcus multilocularis	0
Antrim and Newtownabbey (NUTS 2021)	Foxes - wild - red fox - Hunting - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	3	0	Echinococcus multilocularis	0
	Foxes - wild - red fox - Road transport - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	2	0	Echinococcus multilocularis	0
Lisburn and Castlereagh (NUTS 2021)	Foxes - wild - red fox - Hunting - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	15	0	Echinococcus multilocularis	0
Mid and East Antrim (NUTS 2021)	Foxes - wild - red fox - Hunting - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	17	0	Echinococcus multilocularis	0
Fermanagh and Omagh (NUTS 2021)	Foxes - wild - red fox - Hunting - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	9	0	Echinococcus multilocularis	0
	Foxes - wild - red fox - Road transport - Not Available - animal sample - intestinal content - Surveillance - Official sampling - Objective sampling		Sedimentation and Counting Technique	animal	1	0	Echinococcus multilocularis	0

Table ESCHERICHIA COLI:Escherichia coli in animal

Section: STEC - animal

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	total units tested	total units positive	Zoonoses	ANTH	VTX	AG	N units positive
Not Available	Goats - Farm - Not Available - animal sample - faeces - Unspecified - Industry sampling - Suspect sampling	animal		Not Available	N_A	OIE method for E.coli O157 in animal faecal samples	1	0	Shiga toxin-producing Escherichia coli (STEC)	Not Available	Not Available	Not Available	0
	Sheep - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	animal		Not Available	N_A	OIE method for E.coli O157 in animal faecal samples	2	0	Shiga toxin-producing Escherichia coli (STEC)	Not Available	Not Available	Not Available	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 units positive
Not Available	Cattle (bovine animals) - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	293	6	Listeria monocytogenes	4
							Listeria spp., unspecified	2
	Cattle (bovine animals) - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	293	2	Listeria monocytogenes	2
							Listeria spp., unspecified	1
	Sheep - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	371	12	Listeria ivanovii	6
							Listeria monocytogenes	6
	Sheep - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	371	10	Listeria ivanovii	5
							Listeria monocytogenes	4
							Listeria spp., unspecified	1

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 units positive
Not Available	Alpacas - farmed - Farm - Not Available - Not Available - Control and eradication programmes - Not applicable - Not specified	N_A	PCR	animal	1	1	Mycobacterium bovis	1
	Dogs - Unspecified - Not Available - Not Available - Unspecified - Not applicable - Not specified	N_A	PCR	animal	1	0	Mycobacterium bovis	0
	Pigs - Unspecified - Not Available - Not Available - Unspecified - Not applicable - Not specified	N_A	PCR	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	Number of Flocks Under Control Programme	Target Verification	Sampling Details	Method	total units tested	total units positive	Zoonoses	Units positive
Not Available	Cattle (bovine animals) - adult cattle over 2 years - Farm - Not Available - animal sample - faeces - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella Typhimurium, monophasic	1
	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	1	1	Salmonella Dublin	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	2	2	Salmonella Dublin	2
	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	22	22	Salmonella Dublin	19
									Salmonella Mbandaka	1
									Salmonella Typhimurium, monophasic	2
	Cattle (bovine animals) - Farm - Not Available - animal sample - faeces - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	18	18	Salmonella Dublin	12
									Salmonella Mbandaka	2
									Salmonella Newport	1
									Salmonella Typhimurium	3
	Cattle (bovine animals) - Farm - Not Available - animal sample - foetus/stillbirth - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	14	14	Salmonella Dublin	11
									Salmonella Mbandaka	1
									Salmonella Newport	1
									Salmonella spp., unspecified	1
	Cattle (bovine animals) - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	9	9	Salmonella Dublin	9
	Cattle (bovine animals) - young cattle (1-2 years) - Farm - Not Available - animal sample - foetus/stillbirth - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella Dublin	1
	Dogs - pet animals - Household - Not Available - animal sample - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella Newport	1
	Dogs - pet animals - Household - Not Available - animal sample - faeces - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella spp., unspecified	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	278	N	N_A	Not Available	278	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	278	Y	N_A	Not Available	278	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	278	N	N_A	Not Available	278	0	Salmonella	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Not Available - environmental sample - boot swabs - Clinical investigations - Industry sampling - Suspect sampling	herd/flock		N_A	N_A	Not Available	1	1	Salmonella Mbandaka	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	6404	N	N_A	Not Available	6358	6	Salmonella Agama	1
									Salmonella Infantis	3
									Salmonella Mbandaka	1
									Salmonella spp., unspecified	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	6404	Y	N_A	Not Available	6404	7	Salmonella Agama	1
									Salmonella Infantis	4
									Salmonella Mbandaka	1
									Salmonella spp., unspecified	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Objective sampling	herd/flock	6404	N	N_A	Not Available	46	1	Salmonella Infantis	1
	Gallus gallus (fowl) - laying hens - adult - Farm - Not Available - animal sample - eggshells - Clinical investigations - Industry sampling - Suspect sampling	herd/flock		N_A	N_A	Not Available	1	1	Salmonella Bracknell	1
	Gallus gallus (fowl) - laying hens - adult - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	788	N	N_A	Not Available	387	3	Salmonella enterica, subspecies diarizonae	2
									Salmonella Livingstone	1
	Gallus gallus (fowl) - laying hens - adult - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	788	Y	N_A	Not Available	788	4	Salmonella enterica, subspecies diarizonae	2
									Salmonella Livingstone	2
	Gallus gallus (fowl) - laying hens - adult - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Objective sampling	herd/flock	788	N	N_A	Not Available	401	1	Salmonella Livingstone	1
	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	1	1	Salmonella Tennessee	1

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Number of Flocks Under Control Programme	Target Verification	Sampling Details	Method	total units tested	total units positive	Zoonoses	Units positive
Not Available	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
	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
	Pigeons - Unspecified - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella Typhimurium	1
	Pigs - unspecified - Farm - Not Available - animal sample - faeces - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	1	1	Salmonella Typhimurium, monophasic	1
	Pigs - unspecified - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	11	11	Salmonella Give	1
									Salmonella London	1
									Salmonella Typhimurium	8
									Salmonella Typhimurium, monophasic	1
	Sheep - animals over 1 year - Farm - Not Available - animal sample - foetus/stillbirth - 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	8	8	Salmonella Dublin	1
									Salmonella enterica, subspecies diarizonae	7
	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	5	5	Salmonella enterica, subspecies diarizonae	5
	Sheep - 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 - Farm - Not Available - animal sample - foetus/stillbirth - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	3	3	Salmonella Dublin	1
									Salmonella enterica, subspecies diarizonae	2
	Sheep - Farm - Not Available - animal sample - organ/tissue - Clinical investigations - Industry sampling - Suspect sampling	animal		N_A	N_A	Not Available	2	2	Salmonella enterica, subspecies diarizonae	2
	Turkeys - fattening flocks - before slaughter - Farm - Not Available - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	37	N	N_A	Not Available	33	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	37	Y	N_A	Not Available	37	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	37	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 units positive
Not Available	Meat from bovine animals - carcase - Slaughterhouse - Not Available - food sample - carcase swabs - Surveillance - based on Regulation 2073 - Industry sampling - Objective sampling	single (food/feed)	400	Square centimetre	N_A	ISO 6579-1:2017 Salmonella	1603	1	Salmonella Typhimurium, monophasic	1
	Meat from broilers (Gallus gallus) - carcase - chilled - Slaughterhouse - Not Available - food sample - neck skin - Surveillance - based on Regulation 2073 - Industry sampling - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 6579-1:2017 Salmonella	255	0	Salmonella	0
	Meat from pig - carcase - Slaughterhouse - Not Available - food sample - carcase swabs - Surveillance - based on Regulation 2073 - Industry sampling - Objective sampling	single (food/feed)	400	Square centimetre	N_A	ISO 6579-1:2017 Salmonella	610	10	Salmonella Enterica, unspecified	2
									Salmonella spp., unspecified	3
									Salmonella Typhimurium	3
									Salmonella Typhimurium, monophasic	2
	Meat from sheep - carcase - Slaughterhouse - Not Available - food sample - carcase swabs - Surveillance - based on Regulation 2073 - Industry sampling - Objective sampling	single (food/feed)	400	Square centimetre	N_A	ISO 6579-1:2017 Salmonella	520	0	Salmonella	0
	Meat from turkey - carcase - chilled - Slaughterhouse - Not Available - food sample - neck skin - Surveillance - based on Regulation 2073 - Industry sampling - Objective sampling	single (food/feed)	25	Gram	N_A	ISO 6579-1:2017 Salmonella	5	0	Salmonella	0

Table SALMONELLA:Salmonella in feed

Area of sampling	Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Sampling Details	Method	total units tested	total units positive	Zoonoses	N units positive
Not Available	Compound feedingstuffs, not specified - Feed mill - Not Available - Not Available - Surveillance - Official sampling - Objective sampling	single (food/feed)	25	Gram	N_A	Not Available	53	0	Salmonella	0

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 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	1	Toxoplasma gondii	1
	Cattle (bovine animals) - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	5	4	Toxoplasma gondii	4
	Pigs - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	2	0	Toxoplasma gondii	0
	Sheep - Farm - Not Available - animal sample - blood - Surveillance - Industry sampling - Suspect sampling	N_A	Latex agglutination test (LAT)	animal	297	138	Toxoplasma gondii	138

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 units positive
Not Available	Foxes - Natural habitat - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Convenient sampling	N_A	Magnetic stirrer method for pooled sample digestion	animal	300	0	Trichinella	0
	Pigs - mixed herds - raised under controlled housing conditions, recognised by the competent authorities - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Selective sampling	N_A	Magnetic stirrer method for pooled sample digestion	animal	1205	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 units positive
Not Available	Cattle (bovine animals) - dairy cows - Farm - Not Available - animal sample - milk - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	995	1	Yersinia, unspecified sp.	1
	Cattle (bovine animals) - unspecified - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	995	108	Yersinia enterocolitica	44
							Yersinia pseudotuberculosis	42
							Yersinia, unspecified sp.	22
	Cattle (bovine animals) - unspecified - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	995	1	Yersinia, unspecified sp.	1
	Cattle (bovine animals) - unspecified - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	995	7	Yersinia pseudotuberculosis	7
	Deer - wild - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	4	1	Yersinia enterocolitica	1
	Sheep - animals over 1 year - Farm - Not Available - animal sample - organ/tissue - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	276	3	Yersinia pseudotuberculosis	3
	Sheep - Farm - Not Available - animal sample - foetus/stillbirth - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	276	4	Yersinia enterocolitica	1
							Yersinia pseudotuberculosis	3
	Sheep - mixed herds - Farm - Not Available - animal sample - faeces - Surveillance - Industry sampling - Suspect sampling	N_A	Microbiological tests	animal	276	17	Yersinia enterocolitica	15
							Yersinia pseudotuberculosis	1
							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	Strong				Weak			
Causative agent	Food vehicle		N outbreaks	N human cases	N hospitalized	N deaths	N outbreaks	N human cases	N hospitalized	N deaths
Salmonella Typhimurium	Chocolate		1	1	0	0				
STEC O157	Lettuce						1	18	5	0

Strong Foodborne Outbreaks: detailed data

Causative agent	H	AG	VT	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Salmonella Typhimurium	Not Available	Not Available	Not Available	Not Available	27990	Part of multicountry outbreak	Chocolate	Source for outbreak was Kinder chocolate produced in Europe	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans	Multiple places of exposure in more than one country	Processing plant	European Union	Not Available	This was an international outbreak with multiple cases but only one case in N. Ireland	1	1	0	0

Weak Foodborne Outbreaks: detailed data

Causative agent	H	AG	VT	Other Causative Agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
STEC O157	Not Available	Not Available	Not Available	Not Available	t10.4926	Part of multicountry outbreak	Lettuce	Source not identified. No food products tested positive for strain.	Analytical epidemiological evidence	Multiple places of exposure in more than one country	Unknown;Processing plant	Unknown	Not Available	This was an national/international cluster of cases with 18 in N. Ireland	1	18	5	0

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:United Kingdom (Northern Ireland)

Sampling Details:N_A

	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	**78**	**78**	**78**	**78**	**78**	**78**
MIC	**N of resistant isolates**	**0**	**24**	**2**	**6**	**1**	**57**
<=0.125			50	45			
<=0.25						64	
0.25			3	20			
<=0.5							20
0.5			1	11		9	
<=1					72		
1						4	1
<=2		76					
2			4				
4		2	13	2		1	
8			7				2
16							7
32					3		16
64					1		31
>64							1
512					2		

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:United Kingdom (Northern Ireland)

Sampling Details:N_A

	AM substance	Chloramphenicol	Ciprofloxacin	Ertapenem	Erythromycin	Gentamicin	Tetracycline
	ECOFF	**16**	**0.5**	**0.5**	**4**	**2**	**1**
	Lowest limit	**2**	**0.125**	**0.125**	**1**	**0.25**	**0.5**
	Highest limit	**64**	**32**	**4**	**512**	**16**	**64**
	N of tested isolates	**108**	**108**	**108**	**108**	**108**	**108**
MIC	**N of resistant isolates**	**0**	**41**	**5**	**10**	**2**	**60**
<=0.125			63	88			
<=0.25						92	
0.25			2	4			
<=0.5							47
0.5			2	11		5	
<=1					97		
1				3		8	1
<=2		104					
2			4			1	
4		2	24	1	1	2	4
>4				1			
8		1	10		1		4
16		1	3				17
32					1		14
64					6		21
128					2		

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

Table Antimicrobial susceptibility testing of Salmonella 6,7:z10:- in Gallus gallus (fowl) - broilers - before slaughter

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:United Kingdom (Northern Ireland)

Sampling Details:N_A

ESBL Genes	AMPC Genes	CARBA Genes	MIC	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin
				ECOFF	4	8	16	0.5	2	16	0.064	2
				Lowest limit	4	1	2	0.25	0.25	8	0.015	1
				Highest limit	128	32	64	4	6	64	8	16
				N of tested isolates	1	1	1	1	1	1	1	1
				N of resistant isolates	0	0	0	0	0	0	0	0
Not Available	Not Available	Not Available	<=0.015								1	
			<=0.25					1				
			0.5						1			
			<=1			1						1
			<=4		1							
			<=8							1		
			8				1					

ESBL Genes	AMPC Genes	CARBA Genes	AM substance	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
			ECOFF	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
			Lowest limit	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
			Highest limit	**16**	**16**	**64**	**512**	**32**	**8**	**16**
			N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**
			N of resistant isolates	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Not Available	Not Available	Not Available	**MIC**							
			<=0.03		1					
			<=0.25						1	1
			<=0.5	1						
			<=2					1		
			<=4			1				
			128				1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:United Kingdom (Northern Ireland)

Sampling Details:N_A

ESBL Genes	AMPC Genes	CARBA Genes	MIC	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin
				ECOFF	4	8	16	0.5	2	16	0.064	2
				Lowest limit	4	1	2	0.25	0.25	8	0.015	1
				Highest limit	128	32	64	4	6	64	8	16
				N of tested isolates	1	1	1	1	1	1	1	1
				N of resistant isolates	0	0	0	0	0	0	0	0
Not Available	Not Available	Not Available	0.03								1	
			<=0.25					1	1			
			<=1									1
			2			1						
			<=4		1							
			<=8							1		
			8				1					

ESBL Genes	AMPC Genes	CARBA Genes	AM substance	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
			ECOFF	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
			Lowest limit	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
			Highest limit	**16**	**16**	**64**	**512**	**32**	**8**	**16**
			N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**
			MIC / **N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Not Available	Not Available	Not Available	<=0.03		1					
			<=0.5	1						
			0.5						1	1
			<=2					1		
			<=4			1				
			32				1			

Table Antimicrobial susceptibility testing of Salmonella IIIb 61:-:1,5 in Gallus gallus (fowl) - laying hens

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:United Kingdom (Northern Ireland)

Sampling Details:N_A

ESBL Genes	AMPC Genes	CARBA Genes	MIC	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin
				ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**
				Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**
				Highest limit	**128**	**32**	**64**	**4**	**6**	**64**	**8**	**16**
				N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
				N of resistant isolates	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Not Available	Not Available	Not Available	<=0.015								2	
			<=0.25					2	2			
			<=1			1						2
			2			1						
			<=4		2							
			<=8							2		
			8				2					

ESBL Genes	AMPC Genes	CARBA Genes	AM substance	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
			ECOFF	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
			Lowest limit	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
			Highest limit	**16**	**16**	**64**	**512**	**32**	**8**	**16**
			N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**
			N of resistant isolates	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Not Available	Not Available	Not Available	**MIC**							
			<=0.03		2					
			<=0.25						2	2
			<=0.5	2						
			<=2					2		
			<=4			2				
			32				2			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:United Kingdom (Northern Ireland)

Sampling Details:N_A

ESBL Genes	AMPC Genes	CARBA Genes	MIC	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin
				ECOFF	**4**	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**
				Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**
				Highest limit	**128**	**32**	**64**	**4**	**6**	**64**	**8**	**16**
				N of tested isolates	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
				N of resistant isolates	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**
Not Available	Not Available	Not Available	<=0.25					3				
			0.5					1	2			
			<=1									4
			1						2		3	
			2			3					1	
			<=4		4							
			4			1						
			<=8							1		
			8				2					
			16				2			3		

ESBL Genes	AMPC Genes	CARBA Genes	AM substance	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
			ECOFF	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
			Lowest limit	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
			Highest limit	**16**	**16**	**64**	**512**	**32**	**8**	**16**
			N of tested isolates	**4**	**4**	**4**	**4**	**4**	**4**	**4**
			N of resistant isolates	**0**	**0**	**4**	**4**	**4**	**4**	**4**
Not Available	Not Available	Not Available	**MIC**							
			<=0.03		4					
			<=0.5	4						
			1						4	
			16							3
			>16							1
			32					3		
			>32					1		
			64			3				
			>64			1				
			512				3			
			>512				1			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:United Kingdom (Northern Ireland)

Sampling Details:N_A

ESBL Genes	AMPC Genes	CARBA Genes	MIC	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin
				ECOFF	4	8	16	0.5	2	16	0.064	2
				Lowest limit	4	1	2	0.25	0.25	8	0.015	1
				Highest limit	128	32	64	4	6	64	8	16
				N of tested isolates	2	2	2	2	2	2	2	2
				N of resistant isolates	0	0	0	0	0	0	0	0
Not Available	Not Available	Not Available	0.03								2	
			<=0.25					2	1			
			0.5						1			
			<=1			2						2
			<=4		2							
			<=8							2		
			8				2					

ESBL Genes	AMPC Genes	CARBA Genes	MIC	AM substance	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
				ECOFF	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
				Lowest limit	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
				Highest limit	**16**	**16**	**64**	**512**	**32**	**8**	**16**
				N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**
			MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Not Available	Not Available	Not Available	<=0.03			2					
			<=0.25							2	1
			<=0.5		2						
			0.5								1
			<=2						2		
			<=4				2				
			64					2			

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:United Kingdom (Northern Ireland)

Sampling Details:N_A

ESBL Genes	AMPC Genes	CARBA Genes	MIC	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin
				ECOFF	4	8	16	0.5	2	16	0.064	2
				Lowest limit	4	1	2	0.25	0.25	8	0.015	1
				Highest limit	128	32	64	4	6	64	8	16
				N of tested isolates	1	1	1	1	1	1	1	1
				N of resistant isolates	0	0	0	0	0	0	0	0
Not Available	Not Available	Not Available	<=0.015								1	
			<=0.25					1				
			0.5						1			
			<=1			1						1
			<=4		1							
			<=8							1		
			8				1					

ESBL Genes	AMPC Genes	CARBA Genes	AM substance	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
			ECOFF	**2**	**0.125**	**8**	**256**	**8**	**0.5**	**2**
			Lowest limit	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
			Highest limit	**16**	**16**	**64**	**512**	**32**	**8**	**16**
			N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**
			N of resistant isolates	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Not Available	Not Available	Not Available	**MIC**							
			<=0.03		1					
			<=0.25						1	1
			<=0.5	1						
			<=2					1		
			<=4			1				
			128				1			

ANTIMICROBIAL RESISTANCE TABLES FOR ESCHERICHIA COLI

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:United Kingdom (Northern Ireland)

Sampling Details:N_A

ESBL Genes	AMPC Genes	CARBA Genes	MIC	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin
				ECOFF	**8**	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**
				Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**
				Highest limit	**128**	**32**	**64**	**4**	**6**	**64**	**8**	**16**
				N of tested isolates	**170**	**170**	**170**	**170**	**170**	**170**	**170**	**170**
				N of resistant isolates	**0**	**52**	**0**	**0**	**0**	**6**	**24**	**0**
Not Available	Not Available	Not Available	<=0.015								142	
			0.03								4	
			0.125								11	
			<=0.25					170	167			
			0.25								13	
			0.5						3			
			<=1			17						170
			<=2				21					
			2			60						
			<=4		166							
			4			38	72					
			<=8							163		
			8		4	3	74					

ESBL Genes	AMPC Genes	CARBA Genes	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin
			ECOFF	**8**	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**
			Lowest limit	**4**	**1**	**2**	**0.25**	**0.25**	**8**	**0.015**	**1**
			Highest limit	**128**	**32**	**64**	**4**	**6**	**64**	**8**	**16**
			N of tested isolates	**170**	**170**	**170**	**170**	**170**	**170**	**170**	**170**
			MIC N of resistant isolates	**0**	**52**	**0**	**0**	**0**	**6**	**24**	**0**
Not Available	Not Available	Not Available	16			3			1		
			32		16						
			>32		36						
			64						5		
			>64						1		

ESBL Genes	AMPC Genes	CARBA Genes	MIC	AM substance	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
				ECOFF	**2**	**0.125**	**8**	**64**	**8**	**0.5**	**2**
				Lowest limit	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
				Highest limit	**16**	**16**	**64**	**512**	**32**	**8**	**16**
				N of tested isolates	**170**	**170**	**170**	**170**	**170**	**170**	**170**
Not Available	Not Available	Not Available		**N of resistant isolates**	**2**	**0**	**24**	**32**	**30**	**0**	**22**
			<=0.03			170					
			<=0.25							155	91
			<=0.5		136						
			0.5							15	50
			1		29						7
			<=2						139		
			2		3						
			<=4				146				
			4						1		1
			<=8					87			
			15					1			
			16		2			38			15
			>16								6
			32				2	8	25		
			>32						5		
			64				21	4			
			>64				1				
			512					24			
			>512					8			

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country Of Origin:United Kingdom (Northern Ireland)

Sampling Details:N_A

ESBL Genes	AMPC Genes	CARBA Genes	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**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**128**
			N of tested isolates	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
			N of resistant isolates	**4**	**5**	**2**	**2**	**5**	**2**	**0**	**0**	**0**	**0**
Not Available	Not Available	Not Available	**MIC**										
			<=0.015							3			
			<=0.03									5	
			0.03							1			
			<=0.064			3							
			0.064							1			
			<=0.125						2		4		
			0.125	1									
			0.25	1					1		1		
			0.5	1									
			1					1					
			2		2	1		1					
			4				2		1				2

ESBL Genes	AMPC Genes	CARBA Genes	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**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**128**
				N of tested isolates	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
				N of resistant isolates	**4**	**5**	**2**	**2**	**5**	**2**	**0**	**0**	**0**	**0**
Not Available	Not Available	Not Available	8		2	1	1	1	1	1				2
			16						2					1
			32					1						
			64			2								
			>64					1						

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country Of Origin:United Kingdom (Northern Ireland)

Sampling Details:N_A

ESBL Genes	AMPC Genes	CARBA Genes	MIC	AM substance	Amikacin	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin
				ECOFF	8	8	16	0.25	0.5	16	0.064	2
				Lowest limit	4	1	2	0.25	0.25	8	0.015	1
				Highest limit	128	32	64	4	8	64	8	16
				N of tested isolates	5	5	5	5	5	5	5	5
				N of resistant isolates	0	5	0	5	5	2	0	0
Not Available	Not Available	Not Available	<=0.015								4	
			0.03								1	
			<=1									5
			1						1			
			<=2				2					
			2					1	1			
			<=4	5								
			4				3	1				
			>4					3				
			<=8							3		
			8						2			
			>8						1			
			32							1		
			>32			5						
			>64							1		

ESBL Genes	AMPC Genes	CARBA Genes	MIC	AM substance	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
				ECOFF	**2**	**0.125**	**8**	**64**	**8**	**0.5**	**2**
				Lowest limit	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
				Highest limit	**16**	**16**	**64**	**512**	**32**	**8**	**16**
				N of tested isolates	**5**	**5**	**5**	**5**	**5**	**5**	**5**
			MIC	**N of resistant isolates**	**0**	**0**	**0**	**4**	**2**	**0**	**2**
Not Available	Not Available	Not Available		<=0.03		5					
				<=0.25						5	2
				<=0.5	3						
				0.5							1
				1	2						
				<=2					3		
				<=4			5				
				16				1			
				>16							2
				32					1		
				>32					1		
				>512				4			

OTHER ANTIMICROBIAL RESISTANCE TABLES

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

Programme Code	Matrix Detailed	Zoonotic Agent Detailed	Sampling Strategy	Sampling Stage	Sampling Details	Sampling Context	Sampler	Sample Type	Sampling Unit Type	Sample Origin	Comment	Total Units Tested	Total Units Positive
AMR MON	Turkeys - fattening flocks	Campylobacter jejuni	Census	Slaughterhouse	N_A	Control and eradication programmes	Official sampling	animal sample - caecum	herd/flock	United Kingdom (Northern Ireland)	N_A	169	0
		Escherichia coli, non-pathogenic, unspecified	Census	Slaughterhouse	N_A	Control and eradication programmes	Official sampling	animal sample - caecum	herd/flock	United Kingdom (Northern Ireland)	N_A	207	0
	Turkeys - fattening flocks - before slaughter	Salmonella	Census	Farm	N_A	Control and eradication programmes	Official sampling	environmental sample	herd/flock	United Kingdom (Northern Ireland)	N_A	166	0

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

Latest Transmission set

Table Name	Last submitted dataset transmission date
Antimicrobial Resistance	25-Jul-2023
Esbl	17-Jan-2024
Animal Population	25-Jul-2023
Disease Status	17-Jan-2024
Food Borne Outbreaks	17-Aug-2023
Prevalence	17-Jan-2024

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 2022

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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

https://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 2022 | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk)**

No data/information for NI deer populations as not collected on APHIS nor reported on the Agricultural Census Report. Registration for deer herd's is voluntary on APHIS and so any population data reported in this report for farmed deer is approximate, and the only data we have available at this time

Chicken and turkey flock numbers have been calculated from data collected as part of the Northern Ireland *Salmonella* National Control Plan in 2022.

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.
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* as a zoonotic agent**

M. tuberculosis is the main causative agent of tuberculosis in humans but human infection with *M. bovis* is clinically indistinguishable from disease caused by *M. tuberculosis*. Zoonotic transmission of MTBC 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 (skin) 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 the level of 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 tuberculosis 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 for control of *M. bovis* in animals is the Department of Agriculture, Environment and Rural Affairs (DAERA).

Cattle and badgers are considered to be the main maintenance hosts for *M. bovis* in Northern Ireland and it is currently considered to be endemic in both. MTBC infection can occur and has also been reported in many other species, but these are mainly regarded as “spill over” or “dead end” hosts when they do occur. Sporadic cases are reported in non-bovines in Northern Ireland mainly in alpacas and 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 public 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 2022 there were 68 human confirmed tuberculosis cases diagnosed in Northern Ireland. One of these cases was confirmed to be *M. bovis*.

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,
2019-2021: 3.2 cases per 100,000,
2020-2022: 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)]

M. bovis infection is a notifiable disease in Northern Ireland (NI) and as such, all suspected or confirmed case in any species must be reported to DAERA. DAERA will liaise with the Public Health Agency (PHA) if there is considered to be a significant risk of spread between humans and animals.

There is a very comprehensive programme of MTBC monitoring and surveillance in cattle. This is backed up by additional controls on meat and milk. The key points are summarised below.

TB Monitoring, Surveillance and Control In Cattle (see Section 5 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 whole TB Programme and facilitates application and enforcement of movement restrictions and tracing to and from infected holdings.

There is a very comprehensive TB Eradication Programme in place for cattle. This plan is centred around the use of the CITT (Comparative Intradermal Tuberculin Test) 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 mostly used in parallel with the CITT in confirmed breakdown herds, however, a decoupled test has been used in a number of cases during 2022. The aim of its use is to increase the detection of infected animals, particularly those in the earlier stages of infection. The use of the IFNG test has to date been voluntary in Northern Ireland. During 2021 the rules were tightened so that although the IFNG test itself requires the agreement of the herd keeper, removal of any positive animals is now mandatory irrespective of CITT ("skin test") results.

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

When LRS animals are detected, samples are taken for laboratory analysis. If either histology or culture yields a positive result for *M. bovis* the case is regarded as confirmed.

There is a comprehensive system of breakdown management for all breakdown herds. All outbreaks are managed by a DAERA employed veterinary surgeon. The aim of this breakdown management is to eradicate infection, prevent further spread and identify possible sources. 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 restoration of OTF status have been met. Tracing of animal movements is carried out from all confirmed breakdown herds.

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 from ingestion via 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 NI is collected directly from farms and then pasteurised at an approved processing plant. The pasteurising process is deemed adequate to eliminate any risk from *M. bovis*. In addition, producers are not permitted to include milk from TB reactors or inconclusives in the bulk tank.

A very small number of milk producers are also registered to sell "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 MTBC in Northern Ireland. The TB Programme is currently based on “test and slaughter” with a comprehensive system of movement restrictions and tracing. All confirmed outbreaks are subject to veterinary epidemiological investigation. A TB Eradication Plan (EP) was approved by the EU Commission for Northern Ireland in 2022 which has a span of 6 years until the next approval is required not withstanding some 6-monthly and annual reporting which must be carried out. (Further details of cattle controls are given in **Section 5.)**

In badgers

A passive surveillance programme is in place to monitor levels of *M. bovis* infection in NI badgers. No badger intervention or vaccination took place in 2022.

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,

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 2022 statistics for *M. bovis* in cattle

At the end of 2022, the annual herd incidence in Northern Ireland was 10.20% and the annual animal incidence was 0.934 %, (see **44.4** for definitions).

Animals lesioned at routine slaughter.

Excluding animals imported directly for slaughter 2,938 LRS (lesioned at routine slaughter; confirmed and non-confirmed) animals were detected in NI up to the end of 2022. Of these, 1,991 were confirmed LRS. This is equivalent to approximately 6.051 LRS animals per 1,000 routinely slaughtered animals (4.100 confirmed LRS per 1,000 routinely slaughtered animals). This compares with a figure of 2,387 in 2021 and a figure of 2,270 in 2020. The 5-year trend for LRS animals continues to be upward. Up to the end of 2022 LRS suspects- (confirmed and unconfirmed) resulted in 798 herds having TB 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, 2021 and 2022.

Animals as a source of infection for humans

Surveillance is awaiting information – no data currently available.

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)]

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 whole TB Programme and facilitates application and enforcement of movement restrictions and tracing to and from infected holdings.

"Test and slaughter"

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

Skin testing

The key component of the testing programme is the CITT (**C**omparative **I**ntradermal **T**uberculin **T**est) commonly known as the "skin test." 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 confirmed outbreak are placed on a programme of 6 monthly testing, increased recently from 5 monthly testing.

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

IFNG Testing

The Interferon Gamma (IFNG) blood test is also used in some circumstances, usually in parallel with the CITT in selected confirmed breakdown herds. 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 in Northern Ireland. During 2021 the rules were tightened so that although the IFNG test itself requires the agreement of the herd keeper, removal of any positive animals is now mandatory irrespective of CITT ("skin test") 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. This slaughterhouse surveillance provides an important additional means of detection of infection. When suspect lesions are detected in non-reactor animal samples are taken for laboratory confirmation and tracing is carried out. The herd of origin is restricted pending the outcome of further testing.

Laboratory testing

All laboratory testing services (histology, culture, IFNG testing and strain typing) are carried out by the Agri-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 are positive on subsequent laboratory testing.

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 MTBC is not available or permitted in Northern Ireland.

When TB 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:

- 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.
- Partial or whole herd depopulations are occasionally actioned subject to comprehensive veterinary risk assessment.

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 TB.

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

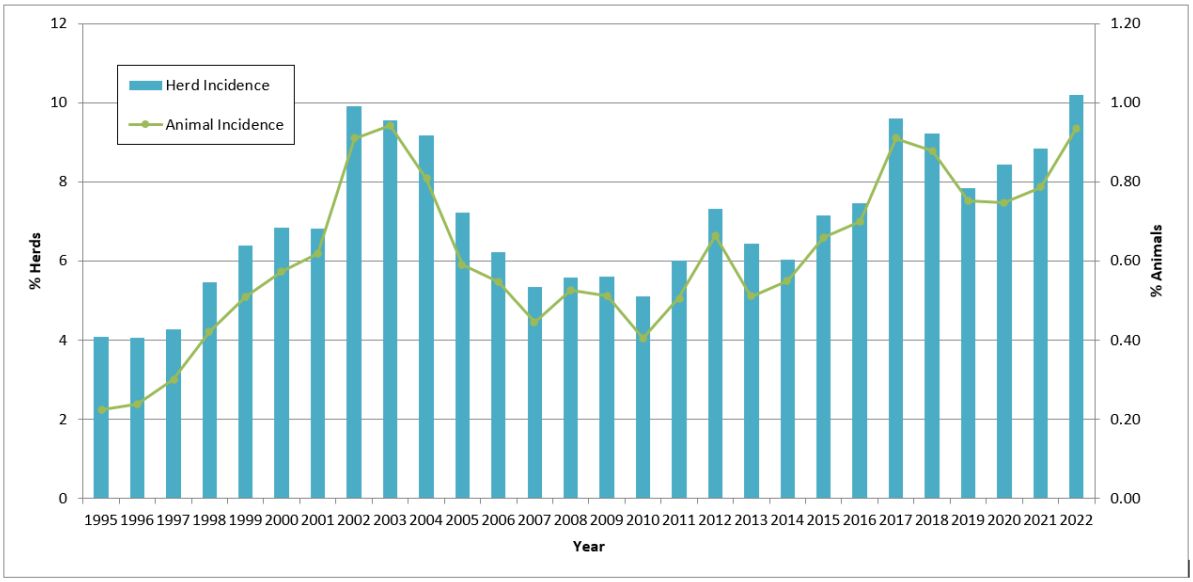
Key statistics for 2022

- **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 2022, the annual herd incidence in Northern Ireland was 10.20% and the annual animal incidence was 0.934 %.

Herd incidence fluctuates 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, 2021 and 2022.



Other summary statistics for 2022

- A total of 3,579,026 individual CITTs were carried out in NI with 1,853,339 cattle tested from 22,098 herds.
- 17,319 animals were identified as CITT reactors and a further 912 animals were removed as “negative in contacts”.
- During 2022, 22,894 IFNG tests were carried out in parallel with a skin test of which 1,673 CITT negative animals yielded a positive IFNG result. These 1,673 were removed on the basis of the positive IFNG result. Of the animals removed solely on the basis of positive IFNG results 8.00 % (134 animals) had visible TB-like lesions detected at slaughter. IFNG testing was also conducted in particular cases in the absence of a CITT in order to detect early infection with bTB. Where the test was carried out after an initial CITT, a period of at least 14 days was allowed before conduction the IFNG test. In 2022 there were 3,907 animals tested using the decoupled IFNG method of which 13% (512 animals) were detected as IFNG positive, with 17% (86 animals) of these positive cases showing lesions at slaughter. In total this meant during 2022, 26,801 animals were tested using the IFNG test, detecting a total of 2,185 positive animals, all of which were removed to slaughter.

- 2,938 animals were found to have suspect lesions at “routine slaughter” (LRS) detected in NI up to the end of 2022 (these figures exclude animals imported into NI for direct slaughter). This equates to approx. 4.09 LRS animals per 1,000 animals slaughtered. The laboratory confirmation rate of these LRS animals was 67.8%. (515 herds). Of the herds initially restricted due to an LRS, 201 herds had at least one CITT reactor in follow up herd testing. This underlines the vital 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-2022

Animals as a source of infection for human cases

This demonstrates that the robust controls in place are protecting human health.

5.5 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).

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 (RTC). 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 M. bovis is confirmed then "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.

The results of the RTC survey provide an estimated annual M. bovis prevalence in badgers in Northern Ireland since 1988.

6.2 Measures in place [(b)]

No badger intervention (culling or vaccination) was carried out in Northern Ireland in 2022.

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 2022, 411 suitable badger carcases were collected for testing. Of the results 302 badgers were negative and 109 were *M. bovis* positive to the end of the year which equates to 26.5% of badgers tested.

For the previous 5-year period for which full data is available (2017-2021 inclusive) 16.8% of collected RTC badgers were confirmed with *M. bovis*. There has been considerable fluctuation from year to year with confirmation levels remaining consistently between 13% and 20%, however, a larger increase can be observed in the figures from 2022 (26.5%; 95% confidence intervals 22.2-30.8%).

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 NI in non-bovines most commonly alpacas. Keepers of alpacas and deer are required to register with DAERA and are issued with a holding number.

Currently there is no legislation in place in NI 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 a recently established commercial deer abattoir in Northern Ireland that operates during the months of October and November, while previously deer had been exported to England for slaughter. When suspect MTBC lesions are detected at slaughter this information is relayed to DAERA for follow up investigation.

7.2 Measures in place [(b)]

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 2022 there was 1 case of suspected *M. bovis* reported by AFBI in an alpaca submitted for post-mortem after a short illness and *M. bovis* was subsequently confirmed in samples taken from the alpaca.

A number of cases of *M. bovis* was also confirmed by AFBI in sheep in 2022. The reasons for case submission ranged from findings at slaughter, to sudden death and positive CITT reactions to non-routine follow up TB breakdown testing. There were 17 samples from 6 cases submitted to AFBI during the year and of these 5 samples from 3 different cases were positive for *M. bovis*.

During 2022, cases of *M. bovis* were found among deer slaughtered at the end of the year between October and November in a newly established commercial deer abattoir in Northern Ireland. There were 9 samples submitted to AFBI for analysis of which 8 samples showed positive for *M. bovis* and

1 inconclusive was found. When strain typing was carried out 7 samples were found to be of a local Northern Ireland strain type of *M. bovis* while 1 strain type was found to have originated in the Republic of Ireland. One of the establishments had an associated cattle herd already under restriction due to a TB breakdown when the positive deer cases were found, and the herd keeper was advised to separate the two different herds.

Unusually, 2 separate suspected cases of TB in pigs were submitted to AFBI for testing. One case had been imported from ROI for direct slaughter and ROI were notified of this following a positive culture result. The second sample submitted was from a pig in NI which cultured negative and showed an alternative diagnosis of actinobacillosis on histology.

No human cases of MTBC were attributed to likely animal sources by PHA during 2022.

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 2022, 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 2022. No cases of *B. ovis* and *B. suis* were detected during 2022.

*** 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 to DAERA 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 animal(s).

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 2022. 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 2022. 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 2022. 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 2022. 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 2022, 385 were collected and tested in Northern Ireland. Of the total 385 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 2022, 385 were collected and tested in Northern Ireland. Of the total 385 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 2022, there were 31 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 9 incidents reported in cattle (includes 6 that involved diagnosis in foetal samples) and 22 incidents (includes 12 that involved diagnosis in foetal samples) in sheep. There were no incidents reported in pigs or goats. This compared with 13 incidents reported in cattle and 35 reported in sheep in 2021. There were 3 incidents reported in cattle and 16 reported in sheep 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).

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 2022 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 2022, a total of 307 sera were received (297 from sheep, 5 from cattle, 2 from pigs and 3 from alpacas). 138 sheep samples were positive (46%), 4 cattle samples were positive and one alpaca sample was positive.

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 2022, the number of animal cases found via clinical surveillance in Northern Ireland was 142 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 2021, the number of animal cases found via clinical surveillance in NI was 120. In 2020, the number of animal cases found via clinical surveillance in in Northern Ireland was 102. During 2019, there were 131 cases of yersiniosis reported in Northern Ireland In 2018, 92 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 2022, the number of animal cases found via clinical surveillance in Northern Ireland was 142 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 2021, the number of animal cases found via clinical surveillance in Northern Ireland was 120

In 2020, the number of animal cases found via clinical surveillance in Northern Ireland was 102 In 2019, 131 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 Northern Ireland, 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 Northern Ireland either in the UK or in other countries that have received meat and meat products from Northern Ireland since 1975. Overall, there were no laboratory-confirmed cases of Trichinellosis between 1987 and 1999 in the UK.
Animals: 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

During 2022 a total of 1,898,894 muscle samples were tested in laboratories designated by the Food Standards Agency (FSA) in Northern Ireland in accordance with the derogation provided in Article 40 of Regulation (EU) 2017/625. All were negative.
In NI in 2022 1203 muscle samples from domestic swine were examined for Trichinella spp as part of a surveillance scheme funded by FSA, all were negative.
A survey of Trichinella in wildlife is carried out for the FSA. In total, 302 fox samples were examined during 2022 and all were negative for Trichinella spp.
These statistics are comparable to those for 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

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 an approved slaughterhouse for human consumption and feral wild boar processed in an Approved Game Handling Establishment.

Testing of samples in Northern Ireland is undertaken at designated official control laboratories either in the slaughterhouse or at a dedicated laboratory site. All official control laboratories involved in Trichinella testing take part in a laboratory quality assurance programme organised by the UK National Reference Laboratory. In addition, all official control laboratories are audited on a two year cycle.

The National Reference Laboratory (NRL) for Trichinella in Northern Ireland is located at the Department of Agriculture, Food and the Marine (DAFM) facility at Backweston in the Republic of Ireland.

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. Northern Ireland has been officially recognised by the EU as a country which may apply the derogation available which exempts pigs from holdings applying controlled housing conditions from testing. However, during 2022, all domestic swine presented for slaughter for human consumption were tested.

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 Northern Ireland.

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.

There is a contingency plan in place in the event of a positive or inconclusive test result which includes the roles and responsibilities of key organisations and people. This forms an annex to the Manual for Official Controls used by operational staff. Full details below.

Day 1 – Trichinella suspected by either “on” or “off site” laboratories

1. The lab manager will immediately inform the Official Veterinarian (OV) at the relevant slaughterhouse of the suspected positive result.
2. The OV will detain all carcases from the pooled sample (including any carcases from the pooled sample that may have been despatched to other approved establishments under specific warm meat authorisations) and will immediately inform the regional DAERA D/SVO who will in turn, immediately inform the Food Standards Agency in Northern Ireland (FSA in NI) by contacting [insert contact number] and NIOperationalpolicy@food.gov.uk
3. The OV will also detain all parts of carcases and batches of offals containing striated muscle which have originated from the pigs making up the positive/inconclusive pooled sample.
4. The FSA in NI will advise on the procedure for the collection and despatch of further samples to the Northern Ireland National Reference Laboratory (NI NRL) which is located at DAFM Laboratories, Backweston, Cellbridge, Co Kildare, W23 X3PH for re-test, and if there are any additional instructions to be followed.

   NB: In the unlikely event that traceability of a suspected positive result cannot be established with certainty, all of the susceptible animals slaughtered on the day that the

sample was taken will be detained by the OV.

5. The FSA in NI will also immediately inform FSA Meat Hygiene Policy Division
6. The OV will re-sample all detained carcases following the instructions in Ch 2.4, Section 5 of the Manual for Official Controls (MOC).
7. These re-samples should be 2 x 20g samples, individually identified and bagged, so that the second (5 animal x 20g) pooled digests and then the third (individual 20g) digests can be tested without the need to go back to re-sample carcases a third time.
8. Both sets of re-samples should be sent to the NI NRL for confirmatory analysis. The second set of re-samples will be analysed at the NI NRL as a pooled sample and if Trichinella is confirmed, the third set of re-samples will be analysed on an individual basis.
9. At this stage the OV should commence the traceability exercise to determine the origin of all the detained carcases associated with the suspected positive result. The OV should be able to establish the names and addresses of all farms from which the detained pigs originated from FBO records and movement documentation.

Day 2 – Trichinella confirmed by National Reference Laboratory (NRL)

1. On confirmation of a positive result, the NI NRL will inform the OV at the slaughterhouse and FSA in NI via phone and confirm via email using the contact details below.

- Head of Operational Policy & Delivery – Elvira.Diez@food.gov.uk – 07799 476515
- Trichinella Policy Lead: – Billy.Armstrong@food.gov.uk – 07773 644312
- Operational Policy & Delivery: NIOperationalpolicy@food.gov.uk

2. If further re-sampling is required for any reason, the OV will follow the specific instructions issued by the NI NRL where necessary. The OV will email traceability information to DAERA D/SVO and FSA in NI using the email addresses above.
3. While awaiting the result of the individual samples as part of the third test, Meat Hygiene Policy Division will convene an urgent meeting involving

- FSA representatives from the Incidents, Legal and Communications Divisions
- the DAERA D/SVO
- the OV and
- FSA in NI

4. The three main aims of the meeting will be:

a) to consider, decide and instruct if appropriate, on the imposition of movement restrictions (see annex 6 of the UK contingency plan);
b) to consider, decide and instigate, if appropriate, the possible withdrawal and recall of meat and
c) to consider, decide, and instigate the epidemiological investigation on the farm(s) of origin with the principle objective of establishing;

i. previous supply of pigs eg up to a week before, especially if the supply was to a different slaughterhouse where there is no Trichinella testing;

ii. if all positive carcases in a pool from the third testing stage (i.e. 5 carcases) are adult pigs, it is probable that they will have originated from different farms. If this is the case, the farm investigation will need to wait until the result of the third examination which will show which carcase(s) is/are infected and the farm(s) of origin.

Day 3 – Trichinella Confirmed in an Individual Carcase by the NRL

1. The NI NRL will communicate the test result of the third diagnosis directly to FSA in NI by phone and email, and arrange for any positive samples to be analysed for species identification.
2. Instructions in point 3 and 4 of Day 2 will apply if they have not already been implemented.
3. Food Safety - Meat Hygiene Policy Division will inform the Commission of the findings, the origin of the positive sample(s) and the control measures in place (see annex 4 of the UK contingency plan).
4. A series of Questions and Answers on Trichinella will be sent to FSA Communications Division and placed on the FSA's website, together with updates on the situation and links to relevant websites (see annex 5 of the UK contingency plan).
5. The farm(s) level investigation will be carried out by DAERA with any further actions dependent on their preliminary findings. Two scenarios are envisaged:

a) If only adult pigs are/were sent from the suspected farm(s), no conditions of movement restriction will be imposed as all adult pigs in the UK are tested for Trichinella;

b) If fattening pigs were sent for slaughter the previous week or are intended to be sent then:

i. movement restrictions on the farm will be considered. Pigs will only be released if permitted by the DAERA officer or; where subsequent batches of live animals are sent to slaughterhouses where Trichinella testing is carried out and the animal(s) are accompanied with appropriate Food Chain Information (see annex 7 of the UK contingency plan);

ii. DAERA D/SVO will investigate whether or not previous fattening pigs were tested for Trichinella. If the pigs were not tested, the identified carcases will be, as far as practicable, detained for testing while further investigation takes place. If meat from non-tested carcases has been placed on the market, the FSA in NI will determine the measures to be taken at retail and consumer level, including if a Food Alert for

Action or a Food Alert for Information is necessary.

On confirmation of the positive result the FSA in NI will instruct DAERA to dispose of the positive carcase(s) and its body parts as a Category 2 Animal by-product.

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.

Additional information

Adult pigs (sows and boars) are not routinely slaughtered in Northern Ireland, arrangements are in place for the transfer of information where a positive or inconclusive test result is reported in a sample where the animal originated in Northern Ireland.

All domestic swine originating from countries and/or regions not operating under controlled housing conditions are routinely sampled and tested for Trichinella. There is a system in place for the transfer of information where a positive or inconclusive test result is reported in a sample where the animal originated in one of those countries and/or regions. During 2022 a total of 384,817 domestic swine originating from the Republic of Ireland were routinely sampled and tested in official control laboratories. All results were negative.

Wildlife surveillance

In Northern Ireland a total of 302 foxes were tested for Trichinella during 2022 as part of a wildlife survey funded by FSA. These were all negative.

*** 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.

There are no slaughterhouses approved for the slaughter of horses in Northern Ireland.

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)

There are no slaughterhouses approved for the slaughter of horses in Northern Ireland.

*** 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 2022, there were 45 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 in 2022 Campylobacter was isolated from 12 submissions of sheep foeti/abortions and 1 submission of bovine foeti/abortions.

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.

Operators of approved poultry slaughterhouses have continued to take samples from broilers in compliance with Article 4 and Annex I Chapter II of Regulation (EC) 2073/2005 for testing against the Campylobacter spp process hygiene criteria 2.1.9.
During 2022 a total of 550 neck skin samples were taken post chilling. There were 41 unsatisfactory results of >1,000cfu/g. Where necessary, action plans were instigated by the food business operator to address the unsatisfactory results. These were monitored to completion by the competent authority.

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 34% of all non-typhoidal *Salmonellae* reported in people in Northern Ireland in 2022. In addition to these, *S*. Infantis was the most common serovar with 14 cases whilst *S*. Virchow and *S*. Mbandaka both had five cases. There were 30 other serovars which had between one and three cases reported. Overall numbers have increased to similar levels experienced prior to the pandemic (168 cases)

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, although this can vary based on the serovar.

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 117 isolations of *Salmonella* in 2022 from animals and poultry (as covered by statutory reporting requirements in Northern Ireland) which represents an increase of 11.4% compared with 2021 (105 isolations). These were 14 isolations from chickens, 1 from a pigeon, 68 from cattle, 12 from pigs and 20 from sheep.

Relative to 2021, there were more isolations from cattle (68 vs. 62 isolations), pigs (12 vs. 5 isolations) and sheep (20 vs. 17 isolations); there was also one isolation from a pigeon compared with none during 2021 and two isolations from dogs compared with none during 2021. In contrast, there were fewer isolations from chickens (14 vs. 20 isolations); there were no isolations from ducks, compared with one during 2021. 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 2021 there were twice as many isolations of *S*. enterica, subspecies diarizonae (20 vs. 10 isolations) and four times as many of *S*. Infantis (4 vs. 0 isolations). Isolations of *S.* Typhimurium increased (12 vs. 5 isolations) as did the number of *S*. typhimurium monophasic isolations (5 vs 1). Also, there were more isolations of *S*. Dublin (57 vs. 52 isolations). In contrast, there were fewer isolations of *S*. Mbandaka (6 vs. 7 isolations) and

fewer isolations of both *S*. Newport (3 vs. 4 isolations). In addition, there were 0 isolations of *S*. Enteritidis in 2022 compared to 1 in 2021 and 0 isolations of *S.*Muenster compared to 3 in 2021.

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 2022.

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. No positives were identified in 2022.

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 2021 and 2022, this extended testing interval (at the discretion of the Competent Authority) and the reduced official sampling frequency have been applied in Northern Ireland in 2022. 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 2022. 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 Infantis was the most frequently isolated *Salmonella* from broiler chicken flocks in 2022. No regulated serovars were identified from Northern Ireland broiler chicken flocks sampled under the *Salmonella* NCP during 2022. 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 isolations of *Salmonella* Livingstone and two isolations *S.* enterica, subspecies diarizonae were isolated in laying chicken flocks in Northern Ireland in 2022. No regulated serovars were identified from Northern Ireland laying chicken flocks sampled under the *Salmonella* NCP during 2022. 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 2022 and none during 2021.

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 2022.

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 2022.

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 was one isolation of *Salmonella* in pigeons from Northern Ireland in 2022. This isolation was *Salmonella* Typhimurium

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 remained the most commonly isolated serovar from pigs in Northern Ireland in 2022.**

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 2022

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 2022

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 2022.

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 2022.

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.

46.4. 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 2022.

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 2022. 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 Competent Authority verifies the correct implementation by food business operators of points 2.1.3, 2.1.4 and 2.1.5 of Chapter 2 of Annex I of Regulation (EC) No 2073/2005 by collecting all information on the total number and the number of *Salmonella* – positive samples taken by food business operators. This verifies the correct implementation by food business operators of the process hygiene criterion for *Salmonella* on carcases of pigs, cattle and sheep after dressing but before chilling, and on carcases of broilers and turkeys after chilling in compliance with Article 35 of Regulation (EU) 2019/627.

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.

No isolations of *Salmonella* in feed were reported from official samples in Northern Ireland in 2022.

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.

In addition, where there are human cases in N. Ireland related to a national (or international) food-borne outbreak where the UK Health Security Agency (UKHSA) are taking the lead, staff from PHA would attend related incident management team meetings. This would also apply to outbreaks suspected to originate in the Republic of Ireland where the PHA would liaise with their counterparts in the Health Protection Surveillance Centre in Dublin.

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

In 2022 there were no food-borne outbreaks identified in N. Ireland that related to a local source. There were, however, a number of cases in N. Ireland related to international outbreaks where the response was led by UKHSA.

These included:

- Salmonella Typhimurium identified in a chocolate product manufactured in Europe with only one confirmed case in N. Ireland.
- A suspected outbreak of STEC O157 with links identified by whole genome sequencing to both national and international case. There were 15 related cases in N. Ireland. No food samples tested positive for the outbreak strain but outbreak was suspected to be related to salad leaves.

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

The Food Standard Agency-in 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 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.

It has been agreed by both organisations that the FSA won't be involved in BCP sampling and that DAERA are leading in this area.

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

Northern Ireland has a One health control plan for AMR. 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.

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 Windsor Framework 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 Food Standards Agency in NI is completing 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. This has impacted on sampling of zoonoses data for 2022. Tenders for the sampling, analysis and reporting of Northern Ireland AMR retail data for the period 2023-2027 are due to close mid to end July 2023. We would expect that contracts can be awarded in August 2023 and would then anticipate sampling to commence from September 2023.

DAERA has completed abattoir sampling for 2022.and is continuing to progress AMR monitoring at Border Control Post (BCPs). Due to resource challenges in testing and sampling capability BCP sampling has been delayed until the fourth quarter of 2023.

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, 7/24 (29%) were resistance to fluoroquinolones (ciprofloxacin); 2/24 (8%) isolates were resistant to macrolides (erythromycin).
- 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-2021

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 broilers, indicator E. coli

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

Caecal contents from healthy broilers at slaughter 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 a pooled caecal sample from ten broilers from a single randomised flock on the nominated day by meat inspection staff.
Sampling of turkeys was not required as NI domestic production was less than 10,000 tonnes in the previous year.

53.2 Stratification procedure per animal population and food category

Stratification was performed in accordance with Decision 2020/1729/EU and EFSA guidelines. Samples were collected from a NI poultry slaughter plant processing more than 60% of NI domestic broiler throughput in the previous year.

53.3 Randomisation procedure per animal population and food category

Randomisation was performed in accordance with Decision 2020/1729/EU and EFSA guidelines. 299 isolates were recovered from 308 caeca. In accordance with EFSA's guidelines, each eligible broiler (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)]

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).

53.6 **Results of investigation**

We detected 299 commensal E.coli out of the 308 broiler caeca we tested.
Microbiological resistance was not detected to colistin and gentamicin. None of the 299 isolates were resistant to cefotaxime or ceftazidime or meopenem

24/299 (8%) isolates were resistant to ciprofloxacin
29/299 (10%)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 broilers, indicator ESBLs , AmpC and CP-producing E. coli

54.1 General description of sampling design and strategy[a]

Caecal contents from healthy broilers at slaughter 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 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 a pooled caecal sample from ten broilers from a single randomised flock on the nominated day by meat inspection staff.

Sampling of turkeys 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 Decision 2020/1729/EU and EFSA guidelines**.** Samples were collected from a NI poultry slaughter plant processing more than 60% of NI domestic broiler 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. 5 isolates were recovered from 308 caecal samples. In accordance with EFSA's guidelines, each eligible (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 yielded growth of E.coli on the two agars selective for carbapenemase producing organisms.
However, we did isolate 5 organisms that were CTX resistant. These 5 isolates were put through both EUVSEC3 and EUVSEC2 sesititre plates.
3 were consistent with ESBL resistance and 2 were consistent with AmpC resistance**.**

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 broilers, Campylobacter jejuni & Campylobacter coli

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

Caecal contents from healthy broilers at slaughter were sampled for *Campylobacter jejuni & Campylobacter 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 a pooled caecal sample from ten broilers from a single randomised flock on the nominated day by meat inspection staff.

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

From the 308 samples, we isolated 288 Camplylobacter isolates.

168 were C. jejuni (58%) and 120 were C.coli(42%)

55.2 Stratification procedure per animal population and food category

Stratification was performed in accordance with Decision 2020/1729/EU and EFSA guidelines.

Samples were collected from a NI poultry slaughter plant processing more than 60% of NI domestic broiler 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 on the 308 to give 170 unique sample ID.

However, 16 of the samples had 2 separate species identified. These were included bringing the total numbers analysed for AMR to 186. From this 108 were C.jejuni and 78 were C.coli

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

MCCDA & Butzler 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.

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 3 of Decision 2020/1729/EU (the ECOFF applied is stated in brackets): erythromycin (>4 for jejuni, >8 for coli), ertapenem (NA), ciprofloxacin (>0.5), chloramphenicol (>16), gentamicin (>2), tetracycline (>1 for jejuni & >2 coli).

55.6 Library preparation used

55.7 Version of the predictive tool
55.8 Results of investigation
From the 170 Sample IDs investigated 16 had two separate species. Therefore, there was 186 Campylobacter isolates investigated for AMR. 108 C.Jejuni 58% 78 C.coli 42% 65 Campy isolates were ciprofloxacin resistant, 3 were gentamicin resistant and 16 were erythromycin
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*; NCP samples, Salmonella

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

Monitoring of *Salmonella Spp* in populations of broilers, laying hens and fattening turkeys obtained within the sampling framework of the national control programmes (NCP) provided for in Article 5 of Regulation (EC) No 2160/2003

56.2 Stratification procedure per animal population and food category

As the total *Salmonella* isolates from the NI NCP was less than 170 per poultry population all 10 eligible isolates were included ensuring that one isolate per *Salmonella* serovar per flock during the year were included in AMR monitoring.
in AMR

56.3 Randomisation procedure per animal population and food category

Randomisation was not required as there were only 10 isolates that were eligible for MIC testing.

56.4 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 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.

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 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).

56.6 Library preparation used

Not applicable

56.7 Version of the predictive tool

Not applicable

56.8 Results of investigation

For 2022 there were 27 samples that tested positive for Salmonella under the NCP framework, after removing duplicates there were 18. Once we had reduced to individual eligible samples we had 10 Salmonella isolates.
None of these were resistant to cefotxime, ceftazidime, meropenem or colistin.
1 isolate was resistant to ciprofloxacine and nalidixic acid and trimethoprim – S. Infantis

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